

**Project Management Leadership Progression: A
Conceptual Framework for Abu Dhabi**

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ABSTRACT

The government of Abu Dhabi made a decision to change the focus of the government from executer of the project to manager of projects in 2008. More and more work was sub-contracted and government departments just project managed the operations. Due to this change in focus the demand for project managers increased. Most of these project managers were not specially trained or educated in project management competencies. They primarily were employees from older operations who were reassigned for project management purposes. What has been realised now is that it is important to have a look at the competencies of these employees and make sure they are suitable to be project managers. In addition to them being suitable for project management positions, it is also important that there is a specific progression path and well defined expectations to be promoted to the next level. Therefore, there is a need to clearly identify the career path of a project manager from the inception of their careers until they retire. The path has to have identifiable objective points which could be used to decide if the project manager is ready to move to the next level. A framework is needed that can facilitate the progression of a project manager in their career paths in the Abu Dhabi government departments; and therefore, is the main aim of this thesis. In order to accomplish the aim, a mixed methods approach was taken. The Use of initial interviews established the context for Abu Dhabi. Use of statistical techniques such as multiple regression and mathematical technique of DEMATEL helped identify the career path from an entry level project coordinator position to a programme director position through the end of the career.

The major findings of this research in addition to the development of the framework are: 1) the career path of a project manager is quite linear; 2) it is not an add-on role but a career in

itself; 3) At the entry level of a project an individual should have high level of behavioural competencies; 4) There is a relationship between project success criteria and programme success factors; Since project success leads to programme success, this relationship could be used to establish the transition between a project manager and a programme manager's role. 5) The technical and contextual competencies of a project manager should be used to promote them during their time as project managers; and 7) Within the programme management there are some competencies that can be regarded as the cause group of competencies and others that could be regarded as the effect group of competencies.

There are several major implications of this work. First of all, the framework developed will act as a good starting point for all the government departments to establish their own project management progression framework which could be modified with their own discipline specific information. This research also establishes the importance of behavioural competencies for project management at the outset of the career itself. The framework also provides an objective way of assessing when an individual is ready to move to the next level of responsibilities within the organisation. This framework will further make the promotion process more transparent and the job of evaluating a promotion application easier.

Chapter I

Research Introduction

1.0 Introduction

How do professionals progress in their careers is an important question posed by researchers in different professions (Judge et al., 2010; Harris et al., 2014). A career is defined as “the sequence of a person’s work experience over his/her working life” (Harris et al., 2014). The way this definition and other similar definitions of career in the literature are phrased is that there is an implicit assumption that there is a path that an individual’s career follows (Inkson, 2004). Establishing that there is a path, also leads to the realisation that in a career path there are a series of moves and evolution of roles, responsibility, and expectations over time (Cappellen & Janssens, 2005). Since we talk about a path, then there is also an assumption that there is a direction of movement. Therefore, there is a progression that an individual experiences as they move ahead in their careers (Harris et al., 2012).

The increasing projectisation of activities and operations of organisations have led to the need to look at project management function in more depth (Pant & Baroudi, 2008). The role and the criticality of the project management function within organisations is widely acknowledged (Syndow et al., 2004), but despite this acknowledged importance of the role, the area of project manager role is under-researched (Holzle, 2010). As Holzle

(2010) indicates “an increasing number of organisations develop dynamic work environments through the use of temporary work forms such as projects and programmes. Yet the implications for employees working in these transient surroundings have only recently being brought to the attention of research and practice.” This has led to lots of randomness in career progression of project managers (Turner et al., 2008). Retaining employees in project manager roles for organisation has, thus, become a major challenge. As Pinto and Kharbanda (1997) put it, “few individuals grow up with the dream of one day becoming a project manager. It is neither a well-defined nor a well-understood career path within most modern organisations. The role is thrust upon people rather than being sought.” The lack of definition and understanding of the role and career path leads to high attrition rate among project managers (Ndhlovu & Weeks, 2013). Having a better understanding of what project managers do; what kinds of skills and competencies they should demonstrate; and how their career path should evolve, would be a very important step for the selection and development of an effective project manager who has the capability to deliver high quality outcomes within the stipulated budget and schedule (El-Sabaa, 2001).

Abu Dhabi has gone through a major transformation in the overall vision and this has resulted in projectisation of operations in the government departments. This has led to a large number of project managers who are recruited in these government departments. However, currently these project managers do not have a discipline specific framework that is used to help decide on their promotion and career progression. This thesis is a step in that direction. Following sections present more details about Abu Dhabi and the new

vision which has led to the need for this research. Following these sections on background, the aim, and objectives of the research are documented before discussing the contributions and structure of this thesis.

1.1 Introduction to Abu Dhabi

The name Abu Dhabi means “Father of Deer” and is the largest emirates of the seven member emirates of the United Arab Emirates. Abu Dhabi lies on a T-shaped island jutting into the Arabian Gulf from the central western coast. Abu Dhabi houses important offices of the federal government, and is the capital for the United Arab Emirates Government and the home for the Abu Dhabi Emiri Family and the President of the UAE. Today the city is the country's centre of political, industrial activities, and a major cultural, and commercial centre due to its position as the capital. Abu Dhabi alone generated 56.7% of the GDP of the United Arab Emirates in 2008.

According to the Abu Dhabi government website ([Abu Dhabi Government, 2015](#)), there are 99 government departments, state enterprises and other government run entities in Abu Dhabi. All of them employ people in project management and programme management roles. Therefore, it is important to have a competency framework that can be used to assess the competency of project managers and identify their training needs and development opportunities. This research will develop the competency framework that can facilitate the evaluation and future training needs assessment.

1.2 Changes in Abu Dhabi Vision and Need for this Research

This and the following four sections summarise the key elements of vision 2030 document of the Abu Dhabi government and establishes the need for this research.

Seeking to ensure the continued success of the Emirate's development, the Government of Abu Dhabi has set guidelines and priorities for the Emirate's socio-economic progress in its Policy Agenda. Taking these guidelines as its parameters, the Abu Dhabi Economic Vision 2030 has been developed by the government, in consultation with the private sector, as a 22-year strategy to achieve these aims and to ensure that all stakeholders in the economy are moving in concert, with a clear view of the long-term goals.

The Abu Dhabi Policy Agenda 2007/2008 defines the priorities for public policy in the Emirate. These priorities have been set to achieve what the Government of Abu Dhabi sees as its primary goals: a safe and secure society and a dynamic, open economy. The government has identified nine pillars that will form the architecture of the Emirate's social, political, and economic future:

- A large empowered private sector
- A sustainable knowledge-based economy
- An optimal, transparent regulatory environment
- A continuation of strong and diverse international relationships
- The optimisation of the Emirate's resources
- Premium education, healthcare and infrastructure assets
- Complete international and domestic security
- Maintaining Abu Dhabi's values, culture and heritage

- A significant and ongoing contribution to the Federation of the UAE

Having established these pillars, the government has committed itself to direct public policy to strengthen and develop them. This involves focusing on four key priority areas:

- Economic development
- Social and human resources development
- Infrastructure development and environmental sustainability
- Optimisation of government operations.

Next four sub-sections discuss the goal of these areas which the government anticipates will be implemented in the Abu Dhabi government as part of the new vision.

1.2.1 Economic Development

Economic diversification is common and fundamental to the government's other stated priority areas and the policy agenda as a whole. The government wishes to see the creation of higher-value employment opportunities, especially for nationals, and maxim participation of women in the workforce. To encourage investment and entrepreneurial activity, the government plans to contribute to enhancing the business environment through further legislative reform and by ensuring that all economic policy is formulated with reference to rigorous data sources and statistical information. Enhancing the economy and business climate will also help to integrate Abu Dhabi further into the global economy by attracting foreign, as well as local investment, and by facilitating the export of capital through targeted investments with international partners.

1.2.2 Social and Human Resources Development

According to the Policy Agenda, social and human development represents the pre-eminent objective and driving motivation behind all policies and initiatives. Ensuring that high quality education and health services are available to residents is, therefore, of the highest priority. When it comes to developing the workforce, the government aims to ensure the availability of a stable supply of high quality labour to staff the economy, and especially, to encourage full employment among nationals. At the same time, Abu Dhabi wishes to maintain an ethical and safe management of its labour resources, through the thorough implementation of federal labour laws and the meeting of commitments made through the UAE's signature of international labour arrangements.

1.2.3 Infrastructure Development and Environmental Sustainability

Developing appropriate the infrastructure, while preserving the environment, forms the third priority area. The government will ensure the development of a professionally designed and well-managed urban environment in the Emirate's towns and cities complete with world-class traffic and transport systems. The simultaneous development of the regions to keep pace with that of the Capital is also an important policy priority in order to achieve an Emirate-wide distribution of economic activity and associated benefits. For its part, the government will also ensure that Abu Dhabi's security is maintained and that its towns and cities remain a safe place in which to live and work. In order to ensure that the urban infrastructure is able to cope with the envisioned growth without stress, the Emirate has already developed and published a comprehensive 2030

urban structure framework plan for the Capital. The initiative will be expanded to cover all the regions of the Emirate.

1.2.4 Optimisation of Government Operations

Finally, the Policy Agenda sets out guidelines for optimising the government's own role in the future of the Emirate, by improving the efficiency and accountability of government departments. The government has already embarked on an extensive review of its processes and structures. Many services are being delivered electronically through e-government initiatives, and departments are being streamlined and non-core services outsourced to the private sector. These initiatives will be continued and enhanced. At the same time, the government will review and enhance the legislative framework and the law-making processes themselves to ensure maximum efficiency. It is this focus that has led to the need for more people to be trained in project management. With non-core services being outsourced to the private sector, there will be a need in the Abu Dhabi government of individuals who are able to manage projects and oversee the process of these non-core services being delivered by the private sector. Therefore, it is important that the Abu Dhabi government looks at equipping its employees with appropriate competency of project management. There is a need to be able to assess the need for these competencies and then be able to provide the required training. This research will try to help towards that goal and will contribute towards the implementation of Vision 2030 for Abu Dhabi.

1.3 The Problem

Because the optimisation of government functions has happened significantly in Abu Dhabi, there has been a shift to making it a more project management oriented operation. The function of the government has become a manager of projects. Most of the activities are sub-contracted to the private sector and monitored through the government departments' project managers. Therefore, the role of project management has become significantly more important. However, what is currently missing is a framework to assess their progress on their career paths as project managers and an evaluation framework to decide when they can be promoted. Therefore, this thesis will look at developing such a framework and facilitation for documenting a career path for project managers that has more objectivity and incorporates the state of the art knowledge that exists in this area.

1.4 Aim

To develop a framework for facilitating the progression along the project management career path in Abu Dhabi government departments.

1.5 Objectives

1. To document the current path followed in the careers of project managers in Abu Dhabi government departments.

2. To document the competencies needed during different roles undertaken by project managers along their career paths.
3. To document the success metrics and factors that lead to complexity in projects and programmes resulting in challenges for the project manager during their careers.
4. To conceptualise a framework for assessing the project manager career path progression in Abu Dhabi government departments.
5. To validate the frameworks for assessing the project manager career path progression in Abu Dhabi government departments.
6. To draw conclusions and recommendations.

1.6 Research Questions

1. What are the milestones in the career path of a project manager in Abu Dhabi government departments?
2. What are the competencies needed by a project manager at different steps of their careers?
3. What are the factors that lead to challenges faced by project managers at different stages of their careers?
4. How can an integrated view be developed to help with the assessment of project manager performance at different milestones of their careers facilitating their mobility?

1.7 Contributions of this Research

1. This research will develop a competency framework for the assessment of project managers in Abu Dhabi government departments throughout their career path.
2. This research will also present an integrated view of the career lifecycle of the project manager and establish links with competencies needed at different stages of their careers as well as highlighting different variables of complexity that pose challenge to them in their careers.

1.8 Need for This Research

There are three major quotes from HH Sheikh Zayed, the founding father of the United Arab Emirates, that conveys the emphasis on human resource development of the country. These are:

"Wealth is not money. Wealth lies in men. This is where true power lies, the power we value. This is what has convinced us to direct all our resources to building the individual, and to using the wealth which God has provided us in the service of the nation."

"No matter how many buildings, foundations, schools and hospitals we build, or how many bridges we raise, all these are material entities. The real spirit behind the progress is the human spirit, the able man with his intellect and capabilities."

"We must not rely on oil alone as the main source of our national income. We have to diversify the sources of our revenue and construct economic projects that will ensure a free, stable and dignified life for the people."

These quotes clearly indicate the focus of the country for developing the skills of the people and considering them as the true wealth. Following these thoughts, the Abu Dhabi government undertook a major restructuring initiative in 2005. The restructuring was designed to not only create an evolved form of government but also to help build a more vibrant economy that attracts and promotes private sector investment. As part of the restructuring there was a major cultural shift that was planned among the government departments. The emphasis was moved to managing services and product delivery through project and programme management. The focus of several government departments was changed to ensuring that projects executed by outside contractors were delivered as per specifications. This created the need to train more project managers in different government departments.

In order to ensure that significant number of government employees are trained and are progressing through the system, it is important that a competence framework be developed. This competence framework should be able to assess their training needs and facilitate their promotion and progression of their jobs. This research will be helpful in meeting these objectives.

1.9 Structure of This Thesis

This thesis has seven more chapters. Chapter 2 presents a review of literature which includes literature in the areas of project and programme manager competencies. It also includes a review of literature on project and programme success factors. It is followed by a discussion of the literature review on project complexity and concludes with a discussion on career paths. Chapter 3 presents a discussion on research philosophy and methodology used in this paper. It is followed by chapter 4 which is on data analysis. This chapter presents a description of expert interviews, and establishes the challenges faced in Abu Dhabi context and outlines the basic career path of a project manager. Chapter 5 explains the analysis of data that helps establish relationships between competencies and success factors, as well as competencies and complexity variables. Chapter 6 presents the analysis of competency relationships at advanced stages in the career of a project manager. Chapter 7 explains the final analysis and testing of the framework to finalise the framework that presents an integrated view of the career path of a project manager. Chapter 8 presents the final conclusions and recommendations for future work.

Chapter II

Literature Review

2.0 Introduction

With a focus on career paths of project managers, this thesis intends to develop an assessment framework that could be used to monitor their progress and promote them to the next level when they are ready. However, as Shehu and Egbu (2008) point out, at some point in their careers a project manager will take a programme management role. So the career path of a project manager needs to consider both the project manager and programme manager roles. Most of the career paths of a project manager and his progression are determined by their grasp on the competencies. Therefore, it is imperative that we look at project and programme competencies while conceptualising the framework. Moreover, this chapter has summarised the research in a range of these areas. The first area covered as part of literature review is a review on career paths. This is followed by a section on career paths of project managers. Following this section is a section that summarises literature in project and programme management. This section is followed by a section on competency followed by sections on project and programme management competencies. Each of these sections also has sections on project success factors and criteria. The chapter ends with a discussion on project and programme complexity and how that influences project manager selection. The literature presented in this chapter is used as a basis for formulating the data collection instrument and the data collection process which is documented in the next chapter on research methodology.

2.1 Career Path

A career is an evolving sequence of job roles, responsibilities, and activities that an individual will develop over their career span (El-Sabaa, 2001). Arthur et al. (1989) define career as “*the evolving sequence of a person’s work experience over time.*”

Careers generally provide linkages between the inner world of self and the outer world of society and profession (Bredin & Soderlund, 2013). When we talk of career path as a single phrase there are two underlying facets, and they are time and direction (Cappellen & Janssens, 2005). The definition of career as a path explicitly accepts the idea of evolution over time, a series of career moves (Inkson, 2004).

According to Hoekstra (2011,) development of a career is a combination of internal career identity formation and growth of external significance. This definition implies that as ones career proceeds, the individual will begin the process of managing their own careers, looking for future opportunities for career progression and negotiating employment conditions. People tend to seek meaning and use of their lives through their success in their careers (El-Sabaa, 2001). Johns (1996) indicates that there are three major elements that one needs to understand to actually decipher the full meaning of a career. The first element is the understanding that a career will involve moving along a path over a period of time. The second element is that a career will involve interacting within and outside the organisation, opening new horizons and presenting new challenges. The third element is that a career provides individuals with an identity. They are able to relate to a group or a profession.

Holland (1973) has presented a theory of careers where he has documented six distinct patterns of career orientation which he labelled: conventional, artistic, realistic, social, enterprising and investigative. Positions in areas such as accounting, finance, and human resources which are often well defined could be classified as conventional positions. These positions involve high level of compliance to professional codes and ethics, orderliness, and have less flexibility in overall overview of the position. If we consider this classification, then Meredith and Mantel (2011) contend that project management positions will be classified as social career positions. They contend that a project manager will often have to be sociable, tactful, friendly, understanding and helpful. These individuals will have to lead organisations and teams in order to reach the overall objectives of the project within stipulated time, cost, and quality.

Brousseau et al. (1996) have proposed four distinct career patterns: spiral, expert, linear and transitory. According to them, a spiral career happens to be one in which a person would make a move across occupational areas which might have some level of link but not so much of a direct link that it could be a move to a sub or super speciality in the discipline. For example, someone from engineering takes over a role in sustainability area. The new skill will be drawing upon the experiences in the old areas but also require some specialised knowledge of other unrelated area to the original discipline, and this would be something that an individual will develop over time. Under this classification of career patterns, a linear career would consist of a progressive series of steps forward and possibly upwards in the organisation hierarchy with more authority and responsibility

added at every step. This kind of career path requires a level of motivation to exploit opportunities in order to achieve more power in their roles and within the organisation.

According to Brousseau et al. (1996), an expert career pattern is the one which involves lifelong commitment to some occupational field or speciality. This is generally pursued by people who are just passionate about one area and one area only. They endeavour to grow their knowledge and expertise in the area as they proceed and would like to serve only that discipline/area throughout their careers. These individuals are driven by a desire to gain expertise and achieve security and stability in their careers. The last kind of career pattern is transitory where individuals would be moving from one discipline to a totally unrelated discipline in their careers. These are individuals who are seeking variety and independence in their jobs, and so they don't stick to one area of knowledge.

According to El-Sabaa (2001), a project manager's career path cannot be classified as a pure linear career path as they have to transition from one type of project to the other kind. However, one issue with that argument is that El-Sabaa does not regard project management as a discipline or function in itself. It is considered a temporary role. El-Sabaa seems to classify project managers as transitional in their career paths since they move from one discipline of project to the other. This is probably not correct given that project management has evolved as a discipline over the years and despite the area of technical expertise required in the project, a project manager will need to be capable of applying same / similar project management competencies across disciplines.

2.2 Career Path of a Project Manager

Documenting the career path is an important step in the selection and development of an effective project manager who is equipped to cope with any problem and take a project to a successful completion within all the constraints imposed on the project (Ndhlovu & Weeks, 2013). Carbone and Gholston (2004) contend that a project manager is often selected for their position based on technical ability. They further add that in most cases project managers are then nurtured into project management roles, and the skillset to manage a project are imparted as an afterthought. An increasing number of organisations these days develop dynamic work environments through the use of temporary work forms such as projects and programmes (Holzle, 2010). Yes, research on implication for employees who work in these transient environment and how to bring some level of permanency to this transient environment is still not there (Aitken & Crawford, 2007). One of the most famous studies of recent times entitled “The Accidental Project Manager” by Darrell et al. (2010) discovered that project managers are selected based on technical and management competencies and lack the competencies to deliver a successful project. In order to develop a project management career path that is objective one needs to develop an appraisal system that is able to identify gaps in knowledge or skill and to negotiate performance achievements and facilitate their progress along the career path (Lee-Kelley & Blackman, 2012; Marion et al., 2014). Pinto and Kharbanda (1997) present it very well by saying that,

“Few individuals grow up with the dream of one day becoming a project manager. It is neither a well-defined nor a well-understood career path within most modern organisations. Generally, the role is thrust upon people rather than being sought.”

In a recent study by Marion et al. (2014), they found that out of a population of 100 project managers in the USA they interviewed, most of them worked their way up through their technical expertise in areas of specialisation such as IT, operations, etc. The organisations they worked for were primarily small and medium sized enterprises. They didn't start or intend to start their career as a project manager. They accidentally ended up there by undertaking several projects in their areas of specialisation. Even their organisations did not do much for them in terms of developing their project management skills. They primarily took an initiative themselves to improve and ended up acquiring professional qualifications from bodies such as APM and PMI. As many as 78 of these project managers said that their organisation did not provide any guidance in developing them as project managers, but rather after their success in managing projects permanently stationed them in a project management function. This demonstrates a kind of unorganised and informal attitude towards project management in organisations even today.

Holzle (2010) have also presented a study on project manager career paths and contend that the career path progresses as their dexterity along certain competencies increases. However, most organisations still rely on on-the-job training for project managers. Some organisations have developed some sort of mentoring model for project managers utilising the expertise of more senior project managers but not many organisations seem to have a formal structure to it. What is also lacking in most organisations is an alignment to all organisational career paths in order to allow for a fair and transparent promotion policy for individuals along the project management career path.

However, in some parts of the world you do see a more defined project management role. This is especially true for large corporations where project management is a key function in the portfolio of their activities. Bredin and Soderlund (2013) have recently published an extensive study on the career path followed by a project manager in Sweden. They have documented the career path for project managers in ten multinational companies. In Saab there are three levels: basic, senior and master. In Ericsson there are five levels: project manager, advanced project manager, senior project manager, master project manager, and principal project manager. For Sandvik there are three levels: project manager, senior project manager and programme manager. In ABB there are four levels: associate project manager, project manager, project manager director, and senior project management director. In TeliaSonera there are four levels: project management associates, project manager, senior project manager, and senior project director. Skanska has project managers at level 1, 2, 3 and 4. Posten , Volvo Aero, and Scania are three companies that do not have any formal levels in their organisation.

Bredin and Soderlund (2013) have further elaborated on some similarities of all the companies that have a defined career path for project manager. The first major similarity is that all of them have taken the standard professional body competence frameworks as the basis of assessment and modified these frameworks to suit their individual needs.

Project Management Institute (PMI) and Association of Project Management (APM) are two such frameworks that have been adopted by most of these organisations. The second major pattern that emerges from this research is that all these organisations assess the

individual's competencies and the dexterity along different competencies to promote them through their careers. The third pattern is that they assess project complexity and based on the complexity of the project decide what level of project manager expertise is needed on the project to make staffing decisions. Two of them see a transition of project manager into a programme manager at a later point in their careers, but they don't define programme manager competencies and assume that attaining a high level of project management competency will automatically lead to success in programme management. As Shehu and Egbu (2008) point out that at some point a project manager will transition into the role of a programme manager but that exact boundary of transition is blurry at the moment, and more needs to be done in that area to establish parameters to assess the location of the boundary in order to facilitate the transition of individuals from project management to programme management role. In order to establish that boundary, it is important that we look at the roles of project and programme managers more closely. The next section highlights the differences in the two areas and takes this study further.

2.3 Project Management and Programme Management

A project is a temporary initiative, which has start and finished dates and has to achieve stated objectives usually in terms of delivering an outcome to a given time, cost and specification. The person responsible to manage the project is referred to as a project manager. On the other hand, a programme is a group of related projects which together achieves a common purpose in support of the strategic aims of the business (Meredith & Schafer, 2009). The definitions of project and programme management often lead one to believe that a programme is a mere extension of projects, and the competencies required

to manage a project as well as programme would be similar. However, as Pellegrinelli (2011) points out that the project and programme management competency frameworks could have some similarity, but there could be some competencies that could be different given the larger scopes, remits, and impacts of programmes. Therefore, when considering competency frameworks, one should consider project and programme manager's competency frameworks separately. Therefore, in this research competency frameworks for programme and project management would be developed separately.

2.4 Competency

The competency approach in human resources management has been around for a very long time. The early Romans practiced a form of competency profiling in attempts to detail the attributes of a good Roman soldier (Draganidis & Mentzas, 2006). The introduction of competency based approaches within the corporate environment was initiated around 1970 and was championed by McClelland from Harvard (Draganidis & Mentzas, 2006). Since then, we have seen an increase in their use and adaption in the industry.

Le Diest and Winterton (2005) distinguish between the words competence and competency. They define competence as expertise in functional areas whereas competency as expertise in behavioural areas. However, they contend that in most of the literature, the terms have been used interchangeably. Therefore, for the purpose of this research also, these terms will be used interchangeably. Authors worldwide have promoted the concept of core competency to gain competitive marketplace (Nadler &

Tushman, 1999). Hamel and Prahalad (1994) defined core competence as “the collective learning in the organisation, especially how to co-ordinate diverse production skills and integrate multiple streams of technologies.” The virtue of the core competence approach is that it “recognises the complex interaction of people, skills and technologies that drives firm performance and addresses the importance of learning and path dependency in its evolution” (Scarborough, 1998). This is how literature on strategy deals with the issue of competency. On the other hand, the literature on human resource development is more concerned with developing highly transferable generic competences that are required for most jobs or particular occupations or job roles (Le´vy-Leboyer, 1996; Stasz, 1997).

There are several definitions of competency in the literature. Hartle (1996) define competency as “a characteristic of an individual that has been shown to drive superior job performance.” Hartle further clarifies that the competencies he is referring to include the visible ‘competencies’ of ‘knowledge and skills’ and ‘underlying elements of competencies’, like ‘traits and motives’. According to Stretton (1995,) competence is intangible; and hence, it cannot be observed directly. Stretton (1995) further adds that there are three approaches of indirectly observing the competence. The first is the attribute-based inference of competence. This approach involves the definition of a series of personal attributes that are believed to underlie competence and testing if those attributes are present at an appropriate level in the individuals whose competence is to be recognised. The presence of the chosen attributes provides the evidence from which the competence is inferred. The second approach is called the performance-based inference of competence. Under this approach the inference of competence is drawn by observing

the performance of individuals in the actual workplace, from which underlying competence can be inferred. The third approach is called the combined inference of competence which uses a combination of the two approaches.

Ahadzie et al. (2008) identify the requisite competencies one needs to look at task behaviours and context behaviours. Task behaviours contribute either directly or indirectly to the technical function; whereas the contextual behaviours support the organizational, social, and psychological environment in which the technical function must operate, are common to many jobs or all jobs, are not role-prescribed, and thus, are normally not (explicitly) part of incumbents formal responsibilities and obligations.

Le Diest and Winterton (2005) present two distinct paradigms in which competence is viewed. They call the the US paradigm a behavioural paradigm. They use the definition given by Spencer and Spencer (1993) to define the behavioural paradigm of competence. According to this definition, competence is

“motives, traits, self-concepts, attitudes or values, content knowledge, or cognitive or behavioral skills – any individual characteristic that can be measured or counted reliably and that can be shown to differentiate significantly between superior and average performers, or between effective and ineffective performers.”

Le Diest and Winterton (2005) present the other paradigm which is the UK centric and call it the functional approach. The UK has developed long portfolios of National Vocational Qualifications (NVQs) based on occupational standards of competence,

grounded in functional analysis of occupations in a variety of contexts listed by the government (Mansfield & Mitchell, 1996). This NVQ model has been adopted by several European countries as well.

Cheetham and Chivers (1996) developed a competence framework with five dimensions.

These five dimensions are:

1. Cognitive competence – This competence includes the basic concepts, theories, knowledge, and understanding of the area of competence one is dealing with.
2. Functional competences (skills or know-how) - those things that “a person who works in a given occupational area should be able to do and be able to demonstrate.”
3. Personal competency (behavioural competencies, ‘know how to behave’) - defined as a “relatively enduring characteristic of a person causally related to effective or superior performance in a job.”
4. Ethical competencies- defined as “the possession of appropriate personal and professional values and the ability to make sound judgements based upon these in work-related situations.”
5. Meta-competencies - concerned with the ability to cope with uncertainty, as well as with learning and reflection.

Competence frameworks are important because they “facilitate the development of mechanisms that recognise and accredit competence, leading to the authorisation of practise in the form of a publicly recognised warrant or a licence” (Sultana, 2009). A

competency-based approach to employee development helps ensure that all training programs are integrated to produce the desired results (Naquin & Holton, 2006). Robust competencies help you define what was done, what is being done, and what needs to be done (Green, 1999).

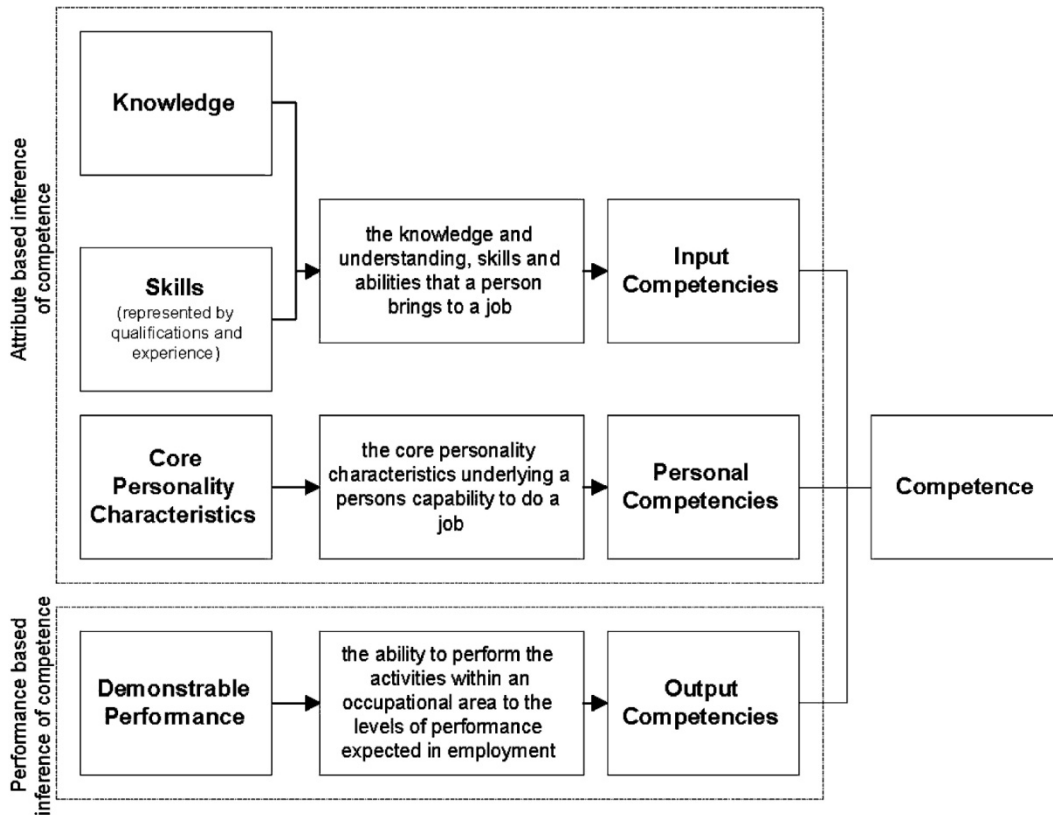


Fig 2.1: Integrated Framework for Competence (Crawford, 2005)

Crawford (2005) asserts that competence is a combination of several aspects and presents an integrated framework which identifies elements of the construct (see figure 2.1). This model recognises that competence is a complex construct. It assumes that competence can be inferred from attributes, which include knowledge, skills and experience, personality traits, attitudes, and behaviours.

The demonstrable performance or relation of competence to performance on an endeavour is an interesting addition to this framework of competence. However, this can open another strand of research in connecting performance to competence. For the purpose of this research, a more extensive survey will be used that will be circulated across the government departments in Abu Dhabi. This survey will help identify elements that are important for Abu Dhabi context. These respondents will choose competencies that are important based on their past experience on project performance. Hence, the part about performance based competencies will be incorporated into the model through this filtering process.

Draganidis and Mentzas, (2006) have also described the concept of competency lifecycle, which consists of four stages:

Competency mapping: It is the stage that aims to provide the organization with an overview of all the necessary competencies required to fulfil its goals, set out in the organizational business plan, and the project requirements. This mapping also establishes the minimum threshold of proficiency required at each level and the job profiles associated with each role. The second stage is competency diagnosis. In this stage an organisational diagnosis is performed about the current state and levels of individual employee proficiency levels. An analysis of the skill gap is also performed in this stage. The results of these analyses lead to the development of an overview of where we are and what we need to do to increase the competency levels of individuals to achieve the final performance goals of the organisation. The results of this stage leads into the competency

development stage of this process. The third stage is the competency development stage. This stage deals with the actual scheduling and execution of activities that are required to increase the proficiency levels of competencies of employees. This also helps the organisation set goals on individual and organisational performances and bring the operational capabilities in line with the strategic direction intended for the organisation. Often results of this stage are used by individuals to develop and propose their own personal development plans. The last stage of this lifecycle is the monitoring of competencies. This stage involves a system of continuous examination of the results achieved by the competency development stage and documentation of the lessons learnt for future use and incorporation into the overall plan.

The competence development can happen both at an individual or an organisational level. Both the individual and the organisation learn and develop their competencies. Argyris and Scho'n (1978) distinguish between individual and organisational learning. They contend that the learning undertaken by an individual may not represent organisational learning unless members of the organisation act as learning agents for their mother organisation and share the knowledge and competency acquired during learning. When an organisation learns, then the total amount of learning is greater than the individual sums of learning. In order to facilitate organisational learning, Argyris and Schon (1978) recommend some enablers that can facilitate organisational learning. These enablers are:

- Flat, decentralised organisational structures that facilitate knowledge sharing between individuals and departments.

- Information systems that provide fast, public feedback for any issues or questions one might have or actions one might have undertaken.
- Mechanisms for surfacing and criticising implicit organisational theories of action, cultivating systematic programs of experimental inquiry. This would facilitate challenging the status quo and help in moving forward on the path of success and organisational enhancement.
- Measures of organisational performance and identification of current and future opportunities of improvements.
- Systems of incentives aimed at promoting organisational learning and knowledge sharing. This could be facilitated through both formal and informal forums. Some formal forums could be suggestion systems or company focus groups and brainstorming sessions.
- Ideologies associated with such measures as total quality, continuous learning, excellence, openness and boundary crossing. These ideologies further facilitate organisational learning and efficiency improvement.

Karvi et al. (2003) highlight that competency on or during the project or a programme is evolutionary and needs a robust knowledge management system within the project management and programme management offices to identify the needs and deliver requisite levels of knowledge through training and mentoring. They have proposed a learning programme model to highlight the dynamism of the process and how it progresses. The model is depicted in figure 2.2 below:

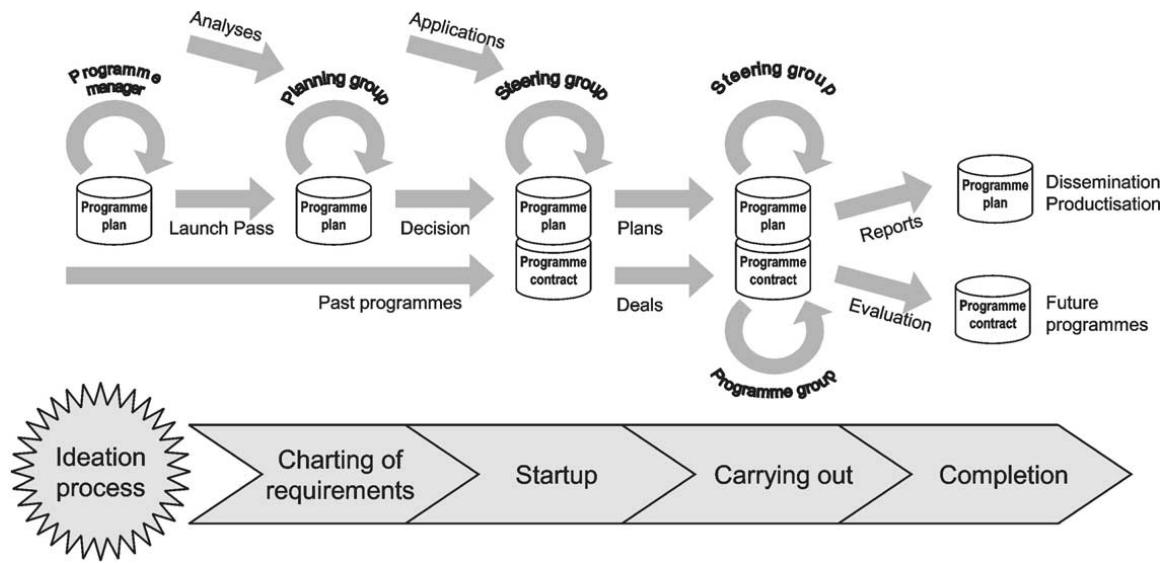


Fig 2.2: Learning Programme Model (Karvi et al, 2003)

The model in figure 2.2 depicts how one starts with an initial charting of requirements, which in turn is used for the identification of required competencies on a project. It then proceeds and as the project moves forward new issues are identified and appropriate competencies added to the project team. This process continues till the end of the project. The overall, completion of this process happens at the completion of the project.

2.5 Project Management Competency

Pinkowska et al. (2011) classified the softer skills of a project manager into six groups: human resource management, team management, conflict management, communication management, self-management and leadership. They have gone further and have defined the sub-processes within each of these softer skills. This paper has also attempted to define the sequence of these sub-processes in achieving a high level of competence for a project manager. On the other hand, Ujiako et al. (2011) present a survey for project

management students to identify the transferable skills for the project manager and the ideal mode of teaching. They identify interpersonal skills, time management, critical thinking, and communicating as some of the key transferable skills. However, they have done this survey for university students only, and their findings have to be applied to working professionals before it can be implemented to project manager training. Ujaiko et al. (2011) have contended that the need for this investigation was driven by the need to address new developments and challenges within the profession such as a new mindset (Hartman, 2008), growing complexity in the project conceptualization (Dalcher, 2009), and the requirement for project managers to be transformed from trained technicians into reflective practitioners (Crawford et al., 2006). Whereas, Bredin (2008) contended that the current project management organisations only look at project capability, functional capability, and strategic capability. What is missing completely is the people capability dimension. Bredin (2008) developed a prism type framework where they have identified different surfaces with people capability as a node. This paper presents different people related issues that need to be covered on each face of the prism to include people capabilities.

Alam et al. (2008) highlight three different schools of thought that are used worldwide for assessing the project management competence. The first one is the input approach, common in the USA, which assumes that individuals require knowledge, skills and behaviours to be competent at work. The second one is the UK based process approach which accounts for processes and functions needed by project managers to deliver projects successfully. The third approach is the output approach, popular in Australia,

which focuses on the actions of project managers to deliver projects. Although there are subtle differences in the types of competencies identified through the three approaches, but still the general list of competencies are quite similar in the three countries as documented later in this section.

Ira and Baroudi (2008) have tried to elicit the types of training in competence and skills delivered to project managers and their inherent challenges. They have categorised the competencies into technical and soft competencies. They contend that most of the training and educational programmes in project management all over the world do a very good job of imparting technical competencies since they are easy to teach. Whereas, the soft competencies are difficult to acquire and provide, and there is a gap in what is being delivered to practitioners worldwide. They cite Carbone and Gholston (2004) who said:

“While certain aspects of the profession might be learned in a classroom setting through simulation and with case studies, there are other aspects of the job that require a different type of experience. Particularly hard to train in a classroom are the soft-skill aspects of the job.”

Walker and Walker (2011) analysed the leadership capabilities for project managers in Australia. They have clearly established the authentic leadership traits; such as value driven, authentic, aware, resilient, fair, realistic, and positive and their relationship towards project success. In another research, Suikki et al. (2006) developed a project management competence development framework presented in Figure 2.3. This

framework provides a comprehensive analysis of the knowledge areas and skills that are needed to ensure that projectified organisations develop an effective group of project managers in their staff. Suikki et al. (2006) have primarily used the competencies from the Project Management Institute (PMI) list of competence. Their unique contribution is the process around the competencies for implementation in a project organisation.

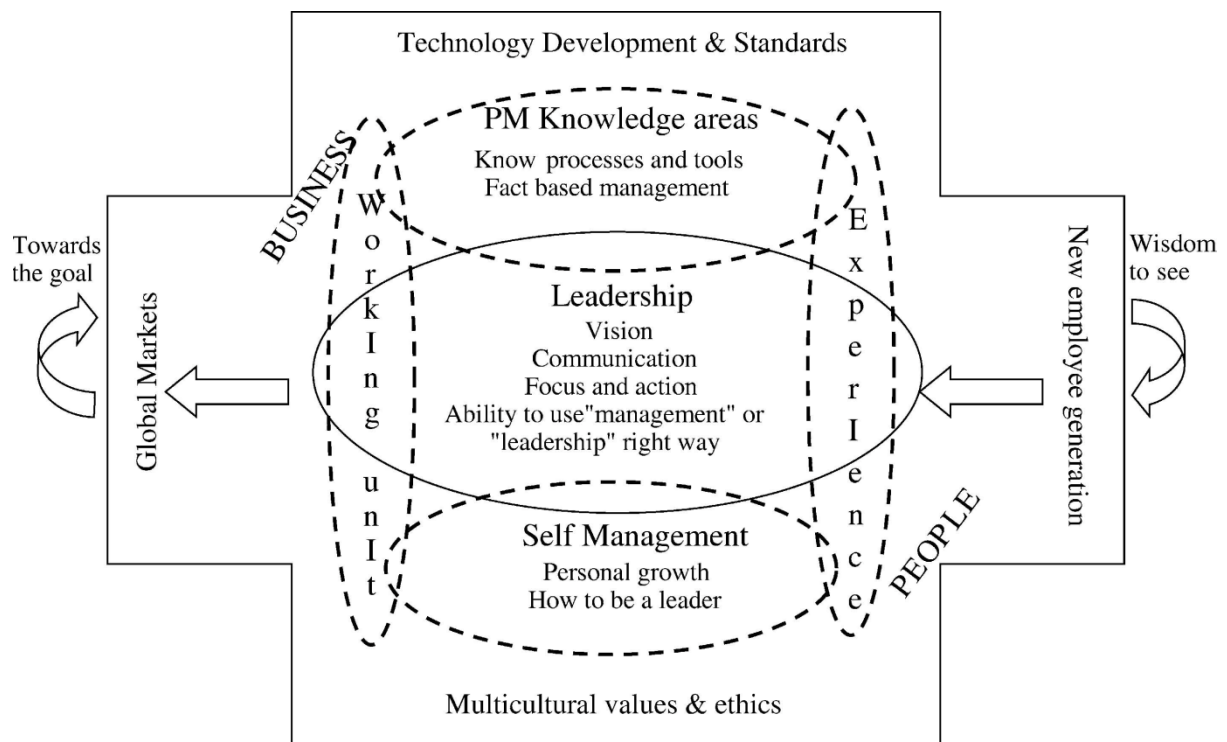


Fig 2.3: Project Management Competence Development Framework (Suikki et al., 2006)

Dainty et al. (2004) differentiate between functional competence and behavioural competences. They contend that the functional competence is easy to measure because they are based on the pre-determined occupational standards. However, the behavioural competences need a more detailed competency based frameworks. They have identified 12 behavioural competencies for construction project managers. These competencies

include: achievement orientation, initiative, information seeking, focus on client's needs, impact and influence, directiveness / assertiveness, team and cooperation, team leadership, analytical thinking, conceptual thinking, composure, and flexibility. They have identified that out of these 12 characteristics composure and team leadership are the most predictive and easier to measure compared to the other 10 characteristics.

Muller and Turner (2010) present the findings of a survey of leadership competency profiles of successful project managers. They profiled intellectual, managerial and emotional competences. The elements within the intellectual competency included critical analysis and judgment, vision and imagination, and strategic perspective. The elements within the managerial competence included engaging communication, managing resources, empowering, developing, and achieving. The emotional competence includes self-awareness, emotional resilience, motivation, sensitivity, influence, intuitiveness, and conscientiousness. They classified the data by the type of project managers. Results indicated that across the board, there were four characteristics that were strong for all the successful project managers. Among the intellectual capabilities the capability that was present in all project managers was critical thinking. Successful project managers also had three emotional competencies, and they are: influence, motivation, and conscientiousness. All the other competencies varied depending on the type of projects. Muller and Turner (2007) have further found a high correlation between the need for these capabilities and the complexity of a project.

PMI has documented their recommendations on project management competencies in IPMA (2007). They have divided the competencies into three groups. The first group is behavioural competence which includes competencies such as leadership, engagement and motivation, self-control, assertiveness, relaxation, openness, creativity, results orientation, efficiency, consultation, negotiation, conflict and crisis, reliability, values appreciation, and ethics. The second group is technical competence which includes competencies such as project management success, interested parties, project requirements and objectives, risk and opportunity, quality, project organization, teamwork, problem resolution, project structures, scope and deliverables, time and project phases, resources, cost and finance, procurement and contract, changes, control and reports, information and documentation, communication, start-up, and close-out. The third group consists of contextual competence which includes competencies such as project orientation, program orientation, portfolio orientation, project program and portfolio implementation, permanent organization, business, systems, products and technology, personnel management, health, security, safety and environment, finance, and legal. Several authors have used this list of competencies to test them in their own contexts.

Dogbegah et al. (2011) has taken the PMI competencies and have identified the most relevant groups of competencies for the Ghanaian housing construction industry. They have classified through factor analysis, the competencies into six factors namely: project human resource management and control, construction innovation and communication, project financial resource management, project risk and quality management, business

and ethical management, and physical resources and procurement management. This is an interesting study that contextualises the standard comprehensive list of competencies for Ghana. Similar studies can classify the competencies for other countries and contexts. Whereas, Taylor and Jill (2012) in a recent study have classified the project manager competencies for IT sector. They have identified the top 10 competencies demonstrated by successful IT project managers. These top 10 competencies are: team leadership, concern for order, impact and influence, initiative, relationship building, information seeking, analytical thinking, acquisition of expertise, directiveness, and achievement orientation. The methodology could also be explored for the context of Abu Dhabi in this study. In another study, Rose et al (2007) identify seven broad categories for software project management competence. These categories are: technical management competence, process management competence, team management competence, customer management competence, business management competence, personal management competence, and uncertainty management competence. Moreover, Edum-Fotwe and McCaffer (2000) have identified the primary and secondary competencies within seven categories of technical skills, managerial skills, financial skills, legal skills, communication skills, IT skills, and general skills. This study is focused on construction sector. The primary competencies within the technical skill category are: planning and scheduling, construction management activities, basic technical knowledge in one's own field, and productivity and cost control. The secondary competencies within this category are: forecasting techniques, quality control, estimating and tendering, material procurement, reading and understanding drawings, design activities and background, site layout, and mobilisation. Under the managerial skills the primary competencies are:

leadership, delegation, negotiation, decision making, motivation and promotion, team working, time management ,and top management relations. The secondary competencies are human behaviour and strategic planning. For the financial skills category the primary competencies are establishing budgets and reporting systems; and the secondary competencies are project finance arrangement and establishing cash flows. For legal skills the primary competency is the ability to draft contracts, and the secondary competencies are: health and safety issues, industrial relations, preparation of claims, and litigation. For communication skills the primary competencies are: presentation, general and business correspondence, and report writing. The secondary competency under this category is public speaking. Under the general skills category the primary competencies are chairing meetings and understanding of organisation. The secondary competencies under this category are marketing and sales as well as public relations. The IT skills category only has secondary skills and they are: project management software, spreadsheet, and CAD. However, it can be argued that this research is more than 13 years old and now a project manager needs to possess significantly more IT skills if they have to manage complex projects.

Exploring different strands on project management competences, Chen and Partington (2006) claim that so far there are two types of strands for project management competence. The first strand is work-oriented and focuses mainly on the development of project management standards. These strands have been compiled primarily by interviewing experts and employers. The second strand is the strand which takes a worker-oriented approach, seeks to define sets of generic personal characteristics of

competent project managers, considers the argument that being a competent project manager requires more than just possession of the 'hard' knowledge and skills described by the project management standards. They also highlight that there is often an organisation or context specific strand that might be part of the organisational tacit knowledge. It is important that this tacit knowledge is explored and additional competencies if required are added to the list of project management competencies. This tacit knowledge would be increasing frequently, and one will need to revisit this list periodically in order to ensure that the organisation is capable of responding to the needs of the changing operating environments, both internal and external.

Another study from the construction sector by Chen et al. (2008) has focussed on looking at the Chinese construction project management sector and the competencies expected of a project manager. According to their study, the competencies could be divided into three major categories: planning and controlling, coordinating relationships, and developing relationships. Under each of these categories they have listed project manager competencies. Under the planning and controlling category they have listed: ability to plan, knowledge of construction work, knowledge of commercial management, ability to communicate, and ability to manage team. Under the coordinating relationships category the competencies included are: knowledge of construction work, knowledge of commercial management, ability to communicate, ability to manage team, and ability to coordinate. Under the developing relationships category the competencies included are: knowledge of construction work, knowledge of commercial management, ability to communicate, ability to manage team, ability to coordinate, and ability to build new

relationships. This study confirms that, that for China the requirements for project management competencies in construction are similar to the ones in the UK, but they still recommend that for other countries similar studies be undertaken because there might be cultural differences which would result in need for additional or fewer competencies. The impact of cultural differences has been covered extensively in the literature, and authors such as Zwikael et al. (2005) have presented these differences through scientific investigation. Taking guidance from Chen et al. (2008) and works such as Zwikael et al. (2005) it is noted that the adaptation of western project management standards to Abu Dhabi might require an additional step of validation, and hence, the need for this thesis which deals with government departments in Abu Dhabi. Stevenson and Starkweather (2010) have done research on identifying the project management critical competency index for IT professionals. They started with 15 attributes namely: ability to communicate at multiple levels, ability to deal with ambiguity and change, ability to escalate, attitude, cultural fit, education, experience, leadership, length of prior engagements, past team size, PMP certification, technical expertise, verbal skills, work history, and written skills. Based on the analysis of data for interviews with top level executives, they determined that the six most important attributes for IT project managers are: leadership, ability to communicate at multiple levels, verbal skills, written skills, attitude, and ability to deal with ambiguity and change.

Omidvar et al. (2011) have developed another comprehensive framework taking into account the competency frameworks of different professional project management associations worldwide and formed their own framework as presented in Figure 2.4.

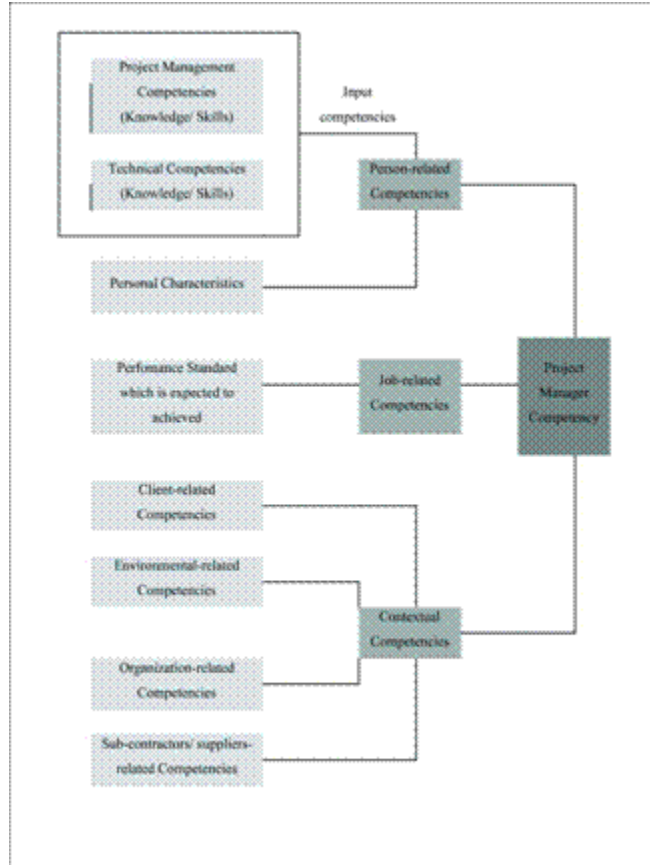


Fig 2.4: Project Management Framework (Omidvar et al (2011))

This is quite a comprehensive framework, but however, the authors have left several redundancies in an attempt to combine different frameworks. One of the other frameworks that is quite popular globally is APM Competence Framework (2012). This framework is similar to PMI competence framework. It has 47 competence characteristics. These characteristics are divided into three groups namely: technical competence, behavioural competence, and contextual competence. In the technical competence there are 30 elements, which are: concept, project success and benefits management, stakeholder management, requirements management, project risk

management, estimating, business case, marketing and sales, project reviews, definition, scope management, modelling and testing, methods and procedures, project quality management, scheduling, resource management, information management and reporting, project management plan, configuration management, change control, implementation, technology management, budgeting and cost management, procurement, issue management, development, value management, earned value management, value engineering, and handover and closeout. The second group is behavioural competence. This group consists of 9 elements, which are: communication, teamwork, leadership, conflict management, negotiation, human resource management, behavioural characteristics, learning and development, and professionalism and ethics. The third group is called contextual competence and consists of variables such as project sponsorship, health, safety and environmental management, project lifecycles, project finance and funding, legal awareness, organisational roles, organisation structure and governance of project management.

However, Walker and Walker (2011) contend that there is a difference in competence characteristics between project managers and programme managers. They state that

“For project managers to aspire to move to roles in which they are responsible for delivery of programmes of projects they need to move beyond the iron triangle to embrace a more holistic view of what PM entails.”

They refer to iron triangle as the three metrics of time, cost and quality which are often used to assess project success. Walker and Walker (2011) further cite literature that says that programme managers are generally situated at the board level to oversee and ensure adequate project definition, and project benefit explication and that project support is evident, and hence, just concentrating on the iron triangle won't be helpful. It is important that programme management competencies be separately assessed as well. The next section summarizes the literature in the area of programme management competencies.

2.6 Success Factors

Project success factors research has been concentrated “at identifying those levers that project managers can pull to increase the likelihood of achieving a successful outcome for their project” (Westerveld, 2003). Kerzner and Saladis (2009) have identified six critical success factors for project management. These factors are: corporate understanding of project management, executive commitment to project management, organizational adaptability, project manager selection criteria, project manager's leadership style, and commitment to planning and control. In one of the classic and highly cited references of project management, Pinto and Slevin (1988) have identified ten factors that contribute to project success. These factors are: project mission, top management support, project schedule/plan, client consultation, personnel available, technical tasks required, client acceptance and buy off, monitoring and feedback, communication, and trouble-shooting capability for unforeseen issues. Thamahin (2004) has identified 13 factors that lead to better performance of project teams which in turn

leads to project success. These factors are: interesting stimulating work; accomplishment and recognition; conflict and problem resolution; clear organizational objectives; job skills and expertise; direction and leadership; trust, respect, credibility; cross-functional cooperation and support; effective communications; clear project plan and support; autonomy and freedom; career development /advancement; and job security. Thamahin (2004) also documented the organisational factors that drive project success. These organisational factors are: professionally stimulating and challenging work environments, opportunity for accomplishments and recognition, the ability to resolve conflict and problems, clearly defined organizational objectives relevant to the project, and job skills and expertise of the team members appropriate for the project work. Crawford et al. (2006) present several categories of factors that result in project success. Some of the major categories are: cost management; cross unit outcomes such as estimating and project phasing; project finalisation activities such as closeout, testing, commissioning and acceptance; interpersonal issues such as leadership, conflict management and teamwork; legal issues; effective marketing; product functionality type issues such as configuration management, design management, requirements management and value management; programme management; project evaluation and improvement issues such as organisational learning, performance management and project evaluation and improvement; project planning and control issues; project start-up issues such as setting up the goals and objectives as well as the project strategy; quality management; relationship management; resource management; risk management; scope management; strategic alignment; and time management. Cheung et al. (2004) pointed at the contractor selection process as an important success factor. Xiao and Huang (2006)

pointed at the relationship between stakeholders, contributions of the project owner, and performance of the project management organisations as important factors contributing to the success of a project. Fortune and White (2006) have summarized the project success factors after reviewing 63 articles. Their list of success factors includes: support from senior management; clear realistic objectives; strong, detailed plan kept up to date; good communication/feedback; user/client involvement; skilled, suitably qualified, sufficient staff/team; effective change management; competent project manager; strong business case, sound basis for project; sufficient, well allocated resources; good leadership; proven, familiar technology; realistic schedule; risks addressed ,assessed ,managed; project sponsor, champion; effective monitoring, control; adequate budget; organizational adaptation, culture, structure; good performance by suppliers , contractors , consultants; planned close down, review, acceptance of possible failure; training provision; political stability; correct choice, past experience of project management methodology, tools; environmental influences; learning from past experience; project size (large), level of complexity (high), number of people involved (too many), duration (over 3 years); and appreciating and seeking different viewpoints.

2.7 Success Criteria

The three major criteria for measuring project success are cost, time, and quality as highlighted extensively in the literature (Westerveld, 2003; Wateridge, 1998; Turner, 1997). However, Westerveld (2003) contends that this is a very narrow view of project success. He further points out that the success criteria for a project will depend on a number of issues such as size of the project, the uniqueness of the project, and project

complexity. Lim and Mohamed (1999) pointed out that the success of the project will be assessed differently by different stakeholders. Some other criteria pointed out in the literature are good risk assessment (Atkins, 1999); stakeholder satisfaction (Oisen, 1950; Westerveld, 2003; PMBOK, 2000; Wateridge, 1998; Turner, 1997; Westerveld, 2003; Morris & Hough, 1987; Munns & Bjeimi, 1996; Dvir et al., 2006); satisfies project objectives (PMBOK, 2000); benefits to the organisation (Shenhar et al., 2001; Atkinson 1999; Dvir et al., 1998; Westerveld, 2003; Wateridge, 1998; Turner, 1997); benefits to the community (Atkinson 1999; Dvir et al., 1998; Westerveld, 2003; Wateridge, 1998; Turner, 1997); project implementation process and the number of unforeseen problems that surface (Dvir et al., 2006; Westerveld, 2003); consumer satisfaction (Atkinson, 1999; Xiao & Huang 2006, Dvir et al., 1998; Westerveld, 2003; Wateridge, 1998). In the above list of ten factors, stakeholder satisfaction is limited to the groups involved in the execution of the project; whereas the consumer satisfaction criteria represents the satisfaction of individuals or groups who use the product or the service.

2.8 Programme Management Competencies

In the last couple of decades programme management has emerged and grown in prominence in a wide variety of sectors as an acknowledged, high profile approach to strategy implementation (Partington et al., 2005). They define programme management as,

“the structures and processes that are used to co-ordinate and direct the multiple inter-related projects that together constitute an organization’s strategy.”

The goals of project management as highlighted by Lycett et al. (2004) are: improved coordination, improved dependency management between projects, effective resource utilisation, effective knowledge transfer, greater senior management visibility, more coherent communication, improved definition of projects, and better drivers with business goals and strategies.

Lycett et al. (2004) contend that programme management should be viewed from three different viewpoints which are as follows: 1) Contextual - Appropriate programme structure, processes and organisation are strongly dependent on factors such as the degree to which the projects are interrelated, the characteristics of the constituent projects and the nature of the wider organisation. 2) Variable and concurrent in practice - Programme management may operate on several levels simultaneously. For example, small groupings of projects may be managed together in one type of programme whilst another type of programme may simultaneously extend across the entire organisation. 3) Evolutionary in sophistication - It is unrealistic to expect that the programme approach can be introduced in a big bang fashion due to the level of organisational change mandated by its introduction. Consequently, it is more fruitful to accept that organisational sophistication in programme management will evolve and that it will not be possible to apply some of the more advanced features of programme management unless appropriate foundations exist.

Milosevic et al. (2007) presents the competence growth path for programme managers. Figure 2.5 presents the high level progression path for the programme managers.

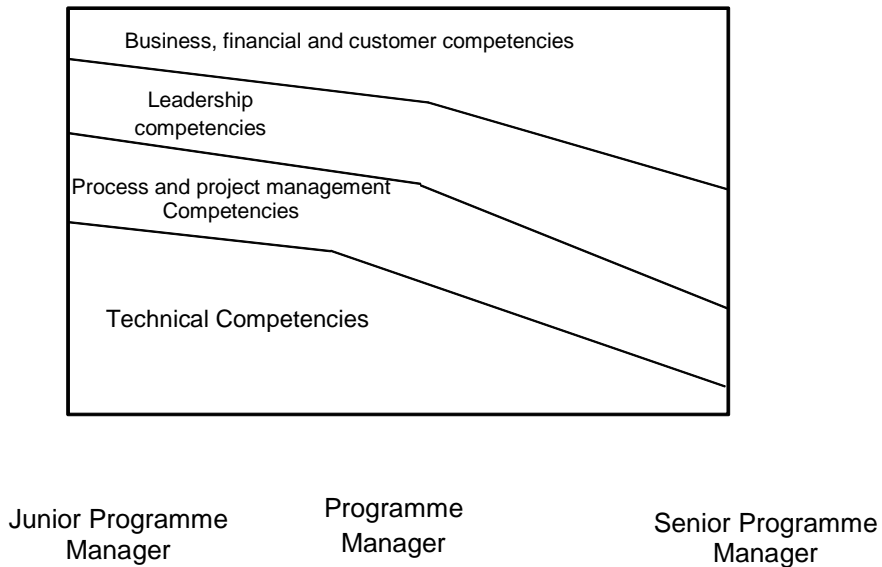


Fig 2.5: Programme Manager Career Progression (Milosevic et al, 2007) (Figure presented in Shehu and Egbu, 2008)

Fern (1991) contend that the personal goals for a programme manager would be

- *“To generate savings and maximize return by the coordination and effective management of projects,*
- *To ensure that projects are delivered successfully, to predetermined scope, time, cost and quality,*
- *To support project managers in their execution of projects, and*
- *To maintain project alignment with business objectives.”*

Therefore, the programme managers’ competencies should be defined in light of these requirements on the programme.

Muller and Turner (2007) have classified 15 programme manager competences and have classified them into three categories: intellectual competence (IQ), managerial competence (MQ), and emotional competence (EQ). IQ includes competences such as critical analysis and judgment, vision and imagination, and strategic perspective. MQ includes competences such as: engaging communication, managing resources, empowering, developing, and achieving. EQ includes competences such as: self-awareness, emotional resilience, motivation, sensitivity, influence, intuitiveness, and conscientiousness.

Pellegrinelli (2002) have identified 9 competencies associated with programme managers. These competencies are: understanding client objectives, project/programme organisation and management, approach and strategy for the project/programme, scope management, risk management, people and resource management, managing the client interface, cultural awareness, and commercial awareness. In another research Shehu and Akintoye (2008) have divided the programme manager's competencies into six categories. The first category is programme control which includes competencies such as planning programme, programme maintenance, controlling programme, forecasting, programme design, planning, identifying risks, managing changes, and managing critical interfaces. The second category is human resources and includes competencies such as quality control and assurance, employee welfare, employee counselling, negotiation, effective leadership, and managing project managers. The third category is programme planning and includes competencies such as: time management, team building, effective

communication, effective sequencing of projects, and conducting meetings. The fourth category is programme decision making and includes competences such as motivation (self and others), managing risks, decision making, and managing programme. The fifth factor is managing team and stakeholder and includes competencies such as management of stakeholders, managing political aspects of stakeholders, supervision of others and delegation. The last factor is resource and supply chain management and includes competences such as resource control, resources allocation, management of suppliers and contractors, and financial/budgetary control.

In a comparative study Crawford and Nahmias (2010) have made a comparison between project management, programme management, and change management competencies. They have listed both the competencies for project managers that are similar to programme managers and those that are different. Among the programme management competencies that are similar to that required of a project manager they have listed: leadership, team development/resource development, stakeholder management, communication, cultural consideration, planning, governance management, commercial, risk and issues management, scope management, progress monitoring, and quality management. Among the competencies that are different for a programme manager they have listed: project management office consideration and benefits management. Although they do agree that both programme and project managers are facilitators of change. They also contend that for pure change management based endeavours one needs some additional competencies that are not needed as project managers or programme managers. These competencies are: analysis and assessment, creativity and challenge, initiative and

self-management, coaching skills, facilitation skills, presentation skills, process design, learning and development, action orientation, strategic thinking, and motivating skills. In another research Partington et al. (2005) include 17 competencies that are essential for programme management. These competencies are: granularity of focus, emotional attachment, disposition of action, approach to role plurality, relationship with team, approach to conflict and divergence, education and support, use of questions, expectations of others, adaptive intent, awareness of organisational capability, approach to risk, approach to face to face communication, approach to governance, attitude to scope, attitude to time, and attitude to funding.

2.9 Project Complexity

Vidal et al. (2011) define project complexity as,

“the property of a project which makes it difficult to understand, foresee and keep under control its overall behaviour, even when given reasonably complete information about the project system. Its drivers are factors related to project size, project variety, project interdependence and project context.”

In another definition Remington et al. (2009) define project complexity as,

“a complex project as one that demonstrates a number of characteristics to a degree, or level of severity, that makes it extremely difficult to predict project outcomes, to control or manage project.”

Project complexity makes a crucial difference to how a project is managed (Baccarini, 1996). Baccarini (1996) further adds that the complexity of a project can effect planning, coordination, control, identification of the goals, selection of organisational form, selection of project inputs, selection of procurement management, and management of time, cost, and quality. Wozinack (1993) operationalizes project complexity in terms of variables such as: criticality of project, project visibility and accountability; and clarity of scope definition. Gidado (1996) says ,

“Scientists and mathematicians consider a system ‘complex’ only when it consists of a multitude of interacting elements. The construction process is always made up of a multitude of interacting parts.”

It can be argued that now days not only in construction, but any project with a big remit will consist of interacting parts, and therefore, some level of complexity will exist in every project. Gidado (1996) concludes his paper by defining project complexity as *“the measure of the difficulty of implementing a planned production workflow in relation to any one or a number of quantifiable managerial objectives.”*

Rosen (1987) has defined a generic measure for complexity which consists of two elements: 1) complexity could be quantitatively measured, like any other observable system, if it were to be related to such things as the dimension of a state space, the length of a programme or the magnitude of a ‘cost’ in money or time and in order to define multiple levels of complexity; (2) there is a threshold of complexity, below in which systems behave in some simple sense.

There has been quite a bit of work done in the area of project complexity for construction. Gidado (1996) identified six variables that have an impact on project complexity. They are: 1) the employed resources; 2) the environment; 3) the level of scientific and technological knowledge required; 4) the number of different parts in the work flow; and 5) the interaction of different parts in the work flow. Wood and Ashton (2009) have taken the work of Gidado forward and have defined project complexity in terms of six elements which are: 1) Inherent complexity; 2) Uncertainty; 3) Number of technologies; 4) Rigidity of sequence; 5) Overlap of phases or concurrency; and 6) Organisational inherent complexity. This definition clearly takes us out of the domain of construction and helps us define it in more generic terms. However, most of the elements defined can be classified as project structural complexity related variables. In another research Cicmil and Marshall (2005) suggest three aspects of complexity in construction projects, which are: 1) complex processes of communicative and power relating among project actors; 2) ambiguity and equivocality related to project performance criteria (success/failure) over time; and 3) the consequence of time flux (change, unpredictability and the paradox of control). These factors are generic enough to be applied to non-construction projects as well. Leung (2007) has devised a way to measure complexity in construction projects. He has developed a Construction Complexity Index (CCI). There are ten variables defined by him that define project complexity. These variables are: 1) project duration; 2) working spaces; 3) contract sum; 4) site area; 5) type of structure; 6) height of building; 7) site location; 8) client; 9) usage of building; and 10) total floor area. Some of these variables can be generalised for non-construction projects as well.

Crawford et al. (2008) have provided seven reasons for increased project complexity. The first reason is the delivery of complicated artefacts, such as physical infrastructure which adds complexity by design. The second is complexity added due to organisational change, which is often a part of project management. Projects intending to deliver organisational change bring about an added level of uncertainty among their stakeholders, and hence, the added complexity. The increase of project lifecycle to include elements of the operational phase and the endeavour to provide long term sustainability to the outputs will result in added complexity as well. New delivery mechanisms of projects such as public-private partnerships add to a new level of complexity in the project. The recent increase in the need for accountability and transparency in corporate governance has added more pressure on project managers and has increased the overall complexity in project management. Advances in communication technologies have benefited project managers, but it has also led to more demands by clients to monitor the project and follow the progress more closely, which in turn has resulted in higher levels of complexity in a project. Changes in societal values with all the different generations, ranging from Baby Boomers to generations X and Y, have further resulted in stakeholder management due to there being increased demands for and expectations of involvement and participation. At the same time, communication and other technologies have made faster response possible and raised expectations, putting practitioners under accelerated time pressures to deliver. All these factors have led to severe increase in complexity of projects and have put additional pressure on the project manager. It is important that we contextualise these additional issues for Abu Dhabi and propose a modified competency based framework for developing the programme and project managers of the future.

Vidal et al. (2011) conclude that in order to measure project complexity, we need to familiarize ourselves with four factors. The first one is project size. This is defined as the sum of sizes of the elementary objects that exist within the project. The second factor is project variety. Project variety is the diversity of the elementary objects that define the project. The third factor is project interdependence. This factor includes the relationships between elementary objects within a project. The last factor is the project context. This refers to the environment or the context in which the project is undertaken. Vidal and Marle (2008) state that as the complexity of the project increases, so does the risk and uncertainty associated with it. Geraldi et al. (2011) have reviewed the evolution of project complexity and have noted that we have evolved from earlier definitions of project complexity that talked about structural complexity of the project to a point where we talk about issues such as socio-economic impact of the project, pace of the project, dynamics of the project, uncertainty in a project, and structural complexity of the project. This evolution in the definition clearly indicates that there is an acknowledgement that the complexity of a project is dependent not only on the internal elements but external micro and macro factors as well. Thomas and Mengal (2008) contend that given the rise in complexity of the projects,

“project managers must be both technically and socially competent to develop teams that can work dynamically and creatively toward objectives in changing environments across organizational functional lines.”

Figure 2.6 below indicates that for complex projects, it is important for the project manager to develop emotional competence in project management along with the intellectual competence.



Fig 2.6: Three-dimensional model of project management knowledge (Thomas and Mengal, 2008)

The literature review presented in this chapter has covered a range of issues starting from career path, project and programme manager competency, project and programme competency, and project and programme complexity. This wide range of literature review has provided some key insights into a range of issues that has helped in establishing the current state of the art knowledge and will be used to develop data collection instruments and strategies.

2.10 Summarising the Way Forward

This chapter has highlighted several key areas that will be addressed as part of this research. The first area was career path. It was important to look at defining what a career path is and developing an understanding of different facets that constitute a career path. Then the chapter talked specifically about a project manager's career path. This section highlighted some key issues. The first one was that the project manager career path could be defined considering the different competency frameworks that have been defined by professional bodies. It also highlighted that attainment along these competencies could be used to assess the time of progression. One of the things that came out of the literature was that most of the organisations that have some sort of competency evaluation framework take the frameworks developed by bodies such as PMI and APM as a starting point. They have used these frameworks because they seem to be quite comprehensive. They then modify these frameworks according to their needs. For this research I have considered the APM framework since it is already an encouraged professional certification in several Abu Dhabi government departments.

Project complexity is a major factor that is considered when assigning project managers to specific projects, and hence, any framework that is developed for facilitating the progress a project manager has to take into account the project complexity variables. There is an implicit assumption that at some later point their careers a project manager will take on a programme manager role. However, not much is defined in terms of that boundary between project and programme managers. This research is going to take into

account the existing knowledgebase in terms of project and programme manager competencies and then endeavour to establish the link so that the boundary between a project manager's role and a programme manager's role is established more explicitly. So all the major areas presented in this review of literature will be taken to develop data collection instruments and analyse the data in order to fulfil the objectives of this research. The next chapter presents the methodology to be followed by this research and is followed by chapters on data analysis, discussion, and conclusions.

Chapter III

Research Methodology

3.0 Introduction

This chapter summarises the research methodology followed in this research. It starts with providing a theoretical underpinning and discusses the position of this research in terms of its philosophical position and concludes with presenting the methods followed in order to fulfil the objectives of this research.

3.1 Research Philosophy

Research methodology refers to the overall approach to a problem which could be put into practice in a research process, from the theoretical underpinnings to the collection and analysis of data (Collis & Hussey, 2003). The selection of an appropriate methodology is vital in order to achieve valid and reliable results. For this, it is important to understand the philosophical underpinnings of the research and a viable research approach.

Philosophy of Research - The three main dimensions of describing the philosophy of research are epistemology, ontology, and axiology. These dimensions are concerned with the nature and reality and the acceptable knowledge in the field of study. These assumptions will help position the research within the philosophical continuum.

Ontology – The first philosophical stance is that ontology is concerned with the nature of the reality (Saunders et al., 2007). This relates to the assumptions researchers have about the way the world operates. This consists of two main aspects: objectivism and subjectivism. Objectivism represents a position where social entities exist in reality that are external to the social actors concerned with their existence. On the other hand, subjectivism holds that social phenomenon are created from the perceptions and the consequent actions of the social actors concerned with their existence (Saunders et al., 2007).

This research study aims to develop a career progression framework for project managers by studying the competence traits of project and programme managers. This deals more with the nature and behaviour of project managers and how that will affect the final success of the project or a programme. Most of these traits could be classified as soft skills, and therefore, fall in the realm of subjectivism. Some of these traits are more objective like the number of years or number of projects that the individual has managed. These lie more in the objectivism domain. After reviewing the literature so far, it appears that there would be higher number of softer competencies, and therefore, this research leans more towards subjectivism than objectivism. This can be depicted in Figure 3.1 below:

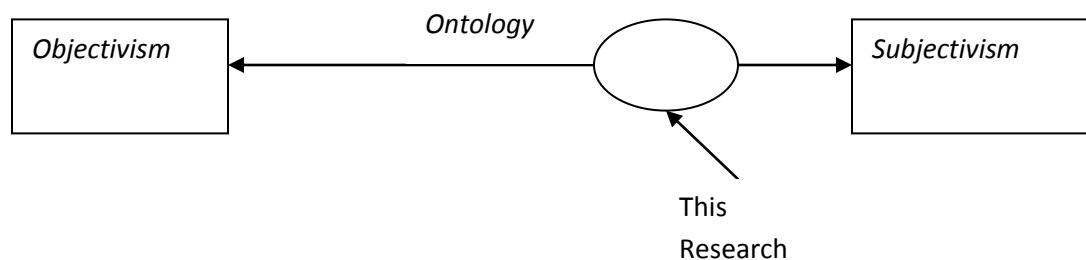


Fig 3.1– Philosophy of Research – Ontological stance

Epistemology - Epistemology comes from the Greek word “epistêmê”; the term for knowledge. In simple terms, epistemology is the philosophy of knowledge or of “*how we came to know*”. The two contrasting views on how social science research should be conducted; can be labelled as positivism and social constructivism (Saunders et al., 2007). The idea behind positivism is that the social world exists externally, and its properties should be measured through objective methods rather than being inferred subjectively through sensation, reflection, or intuition. The positivist philosophical stance assumes that “the researcher is independent of and neither affects nor is affected by the subject of the research” (Easterby-Smith et al., 2008). Under social constructivism, the reality is determined by people rather than by objective or external factors. Unlike the positivist, the social constructivist does not consider the world to consist of an “objective reality but instead focuses primarily on subjective consciousness” (Easterby-Smith et al., 2008). Thus, the social constructivism paradigm assumes that reality is not objective or external but is socially constructed and given meaning by players and people who form part of that reality.

This research will explore the competencies of project and programme managers in order to establish a career progression framework. The majority of factors reviewed so far are softer factors; however, some might be more objective. In this context, it could be said that the research takes a stance that needs to look into both the philosophies of positivism and social constructivism with a bit more propensity towards social constructivism. This can be depicted in Figure 3.2 below:-

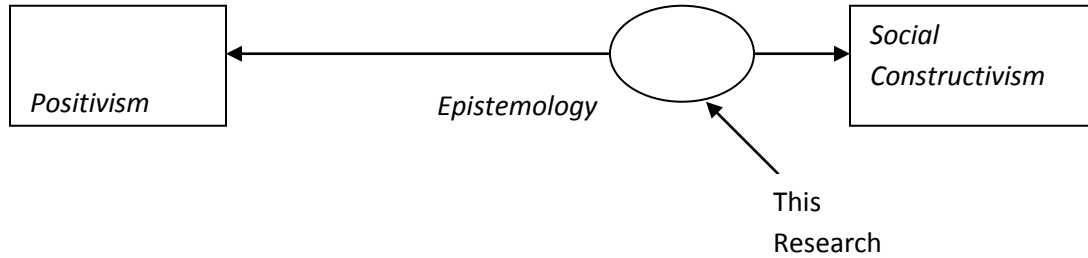


Figure 3.2 – Philosophy of Research – Epistemological stance

Axiology – Greener (2008) explains that axiology is important in research because it focuses on the roles that individual values play in the way choices for research are made. Saunders et al. (2009) explain that axiology is concerned with the judgements that people make about value; especially the researcher who is involved with data collection and analysis. The argument has been that the way people value things could influence their process of social inquiry because they could either be concerned or not concerned; therefore, the importance they may attach to the research could also be affected by value. There are two types of axiological stance: value laden and value free. Since the researcher is part of the Abu Dhabi government sector and most of the respondents would be from his work environment, he will have some understanding of the context and also content of issues being raised. Therefore, for this research the axiological stance would be a value laden stance.

3.2 Research Approach

Hughes and Sharrock (1997) define research as “carrying out an investigation to discover something that is not already known about.” The research approach normally begins with an investigation of theory that summarizes and organizes knowledge by proposing a

general relation between events. The research approach consists of four components:

Purpose of Research, Process of Research, Logic of Research, and Outcome of Research.

- Purpose of Research is exploratory, explanatory or descriptive.
- Process of Research is either quantitative or qualitative.
- Logic of Research is either deductive or inductive.
- Outcome of Research is either applied or basic research.

Robson (2002) explains that exploratory research is conducted to find out what is happening or to find new insights. The purpose of this research is of exploratory type because there have been no studies done so far to identify the project manager and programme manager competencies in order to establish a career progression framework for Abu Dhabi. For data collection, this research will be employing the methods: pilot study, questionnaire and interviews and if required focus groups. Thus, this research work would follow both; qualitative as well as quantitative process of research. The logic of this research will employ inductive as well as deductive (or dialectic) processes. The initial part of the research will follow a deductive pattern; factors identified after literature review, framework created using pilot study, and framework refined by questionnaire. The remaining part of the research would be inductive; the refined framework will be validated through expert interviews and focus groups, and analysis would be done to refine the framework. This research is an applied research as the aim of the research is to make a contribution to the application of a career progression theory and career path research for project managers.

3.3 Research Phases

This research investigation is divided into two distinct aspects: first, the process of developing the conceptual framework and the research question testing; and secondly, the design that involves the planning of the actual study, location of the study, sampling, data collection, and data analysis (Sekaran, 2003). The activities in this research have been divided into three inter-dependent phases. These phases are: research planning, research development, and research validation.

The research planning activities include desk studies consisting of literature review, designing the research methodology, and conducting pilot study. The pilot study interview questionnaire instrument will be created on basis of the literature review and discussion. This interview instrument will be used to elicit information from a sample set of senior project and programme managers in government departments in the emirate of Abu Dhabi. This information will be analysed qualitatively and will be used for creation of a conceptual framework to establish a career path for project managers. The schematic representation of the research is depicted in figure 3.3. This is how this research is conceived at the moment. Once the data from the pilot study is summarised, then this conceptual framework will become more populated. This framework will be used as the starting point for the research development phase.

The research development activities include data collection through questionnaire survey, and expert interviews followed by quantitative analysis of data and refining the framework created in the planning phase. The results of survey questionnaire will also provide an opportunity to establish correlations between project and programme manager

competencies as well as success metrics and complexity. The refined framework will be used in the research validation phase. The final phase is the research validation phase and its objective is to validate the research findings. This would be done through interviews and focus groups. The data collected by this method will be analysed and the final findings will be critically examined to draw conclusions and future research recommendations. Successful completion of the activities of this phase will signify the completion of the research process.

The pictorial depiction of the research phases is shown in Fig 3.4. All the research activities are divided into three interdependent and sequential phases: research planning phase, research development phase, and research validation phase. A total of 14 research activities are going to be carried out in these three phases. The completion of the research validation phase will signify the culmination of the research work undertaken.

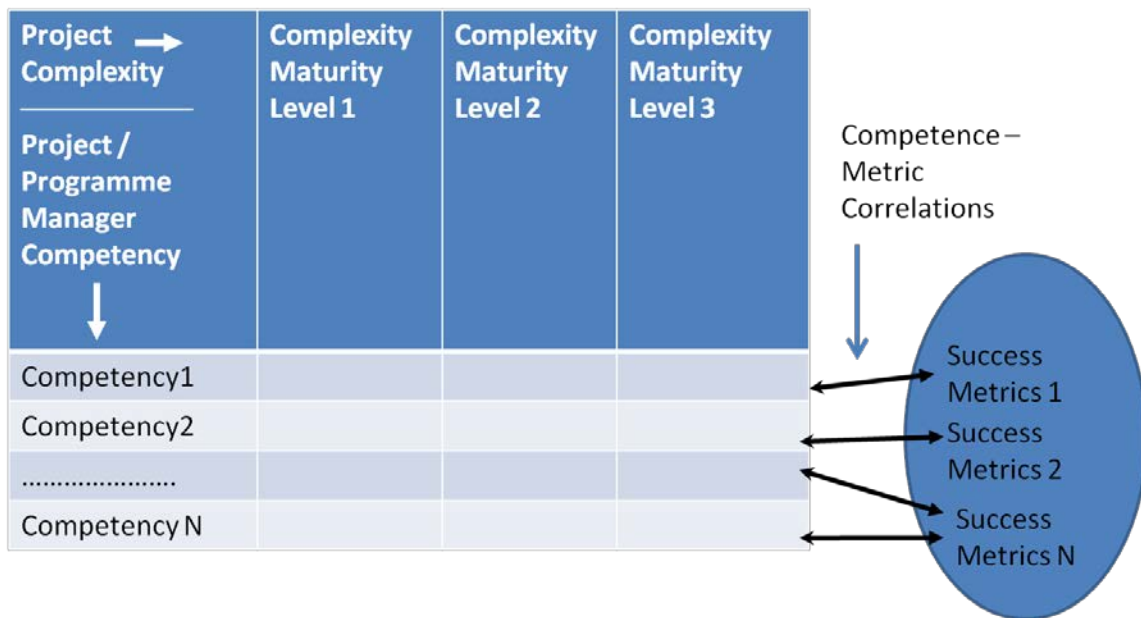


Figure 3.3: Schematic Representation of this Research

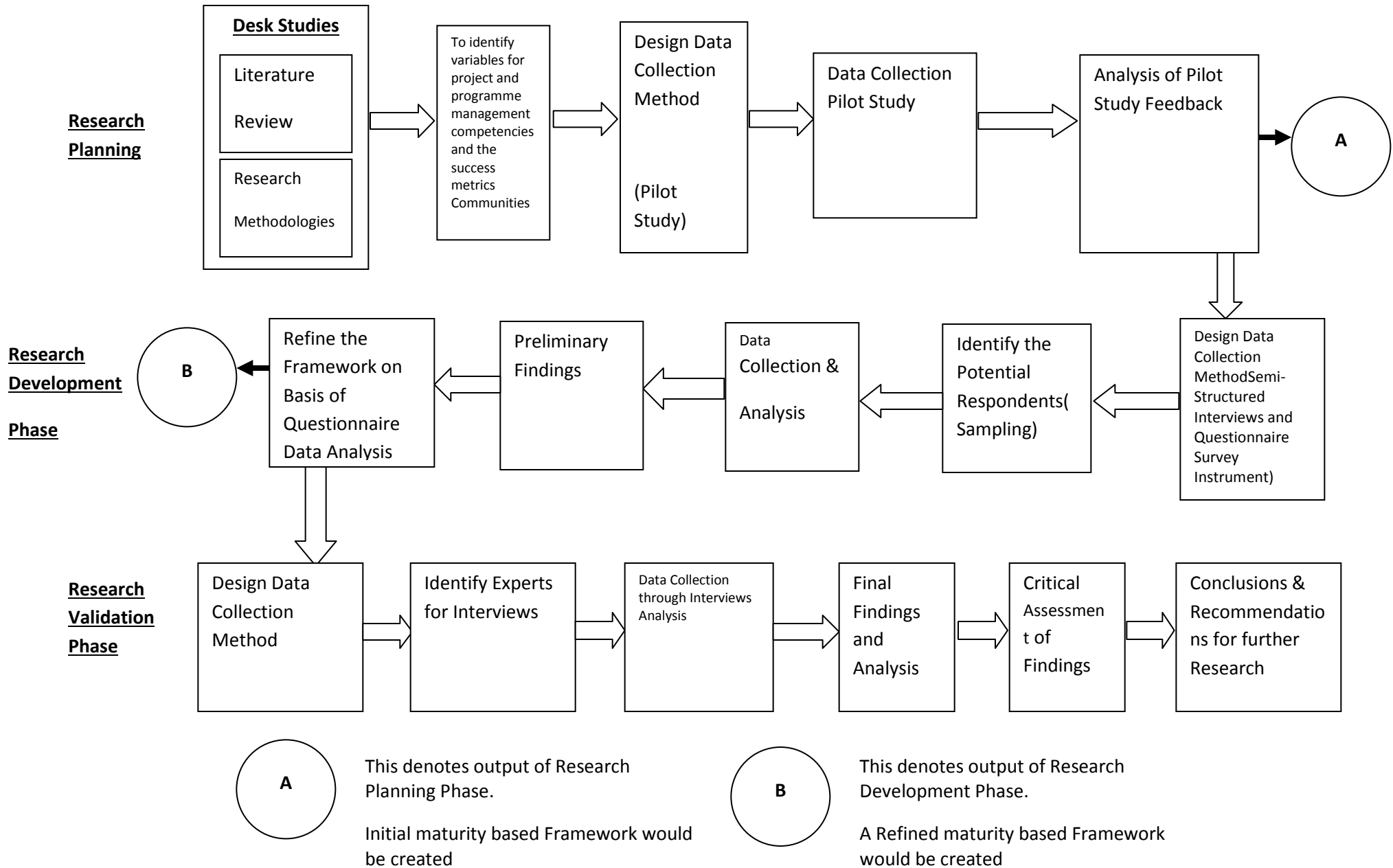


Figure 3.4– Research Phases

3.4 Research Activities

This section will explain the details of the primary research activities that were carried out during each of the research phases. Each research activity is explained in terms of three parameters: the need for the research activity, the method adopted, and the expected outcome of the research activity.

3.4.1 Research Planning Phase

There will be two primary research activities in the research planning phase: literature review and pilot study. Through the review of literature, the current state of the art knowledge globally in this area will be documented and an initial design of data collection instruments conducted. A pilot study will be used to further refine the data collection instruments and prepare them for final data collection.

3.4.1.1 Literature Review

Literature review and synthesis will continuously support this research throughout its process. The literature review will explore the fields: Career Path, Project Manager Career Path, Project Manager Competencies, Programme Manager Competencies, Success Metrics for Project Management, and Programme Management. In reading the current research, the researcher is advancing his knowledge, understanding, and perspectives of the areas. This research used the university library to search for the relevant material. The university has an access for 25000 journals. Because the university had the subscription to main databases such as EBASCO, Science Direct, Emerald, Google Scholar and Wiley, a search was performed on these databases using the keywords: project manager competency, programme manager competency, project success metrics, programme success metrics, project complexity,

programme complexity, career path, project manager career path, and career progression. The literature review helped identify the variables needed to construct the primary data collection questionnaire instrument.

The literature review was divided into three parts: reviewing different career path models, looking at competency skills of project and programme managers, and establishing the success metrics for project and programme managers as well as variables that help define complexity for both project and programme management careers. Although a bigger chunk of literature review was conducted at the beginning of this study, some parts will be continuing throughout the research.

The literature review provides a basis for developing the research instruments through initial identification of the factors and project/programme success as well as complexity could be assessed.

3.4.1.2 Pilot Study

A pilot study would provide an opportunity to test some of the research objectives and research questions; thus, enabling the researcher to make necessary changes or amendments before the primary data collection is conducted. A pilot study acts as a rehearsal for the main study and helps refine the data collection instruments needed to collect data for the study (Yin, 2012). The pilot study will highlight any issues that have been overlooked in the design of data collection instruments. It will provide insights into the questions that have been phrased for this study and how the study is planned to be conducted. It can also provide insight into the layout and duration and length of survey or interviews that will help provide the ideal kind of results.

For the initial data collection there were three data collection instruments that were designed based on the information gleaned from the review of literature. The first data collection instrument will be used to assess the viewpoint of senior project managers in the Abu Dhabi government departments through a semi-structured interview. One senior project manager was used to conduct the pilot and had several comments about the interview. He highlighted some issues with the total duration of the interview. He felt that the researcher should endeavour to complete the interview in about an hour; otherwise, the individuals responding to the interview will lose interest. Therefore, a note was made to keep track of time while conducting the interview. The other two data collection instruments were meant to collect data through survey of large numbers of project and programme managers. These instruments were presented to two project and two programme managers. There were some common themes that emerged from their feedback. The first one was that although most of the questions were important, there were about 20 questions on profile and those needed to be reduced. This provided some information for the researcher; and therefore, the number of research questions was reduced. The second major issue raised was about the questionnaire in the format being too long. It was suggested to format the questionnaire in tabular form. The third issue that was raised was regarding the plan to send the questionnaire via email or post. The participants felt that generally the response rates are lot lower when such means are adopted. Therefore, it would be good to use forums such as Survey Monkey to facilitate the data collection. Survey Monkey links could be sent via email to respondents who could then respond online, and the raw data is compiled by the portal itself.

3.4.2 Research Development Phase

There were two major steps undertaken within the research development phase. The first step was the semi-structured interview. The second was a much wider survey questionnaire with

structured questions. The semi-structured interviews will be used to establish the context of Abu Dhabi; whereas the survey questionnaire will be used to collect data that will be used to establish relationships between competence and success as well as complexity. These two steps are described in detail in the following two sub-sections.

3.4.2.1 Semi-structured Interview

The review of literature had provided some good insight into issues such as project and programme manager competencies, their success factors, and the complex daily issues they have to deal with. The review of literature was also helpful in establishing a good background about career path research and career path for project managers in particular. However, one thing that was not possible to establish through literature review was the context about Abu Dhabi government departments and how they perceive the progression of a project manager. In order to establish this context, the researcher had to rely on semi-structured interviews. Therefore, in order to document the progression route this researcher conducted 6 semi-structured interviews in Abu Dhabi. Each of the participants had on average about 10 years of experience working on projects or programmes. They were promoted from project to programme managers to section heads and to vice presidents for projects or programmes. Each of the interviews lasted for about 55 minutes. There were eight questions in total that were asked. The questions asked were as follows:

1. What link do you see between the jobs of a project manager to a programme manager?
2. How do you see the difference in roles of project and programme managers in the Abu Dhabi government?

3. How does a project manager evolve in his career to become a programme manager?
What competencies do you see in a project manager for considering them to be promoted to a programme manager?
4. What are the major challenges a new programme manager faces after being promoted from a project manager and how does Abu Dhabi government departments provide them support and training to deal with these challenges?
5. If you were to classify the different types of projects, what would they be? How would you measure the success of these projects differently?
6. What difficulties are faced by new programme managers in the Abu Dhabi government?
7. What are the unique cultural and national factors of Abu Dhabi that impact the performance of project and programme managers?
8. What is a typical progression path of a project manager in the Abu Dhabi government and how can a decision to promote him/her be made more objective?

These eight questions provided a good basis to establish the context of Abu Dhabi government departments and the issues facing the project managers and programme managers in these departments. The data collected was analysed using content analysis. The interviews were transcribed, and then based on the transcript keywords representing the themes of responses were document. A link was established between these keywords, and then an analysis of the content led to preliminary insights into a career path of a project manager. However, what was missing was an objective basis to identify the milestones where one could confidently say that the project manager is ready to move on to the next stage. This will be accomplished through further analysis using the data collected from the questionnaire survey.

3.4.2.2 Questionnaire Survey

The purpose of this survey would be to determine how project and programme managers feel about different competencies and how they rate success metrics in the context of Abu Dhabi government departments. The objective of the questionnaire survey is to validate and refine the research framework as well as to establish the relationships between success factors, complexity, and competencies created as an outcome of the research planning phase. The item generation for the questionnaire survey instrument was done on basis of the literature review and responses obtained during the pilot phase. Questions were phrased so as to collect quantitative data using appropriate scales. The types of questions used in the questionnaire were mainly of the closed question style which enabled the respondents to give answers that fit into categories that have been established in advance by the researcher. A five-point Likert scale was employed to enable the respondents to rank the importance of each factor from a minimum of “not important” to a maximum of “extremely important”.

An electronic survey method was used in this research. A web based questionnaire instrument was posted on [surveymonkey.com](https://www.surveymonkey.com). Project and programme managers were approached via email and were given access to this questionnaire. The mailing list was developed by approaching different government departments in the Emirate of Abu Dhabi. The researcher himself works for a government department and has access to a large number of potential participants. The sampling used was purposive sampling because only project and programme managers were selected to respond to the survey. The first step in the process of eliciting views on project and programme management competencies from the Abu Dhabi government sector was to develop and distribute a questionnaire. The development of the questionnaire started with a review of the literature. Based on the review of the literature a body of knowledge from Association of Project Management was chosen and the competencies listed for project managers. For programme managers, a separate list of

competencies was used from the literature. The surveys questionnaires are included in Appendix A and B. Appendix A has the survey questionnaire developed for project managers. The questionnaire has 68 questions in all. The first six questions are the profile questions included to ascertain the general characteristics of the respondent population. Questions 7 through 53 deal with the project management competencies and asks respondents to rate their importance. Questions 54 through 63 discuss different project success criteria and their importance in the Abu Dhabi government departments. Questions 64 through 68 look at the measures of complexity and their importance in the context of Abu Dhabi government departments.

Appendix B is the survey questionnaire that would be administered to programme managers. This questionnaire has 41 questions. The first six questions are profile questions. Questions 7 through 26 list the competencies for a programme manager and their importance in the context of Abu Dhabi government departments is sought from the respondents. Questions 27 through 36 list the success criteria for programmes in Abu Dhabi government and the importance of those criteria to Abu Dhabi government departments. Questions 37 through 41 list variables that define the complexity of a programme; the purpose is to elicit the views of programme managers on its importance for Abu Dhabi government departments.

The survey was administered through [surveymonkey.com](https://www.surveymonkey.com). An email to all the Abu Dhabi government project managers and programme managers was sent to inform them about the respective instruments on [surveymonkey.com](https://www.surveymonkey.com). There were about 3000 project managers and about 1200 programme managers that were contacted. In all 460 completed responses from project managers and 282 from programme managers were received. The profile of the respondents is presented in Chapter 5. The response rates were 15% for project managers and

24% for programme managers. According to Hair et al. (2006,) there is still a way for ensuring the reliability of the data in case of multiple regression when the response rates are below 30%. If one looks at the difference between R-square and R-square adjusted and the difference is less than 30%, then that indicates that the sample is at least 70% accurate representation of the population, which can be regarded as acceptable. In order to ensure reliability, this test will be done on all the multiple regression analyses conducted in the data analysis chapter.

Data analysis for this research would consist of tabulating and testing the data gathered using a set of qualitative and quantitative methods. The aim here would be to recombine the evidence to address the initial propositions of this research (Yin, 2012). For statistical analysis software such as SPSS, was used to aid the analytic process in this research. The following statistical methods would be used for the analysis of the data collected from the above mentioned electronic surveys.

Descriptive statistics would be used to describe the main features regarding the profiles of the responded. This provided a better understanding of the people who were responding to surveys. Reliability analysis would be used to determine the reliability of the data collected from questionnaire survey. Four major relationships needed to be established as part of the data analysis:

1. Project Manager Competencies to Project Success Criterion
2. Project Manager Competencies to Project Complexity
3. Programme Manager Competencies to Programme Success Criterion
4. Programme Manager Competencies to Programme Complexity

The data was analysed using multiple regression. Multiple regression is a general statistical technique used to analyze the relationship between a single dependent variable and two or more independent variables (Hair et al., 2006). The objective of multiple regression analysis is to predict changes in the dependent variable in response to changes in independent variables. This objective is most often achieved through statistical rule of least squares. In this study, hypothesis testing is done using multiple regression analysis. Various statistics used are explained below.

Normal probability plots were used to verify that the residuals were normally distributed. Residuals are the actual value of the dependent variable minus the value predicted by the regression equation. The residual divided by an estimate of its standard deviation is known as the standardized residual. One can obtain histograms of standardized residuals and normal probability plots comparing the distribution of the standardized residuals to a normal distribution. R represents the correlation between the observed values and the predicted values (based on the regression equation obtained) of the dependent variable. R Square (R^2) gives the proportion of variance in the dependent variable accounted for by the set of independent variables chosen for the model. R Square is used to find out how well the independent variables (IV) are able to predict the dependent variables (DV).

The coefficient of determination R^2 - It represents the percentage of the variation in the outcome that can be explained by the model. However, the R^2 value tends to be a bit inflated when the number of IVs is more or when the number of cases is large. The adjusted R^2 takes into account these things and gives more accurate information about the fitness of the model. Ideally, its value should be same or very close to R^2 . The difference between the

two explained that if the model were derived from population rather than a sample, it would account for change % less variance in the outcome.

The F value represents the ratio of the improvement in prediction that results from fitting the model relative to the inaccuracy that still exists in the model. A significant value means that the final model significantly improves our ability to predict the outcome variable. Based on the analysis of the data the relationships are shown between:

1. Project Manager Competencies to Project Success Criterion
2. Project Manager Competencies to Project Complexity
3. Programme Manager Competencies to Programme Success Criterion
4. Programme Manager Competencies to Programme Complexity

The influence on project and programme success criterion on each other establishes those two variables as the link between project and programme manager competencies. This link helps establish the link for transition from a project manager to programme manager. All this analysis is presented in Chapter 5. Once the individual becomes a programme manager then it is important to see how he/she transitions from one stage to the next at programme management level. Therefore, for the purpose of this research we needed to identify within programme manager competencies which ones are the drivers and which ones are driven? In other words, what are causes and what are effects? In order to accomplish this, this research will use a Multi Criteria Decision Making (MCDM) approach called DEMATEL.

Multi Criteria Decision Making (MCDM) methods are being used in this research to offer a solution by combining the qualitative subject matter expert opinion with quantitative mathematical techniques. There are some limitations of MCDM, for example, it remains

really difficult to model inputs such as political influence or public opinion but despite all these constraints, It has been concluded by some researchers that the combination of MCDM models provide even more realistic solutions (Mandal & Sakar, 2011). MCDM methods attempt to eliminate the influence of ambiguity and intuition from any analysis. The technique of DEMATEL (The Decision Making Trial and Evaluation Laboratory) is chosen to do further analysis. This analysis results in the identification of a cause group of variables and an effect group of variables. The primary purpose of this was to investigate the relationship between complex and intertwined group of variables. It has been extensively accepted as an important tool to solve the cause and effect relationship among any kind of evaluation criteria (Lin & Tzeng, 2009).

For this research the researcher took the programme manager competencies and established which of these is the most important (cause) and which ones are the effect. Which ones are the drivers and which ones drive the relationship. The more important ones could be identified as the competencies for the first level of program management position, and the second level would be the competencies at the second level of director of programme management. Two directors of programme management, both with more than 20 years of experience, were chosen to provide a rating and establish a relationship between programme management competencies. The two decision makers gave their opinions on a 0 to 4 scale. The procedure of DEMATEL technique is explained in the following steps:

Step 1:

The scale is defined for the decision matrix ranging integer value from 0 to 4. A higher value is assigned if the respondent feels a strong direct influence between the indicators. The score 0 signifies “no response”, 1 signifies “little influence”, 2 signifies “moderate influence”, 3 signifies “high influence”, and the score 4 signifies “very high influence”.

Step 2:

The initial direct influence matrix, $D_{n \times n}$ is formulated as Equation 2, where d_{ij} represents the influence of element i on element j , (i, j belongs to values from 1 to n). The elements of this initial matrix are the values of the responses which are taken directly from the respondents. These responses are dependent upon the respondent's judgement. Later the average direct influence matrix $Z_{n \times n}$ is formed as in Equation 3 in which each element of the matrix will be derived by taking the average values of the scores d_{ij} assigned by the different respondents for the same indicators.

$$D_{n \times n} = \begin{pmatrix} d_{11} & \dots & d_{1j} & \dots & d_{1n} \\ \dots & \dots & \dots & \dots & \dots \\ d_{i1} & \dots & d_{ij} & \dots & d_{in} \\ \dots & \dots & \dots & \dots & \dots \\ d_{n1} & \dots & d_{nj} & \dots & d_{nn} \end{pmatrix}$$

Equation 1

The average influence matrix is given in the following way:

$$Z_{n \times n} = \begin{pmatrix} z_{11} & \dots & z_{1j} & \dots & z_{1n} \\ \dots & \dots & \dots & \dots & \dots \\ z_{i1} & \dots & z_{ij} & \dots & z_{in} \\ \dots & \dots & \dots & \dots & \dots \\ z_{n1} & \dots & z_{nj} & \dots & z_{nn} \end{pmatrix}$$

Equation 2

Step 3:

The normalized direct influence matrix will be calculated. This matrix can be computed with the help of Equation 3 and the relation is written in the following manner.

Step 4:

The matrix of total relations, T which (full direct/ indirect influence) can be derived from the Equation 4

$$T = X * (I - X)^{(-1)} \quad \text{Equation 3}$$

Where I is the identity matrix and $(I - X)^{(-1)}$ is the inverse of the matrix $(I - X)$ matrix. To obtain a map of relationship, a digraph, a decision-maker must set a threshold value to filter out some negligible effects. In fact, while doing this only the values more than the threshold value will be retained and shown in digraph. The threshold value can be calculated as the average of all the values of matrix T or is decided by the decision-maker or by experts through discussion (Tzeng et al., 2007).

Step 5:

The Total-relation matrix ($T = t_{ij}$) will be analyzed in a detailed way. The sum of rows and sum of columns are calculated. Suppose D_i represents the sum of all the elements of row i of matrix T . It shows the total amount of influence (directly or indirectly) dispatched by the component i on other components. Suppose R_j represents the sum of all the elements of column j of matrix T . This shows the total influence received by the component j from the other components. The sum of columns (D) and the sum of the rows (R) are calculated by using Equation 6 and Equation 7 respectively.

$$D_i = \sum_{j=1}^{j=n} t_{ij} \text{ for all } i = 1, 2, \dots, n \quad \text{Equation 4}$$

$$R_j = \sum_{i=1}^{i=n} t_{ij} \text{ for all } j = 1, 2, \dots, n \quad \text{Equation 5}$$

The value of $(D + R)$ is important and indicates the amount of influence of both dispatch and receipt. The more related factors will have high values of $(D + R)$. Same way, the value of $(D - R)$ shows the “severity of influence”. In fact, the prioritization of factors can be decided with the help of $(D - R)$ values. In general, higher value of $(D - R)$ indicates that it is a “cause factor”, which dispatches the influence to other factors and the lower value of $(D - R)$ indicates that it is an “effect factor”, which receives the influence from the other factors. If the factors show the higher values of $(D - R)$, then it means that they will dispatch more influence on others. With this influence, they are presumed to have more priority over the others.

Hence, in other words, it can be stated that, the lower values of $(D - R)$ of factors indicate more influence on these factors by the other factors or lower priorities of these factors as compared to others. All values of $(D + R)$ and $(D - R)$ are arranged in the descending order. Practically, the value of $(D - R)$ is more effective and applicable than $(D + R)$. The component with the highest positive value of $(D - R)$ can be named as the master dispatcher and the component with the lowest value of $(D - R)$ can be named as the master receiver. Establishing the cause and effect helped determine a progression path that could be followed by project managers once they enter the programme management domain. The results of DEMATEL analysis are presented in Chapter 6. Once the results of the three data collection

exercises were analysed, a framework was developed, which was presented to experts for validation.

3.4.2.3 Experience during Fieldwork

The data collection process throughout this research had to face a range of issues. One of the major issues was the focus of this thesis, which was on government departments. Most of the people approached were from government departments and were reluctant to participate because they did not want to appear to be against any of the government policies. Some people were even questioning whether it would be legal for them to participate and wanted to check independently before they agreed to participate. The experts needed for semi-structured interviews and DEMATEL were very senior people and it was very difficult to get an appointment with them. There were several last minute cancellations. However, as the participation had to be voluntary, these last minute cancellations were accommodated either by rescheduling the interview or by looking at alternate individuals. There were additional challenges faced during the administering of the two surveys. The first issue was the ability to get access to large number of participants. The only way to get access to a large number of participants was through the Human Resources (HR) department of Abu Dhabi government. However, in order to administer any questionnaire through the HR departments, it was essential that the survey questionnaire be translated into Arabic. The challenge with translation was to get an accurate translation of the questionnaire. In order to accomplish accuracy, the researcher used certified technical translation firm which was expensive. All these challenges had to be overcome to facilitate good data collection. It is recommended that in future researchers keep these issues in mind before undertaking any data collection in the Middle East.

3.4.3 Research Validation Phase

The outcome of this activity would be a refined framework(s) for project and programme manager competencies and the correlations with success metrics. This framework will provide a career progression pathway for project managers with objective measures that could be developed at each stage in their careers, so they could be assessed appropriately. Once this framework was conceptualised, it was presented to two experts for validation. These two experts were the same individuals who had done the DEMATEL analysis for this thesis. Both of them were directors of programme management, and both had more than 20 years of experience. They both were brought together in the same room and the overall findings of the whole research so far were shared with them. They were also provided with the results of their own DEMATEL analysis. The session lasted for about an hour where they evaluated different aspects of the problem and the conceptual framework. These experts suggested some revisions to the framework and the revised framework has been presented in figure 7.3. Through these research methods, the overall aim and objectives of this research have been achieved. Chapter 4 that follows this chapter presents the results of the interviews of six senior project managers. Chapter 5 presents the results of the survey; Chapter 6 presents the results of DEMATEL; and Chapter 7 presents the final analysis and the framework. Chapter 8 summarises the major conclusions of this research.

Chapter IV

Data Analysis 1

4.0 Introduction

One of the aims of this thesis is to document a career path that could be undertaken by a project manager leading to a programme manager position and beyond. It is quite important to establish a link between competencies to facilitate progression from project manager to programme manager. There is quite a bit of literature that talks about project manager and programme manager competencies. Most of it has been documented in the literature review section. However, not much exists in terms of progression of a project manager to programme manager.

This thesis is analysing the progression of a project manager to a programme manager within the context of Abu Dhabi government departments. This added focus makes it even more challenging to find literature that is so specific. Therefore, in order to document the progression route, this researcher conducted six semi-structured interviews in Abu Dhabi. Each of the participants had on average about 10 years of experience working on projects or programmes. They were promoted from project to programme managers to section heads and to vice presidents for projects or programmes. Each of interview lasted for about 55minutes. There were 8 questions in total that were asked. The results of the responses are presented in the following sections.

4.1 Semi-structured Interviews

Question1:

The first question that was posed to the interviewees was about what link they see between the jobs of a project manager to a programme manager?

There was one very important theme that emerged as part of the interviews. The issue that interviewees highlighted was the connection to be established between the project and programme manager jobs based on the expected success criteria to be employed for assessing projects and programme. Some of them highlighted that in a way the success of programme is linked to the success of individual projects within the programme. A majority of participants started discussing the project success criteria and tried to derive programme success criteria based upon the analysis of project success.

- Looking at the **list of project success criteria** it is easy to derive programme success criteria. The list includes timely completion, within budget, as per specifications, good risk assessment and management, meets stakeholder satisfaction, satisfaction of programme objectives, benefits to organization, benefits to community, programme implementation process, and customer satisfaction. Taking these success criteria one at a time, we can see that timely completion of a project is compulsory for the overall timely achievement of the programme objectives. Although, programmes have long and in some cases undefined time horizons, they are planned in Abu Dhabi government departments based on 5 or 10 year visions about the future from the government. Therefore, there is still an anticipated timeframe that one would like the programme to be accomplished. Hence, achievement of programme objectives in

some anticipated time horizon would be important. Two interviewees raised the issue that in programmes that run over 15 or 20 years, there is a possibility that the overall time horizon might not be that clear or important, but there would be intermediate milestones which might have a time horizon and it would be important to achieve those milestones. Therefore, the ability to achieve timely completion of either the milestones or the whole project was considered as a success criteria for the programme as well.

- **The second project success criterion** was the completion of project within budget. A programme will have several projects within it. Generally, in Abu Dhabi government there are annual and in some cases five year budget allocations. It is important to monitor these budgets for the projects and ensure that the budget for the programme is managed appropriately. Some of the projects also act as major milestones within the programme, and there are instances that a “go – no go” decision is taken for future projects within the programme based on the performance of a project that acts as a milestone. Exceeding the budget significantly on the project could be an indication that the anticipated budget for the programme might need increasing. If such a situation arises, then the project funders; in this case the Abu Dhabi government will have to make a decision whether to continue with the programme or to commit the money to other programme that might provide greater benefits per unit cost.

- **The third project success criterion** is the meeting of project specifications. For the overall programme to meet the intended outcomes, it is important that the individual projects also conform to their intended success criterion. If any project does not meet

the intended specifications, then some sort of remedial action might be needed by the programme manager to make sure that any corrective actions needed are taken and the overall programme objectives are still achieved. Therefore, delivering the programme as per specifications is also a reasonable programme success criterion. As highlighted earlier with time and budget, this might also imply that the milestones within the programme will also have some specifications on deliverables, and they will also have to be achieved.

➤ **The fourth success criterion** was good risk assessment and management. Managing and mitigating the risks in the programme will mean managing and mitigating risks effectively in individual projects within the programme. The risks within the programme increases as the risks within each project increases. Therefore, the programme manager will have to monitor and manage risks at project level and then take corrective actions wherever necessary for the programme. This, therefore, is a success criterion for a programme as well.

➤ **The remaining criteria for project success** meet stakeholder satisfaction. Satisfaction of programme objectives, benefits to organization, benefits to community, programme implementation process, and customer satisfaction are also applicable to the overall success of the programme. Therefore, one can use these success criteria as the link between project manager and programme manager competencies. So project manager competencies that lead to a certain success criterion in the project would be related to competencies that are related to similar programme management success criteria. This question, therefore, has provided a

good basis to establish the link between the project manager competencies and programme manager competencies.

Question2:

The second question posed to all the participants was. “How do you see the difference in roles of project and programme managers in Abu Dhabi government?”

The programme and project manager roles differ in nature. These can be explained through the various functions or tasks that are related to each role. The project manager is mostly confined to tasks within project. and therefore. is responsible for managing the technical aspects of the project. These mainly deal with ensuring the tasks at each stage are at control by monitoring the budgets, time, scope, and resources. The project manager, therefore, handles an operational role from the start of the project until the closure and manages the risks involved.

One of the interviewees said

“Any single project failure within a project would have impact on the success of the programme, therefore, a programme manager must have wider and higher level of experience in dealing with various stages of the project across multiple projects.”

The programme manager’s role is more strategic than handling many projects at times and requires having good vertical and horizontal management expertise. Any single project failure within a project would have impact on the success of the programme; therefore, a programme manager must have wider and higher depth of experience in dealing with various

stages of the project across multiple projects. He plays a very strategic role and most importantly plays a crucial role in providing and directing the various programme and having to deal with senior executives for various essential tasks related to the programme. The roles can be differentiated as shown in the table below. A programme manager thus must have five years of experience in multiple projects including at least a few successful projects. It was also pointed out that there is a link between project and programme complexity and this could be used to assess the most appropriate individual for the job. All the project complexity variables such as size, variety, interdependence, context, and rigidity also apply to programme complexity.

Based on the discussions with the interviewees, the table 4.1 below documents the role of project and programme managers.

Project Manager	Programme Manager
Focuses on issues specific to project	Requires to understand the overall perspectives of the organization
Requires to make moderate level of negotiation and decision making	Requires to envisage political and strategic view
Oversees the specifics of a typical project from start to a closure of project	Requires to handle high levels of negotiation and decision making skills
Vertical nature of Management for a project	Oversees the specifics of multiple projects any given time
operation role focused on delivering the output of the projects	Requires to do vertical and horizontal management

Provides leadership in relation to budget ,quality across within a project	Management of cross functional teams
Manage the technical elements such as timeframe and budget	Advanced Budget Management
Improves project schedule, procurement cycle	strategic alignment of the programme
Manage project risks	Programme process Management
Manage variance in project scope and project constraints	Strategic role delivering the programme outcomes
	Provides leadership in relation to budget ,quality across the programme
	Be part of programme board, or a steering committee, managing stakeholders' relations and community expectations
	Develop the fresher's in the team
	Problem solving
	Develop process and measure the success
	Manage bigger and wider risks
	Analyse the project performances

Table 4.1 : Roles of Managers

Question3:

The third question presented to the participants was: “How does a project manager evolve in his career to become a programme manager? What competencies do you see in a project manager for considering them to be promoted to a programme manager?”

As project manager, an incumbent would have exposure to handling the tasks related to a project. They are naturally limited to the individual project and the exposure would narrow in scope depending on the experience with managing the team members of a project.

Interestingly, most of the respondents repeatedly mentioned the the key competencies involving the strategic focus, ability to have the buy-ins, and dealing with higher and senior management effectively and efficiently is the secret to the programme manager's role. It was widely agreed upon that programme manager's role is strategic and must have a vision and ability to be flexible and get the consensus of various stakeholders and team member for its success. Some the key competencies discussed by majority of the respondents included:

- **People Management:** This basically involves managing the interaction with team members and other external people connected to the project.

- **Communication:** This indicates a project or programme manager's ability to clearly specify the programme objectives, decisions, etc. in a clear manner to all its stakeholders.

- **Adaptable and an open mind:** A project and particularly a programme manager should be flexible enough to take the views of his team remembers, able to build consensus and does not exhibit a rigid or impose a one-way direction.

- **Develop Good Awareness of Needs:** This implies that the project and programme managers should develop good awareness of the needs of a project and should be able to define the objectives and outcomes.

- **Avail certifications and engage in workshops and seminars:** This implies that managers should continually engage in developing themselves either through availing certifications, attending workshops, or seminars.

- **Issue management skills:** This implies that managers should have an aptitude to manage the both internal or external concerns arising during the life cycle of a programme or a project.

- **Coordination of outsourced projects:** This implies that managers should have the ability to facilitate the coordination among various departments and organizations related to the programme or project.

- **Negotiations:** Managers should have the ability to negotiate the different contracts or working terms with various stake holders that may include procurements, government agencies, and others depending on the nature of the project.

- **Liaison with senior management:** This implies that managers should have the ability to confidently engage in discussions with senior management.

- **Leadership charisma:** Managers should have the ability to direct, influence and develop leadership within the programme team or from within the organizations. It also implies having an ability to lead regardless of position or location.

- **Be strategic and be able to chart the vision:** This implies that managers have the ability to think and take an higher level long term view of a programme or a project and have capacity to having higher order thinking skills.

- **Leadership skills:** This implies that a manager should have an ability to plan and provide guidance, direction, lead, and mentor all parties. He should be focusing on building abilities to pursue the project, and explain the projects to all its stakeholders. He also should have ability to communicate ideas and develop new skills as needed.

- **Stakeholder management skills:** Managers should have the ability to create win-win situations and an ability to act up to the satisfaction and expectation levels of the stakeholders especially in dealing with experienced stakeholders of a programme.

- **Decision making skills:** Managers must be able to demonstrate an ability to make timely and appropriate decisions relating to the projects or programme matters.

- **Organizational risk management skills:** Managers should have the ability to foresee risks and develop plans to deal with the risks.

- **Financial management skills:** Managers should have enough experience and skills to deal with the financial aspects of the projects: that is estimating appropriate budgets, allocating budgets appropriately by prioritizing the required tasks, and keeping the programme or project within the specified budget.

- **Quality assurance skills:** Managers should have An ability to keep the project as per the conformance of the specification and meeting or exceed the stakeholder expectations. This implies appropriate level of resources usage and ability to plan for the completion of the project as per the plan.

- **Gain experience of critical issues:** Projects involve unforeseen issues that are different in nature from project to project. Programme or Project managers should develop these unique skills to capture this experience and transfer it to the team members. He should also demonstrate the ability to apply the lessons learnt from the experience.

- **A Problem solver:** The manager should have the ability to understand what the problem is and to provide a solution and alternative as required.

- **Winning Team:** Effective managers are able to recruit team members who are the most suitable to the given task.

- **Project skills:** Managers should have the technical skills relevant to the project that would include: initiating, executing and following up. and bringing the project closure.

Question4:

The fourth question was. “What are the major challenges a new programme manager faces after being promoted from a project manager and how do Abu Dhabi government departments provide them support and training to deal with these challenges?”

The challenges of new programme managers are many. These challenges revolve around making the programme and projects profitable and managing stakeholder expectations and satisfaction successfully. The challenge, yet at times, is also with decision making and changing the mind-sets of people. Some expressed that they experience lack of management support and team support. As one of the interviewees stated:

“A programme manager should aim at widening his experiences and applying them to wider or larger issues; and therefore, as he manages project, he should focus on building certain competencies to handle the complexities of a programme.”

The typical challenges faced by programme managers include:

- skills to measure the project’s success
- estimate the benefits of the project or the programme
- ability to analyse the project data

- allocation of the HR resources
- manage the interdependences of the projects

Finally, the freedom to make the decisions and support of the budget are essential for a new programme manager.

It was noted that the support given to cope with new positions is scanty and there is no job description. Although trainings are provided, yet at times, this may not be fully appropriate. There is no plan for competency building. A way forward to tackle this could be through the appointment of an advisor with significant experience in programme management to give coaching and guidance for the new programme manager. Hopefully, this would become the best practice and model in Abu Dhabi government because helping to cope with scope changes and involving the managers in the programmes is also a way of developing for future roles.

A programme manager faces difficulty with building a team initially and/or providing clarity on project objectives to its members. Therefore, a dedicated management support can initially help programme managers to establish a firm ground. Yet, it is essential that there is systematic transition of roles during which ability or competences are monitored. Setting the provisions for appropriate help in the form of training is a good way of coping with the new programme managers and helping them to gain the ground. Most importantly, the new programme managers tend to be unaware of team or programme objectives, and they lack clarity on programme goals or objectives. The other major challenges that a programme manager faces is the lack of commitment from organizational leaders. Many times,

programme managers need to deal with delays in previous programmes. They are naïve to building the knowledge on portfolios. Managers lack the exposure to other departments. The cross functional expertise and making internal/external integrations are among the other challenges.

Question5:

The fifth question was, “If you were to classify the different types of projects, what would they be? How would you measure the success of these projects differently?”

The projects can be classified according to priorities, project value, size, budgets and the nature of the project, and the complexity. Broadly, according to its nature the following are different types of projects in Abu Dhabi Government:

- Construction
- ICT
- Industrial
- Maintenance
- New product development
- Event and exhibition
- Marketing and promotion
- Research and development

The priorities basically indicate the project’s alignment with PMOs strategic plans or government projects. These generally tend to be important. The budget is another classification; based on which small, medium size or large type of project. Another

classification may be based on the complexity; that is to say, a project involving multiple divisions or organizations. There are many projects that are in one programme or projects within projects. This is an example; the number of programmes sharing a project could be municipality, civil defence and education council or if it is a project related to health, there might be other projects within it; each is case specific.

IT projects have success measures such as selection of software and end user satisfaction. Maintenance projects that have success measures such as service availability, response time, quality of job and meeting the customer satisfaction. According to the value of the project, they can be classified as short or long service projects.

The programme can be classified as:

- Infrastructure
- Services
- Education and culture
- Health and wellbeing
- Environment and nature

The success of any programme is based on delivering the required outcomes and benefits to the stakeholders and the community. The success measure of outcomes is normally defined in the programme planning stage. These measures of success should be aligned to the vision, mission, and strategy of the government.

Question6:

The **sixth question** was about the difficulties faced by new programme managers in the Abu Dhabi government. In response the interviewees shared the following information.

A number of factors contribute to the difficulties faced by the programme managers. The respondents talked about a number of factors listed below. Lack of right policies and procedure or regulations. The factors that were widely regarded as major contributors to programme manager difficulties are:

- **Recruitment mechanism:** This factor indicates the rigid systems involved in the recruitment process. Organization to organization, recruitment processes differ and have their own internal requirements.
- **Technology:** This implies that the lack of latest or required technology hinders the project execution.
- **Change complexity:** This implies that the changes being requested during the execution are.
- **Projects have a wrong team in place:** This implies manager's lack of experience or inability to assemble an appropriate team.
- **Lack of involvements of the team members:** When the projects are spread across many organizations, the priorities of team members involved are different. That gives

a chance for the lack of involvement of team member, particularly if they are not happy with the tasks or jobs given to them.

- **Infrastructure:** This implies the poor quality infrastructure or non-allocation of infrastructure complicates the project.

- **Resources allocation:** This implies that there is difficulty in recruiting highly skilled human resources required for specialization projects. This is basically an imbalance of supply and demand and the lack of appropriate a plan for execution.

- **Lack of regulations and programme standards:** This implies that the absence of robust laws or regulations complicates the project.

- **Conflict between different entities of the government:** Programmes often involve more than one organization. Each of the organizations has priorities in terms of their projects or programmes. Therefore, conflicts at times are inevitable. The disagreements between the different entities working on a programme, therefore, complicate a project.

- **Lack of support of stakeholders:** It is essential that stakeholders are involved in the programme so that they can provide their point and approve the design or resources and convey their preferences. However, it is possible that not all stakeholders would do as expected. This may imply the lack of involvement and support of stakeholders.

- **Change in legislation:** This implies a change in the government's position because of unforeseen economic conditions. They may include economic crises or some natural disasters, etc.

- **International partnership:** The international relationships require being explicit. It is often hard to devise the relationships due to the various factors, such as culture and working style. Lack of understanding of these aspects will complicate a project.

- **Interdependency:** Programmes are interrelated to other programmes. Therefore, there is interdependency when one programme's completion depends on the completion of another's programme. If these programmes belong to different organizations, getting the commitment and buy-in to complete the tasks is a challenge; and therefore, this may complicate the project.

- **Lack of authority to make decisions in due time:** Due to the cost of the project, authority is limited; for example, higher the cost the more complex layers of project approvals.

- **Authenticity and originality of the project:** When projects are new to the organization, they will have social, economic, or political impact. Sometimes the unknown reaction of the society, impact on economy, the technology needed, or the leadership needed, sometimes makes it even more complicated.

All these parameters contribute to difficulties faced by the programme manager particularly when a programme is shared with other organizations. It gets complicated because their vision may not sink with each other's. Commitment of the people in this case would be difficult to achieve; although networking and the official approach are way to get control of it. While external organizations are involved, it is often difficult get their commitment and their involvement will deter the project or programme. The other factors that lead to the difficulties of the projects and programmes are: targets, resources, management support, and unreasonable schedules. Tight schedules and assigning too many objectives make them complicated. There are external consultants who are engaged by the Abu Dhabi government departments. As one of the interviewees put it,

“At the program manager level, it is very important to support new program managers with coaching and guidance especially in the decision making process through the appointment of highly skilled advisors.”

Question7:

The **seventh question** that was asked to the interviewees was: “What are the unique cultural and national factors of Abu Dhabi that impact upon the performance of project and programme managers?”

There have been interesting insights with regard to the cultural and national factors. It was evident that the culture of informal consensus building approach found to have positive impact on project management. The special attitudes such as welcoming improvements and encouragement for creativity and robust systems seem to have a positive impact as well. However, the rigid procurement system kills the innovative ability and blind rules hinder the

project performance. Project and programme managers are open and eager to learn. Therefore, it is very important to support new programme managers with coaching and guidance especially in the decision making process through the appointment of highly skilled advisors.

Question8:

The last question was: “What is a typical progression path of a project manager in the Abu Dhabi government and how could a decision to promote the employee be made more objective?”

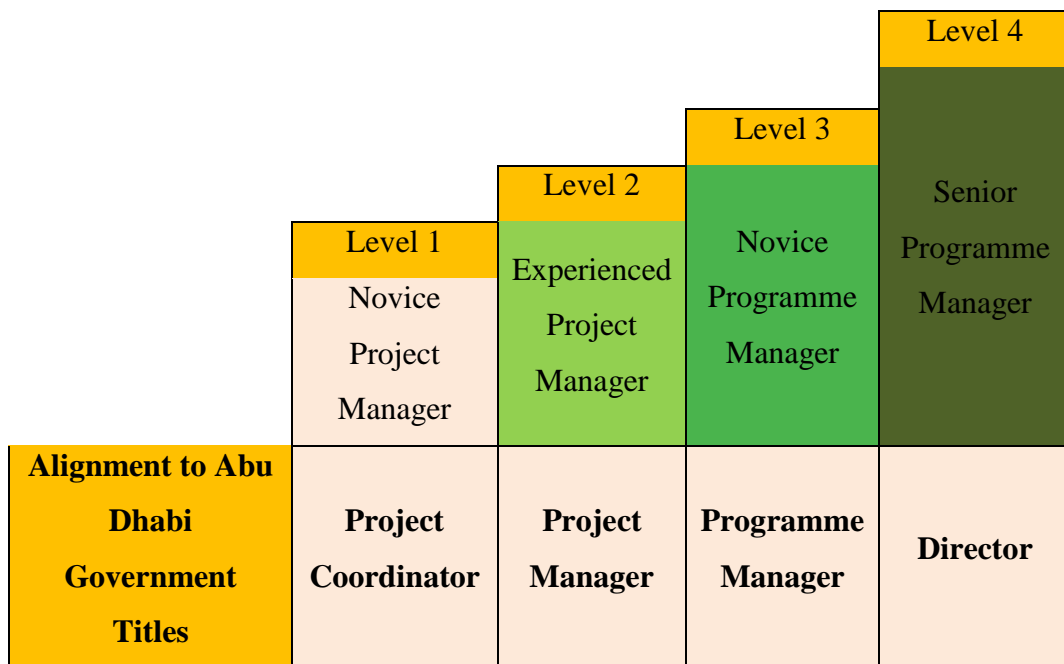


Figure 4.1 The typical progression path of a project manager

The figure 4.1 above indicated the typical career path of a project manager through his/her career in the Abu Dhabi government. The job starts as an entry level project manager. The title used for this position is project coordinator. Then after three to four years of experience and with acceptable professional reviews, they are promoted to a project manager position. After more than five years as a project manager and subject to the availability of a position,

the project manager is promoted to a programme manager position. The final promotion for the programme manager is to a director. This happens after 5-10 years depending position availability for programme managers and individual job performance. Currently, the promotions are primarily dependent on years of service and acceptable performance on very high level performance parameters. These parameters are common for all positions and not specific to project or programme managers. What is needed is competency based parameters specific to project managers. The project and programme complexity could be used to assess the level of attainment of the competency. This two dimensional framework will serve well to generate a discipline specific criteria for promotion of project managers in Abu Dhabi government. The framework can be adopted by individual government departments for their own use. The framework could also serve as the starting point for other emirates within the UAE for assessing the competency of their project managers.

4.2 Summarising Future Steps for This Research

The interviews with the senior programme managers proved invaluable for this thesis. The feedback provided was used to formulate a career progression path for project and programme managers. The first step is the progression path from project coordinator to a project manager. Both of these are project management positions. They both require project management competencies. However, the levels of competencies needed are different. The individual in project manager position will manage more complex and larger size projects compared to the project coordinator. Therefore, one can use the project manager competencies as the criterion for assessment and use the level of attainment along those complexity parameters that are associated with the competencies as a measure of their achievement. The overall vision for this assessment is indicated in the table 4.2 below.

	Complexity Parameters		
	Level 1	Level 2	Level 3
Project Competency 1			
Project Competency 2			
Project Competency 3			

Table 4.2 Complexity Parameters

The movement from a project manager to a programme manager would be a bit more complex and in order to establish that connection it is important that we look at the response to question 1. The response indicates that we can use project and programme success criteria as the measure that could be used to connect the competencies required for promotion of a project manager to a programme manager. If we establish the relationship between project manager competencies and project success criteria and then programme success criteria which are derived from project success criteria with programme manager competencies, we can easily transition the project manager to a programme manager (Figure 4.2) below.

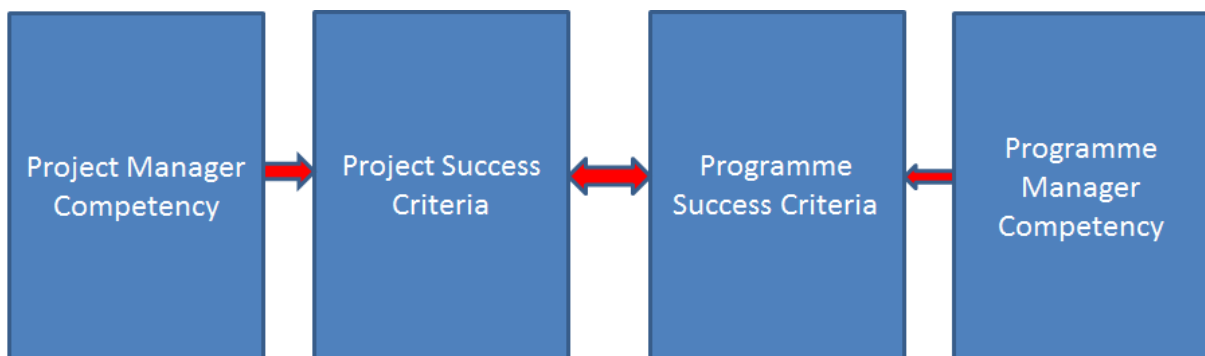


Figure 4.2 Transition of the project manager to a programme manager

Within the programme manager competencies, there would be relationships. These relationships would indicate that some of these competencies are causes and some of them are effects. If we classify the programme manager competencies as cause and effect, we can

highlight what competencies are needed for a programme manager and what competencies are needed for a director. Again, we can use the complexity parameters as a way to assess the level of attainment of programme managers along a certain competency (Table 4.3).

	Complexity Parameters		
	Level 1	Level 2	Level 3
Cause Competencies			
Cause Programme Competency 1			
Cause Programme Competency 2			
Effect Competencies			
Effect Programme Competency 1			
Effect Programme Competency 2			

Table 4.3 Complexity Parameters (Cause/Effect Competencies)

The initial interviews have been invaluable in charting the research path for this thesis. The following two chapters present the analysis of the data to implement the plan that has been highlighted in this chapter.

Chapter V

Data Analysis 2

5.0 Introduction

After formulating a strategy for data collection and analysis in the previous chapter, the next step was to assemble the data collection instrument and collect data from project and programme managers in the Abu Dhabi government. The instruments are included in Appendices A and B.

5.1 Summary of the Respondent Profile

There were two separate survey instruments; one for project managers and one for programme managers. The survey was administered through surveymonkey.com. An email to all the Abu Dhabi government project managers and programme managers was sent to inform them about the respective instruments on surveymonkey.com. There about 3000 project managers and 1200 programme managers were contacted. In all 460 completed responses from project managers and 282 from programme managers were received. Of the 460 project managers 295 (64%) were in the 22-30 year age range and the remaining 165 (36%) were in the 30-40 year category; 310 (67.4%) of them were males and 150 (32.6%) were females; 95 (20.6%) had a higher national diploma, 286 (62.2%) had a bachelor's degree and 79 (17.2%) had a master's degree; 192 (41.7%) of them were working in their organisations for 3 to 6 years, 224 (48.7%) had 6-10 years with the organisation, and the remaining had 10+ years in their organisations. As far as number of years of experience in project management was concerned, 198 (43%) had less than 3 year experience, 142 (30.8%) had between 3 and 6 year experience, and the remaining had more than 6 year experience.

For respondents of the programme manager survey the profile of respondents is as follows.

Of the 282 programme managers who responded, 180 (63.8%) were in 30-40 years age group and the remaining 102 were in 40-50 years age group; 135 (47.9%) of them were males and 147 (52.1%) of them were females; 180 (63.8%) of them had a bachelor's degree, 92 (32.6%) had a master's degree, and 10 (3.6%) doctoral degree; 85 (30.1%) had been working with their current organisations for 3 to 6 years, 92 (32.6%) had been with the organisation for 6 to 10 years, and 105 (37.3%) had been with their organisations for more than 10 years; 136 (48.2%) had been working in the area of project management for 6 to 10 years and the remaining 146 (51.8%) had been working in the project management area for more than 10 years.

After administering the survey, the data was compiled into SPSS and several multiple regression analyses were performed. The list of multiple regression analysis performed and presented in this chapter are as follows:

1. Project Manager Competencies to Project Success Criterion
2. Project Manager Competencies to Project Complexity
3. Programme Manager Competencies to Programme Success Criterion
4. Programme Manager Competencies to Programme Complexity

The analysis is summarised in the following sections of this chapter.

5.2 Project Manager Competencies vs Project Success

The first part of analysis was to analyse the relationship between project manager competencies and project success criteria. In order to establish the relationship, a regression analysis was performed between different types of competencies and project success criteria.

The following sections summarise the results of the analysis.

5.2.1 Technical Competencies vs Project Success Criteria

The model summary is

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.827 ^a	.685	.675	.24318

a. Predictors: (Constant), Customer Satisfaction, As per Specifications, Benefits to Community, Timely Completion, Benefits to Organization, Satisfaction of Project Objectives, Within Budget, Project Implementation Process, Meets Stakeholder Satisfaction, Good Risks Assessment Management

Table 5.1 Model Summary of Technical Competencies Vs Project Success Criteria

As seen in the model summary above, the coefficient of correlation is 0.827 which means that 82.7% variability of the model could be predicted using the variables of this model. The difference between R-square and Adjusted R-square is 0.01 (0.685-0.675) which means the sample used for survey is 90% and is a good predictor of the population.

The null hypothesis is

H1 Project Manager Technical Competencies Affect Project Success

The sub hypotheses are:

H1a Project Manager Technical Competencies Affect Timely Completion

H1b Project Manager Technical Competencies Affect Completion of Project within Budget

H1c Project Manager Technical Competencies Affect Completion of Project as per

Specifications are:

H1d Project Manager Technical Competencies Affect Good Risks Assessment

H1e Project Manager Technical Competencies Affect Meeting of Stakeholder Satisfaction

H1f Project Manager Technical Competencies Affect Satisfaction of Project Objectives

H1g Project Manager Technical Competencies Affect Benefits to Organization

H1h Project Manager Technical Competencies Affect Benefits to Community

H1i Project Manager Technical Competencies Affect Project Implementation Process

H1j Project Manager Technical Competencies Affect Overall Customer Satisfaction

The table below shows the output of the regression analysis.

Coefficients^a						
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	
	B	Std. Error	Beta			
1	(Constant)	1.659	.195		8.514	.000
	Timely Completion	-.131	.034	-.177	-3.897	.000
	Within Budget	.141	.034	.195	4.121	.000
	As per Specifications	.195	.042	.234	4.628	.000
	Good Risks Assessment Management	.187	.034	.355	5.409	.000
	Meets Stakeholder Satisfaction	.119	.034	.223	3.471	.001
	Satisfaction of Project Objectives	.134	.042	.171	3.159	.002
	Benefits to Organization	-.059	.042	-.067	-1.401	.162
	Benefits to Community	-.067	.041	-.067	-1.633	.103
	Project Implementation Process	.059	.045	.065	1.313	.190
	Customer Satisfaction	.033	.055	.039	.594	.553

a. Dependent Variable: Technical Competence

Table 5.2 Technical Competencies vs Project Success Criteria (Detail)

Testing hypothesis H1a to H1j at 95% confidence, it can be seen that hypothesis H1a to H1f are accepted and the remaining hypotheses are rejected (accepted if significant < 0.05 and rejected if it is >0.05). The technical competencies of a project manager do affect the timely completion of the project. There are competencies such as estimating, scheduling, project reviews, configuration management, and change control which are included under the category of technical competencies. The competencies have a direct effect on the timely completion of the project. Competencies such as estimating, business case, resource management, budget and cost management, and earned value management will help in controlling the schedule of the project, resulting in timely completion. For completion of

project within specifications technical competencies such as project reviews, configuration management, information management and reporting, stakeholder management, and handover and closeout process has an impact. There are technical competencies such as project risk management and project reviews that have a direct effect on eventual successful risk management of the project. Meeting stakeholder satisfaction is affected by technical competencies such as good stakeholder management that are part of technical competency nature. Satisfaction of project objectives is also affected by technical competencies such as requirements management, project reviews, project quality management, and value management. The main hypothesis that project manager technical competence affects project success is thus partially accepted.

5.2.2 Behavioural Competencies Vs Project Success Criteria

The model summary for this model is as follows:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.706 ^a	.498	.482	.28006

a. Predictors: (Constant), Customer Satisfaction, As per Specifications, Benefits to Community, Timely Completion, Benefits to Organization, Satisfaction of Project Objectives, Within budget, Project Implementation Process, Meets Stakeholder Satisfaction, Good Risks Assessment Management

Table 5.3 Model Summary of Behavioural Competencies vs Project Success Criteria

As seen in the model summary above, the coefficient of correlation is 0.706 which means that 70.6% variability of the model could be predicted using the variables of this model. The difference between R-square and Adjusted R-square is 0.016 (0.498-0.482) which means the sample used for survey is 84% and is a good predictor of the population.

The null hypothesis is:

H2 Project Manager Behavioural Competencies Affect Project Success

The sub hypotheses are:

H2a Project Manager Behavioural Competencies Affect Timely Completion

H2b Project Manager Behavioural Competencies Affect Completion of Project within Budget

H2c Project Manager Behavioural Competencies Affect Completion of Project as per

Specifications:

H2d Project Manager Behavioural Competencies Affect Good Risks Assessment

H2e Project Manager Behavioural Competencies Affect Meeting of Stakeholder Satisfaction

H2f Project Manager Behavioural Competencies Affect Satisfaction of Project Objectives

H2g Project Manager Behavioural Competencies Affect Benefits to Organization

H2h Project Manager Behavioural Competencies Affect Benefits to Community

H2i Project Manager Behavioural Competencies Affect Project Implementation Process

H2j Project Manager Behavioural Competencies Affect Overall Customer Satisfaction

The table below shows the output of the regression analysis.

Model		Coefficients ^a			T	Sig.
		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta		
1	(Constant)	1.736	.224		7.738	.000
	Timely Completion	-.222	.039	-.329	-5.748	.000
	Within Budget	.128	.040	.193	3.236	.001
	As per Specifications	.149	.049	.195	3.067	.002
	Good Risks Assessment Management	.086	.040	.179	2.166	.031
	Meets Stakeholder Satisfaction	.094	.040	.193	2.384	.018
	Satisfaction of Project Objectives	.136	.049	.190	2.788	.006
	Benefits to Organization	-.058	.048	-.074	-1.216	.225
	Benefits to Community	.176	.047	.194	3.734	.000
	Project Implementation Process	.094	.052	.114	1.814	.071
	Customer Satisfaction	.016	.063	.021	.260	.795

a. Dependent Variable: Behavioural Competence

Table 5.4 Behavioural Competencies vs Project Success Criteria (Detail)

Looking at the significance levels, it can be seen that other than H2g, H2i and H2j all the other sub-hypotheses are accepted. Behavioural competencies such as communication, teamwork, leadership, conflict management, negotiations, learning and development, and human resource management all have an impact the assurance that the project runs smoothly and is completed within time, budget, and as per specifications. Ensuring that the project runs smoothly also means that there is good control over the risks involved and steps have been taken to mitigate any that might occur. Wherever needed, the project manager pulls together the team and negotiates with stakeholders to ensure that any unforeseen risks that have come up are addressed appropriately. The main hypothesis that project manager behavioural competence affects project success is, thus, partially accepted.

5.2.3 Contextual Competencies vs Project Success

The model summary for this model is as follows:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.875 ^a	.766	.758	.28716

a. Predictors: (Constant), Customer Satisfaction, As per Specifications, Benefits to Community, Timely Completion, Benefits to Organization, Satisfaction of Project Objectives, Within Budget, Project Implementation Process, Meets Stakeholder Satisfaction, Good Risks Assessment Management

Table 5.5 Model Summary Contextual Competencies vs Project Success

As seen in the model summary above, the coefficient of correlation is 0.875 which means that 87.5% variability of the model could be predicted using the variables of this model. The difference between R-square and Adjusted R-square is 0.008 (0.766-0.758) which means the sample used for survey is 92% and is a good predictor of the population.

The null hypothesis is

H3 Project Manager Contextual Competencies Affect Project Success

The sub hypotheses are:

H3a Project Manager Contextual Competencies Affect Timely Completion

H3b Project Manager Contextual Competencies Affect Completion of Project within Budget

H3c Project Manager Contextual Competencies Affect Completion of Project as per

Specifications:

H3d Project Manager Contextual Competencies Affect Good Risks Assessment

H3e Project Manager Contextual Competencies Affect Meeting of Stakeholder Satisfaction

H3f Project Manager Contextual Competencies Affect Satisfaction of Project Objectives

H3g Project Manager Contextual Competencies Affect Benefits to Organization

H3h Project Manager Contextual Competencies Affect Benefits to Community

H3i Project Manager Contextual Competencies Affect Project Implementation Process

H3j Project Manager Contextual Competencies Affect Overall Customer Satisfaction

Model		Coefficients ^a			t	Sig.
		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta		
1	(Constant)	.736	.230		3.201	.002
	Timely Completion	-.109	.040	-.108	-2.757	.006
	Within Budget	.109	.041	.110	2.683	.008
	As per Specifications	.210	.050	.184	4.219	.000
	Good Risks Assessment Management	.306	.041	.426	7.525	.000
	Meets Stakeholder Satisfaction	.142	.041	.194	3.507	.001
	Satisfaction of Proj Objectives	.209	.050	.194	4.158	.000
	Benefits to Organization	-.023	.049	-.019	-.470	.639
	Benefits to Community	-.204	.048	-.150	-4.226	.000
	Project Implementation Process	.139	.053	.112	2.623	.009
	Customer Satisfaction	.032	.065	.028	.500	.618

a. Dependent Variable: Contextual Competence

Table 5.6 Contextual Competencies vs Project Success (Detail)

All sub-hypotheses except H3j and H3g are accepted. Competencies such as managing project sponsorship, management of health and safety, management of project lifecycle, management of project finance, legal awareness and actions, organisational roles and structures, and overall project governance lead to ensuring that project is completed on-time within budget and as per specifications. It also ensures that stakeholder satisfaction is constantly monitored, project objectives are satisfied throughout the duration of the project, and appropriate levels of benefit to community are planned, monitored, and achieved by the project. Ensuring effective organisational roles and structures also means that the project implementation process proceeds smoothly. The main hypothesis that project manager contextual competence affects project success is, thus, partially accepted.

5.3 Project Manager Competence Vs Project Complexity

The second set of analysis with project manager competency is performed with project complexity. Establishing this relationship will help us understand what competencies have to be considered while assigning project managers to a certain project given the complexity involved. The results for the analysis are as follows:

5.3.1 Technical Competencies Vs Project Complexity

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.707 ^a	.500	.492	.30379

a. Predictors: (Constant), Rigidity of the Sequence of Activities, Project Context or the Environment in Which Project is Being Executed, Project Size, Interdependence of Activity Within the Project, Project Variety Diversity of Jobs Skill Sets Required

Table 5.7 Model Summary of Technical Competencies vs Project Complexity

As seen in the model summary above, the coefficient of correlation is 0.707 which means that 70.7% variability of the model could be predicted using the variables of this model. The difference between R-square and Adjusted R-square is 0.008 (0.5-0.492) which means the sample used for survey is 92% and is a good predictor of the population.

The null hypothesis is:

H4 Project Manager Technical Competencies and Project Complexity Are Related

The sub hypotheses are:

H4a Project Manager Technical Competencies and Project Size Are Related

H4b Project Manager Technical Competencies and Project Variety in Terms of Diversity of Jobs and Skill Sets Required Are Related

H4c Project Manager Technical Competencies and Interdependence of Activities within the Project Are Related

H4d Project Manager Technical Competencies and Project Context or the Environment in Which Project is Being Executed Are Related

H4e Project Manager Technical Competencies and Rigidity of the Sequence of Activities Are Related

The table below shows the output of the regression analysis.

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
1	(Constant)	2.475	.138		17.908	.000
	Project Size	.001	.034	.001	.016	.987
	Project Variety Diversity of Jobs Skill Sets Required	.226	.033	.436	6.808	.000
	Interdep of Act Within the Project	.080	.037	.133	2.152	.032
	Project Context or the Environment in Which Project is Being Executed	-.021	.037	-.031	-.577	.565
	Rigidity of the Sequence of Activities	.173	.050	.245	3.420	.001

a. Dependent Variable: Technical Competence

Table 5.8 Technical Competencies vs Project Complexity

Based on the analysis, there are only three hypotheses that are accepted, 4b, 4c and 4e. There is a clear relationship between technical competencies and project variety, diversity of jobs, skill sets requirements, interdependencies of activities within the project, and the rigidity of the sequence of activities. Technical competencies such as estimating, scheduling, resource management, configuration management, change control and procurement are directly impacted by the diversity of jobs and roles required in a project. Same is the case with interdependence of activities. Scheduling and resource management becomes complex as

more activities have to be synchronised due to their interdependence and that makes it more difficult to handle.

5.3.2 Behavioural Competencies vs Project Complexity

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.543 ^a	.294	.283	.32942

a. Predictors: (Constant), RigidityoftheSequenceofActivities ProjContextortheEnvironmentinWhichProjisBeingExecuted ProjectSize, InterdepofActWithintheProject, ProjectVarietyDiversityofJobsSkillSetsRequired

Table 5.9 Model Summary Behavioural Competencies vs Project Complexity

As seen in the model summary above, the coefficient of correlation is 0.543 which means that 54.3% variability of the model could be predicted using the variables of this model. The difference between R-square and Adjusted R-square is 0.011 (0.294-0.283) which means the sample used for survey is 89% and is a good predictor of the population. The coefficient of correlation is less than 0.6 and that makes it weak.

The null hypothesis is:

H5 Project Manager Behavioural Competencies and Project Complexity Are Related

The sub hypotheses are:

H5a Project Manager Behavioural Competencies and Project Size Are Related

H5b Project Manager Behavioural Competencies and Project Variety in Terms of Diversity of Jobs and Skill Sets Required Are Related

H5c Project Manager Behavioural Competencies and Interdependence of Activities within the Project Are Related

H5d Project Manager Behavioural Competencies and Project Context or the Environment in Which Project is Being Executed Are Related

H5e Project Manager Behavioural Competencies and Rigidity of the Sequence of Activities Are Related

The table below shows the output of the regression analysis.

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	3.087	.150		20.595	.000
Project Size	-.083	.037	-.154	-2.220	.027
Project Variety Diversity of Jobs Skill Sets Req	.104	.036	.220	2.896	.004
Interdep of Act Within the Project	.185	.040	.338	4.594	.000
Proj Context or the Environment in Which Proj is Being Executed	.106	.040	.169	2.648	.008
Rigidity of the Sequence of Activities	.017	.055	.026	.304	.761

a. Dependent Variable: Behavioural Competence

Table 5.10 Behavioural Competencies vs Project Complexity (Detail)

Given the low correlation of this model the hypotheses are inconclusive at the moment.

Based on this data it is not possible to conclusively prove or disprove any of these hypotheses.

5.3.3 Contextual Competencies vs Project Complexity

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.755 ^a	.570	.563	.38595

a. Predictors: (Constant), Rigidity of the Sequence of Activities, Proj Context or the Environment in Which Proj is Being Executed, Project Size, Interdep of Act Within the Project, Project Variety Diversity of Jobs Skill Sets Req

Table 5.11 Model Summary Contextual Competencies vs Project Complexity

As seen in the model summary above, the coefficient of correlation is 0.755 which means that 75.5% variability of the model could be predicted using the variables of this model. The difference between R-square and Adjusted R-square is 0.007 (0.570-0.563) which means the sample used for survey is 93% and is a good predictor of the population.

The null hypothesis is:

H6 Project Manager Contextual Competencies and Project Complexity Are Related

The sub hypotheses are:

H6a Project Manager Contextual Competencies and Project Size Are Related

H6b Project Manager Contextual Competencies and Project Variety in Terms of Diversity of Jobs and Skill Sets Required Are Related

H6c Project Manager Contextual Competencies and Interdependence of Activities within the Project Are Related

H6d Project Manager Contextual Competencies and Project Context or the Environment in Which Project is Being Executed Are Related

H6e Project Manager Contextual Competencies and Rigidity of the Sequence of Activities Are Related

The table below shows the output of the regression analysis.

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.582	.176		9.010	.000
Project Size	-.028	.044	-.035	-.643	.521
Project Variety Diversity of Jobs Skill Sets Req	.296	.042	.418	7.042	.000
Interdep of Act Within the Project	.217	.047	.264	4.593	.000
Proj Context or the Environment in Which Proj is Being Executed	-.054	.047	-.057	1.140	.255
Rigidity of the Sequence of Activities	.229	.064	.237	3.565	.000

a. Dependent Variable: Contextual Competence

Table 5.12 Contextual Competencies vs Project Complexity (Detail)

The three hypotheses that are accepted are hypotheses 6 b, c and e. The data indicates that competencies such as managing project sponsorship, management of health and safety, management of project lifecycle, management of project finance, legal awareness and actions, organisational roles and structures, and overall project governance are impacted by complexity variables such as project variety, diversity of skill sets required, and interdependence of activities within the project as well as rigidity of the sequence of activities. All these complexity variables seem to add an additional level of complications to management issues such as health and safety, project lifecycle, project finance, contractual issues associated with the legal aspects of the project, and the structure of the organisation; all of which have to be configured differently.

5.4 Programme Manager Competencies

After analysing the project management competencies, the next step is to analyse programme manager competencies. The lists of programme manager competencies are:

planning the programme, maintaining programme activities, programme control, forecasting, designing the programme, planning day to day activities, identification of risks, managing change, managing critical interfaces, quality control and assurance, employee welfare, employee counselling, negotiations within and outside the programme, effective leadership, managing project managers, time management, team building, effective communication, effective sequencing of projects, and conducting meetings.

5.4.1 Planning the Programme vs Programme Success Criteria

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.867 ^a	.751	.746	.27032

a. Predictors: (Constant), Customer Satisfaction, Programme Implementation Process, Satisfaction of Programme Objectives, Benefits to Organization, Within Budget, Benefits to Community, As per Specifications, Meets Stakeholder Satisfaction, Good Risks Assessment and Management, Timely Completion

Table 5.13 Model Summary Planning the Programme vs Programme Success Criteria

As seen in the model summary above, the coefficient of correlation is 0.867 which means that 86.7% variability of the model could be predicted using the variables of this model. The difference between R-square and Adjusted R-square is 0.005 (0.751-0.746) which means the sample used for survey is 95% and is a good predictor of the population.

The null hypothesis is:

H7 Planning the Programme Affects the Programme Success Criteria

The sub hypotheses are:

H7a Planning the Programme Affects Timely Completion

H7b Planning the Programme Affects Programme Completion Within Budget

H7c Planning the Programme Affects Programme Completion As Per Specification

H7d Planning the Programme Affects Good Risk Assessment and Management

H7e Planning the Programme Affects Meeting Stakeholder Satisfaction

H7f Planning the Programme Affects Satisfaction of Programme Objectives

H7g Planning the Programme Affects Benefits to Organisation

H7h Planning the Programme Affects Benefits to Community

H7i Planning the Programme Affects Programme Implementation Process

H7j Planning the Programme Affects Customer Satisfaction

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.720	.255		10.658	.000
1 Timely Completion	.223	.046	.213	4.868	.000
Within Budget	-.027	.035	-.029	-.764	.445
As per Specifications	.255	.045	.245	5.629	.000
Good Risks Assessment and Management	-.229	.048	-.207	-4.796	.000
Meets Stakeholder Satisfaction	-.008	.041	-.008	-.183	.855
Satisfaction of Programme Objectives	.423	.048	.409	8.881	.000
Benefits to Organization	-.199	.044	-.187	-4.558	.000
Benefits to Community	-.028	.050	-.021	-.561	.575
Programme Implementation Process	.079	.031	.098	2.506	.013
Customer Satisfaction	-.041	.055	-.030	-.758	.449

a. Dependent Variable: Planning the programme

Table 5.14 Planning the Programme vs Programme Success Criteria (Detail)

Based on the analysis of the data, the sub-hypotheses that are accepted are H7a, 7c, 7d, 7f,

7g, 7i. Planning the programme appropriately would result in timely completion of the

programme. However, the sub-hypothesis regarding completion within budget is not accepted. This could be due to the lack of control on currency fluctuation and Abu Dhabi's relying heavily on imports. Planning the programme appropriately would result in completion as per specification. Depth of planning would also mean an appropriate level of risk planning and management. The sub-hypothesis regarding meeting stakeholder satisfaction is rejected and this could be due to long duration of programmes which would mean that the expectations of stakeholders could change over time; so anything planned at the beginning would not meet the expectations towards the end. However, meeting the programme objectives and benefits to the organisation would be achieved because the appropriate level of planning would mean that programme objectives and benefits to the organisation are documented upfront and they could be included in project planning. However, as far as benefits to the community are concerned, the sub-hypothesis is rejected and this could be due to expectations of the community changing over time, and the long duration that a programme will take to complete. The programme implementation process will proceed smoothly if the planning is good and this hypothesis is accepted. For customer satisfaction, we can again use the same arguments regarding the rejection of the hypothesis due to changing expectations of the customers over long durations of the programme. Therefore, the main hypothesis is partially accepted.

5.4.2 Maintaining Programme Activities vs Programme Success Criteria

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.817 ^a	.667	.660	.30370

a. Predictors: (Constant), Customer Satisfaction, Programme Implementation Process, Satisfaction of Programme Objectives, Benefits to Organization, Within Budget, Benefits to Community, As per Specifications, Meets Stakeholder Satisfaction, Good Risks Assessment and Management, Timely Completion

Table 5.15 Model Summary Maintaining Programme Activities vs Programme Success Criteria

As seen in the model summary above, the coefficient of correlation is 0.817 which means that 81.7% variability of the model could be predicted using the variables of this model. The difference between R-square and Adjusted R-square is 0.007 (0.667-0.660) which means the sample used for survey is 93% and is a good predictor of the population.

The null hypothesis is:

H8 Maintaining Programme Activities Affects the Programme Success Criteria

The sub hypotheses are:

H8a Maintaining Programme Activities Affects Timely Completion

H8b Maintaining Programme Activities Affects Programme Completion Within Budget

H8c Maintaining Programme Activities Affects Programme Completion As Per Specification

H8d Maintaining Programme Activities Affects Good Risk Assessment and Management

H8e Maintaining Programme Activities Affects Meeting Stakeholder Satisfaction

H8f Maintaining Programme Activities Affects Satisfaction of Programme Objectives

H8g Maintaining Programme Activities Affects Benefits to Organisation

H8h Maintaining Programme Activities Affects Benefits to Community

H8i Maintaining Programme Activities Affects Programme Implementation Process

H8j Maintaining Programme Activities Affects Customer Satisfaction

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	2.016	.287		7.031	.000
Timely Completion	-.379	.052	-.372	-7.361	.000
Within Budget	.239	.039	.266	6.110	.000
As per Specifications	.113	.051	.111	2.215	.027
Good Risks Assessment and Management	.156	.054	.145	2.910	.004
Meets Stakeholder Satisfaction	-.097	.046	-.101	-2.086	.038
Satisfaction of Programme Objectives	-.054	.054	-.054	-1.012	.312
Benefits to Organization	.125	.049	.120	2.537	.011
Benefits to Community	.085	.056	.065	1.522	.129
Programme Implementation Process	.118	.035	.153	3.360	.001
Customer Satisfaction	.274	.061	.203	4.469	.000

a. Dependent Variable: Maintaining Programme Activities

Table 5.16 Maintaining Programme Activities vs Programme Success Criteria (Detail)

Based on the analysis, the sub-hypotheses that are accepted are 8a, 8b, 8c, 8d, 8e, 8g, 8i and 8j. Therefore, the main hypothesis 8 is partially accepted. Maintaining programme activities would help achieving the time, cost and specifications of the programme. It will also help in managing risks as the programme manager is keeping an eye on any risks that emerge. This will also help in meeting the stakeholder expectations, as any change in their expectation is noted and incorporated in the programme. The sub-hypothesis about relationship between maintaining programme activities and satisfaction of programme objectives is rejected. This could be due to the modification of activities over time, which might lead to not being able to satisfy some initial programme objectives. The maintenance of programme activities will also help in smooth implementation of programme activities and overall customer satisfaction.

5.4.3 Programme Control vs Programme Success Criteria

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.788 ^a	.621	.613	.32983

a. Predictors: (Constant), Customer Satisfaction, Programme Implementation Process, Satisfaction of Programme Objectives, Benefits to Organization, Within Budget, Benefits to Community, As per Specifications, Meets Stakeholder Satisfaction, Good Risks Assessment and Management, Timely Completion

Table 5.17 Model Summary Programme Control vs Programme Success Criteria

As seen in the model summary above, the coefficient of correlation is 0.788 which means that 78.8% variability of the model could be predicted using the variables of this model. The difference between R-square and Adjusted R-square is 0.008 (0.621-0.613) which means the sample used for survey is 92% and is a good predictor of the population.

The null hypothesis is:

H9 Programme Control Affects the Programme Success Criteria

The sub hypotheses are:

H9a Programme Control Affects Timely Completion

H9b Programme Control Affects Programme Completion Within Budget

H9c Programme Control Affects Programme Completion As Per Specification

H9d Programme Control Affects Good Risk Assessment and Management

H9e Programme Control Affects Meeting Stakeholder Satisfaction

H9f Programme Control Affects Satisfaction of Programme Objectives

H9g Programme Control Affects Benefits to Organisation

H9h Programme Control Affects Benefits to Community

H9i Programme Control Affects Programme Implementation Process

H9j Programme Control Affects Customer Satisfaction

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.663	.311		5.341	.000
Timely Completion	.121	.056	.117	2.171	.030
Within Budget	.015	.043	.016	.350	.726
As per Specifications	.283	.055	.275	5.122	.000
Good Risks Assessment and Management	-.194	.058	-.177	-3.329	.001
Meets Stakeholder Satisfaction	-.012	.050	-.013	-.243	.808
Satisfaction of Programme Objectives	.230	.058	.225	3.958	.000
Benefits to Organization	.240	.053	.228	4.495	.000
Benefits to Community	-.108	.061	-.082	-1.788	.074
Programme Implementation Process	.277	.038	.351	7.243	.000
Customer Satisfaction	-.199	.067	-.145	-2.995	.003

a. Dependent Variable: Programme Control

Table 5.18 Programme Control vs Programme Success Criteria (Detail)

Based on the analysis, the sub-hypotheses that are accepted are 9a, 9c, 9d, 9f, 9g, 9i and 9j. Therefore, the main hypothesis 9 is partially accepted. Programme control is important for timely completion of the project, meeting specifications and stakeholder satisfaction, risk management, benefits to the organisation, overall programme implementation process, and the satisfaction of the customer. However, programme control could lead to not being able to meet the initial budget due to long duration of the programme and fluctuating currency. Meeting stakeholder satisfaction and benefits to the community might not be exactly the same as those at the beginning of the project because during the long duration of a programme the stakeholder, community and their expectations might change and controlling the programme for meeting either the initial or modified scope would mean that someone would be dissatisfied.

5.4.4 Forecasting vs Programme Success Criteria

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.891 ^a	.794	.790	.33414

a. Predictors: (Constant), Customer Satisfaction, Programme Implementation Process, Satisfaction of Programme Objectives, Benefits to Organization, Within Budget, Benefits to Community, As per Specifications, Meets Stakeholder Satisfaction, Good Risks Assessment and Management, Timely Completion

Table 5.19 Model Summary Forecasting vs Programme Success Criteria

As seen in the model summary above, the coefficient of correlation is 0.891 which means that 89.1% variability of the model could be predicted using the variables of this model. The difference between R-square and Adjusted R-square is 0.004 (0.794-0.790) which means the sample used for survey is 96% and is a good predictor of the population.

The null hypothesis is:

H10 Forecasting Affects the Programme Success Criteria

The sub hypotheses are:

H10a Forecasting Affects Timely Completion

H10b Forecasting Affects Programme Completion within Budget

H10c Forecasting Affects Programme Completion as Per Specification

H10d Forecasting Affects Good Risk Assessment and Management

H10e Forecasting Affects Meeting Stakeholder Satisfaction

H10f Forecasting Affects Satisfaction of Programme Objectives

H10g Forecasting Affects Benefits to Organisation

H10h Forecasting Affects Benefits to Community

H10i Forecasting Affects Programme Implementation Process

H10j Forecasting Affects Customer Satisfaction

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	.387	.315		1.226	.221
Timely Completion	.026	.057	.018	.457	.648
Within Budget	-.074	.043	-.058	-1.708	.088
As per Specifications	.268	.056	.189	4.793	.000
Good Risks Assessment and Management	.278	.059	.185	4.721	.000
Meets Stakeholder Satisfaction	.085	.051	.063	1.663	.097
Satisfaction of Programme Objectives	.028	.059	.020	.484	.629
Benefits to Organization	.283	.054	.195	5.231	.000
Benefits to Community	-.581	.061	-.318	-9.475	.000
Programme Implementation Process	.529	.039	.487	13.662	.000
Customer Satisfaction	.054	.067	.029	.802	.423

a. Dependent Variable: Forecasting

Table 5.20 Forecasting vs Programme Success Criteria (Detail)

Based on the analysis, the sub-hypotheses that are accepted are 10c, 10d, 10g, 10h and 10i.

Therefore, the main hypothesis 10 is partially accepted. Forecasting is important for any endeavour, but in a programme where in most cases the duration would be not known at inception, it would be highly difficult to forecast time and cost accurately. Meeting programme objectives, stakeholder and customer satisfaction would also significantly difficult as the stakeholders and their expectations would change significantly over time, and accurate forecasting at the beginning of the programme would not be possible.

5.4.5 Designing the Programme vs Programme Success Criteria

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.611 ^a	.373	.361	.29790

a. Predictors: (Constant), Customer Satisfaction, Programme Implementation Process, Satisfaction of Programme Objectives, Benefits to Organization, Within Budget, Benefits to Community, As per Specifications, Meets Stakeholder Satisfaction, Good Risk Assessment and Management, Timely Completion

Table 5.21 Model Summary Designing the Programme vs Programme Success Criteria

As seen in the model summary above, the coefficient of correlation is 0.611 which means that 61.1% variability of the model could be predicted using the variables of this model. The difference between R-square and Adjusted R-square is 0.012 (0.373-0.361) which means the sample used for survey is 88% and is a good predictor of the population.

The null hypothesis is:

H11 Designing the Programme Affects the Programme Success Criteria

The sub hypotheses are:

H11a Designing the Programme Affects Timely Completion

H11b Designing the Programme Affects Programme Completion within Budget

H11c Designing the Programme Affects Programme Completion as Per Specification

H11d Designing the Programme Affects Good Risk Assessment and Management

H11e Designing the Programme Affects Meeting Stakeholder Satisfaction

H11f Designing the Programme Affects Satisfaction of Programme Objectives

H11g Designing the Programme Affects Benefits to Organisation

H11h Designing the Programme Affects Benefits to Community

H11i Designing the Programme Affects Programme Implementation Process

H11j Designing the Programme Affects Customer Satisfaction

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	.926	.281		3.292	.001
Timely Completion	.146	.051	.201	2.897	.004
Within Budget	-.090	.038	-.140	-2.350	.019
As per Specifications	.049	.050	.068	.986	.324
Good Risk Assessment and Management	.433	.053	.564	8.231	.000
Meets Stakeholder Satisfaction	-.024	.046	-.035	-.524	.600
Satisfaction of Programme Objectives	.083	.053	.116	1.583	.114
Benefits to Organization	.026	.048	.035	.539	.590
Benefits to Community	-.006	.055	-.007	-.114	.909
Programme Implementation Process	-.238	.035	-.429	-6.887	.000
Customer Satisfaction	.418	.060	.434	6.960	.000

a. Dependent Variable: Designing the Programme

Table 5.22 Designing the Programme vs Programme Success Criteria (Detail)

Based on the analysis, the sub-hypotheses that are accepted are 11a, 11b, 11d, 11i, and 11j.

Therefore, the main hypothesis 11 is partially accepted. Designing the programme effectively right from the beginning would definitely give tighter control over time and budget. It will also provide a good understanding of the risks involved and the programme implementation process to be followed for effective implementation which would lead to a high level of customer satisfaction. However, the data which is very specific to Abu Dhabi indicates that the initial designing of the programme might not have the desired effect on meeting the specifications or achieving the eventual benefits due to long duration, which could lead to a moving goal post and changing expectations with a changing environment and the available technology.

5.4.6 Planning Day to Day Activities vs Programme Success Criteria

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.773 ^a	.597	.589	.36697

a. Predictors: (Constant), Customer Satisfaction, Programme Implementation Process, Satisfaction of Programme Objectives, Benefits to Organization, Within Budget, Benefits to Community, As per Specifications, Meets Stakeholder Satisfaction, Good Risk Assessment and Management, Timely Completion

Table 5.23 Model Summary Planning Day to Day Activities vs Programme Success Criteria

As seen in the model summary above, the coefficient of correlation is 0.773 which means that 77.3% variability of the model could be predicted using the variables of this model. The difference between R-square and Adjusted R-square is 0.008 (0.597-0.589) which means the sample used for survey is 92% and is a good predictor of the population.

The null hypothesis is:

H12 Planning Day to Day the Programme Success Criteria

The sub hypotheses are:

H12a Planning Day to Day Activities Affects Timely Completion

H12b Planning Day to Day Activities Affects Programme Completion within Budget

H12c Planning Day to Day Activities Affects Programme Completion as Per Specification

H12d Planning Day to Day Activities Affects Good Risk Assessment and Management

H12e Planning Day to Day Activities Affects Meeting Stakeholder Satisfaction

H12f Planning Day to Day Activities Affects Satisfaction of Programme Objectives

H12g Planning Day to Day Activities Affects Benefits to Organisation

H12h Planning Day to Day Activities Affects Benefits to Community

H12i Planning Day to Day Activities Affects Programme Implementation Process

H12j Planning Day to Day Activities Affects Customer Satisfaction

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.240	.346		3.580	.000
Timely Completion	-.184	.062	-.165	-2.964	.003
Within Budget	.346	.047	.350	7.310	.000
As per Specifications	-.055	.061	-.049	-.893	.372
Good Risk Assessment and Management	.475	.065	.403	7.336	.000
Meets Stakeholder Satisfaction	-.021	.056	-.020	-.382	.703
Satisfaction of Programme Objectives	-.154	.065	-.139	-2.377	.018
Benefits to Organization	.189	.059	.166	3.188	.002
Benefits to Community	-.052	.067	-.037	-.779	.436
Programme Implementation Process	-.078	.043	-.092	-1.841	.066
Customer Satisfaction	.254	.074	.171	3.425	.001

a. Dependent Variable: Planning Day to Day Activities

Table 5.24 Planning Day to Day Activities vs Programme Success Criteria (Detail)

Based on the analysis, the sub-hypotheses that are accepted are 12a, 12b, 12d, 12f, 12g, and 12j. Therefore, the main hypothesis 12 is partially accepted. Appropriate level of planning of day to day activities keeps a firm control over the budget, time, and the on-going risks. It also brings benefits to the organisation and overall satisfaction to the customer. Based on the tests, there is not sufficient evidence to support its effect on the attainment of the intended specifications.

5.4.7 Identification of Risks vs Programme Success Criteria

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.820 ^a	.672	.666	.29700

a. Predictors: (Constant), Customer Satisfaction, Programme Implementation Process, Satisfaction of Programme Objectives, Benefits to Organization, Within Budget, Benefits to Community, As per Specifications, Meets Stakeholder Satisfaction, Good Risks Assessment and Management, Timely Completion

Table 5.25 Model Summary Identification of Risks vs Programme Success Criteria

As seen in the model summary above, the coefficient of correlation is 0.820 which means that 82.0% variability of the model could be predicted using the variables of this model. The difference between R-square and Adjusted R-square is 0.006 (0.672-0.666) which means the sample used for survey is 94% and is a good predictor of the population.

The null hypothesis is:

H13 Identification of Risks Affects the Programme Success Criteria

The sub hypotheses are:

H13a Identification of Risks Affects Timely Completion

H13b Identification of Risks Affects Programme Completion within Budget

H13c Identification of Risks Affects Programme Completion as Per Specification

H13d Identification of Risks Affects Good Risk Assessment and Management

H13e Identification of Risks Affects Meeting Stakeholder Satisfaction

H13f Identification of Risks Affects Satisfaction of Programme Objectives

H13g Identification of Risks Affects Benefits to Organisation

H13h Identification of Risks Affects Benefits to Community

H13i Identification of Risks Affects Programme Implementation Process

H13j Identification of Risks Affects Customer Satisfaction

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
1	(Constant)	1.683	.280		6.001	.000
	Timely Completion	-.016	.050	-.016	-.312	.755
	Within Budget	-.079	.038	-.089	-2.059	.040
	As per Specifications	.180	.050	.180	3.612	.000
	Good Risk Assessment and Management	.152	.052	.144	2.904	.004
	Meets Stakeholder Satisfaction	.044	.045	.047	.967	.334
	Satisfaction of Programme Objectives	.417	.052	.421	7.966	.000
	Benefits to Organization	-.092	.048	-.091	-1.924	.055
	Benefits to Community	-.321	.054	-.250	-5.886	.000
	Programme Implementation Process	.355	.034	.465	10.319	.000
	Customer Satisfaction	.004	.060	.003	.063	.950

a. Dependent Variable: Identification of Risks

Table 5.26 Identification of Risks vs Programme Success Criteria (Detail)

Based on the analysis, the sub-hypotheses that are accepted are 13b, 13c, 13d, 13f, 13h, and 13i. Therefore, the main hypothesis 13 is partially accepted. Identification of risk leads to appropriate management of budget, specification, risks, programme objectives, community benefits, and programme implementation process.

5.4.8 Managing Change vs Programme Success Criteria

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.800 ^a	.640	.633	.33923

a. Predictors: (Constant), Customer Satisfaction, Programme Implementation Process, Satisfaction of Programme Objectives, Benefits to Organization, Within Budget, Benefits to Community, As per Specifications, Meets Stakeholder Satisfaction, Good Risk Assessment and Management, Timely Completion

Table 5.27 Model Summary Managing Change vs Programme Success Criteria

As seen in the model summary above, the coefficient of correlation is 0.800 which means that 80.0% variability of the model could be predicted using the variables of this model. The difference between R-square and Adjusted R-square is 0.007 (0.640-0.633) which means the sample used for survey is 93% and is a good predictor of the population.

The null hypothesis is:

H14 Managing Change Affects the Programme Success Criteria

The sub hypotheses are:

H14a Managing Change Affects Timely Completion

H14b Managing Change Affects Programme Completion Within Budget

H14c Managing Change Affects Programme Completion As Per Specification

H14d Managing Change s Affects Good Risk Assessment and Management

H14e Managing Change Affects Meeting Stakeholder Satisfaction

H14f Managing Change Affects Satisfaction of Programme Objectives

H14g Managing Change s Affects Benefits to Organisation

H14h Managing Change Affects Benefits to Community

H14i Managing Change Affects Programme Implementation Process

H14j Managing Change Affects Customer Satisfaction

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.048	.320		.150	.880
Timely Completion	.187	.058	.171	3.244	.001
Within Budget	.017	.044	.018	.392	.695
As per Specifications	.055	.057	.051	.971	.332
Good Risk Assessment and Management	-.147	.060	-.127	-2.449	.015
1 Meets Stakeholder Satisfaction	.247	.052	.240	4.757	.000
Satisfaction of Programme Objectives	.270	.060	.250	4.517	.000
Benefits to Organization	-.205	.055	-.184	-3.731	.000
Benefits to Community	.238	.062	.170	3.829	.000
Programme Implementation Process	.066	.039	.080	1.691	.091
Customer Satisfaction	.232	.068	.160	3.391	.001

a. Dependent Variable: Managing Change

Table 5.28 Managing Change vs Programme Success Criteria (Detail)

Based on the analysis, the sub-hypotheses that are accepted are 14a, 14d, 14e, 14f, 14g, 14h and 14j. Therefore, the main hypothesis 14 is partially accepted. Managing change effectively in a programme will lead to timely completion, good risk management, meet stakeholder satisfaction, satisfaction of programme objectives, benefits to organisation, benefits to community, and overall customer satisfaction.

5.4.9 Managing Critical Interfaces vs Programme Success Criteria

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.850 ^a	.722	.716	.28446

a. Predictors: (Constant), Customer Satisfaction, Programme Implementation Process, Satisfaction of Programme Objectives, Benefits to Organization, Within Budget, Benefits to Community, As per Specifications, Meets Stakeholder Satisfaction, Good Risk Assessment and Management, Timely Completion

Table 5.29 Model Summary Managing Critical Interfaces vs Programme Success Criteria

As seen in the model summary above, the coefficient of correlation is 0.850 which means that 85.0% variability of the model could be predicted using the variables of this model. The difference between R-square and Adjusted R-square is 0.006 (0.722-0.716) which means the sample used for survey is 94% and is a good predictor of the population.

The null hypothesis is:

H15 Managing Critical Interfaces Affects the Programme Success Criteria

The sub hypotheses are:

H15a Managing Critical Interfaces Affects Timely Completion

H15b Managing Critical Interfaces Affects Programme Completion within Budget

H15c Managing Critical Interfaces Affects Programme Completion as Per Specification

H15d Managing Critical Interfaces Affects Good Risk Assessment and Management

H15e Managing Critical Interfaces Affects Meeting Stakeholder Satisfaction

H15f Managing Critical Interfaces Affects Satisfaction of Programme Objectives

H15g Managing Critical Interfaces Affects Benefits to Organisation

H15h Managing Critical Interfaces Affects Benefits to Community

H15i Managing Critical Interfaces Affects Programme Implementation Process

H15j Managing Critical Interfaces Affects Customer Satisfaction

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.159	.269		4.316	.000
Timely Completion	.091	.048	.087	1.881	.061
Within Budget	.326	.037	.354	8.881	.000
As per Specifications	-.049	.048	-.047	-1.028	.304
Good Risk Assessment and Management	-.167	.050	-.152	-3.329	.001
Meets Stakeholder Satisfaction	.061	.044	.063	1.408	.160
Satisfaction of Programme Objectives	.480	.050	.467	9.581	.000
Benefits to Organization	-.152	.046	-.144	-3.310	.001
Benefits to Community	.136	.052	.102	2.611	.009
Programme Implementation Process	-.033	.033	-.042	-1.008	.314
Customer Satisfaction	.052	.057	.038	.909	.364

a. Dependent Variable: Managing Critical Interfaces

Table 5.30 Managing Critical Interfaces vs Programme Success Criteria (Detail)

Based on the analysis, the sub-hypotheses that are accepted are 15b, 15d, 15f, 15g, and 15h.

Therefore, the main hypothesis 15 is partially accepted. Managing critical interfaces in a programme effectively has an impact on completion of project within budget, effective risk management due to effective information sharing from different parts of the programme, benefits to the community, and benefits to the organisation.

5.4.10 Quality Control and Analysis vs Programme Success Criteria

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.806 ^a	.650	.643	.29797

a. Predictors: (Constant), Customer Satisfaction, Programme Implementation Process, Satisfaction of Programme Objectives, Benefits to Organization, Within Budget, Benefits to Community, As per Specifications, Meets Stakeholder Satisfaction, Good Risk Assessment and Management, Timely Completion

Table 5.31 Model Summary Quality Control and Analysis vs Programme Success Criteria

As seen in the model summary above, the coefficient of correlation is 0.806 which means that 80.6% variability of the model could be predicted using the variables of this model. The difference between R-square and Adjusted R-square is 0.007 (0.650-0.643) which means the sample used for survey is 93% and is a good predictor of the population.

The null hypothesis is:

H16 Quality Control and Analysis Affects the Programme Success Criteria

The sub hypotheses are:

H16a Quality Control and Analysis Affects Timely Completion

H16b Quality Control and Analysis Affects Programme Completion within Budget

H16c Quality Control and Analysis Affects Programme Completion as Per Specification

H16d Quality Control and Analysis Affects Good Risk Assessment and Management

H16e Quality Control and Analysis Affects Meeting Stakeholder Satisfaction

H16f Quality Control and Analysis Affects Satisfaction of Programme Objectives

H16g Quality Control and Analysis Affects Benefits to Organisation

H16h Quality Control and Analysis Affects Benefits to Community

H16i Quality Control and Analysis Affects Programme Implementation Process

H16j Quality Control and Analysis Affects Customer Satisfaction

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.689	.281		6.005	.000
Timely Completion	-.008	.051	-.008	-.163	.871
Within Budget	.089	.038	.103	2.304	.022
As per Specifications	.125	.050	.129	2.498	.013
Good Risk Assessment and Management	.430	.053	.418	8.174	.000
Meets Stakeholder Satisfaction	-.121	.046	-.133	-2.666	.008
Satisfaction of Programme Objectives	-.093	.053	-.097	-1.774	.077
Benefits to Organization	.287	.048	.289	5.948	.000
Benefits to Community	-.111	.055	-.089	-2.031	.043
Programme Implementation Process	-.003	.035	-.004	-.080	.936
Customer `Satisfaction	.061	.060	.047	1.008	.314

a. Dependent Variable: Quality Control and Assurance

Table 5.32 Quality Control and Analysis vs Programme Success Criteria (Detail)

Based on the analysis, the sub-hypotheses that are accepted are 16b, 16c, 16d, 16e, 16f, 16g, and 16h. Therefore, the main hypothesis 16 is partially accepted. Quality control and assurance in a programme effectively has an impact on completion of project within budget and specifications, effective risk management, meeting stakeholder satisfaction, and benefits to the community and the organisation.

5.4.11 Employee Welfare vs Programme Success Criteria

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.810 ^a	.656	.649	.30937

a. Predictors: (Constant), Customer Satisfaction, Programme Implementation Process, Satisfaction of Programme Objectives, Benefits to Organization, Within Budget, Benefits to Community, As per Specifications, Meets Stakeholder Satisfaction, Good Risk Assessment and Management, Timely Completion

Table 5.33 Model Summary Employee Welfare vs Programme Success Criteria

As seen in the model summary above, the coefficient of correlation is 0.81 which means that 81% variability of the model could be predicted using the variables of this model. The difference between R-square and Adjusted R-square is 0.007 (0.656-0.649) which means the sample used for survey is 93% and is a good predictor of the population.

The null hypothesis is:

H17 Employee Welfare Affects the Programme Success Criteria

The sub hypotheses are:

H17a Employee Welfare Affects Timely Completion

H17b Employee Welfare Affects Programme Completion within Budget

H17c Employee Welfare Affects Programme Completion as Per Specification

H17d Employee Welfare Affects Good Risk Assessment and Management

H17e Employee Welfare Affects Meeting Stakeholder Satisfaction

H17f Employee Welfare Affects Satisfaction of Programme Objectives

H17g Employee Welfare Affects Benefits to Organisation

H17h Employee Welfare Affects Benefits to Community

H17i Employee Welfare Affects Programme Implementation Process

H17j Employee Welfare Affects Customer Satisfaction

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.371	.292		4.694	.000
Timely Completion	-.130	.052	-.128	-2.484	.013
Within Budget	.106	.040	.117	2.649	.008
As per Specifications	.178	.052	.176	3.443	.001
Good Risk Assessment and Management	.505	.055	.468	9.239	.000
Meets Stakeholder Satisfaction	-.131	.047	-.137	-2.773	.006
Satisfaction of Programme Objectives	.006	.055	.006	.114	.909
Benefits to Organization	.310	.050	.298	6.187	.000
Benefits to Community	-.331	.057	-.253	-5.824	.000
Programme Implementation Process	-.104	.036	-.134	-2.899	.004
Customer Satisfaction	.298	.062	.221	4.778	.000

a. Dependent Variable: Employee Welfare

Table 5.34 Employee Welfare vs Programme Success Criteria (Detail)

Based on the analysis, the sub-hypotheses that are accepted are 17a, 17b, 17c, 17d, 17e, 17g, 17h, 17i, and 17j. Therefore, the main hypothesis 17 is partially accepted. Employee welfare in a programme has an impact on completion of programme within the stipulated time, budget, and specifications, effective risk management, benefits to the community and the organisation, effective implementation process, and customer satisfaction.

5.4.12 Employee Counseling vs Programme Success Criteria

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.786 ^a	.618	.610	.34414

a. Predictors: (Constant), Customer Satisfaction, Programme Implementation Process, Satisfaction of Programme Objectives, Benefits to Organization, Within Budget, Benefits to Community, As per Specifications, Meets Stakeholder Satisfaction, Good Risk Assessment and Management, Timely Completion

Table 5.35 Model Summary Employee Counselling vs Programme Success Criteria

As seen in the model summary above, the coefficient of correlation is 0.786 which means that 78.6% variability of the model could be predicted using the variables of this model. The difference between R-square and Adjusted R-square is 0.008 (0.618-0.610) which means the sample used for survey is 92% and is a good predictor of the population.

The null hypothesis is:

H18 Employee Counselling Affects the Programme Success Criteria

The sub hypotheses are:

H18a Employee Counselling Affects Timely Completion

H18b Employee Counselling Affects Programme Completion within Budget

H18c Employee Counselling Affects Programme Completion as Per Specification

H18d Employee Counselling Affects Good Risk Assessment and Management

H18e Employee Counselling Affects Meeting Stakeholder Satisfaction

H18f Employee Counselling Affects Satisfaction of Programme Objectives

H18g Employee Counselling Affects Benefits to Organisation

H18h Employee Counselling Affects Benefits to Community

H18i Employee Counselling Affects Programme Implementation Process

H18j Employee Counselling Affects Customer Satisfaction

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.276	.325		3.928	.000
Timely Completion	.105	.058	.098	1.807	.071
Within Budget	.089	.044	.093	2.002	.046
As per Specifications	-.119	.058	-.112	-2.070	.039
Good Risk Assessment and Management	.694	.061	.611	11.431	.000
Meets Stakeholder Satisfaction	-.138	.053	-.137	-2.622	.009
Satisfaction of Programme Objectives	-.049	.061	-.047	-.815	.416
Benefits to Organization	.278	.056	.253	4.986	.000
Benefits to Community	-.170	.063	-.123	-2.688	.007
Programme Implementation Process	-.065	.040	-.079	-1.620	.106
Customer Satisfaction	.082	.069	.057	1.177	.240

a. Dependent Variable: Employee Counselling

Table 5.36 Employee Counselling vs Programme Success Criteria (Detail)

Based on the analysis, the sub-hypotheses that are accepted are 18b, 18c, 18d, 18e, 18g, and 18h. Therefore, the main hypothesis 18 is partially accepted. Employee counselling in a programme has an impact on completion of within budget and specifications, effective risk management, and benefits to the community and organisation.

5.4.13 Negotiations Within and Outside the Programme vs Programme Success Criteria

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.680 ^a	.463	.452	.35983

a. Predictors: (Constant), Customer Satisfaction, Programme Implementation Process, Satisfaction of Programme Objectives, Benefits to Organization, Within Budget, Benefits to Community, As per Specifications, Meets Stakeholder Satisfaction, Good Risk Assessment and Management, Timely Completion

Table 5.37 Model Summary Negotiations Within and Outside the Programme vs Programme Success Criteria

As seen in the model summary above, the coefficient of correlation is 0.680 which means that 68% variability of the model could be predicted using the variables of this model. The difference between R-square and Adjusted R-square is 0.011 (0.463-0.452) which means the sample used for survey is 89% and is a good predictor of the population.

The null hypothesis is:

H19 Negotiations Within and Outside the Programme Affects the Programme Success Criteria

The sub hypotheses are:

H19a Negotiations Within and Outside the Programme Affects Timely Completion

H19b Negotiations Within and Outside the Programme Affects Programme Completion within Budget

H19c Negotiations Within and Outside the Programme Affects Programme Completion as Per Specification

H19d Negotiations Within and Outside the Programme Affects Good Risk Assessment and Management

H19e Negotiations Within and Outside the Programme Affects Meeting Stakeholder

Satisfaction

H19f Negotiations Within and Outside the Programme Affects Satisfaction of Programme

Objectives

H19g Negotiations Within and Outside the Programme Affects Benefits to Organisation

H19h Negotiations Within and Outside the Programme Affects Benefits to Community

H19i Negotiations Within and Outside the Programme Affects Programme Implementation

Process

H19j Negotiations Within and Outside the Programme Affects Customer Satisfaction

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	.352	.340		1.036	.301
Timely Completion	.019	.061	.020	.311	.756
Within Budget	.249	.046	.297	5.371	.000
As per Specifications	-.076	.060	-.080	-1.256	.210
Good Risk Assessment and Management	.162	.064	.161	2.544	.011
Meets Stakeholder Satisfaction	-.045	.055	-.050	-.812	.417
Satisfaction of Programme Objectives	.363	.063	.388	5.727	.000
Benefits to Organization	-.069	.058	-.071	-1.181	.238
Benefits to Community	-.014	.066	-.011	-.209	.835
Programme Implementation Process	.263	.042	.363	6.295	.000
Customer Satisfaction	.035	.073	.028	.480	.632

a. Dependent Variable: Negotiations Within and Outside the Programme

Table 5.38 Negotiations Within and Outside the Programme vs Programme Success Criteria (Detail)

Based on the analysis, the sub-hypotheses that are accepted are 19b, 19d, 19f, and 19i.

Therefore, the main hypothesis 19 is partially accepted. Negotiations within and outside the programme by a programme manager has an impact on completion within budget, risk management, satisfaction of programme objectives, and programme implementation process.

5.4.14 Effective Leadership vs Programme Success Criteria

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.396 ^a	.156	.140	.26844

a. Predictors: (Constant), Customer Satisfaction, Programme Implementation Process, Satisfaction of Programme Objectives, Benefits to Organization, Within Budget, Benefits to Community, As per Specifications, Meets Stakeholder Satisfaction, Good Risk Assessment and Management, Timely Completion

Table 5.39 Model Summary Effective Leadership vs Programme Success Criteria

As seen in the model summary above, the coefficient of correlation is 0.396 which means that 39.6% variability of the model could be predicted using the variables of this model. The difference between R-square and Adjusted R-square is 0.016 (0.156-0.140) which means the sample used for survey is 84% and is a good predictor of the population.

The null hypothesis is:

H20 Effective Leadership Affects the Programme Success Criteria

The sub hypotheses are:

H20a Effective Leadership Affects Timely Completion

H20b Effective Leadership Affects Programme Completion within Budget

H20c Effective Leadership Affects Programme Completion as Per Specification

H20d Effective Leadership Affects Good Risk Assessment and Management

H20e Effective Leadership Affects Meeting Stakeholder Satisfaction

H20f Effective Leadership Affects Satisfaction of Programme Objectives

H20g Effective Leadership Affects Benefits to Organisation

H20h Effective Leadership Affects Benefits to Community

H20i Effective Leadership Affects Programme Implementation Process

H20j Effective Leadership Affects Customer Satisfaction

Since the coefficient of correlation is less than 0.6, the main hypothesis is rejected.

5.4.15 Managing Project Managers vs Programme Success Criteria

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.517 ^a	.267	.253	.33549

a. Predictors: (Constant), Customer Satisfaction, Programme Implementation Process, Satisfaction of Programme Objectives, Benefits to Organization, Within Budget, Benefits to Community, As per Specifications, Meets Stakeholder Satisfaction, Good Risk Assessment and Management, Timely Completion

Table 5.40 Model Summary Managing Project Managers vs Programme Success Criteria

As seen in the model summary above, the coefficient of correlation is 0.517 which means that 51.7% variability of the model could be predicted using the variables of this model. The difference between R-square and Adjusted R-square is 0.014 (0.267-0.253) which means the sample used for survey is 86% and is a good predictor of the population.

The null hypothesis is:

H21 Managing Project Managers Affects the Programme Success Criteria

The sub hypotheses are:

H21a Managing Project Managers Affects Timely Completion

H21b Managing Project Managers Affects Programme Completion within Budget

H21c Managing Project Managers Affects Programme Completion as Per Specification

H21d Managing Project Managers Affects Good Risk Assessment and Management

H21e Managing Project Managers Affects Meeting Stakeholder Satisfaction

H21f Managing Project Managers Affects Satisfaction of Programme Objectives

H21g Managing Project Managers Affects Benefits to Organisation

H21h Managing Project Managers Affects Benefits to Community

H21i Managing Project Managers Affects Programme Implementation Process

H21j Managing Project Managers Affects Customer Satisfaction

Since the coefficient of correlation is less than 0.6, the main hypothesis is rejected.

5.4.16 Time Management vs Programme Success Criteria

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.542 ^a	.293	.279	.30197

a. Predictors: (Constant), Customer Satisfaction, Programme Implementation Process, Satisfaction of Programme Objectives, Benefits to Organization, Within Budget, Benefits to Community, As per Specifications, Meets Stakeholder Satisfaction, Good Risk Assessment and Management, Timely Completion

Table 5.41 Model Summary Time Management vs Programme Success Criteria

As seen in the model summary above, the coefficient of correlation is 0.542 which means that 54.2% variability of the model could be predicted using the variables of this model. The difference between R-square and Adjusted R-square is 0.014 (0.293-0.279) which means the sample used for survey is 86% and is a good predictor of the population.

The null hypothesis is:

H22 Time Management Affects the Programme Success Criteria

The sub hypotheses are:

H22a Time Management Affects Timely Completion

H22b Time Management Affects Programme Completion within Budget

H22c Time Management Affects Programme Completion as Per Specification

H22d Time Management Affects Good Risk Assessment and Management

H22e Time Management Affects Meeting Stakeholder Satisfaction

H22f Time Management Affects Satisfaction of Programme Objectives

H22g Time Management Affects Benefits to Organisation

H22h Time Management Affects Benefits to Community

H22i Time Management Affects Programme Implementation Process

H22j Time Management Affects Customer Satisfaction

Since the coefficient of correlation is less than 0.6, the main hypothesis is rejected.

5.4.17 Team Building vs Programme Success Criteria

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.840 ^a	.705	.699	.29477

a. Predictors: (Constant), Customer Satisfaction, Programme Implementation Process, Satisfaction of Programme Objectives, Benefits to Organization, Within Budget, Benefits to Community, As per Specifications, Meets Stakeholder Satisfaction, Good Risk Assessment and Management, Timely Completion

Table 5.42 Model Summary Team Building vs Programme Success Criteria

As seen in the model summary above, the coefficient of correlation is 0.840 which means that 84% variability of the model could be predicted using the variables of this model. The difference between R-square and Adj R-square is 0.006 (0.705-0.699) which means the sample used for survey is 94% and is a good predictor of the population.

The null hypothesis is:

H23 Team Building Affects the Programme Success Criteria

The sub hypotheses are:

H23a Team Building Affects Timely Completion

H23b Team Building Affects Programme Completion within Budget

H23c Team Building Affects Programme Completion as Per Specification

H23d Team Building Affects Good Risk Assessment and Management

H23e Team Building Affects Meeting Stakeholder Satisfaction

H23f Team Building Affects Satisfaction of Programme Objectives

H23g Team Building Affects Benefits to Organisation

H23h Team Building Affects Benefits to Community

H23i Team Building Affects Programme Implementation Process

H23j Team Building Affects Customer Satisfaction

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.147	.278		4.123	.000
1 Timely Completion	.411	.050	.391	8.223	.000
Within Budget	-.225	.038	-.242	-5.911	.000
As per Specifications	-.032	.049	-.031	-.655	.513
Good Risk Assessment and Management	-.060	.052	-.054	-1.151	.250
Meets Stakeholder Satisfaction	.061	.045	.062	1.344	.179
Satisfaction of Programme Objectives	.452	.052	.437	8.703	.000
Benefits to Organization	-.212	.048	-.199	-4.448	.000
Benefits to Community	.025	.054	.019	.462	.645
Programme Implementation Process	.260	.034	.325	7.607	.000
Customer Satisfaction	.078	.059	.056	1.308	.191

a. Dependent Variable: Team Building

Table 5.43 Team Building vs Programme Success Criteria (Detail)

Based on the analysis, the sub-hypotheses that are accepted are 23a, 23b, 23f, 23g, and 23i.

Therefore, the main hypothesis 23 is partially accepted. Good team building competencies in

a programme manager has an impact on completion within time and budget, satisfaction of programme objectives, benefits to the organisation, and programme implementation process.

5.4.18 Effective Communication vs Programme Success Criteria

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.869 ^a	.755	.750	.26432

a. Predictors: (Constant), Customer Satisfaction, Programme Implementation Process, Satisfaction of Programme Objectives, Benefits to Organization, Within Budget, Benefits to Community, As per Specifications, Meets Stakeholder Satisfaction, Good Risk Assessment and Management, Timely Completion

Table 5.44 Model Summary Effective Communication vs Programme Success Criteria

As seen in the model summary above, the coefficient of correlation is 0.869 which means that 86.9% variability of the model could be predicted using the variables of this model. The difference between R-square and Adj R-square is 0.005 (0.755-0.750) which means the sample used for survey is 95% and is a good predictor of the population.

The null hypothesis is:

H24 Effective Communication Affects the Programme Success Criteria

The sub hypotheses are:

H24a Effective Communication Affects Timely Completion

H24b Effective Communication Affects Programme Completion within Budget

H24c Effective Communication Affects Programme Completion as Per Specification

H24d Effective Communication Affects Good Risk Assessment and Management

H24e Effective Communication Affects Meeting Stakeholder Satisfaction

H24f Effective Communication Affects Satisfaction of Programme Objectives

H24g Effective Communication Affects Benefits to Organisation

H24h Effective Communication Affects Benefits to Community

H24i Effective Communication Affects Programme Implementation Process

H24j Effective Communication Affects Customer Satisfaction

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.613	.250		6.464	.000
Timely Completion	.373	.045	.360	8.309	.000
Within Budget	-.218	.034	-.239	-6.386	.000
As per Specifications	.104	.044	.102	2.355	.019
Good Risk Assessment and Management	-.224	.047	-.205	-4.793	.000
1 Meets Stakeholder Satisfaction	.174	.040	.179	4.301	.000
Satisfaction of Programme Objectives	.314	.047	.308	6.733	.000
Benefits to Organization	-.104	.043	-.099	-2.423	.016
Benefits to Community	-.083	.048	-.063	-1.706	.089
Programme Implementation Process	.206	.031	.262	6.734	.000
Customer Satisfaction	.126	.053	.092	2.356	.019

a. Dependent Variable: Effective Communication

Table 5.45 Effective Communication vs Programme Success Criteria (Detail)

Based on the analysis, the sub-hypotheses that are accepted are 24a, 24b, 24c, 24d, 24e, 24f, 24g, 24i and 24j. Therefore, the main hypothesis 24 is partially accepted. Effective communication competencies in a programme manager has a positive impact on customer and stakeholder satisfaction, programme implementation process, fulfilment of programme objectives, benefits to the organization, within budget as per specifications, risk assessment and management, and timely completion.

5.4.19 Effective Sequencing of Projects vs Programme Success Criteria

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.793 ^a	.629	.622	.35406

a. Predictors: (Constant), Customer Satisfaction, Programme Implementation Process, Satisfaction of Programme Objectives, Benefits to Organization, Within Budget, Benefits to Community, As per Specifications, Meets Stakeholder Satisfaction, Good Risk Assessment and Management, Timely Completion

Table 5.46 Model Summary Effective Sequencing of Projects vs Programme Success Criteria

As seen in the model summary above, the coefficient of correlation is 0.793 which means that 79.3% variability of the model could be predicted using the variables of this model. The difference between R-square and Adj R-square is 0.007 (0.629-0.622) which means the sample used for survey is 93% and is a good predictor of the population.

The null hypothesis is:

H25 Effective Sequencing of Projects Affects the Programme Success Criteria

The sub hypotheses are:

H25a Effective Sequencing of Projects Affects Timely Completion

H25b Effective Sequencing of Projects Affects Programme Completion within Budget

H25c Effective Sequencing of Projects Affects Programme Completion as Per Specification

H25d Effective Sequencing of Projects Affects Good Risk Assessment and Management

H25e Effective Sequencing of Projects Affects Meeting Stakeholder Satisfaction

H25f Effective Sequencing of Projects Affects Satisfaction of Programme Objectives

H25g Effective Sequencing of Projects Affects Benefits to Organisation

H25h Effective Sequencing of Projects Affects Benefits to Community

H25i Effective Sequencing of Projects Affects Programme Implementation Process

H25j Effective Sequencing of Projects Affects Customer Satisfaction

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-.134	.334		-.402	.688
Timely Completion	.481	.060	.428	8.015	.000
Within Budget	-.067	.046	-.067	-1.461	.145
As per Specifications	.087	.059	.078	1.472	.142
Good Risk Assessment and Management	-.177	.063	-.149	-2.826	.005
Meets Stakeholder Satisfaction	.072	.054	.069	1.336	.182
Satisfaction of Programme Objectives	.344	.062	.310	5.517	.000
Benefits to Organization	.112	.057	.098	1.952	.051
Benefits to Community	-.085	.065	-.059	-1.315	.189
Programme Implementation Process	.030	.041	.035	.727	.468
Customer Satisfaction	.219	.071	.147	3.063	.002

a. Dependent Variable: Effective Sequencing of Projects

Table 5.47 Effective Sequencing of Projects vs Programme Success Criteria (Detail)

Based on the analysis, the sub-hypotheses that are accepted are 25a, 25d, 25f, and 25j.

Therefore, the main hypothesis 25 is partially accepted. Effective sequencing of projects by a programme manager has an impact on customer satisfaction, completion of programme objectives, good risk assessment and management, and timely completion.

5.4.20 Conducting Meetings vs Programme Success Criteria

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.785 ^a	.616	.609	.34806

a. Predictors: (Constant), Customer Satisfaction, Programme Implementation Process, Satisfaction of Programme Objectives, Benefits to Organization, Within Budget, Benefits to Community, As per Specifications, Meets Stakeholder Satisfaction, Good Risk Assessment and Management, Timely Completion

Table 5.48 Model Summary Conducting Meetings vs Programme Success Criteria

As seen in the model summary above, the coefficient of correlation is 0.785 which means that 78.5% variability of the model could be predicted using the variables of this model. The difference between R-square and Adjusted R-square is 0.007 (0.616-0.609) which means the sample used for survey is 93% and is a good predictor of the population.

The null hypothesis is:

H26 Conducting Meetings Affects the Programme Success Criteria

The sub hypotheses are:

H26a Conducting Meetings Affects Timely Completion

H26b Conducting Meetings Affects Programme Completion Within Budget

H26c Conducting Meetings Affects Programme Completion As Per Specification

H26d Conducting Meetings Affects Good Risk Assessment and Management

H26e Conducting Meetings Affects Meeting Stakeholder Satisfaction

H26f Conducting Meetings Affects Satisfaction of Programme Objectives

H26g Conducting Meetings Affects Benefits to Organisation

H26h Conducting Meetings Affects Benefits to Community

H26i Conducting Meetings Affects Programme Implementation Process

H26j Conducting Meetings Affects Customer Satisfaction

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.612	.329		1.862	.063
Timely Completion	-.011	.059	-.010	-.192	.848
Within Budget	.048	.045	.050	1.078	.282
As per Specifications	.058	.058	.053	.986	.324
Good Risk Assessment and Management	.436	.061	.380	7.090	.000
Meets Stakeholder Satisfaction	-.019	.053	-.018	-.350	.726
Satisfaction of Programme Objectives	-.106	.061	-.099	-1.729	.084
Benefits to Organization	.422	.056	.382	7.495	.000
Benefits to Community	-.056	.064	-.040	-.874	.382
Programme Implementation Process	.001	.040	.001	.023	.981
Customer Satisfaction	.093	.070	.065	1.324	.186

a. Dependent Variable: Conducting Meetings

Table 5.49 Conducting Meetings vs Programme Success Criteria (Detail)

Based on the analysis, the sub-hypotheses that are accepted are 26d, and 26g. Therefore, the main hypothesis 26 is partially accepted. Conducting meetings by a programme manager has an impact on good risk assessment and management, and benefits to organization.

5.5 Programme Complexity and Programme Manager Competency

This section presents the analysis of establishment of relationship between programme manager competency and variables that define programme complexity such as programme size, programme variety in terms of diversity of jobs and skill sets required, interdependence of activities and projects within the programme, programme context or the environment in which programme is being executed, rigidity of the sequence of activities, and sequence of projects being executed in the programme.

5.5.1 Planning the Programme vs Programme Complexity

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.746 ^a	.556	.552	.35922

a. Predictors: (Constant), Rigidity of the Seq of Acts and Seq of Proj Being Exec In The Prog, Programme Size, Programme Context of the Environment in Which Programme is Being Executed, Programme Variety in Terms of Diversity of Jobs and Skill Sets Required, Interdependence of Activities and Projects Within the Programme

Table 5.50 Model Summary Planning the Programme vs Programme Complexity

As seen in the model summary above, the coefficient of correlation is 0.746 which means that 74.6% variability of the model could be predicted using the variables of this model. The difference between R-square and Adj R-square is 0.004 (0.556-0.552) which means the sample used for survey is 96% and is a good predictor of the population.

The null hypothesis is:

H27 Planning the Programme is Affected by the Programme Complexity

The sub hypotheses are:

H27a Planning the Programme is Affected by Programme Size

H27b Planning the Programme is Affected by Programme Variety in Terms of Diversity of Jobs and Skill Sets Required

H27c Planning the Programme is Affected by Interdependence of Activities and Projects within the Programme

H27d Planning the Programme is Affected by Programme Context or the Environment in Which Programme Is Being Executed

H27e Planning the Programme is Affected by Rigidity of the Sequence of Activities and Sequence of Projects Being Executed in the Programme.

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
1	(Constant)	3.699	.222		16.667	.000
	Programme Size	.032	.026	.044	1.253	.211
	Programme Variety in Terms of Diversity of Jobs and Skill Sets Required	.134	.051	.116	2.608	.009
	Interdependence of Activities and Projects Within the Programme	.090	.051	.081	1.788	.074
	Programme Context of the Environment in Which Programme is Being Executed	.670	.034	.622	19.607	.000
	Rigidity of the Seq of Acts and Seq of Proj Being Exec In The Prog	-.696	.040	-.748	-17.471	.000

a. Dependent Variable: Planning the programme

Table 5.51 Planning the Programme vs Programme Complexity (Detail)

Based on the analysis, the sub-hypotheses that are accepted are 27b, 27d and 27e. Therefore, the main hypothesis 27 is partially accepted. Planning the programme is affected by programme variety in terms of diversity of jobs, skill sets required, programme context or the environment in which programme is being executed, rigidity of the sequence of activities, and sequence of projects being executed in the programme.

5.5.2 Maintaining Programme Activities vs Programme Complexity

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.714 ^a	.510	.505	.36649

a. Predictors: (Constant), Rigidity of the Seq of Acts and Seq of Proj Being Exec In The Prog, Programme Size, Programme Context of the Environment in Which Programme is Being Executed, Programme Variety in Terms of Diversity of Jobs and Skill Sets Required, Interdependence of Activities and Projects Within the Programme

Table 5.52 Model Summary Maintaining Programme Activities vs Programme Complexity

As seen in the model summary above, the coefficient of correlation is 0.714 which means that 71.4% variability of the model could be predicted using the variables of this model. The difference between R-square and Adj R-square is 0.005 (0.510-0.505) which means the sample used for survey is 95% and is a good predictor of the population.

The null hypothesis is:

H28 Maintaining Programme Activities is Affected by the Programme Complexity

The sub hypotheses are:

H28a Maintaining Programme Activities is Affected by Programme Size

H28b Maintaining Programme Activities is Affected by Programme Variety in Terms of Diversity of Jobs and Skill Sets Required

H28c Maintaining Programme Activities is Affected by Interdependence of Activities and Projects within the Programme

H28d Maintaining Programme Activities is Affected by Programme Context or the Environment in which Programme Is Being Executed

H28e Maintaining Programme Activities is Affected by Rigidity of the Sequence of Activities and Sequence of Projects Being Executed in the Programme

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
1	(Constant)	5.302	.226		23.414	.000
	Programme Size	-.399	.026	-.561	-15.248	.000
	Programme Variety in Terms of Diversity of Jobs and Skill Sets Required	.148	.052	.132	2.821	.005
	Interdependence of Activities and Projects Within the Programme	-.076	.052	-.071	-1.482	.139
	Programme Context of the Environment in Which Programme is Being Executed	-.220	.035	-.210	-6.303	.000
	Rigidity of the Seq of Acts and Seq of Proj Being Exec In The Prog	.340	.041	.376	8.358	.000

a. Dependent Variable: Maintaining Programme Activities

Table 5.53 Maintaining Programme Activities vs Programme Complexity (Detail)

Based on the analysis, the sub-hypotheses that are accepted are 28a, 28b, 28d and 28e.

Therefore, the main hypothesis 28 is partially accepted. Maintaining programme activities is affected by programme size, programme variety in terms of diversity of jobs, skill sets required, programme context or the environment in which programme is being executed, rigidity of the sequence of activities, and sequence of projects being executed in the programme.

5.5.3 Programme Control vs Programme Complexity

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.675 ^a	.455	.450	.39351

a. Predictors: (Constant), Rigidity of the Seq of Acts and Seq of Proj Being Exec In The Prog, Programme Size, Programme Context of the Environment in Which Programme is Being Executed, Programme Variety in Terms of Diversity of Jobs and Skill Sets Required, Interdependence of Activities and Projects Within the Programme

Table 5.54 Model Summary Programme Control vs Programme Complexity

As seen in the model summary above, the coefficient of correlation is 0.675 which means that 67.5% variability of the model could be predicted using the variables of this model. The difference between R-square and Adj R-square is 0.005 (0.455-0.450) which means the sample used for survey is 95% and is a good predictor of the population.

The null hypothesis is:

H29 Programme Control is Affected by the Programme Complexity

The sub hypotheses are:

H29a Programme Control is Affected by Programme Size

H29b Programme Control is Affected by Programme Variety in Terms of Diversity of Jobs and Skill Sets Required

H29c Programme Control is Affected by Interdependence of Activities and Projects within the Programme

H29d Programme Control is Affected by Programme Context or the Environment in which Programme Is Being Executed

H29e Programme Control is Affected by Rigidity of the Sequence of Activities and

Sequence of Projects Being Executed In the Programme

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.766	.243		11.376	.000
Programme Size	-.053	.028	-.073	-1.892	.059
Programme Variety in Terms of Diversity of Jobs and Skill Sets Required	-.003	.056	-.002	-.046	.963
1 Interdependence of Activities and Projects Within the Programme	-.266	.055	-.242	-4.802	.000
Programme Context of the Environment in Which Programme is Being Executed	.701	.037	.657	18.716	.000
Rigidity of the Seq of Acts and Seq of Proj Being Exec In The Prog	.016	.044	.018	.370	.712

a. Dependent Variable: Programme Control

Table 5.55 Programme Control vs Programme Complexity (Detail)

Based on the analysis, the sub-hypotheses that are accepted are 29c, and 29d. Therefore, the main hypothesis 29 is partially accepted. Programme control is affected by interdependence of activities and projects within the programme; programme context or the environment in which programme is being executed.

5.5.4 Forecasting vs Programme Complexity

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.825 ^a	.681	.678	.41401

a. Predictors: (Constant), Rigidity of the Seq of Acts and Seq of Proj Being Exec In The Prog, Programme Size, Programme Context of the Environment in Which Programme is Being Executed, Programme Variety in Terms of Diversity of Jobs and Skill Sets Required, Interdependence of Activities and Projects Within the Programme

Table 5.56 Model Summary Forecasting vs Programme Complexity

As seen in the model summary above, the coefficient of correlation is 0.825 which means that 82.5% variability of the model could be predicted using the variables of this model. The difference between R-square and Adj R-square is 0.003 (0.681-0.678) which means the sample used for survey is 97% and is a good predictor of the population.

The null hypothesis is:

H30 Forecasting is Affected by the Programme Complexity

The sub hypotheses are:

H30a Forecasting is Affected by Programme Size

H30b Forecasting is Affected by Programme Variety in Terms of Diversity of Jobs and Skill Sets Required

H30c Forecasting is Affected by Interdependence of Activities and Projects within the Programme

H30d Forecasting is Affected by Programme Context or the Environment in which Programme Is Being Executed

H30e Forecasting is Affected by Rigidity of the Sequence of Activities and Sequence of Projects Being Executed in the Programme

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.340	.256		5.240	.000
Programme Size	-.103	.030	-.103	-3.489	.001
Programme Variety in Terms of Diversity of Jobs and Skill Sets Required	-.289	.059	-.184	-4.874	.000
Interdependence of Activities and Projects Within the Programme	-.424	.058	-.281	-7.275	.000
Programme Context of the Environment in Which Programme is Being Executed	.772	.039	.526	19.581	.000
Rigidity of the Seq of Acts and Seq of Proj Being Exec In The Prog	.715	.046	.565	15.571	.000

a. Dependent Variable: Forecasting

Table 5.57 Forecasting vs Programme Complexity (Detail)

Based on the analysis, the sub-hypotheses that are accepted are 30a, 30b, 30c, 30d, and 30e. Therefore, the main hypothesis 30 is fully accepted. Forecasting is affected by programme size, programme variety in terms of diversity of jobs, skill sets required, interdependence of activities and projects within the programme, programme context or the environment in which programme is being executed, rigidity of the sequence of activities, and sequence of projects being executed in the programme.

5.5.5 Designing the Programme vs Programme Complexity

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.536 ^a	.287	.280	.31606

a. Predictors: (Constant), Rigidity of the Seq of Acts and Seq of Proj Being Exec In The Prog, Programme Size, Programme Context of the Environment in Which Programme is Being Executed, Programme Variety in Terms of Diversity of Jobs and Skill Sets Required, Interdependence of Activities and Projects Within the Programme

Table 5.58 Model Summary Designing the Programme vs Programme Complexity

As seen in the model summary above, the coefficient of correlation is 0.536 which means that 53.6% variability of the model could be predicted using the variables of this model. The difference between R-square and Adj R-square is 0.007 (0.287-0.280) which means the sample used for survey is 93% and is a good predictor of the population.

The null hypothesis is:

H31 Designing the Programme is Affected by the Programme Complexity

The sub hypotheses are:

H31a Designing the Programme is Affected by Programme Size

H31b Designing the Programme is Affected by Programme Variety in Terms of Diversity of Jobs and Skill Sets Required

H31c Designing the Programme is Affected by Interdependence of Activities and Projects within the Programme

H31d Designing the Programme is Affected by Programme Context or the Environment in which Programme Is Being Executed

H31e Designing the Programme is Affected by Rigidity of the Sequence of Activities and Sequence of Projects Being Executed in the Programme

Since the coefficient of correlation is less than 0.6, the null hypothesis is rejected.

5.5.6 Planning Day to Day Activities Vs Programme Complexity

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.742 ^a	.551	.546	.38551

a. Predictors: (Constant), Rigidity of the Seq of Acts and Seq of Proj Being Exec In The Prog, Programme Size, Programme Context of the Environment in Which Programme is Being Executed, Programme Variety in Terms of Diversity of Jobs and Skill Sets Required, Interdependence of Activities and Projects Within the Programme

Table 5.59 Model Summary Planning Day to Day Activities vs Programme Complexity

As seen in the model summary above, the coefficient of correlation is 0.742 which means that 74.2% variability of the model could be predicted using the variables of this model. The difference between R-square and Adj R-square is 0.005 (0.551-0.546) which means the sample used for survey is 95% and is a good predictor of the population.

The null hypothesis is:

H32 Planning Day to Day Activities is Affected by the Programme Complexity

The sub hypotheses are:

H32a Planning Day to Day Activities is Affected by Programme Size

H32b Planning Day to Day Activities is Affected by Programme Variety in Terms of Diversity of Jobs and Skill Sets Required

H32c Planning Day to Day Activities is Affected by Interdependence of Activities and Projects within the Programme

H32d Planning Day to Day Activities is Affected by Programme Context or the Environment in which Programme Is Being Executed

H32e Planning Day to Day Activities is Affected by Rigidity of the Sequence of Activities and Sequence of Projects Being Executed in the Programme

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
1	(Constant)	4.681	.238		19.654	.000
	Programme Size	-.411	.028	-.526	-14.948	.000
	Programme Variety in Terms of Diversity of Jobs and Skill Sets Required	.091	.055	.074	1.644	.101
	Interdependence of Activities and Projects Within the Programme	.147	.054	.124	2.718	.007
	Programme Context of the Environment in Which Programme is Being Executed	-.332	.037	-.288	-9.045	.000
	Rigidity of the Seq of Acts and Seq of Proj Being Exec In The Prog	.404	.043	.407	9.447	.000

a. Dependent Variable: Planning Day to Day Activities

Table 5.60 Planning Day to Day Activities vs Programme Complexity (Detail)

Based on the analysis, the sub-hypotheses that are accepted are 32a, 32c, 32d, and 32e.

Therefore, the main hypothesis 32 is partially accepted. Planning day to day activities is

affected by programme size, interdependence of activities and projects within the

programme, programme context or the environment in which programme is being executed,

rigidity of the sequence of activities, and sequence of projects being executed in the

programme.

5.5.7 Identification of Risks vs Programme Complexity

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.723 ^a	.523	.518	.35649

a. Predictors: (Constant), Rigidity of the Seq of Acts and Seq of Proj Being Exec In The Prog, Programme Size, Programme Context of the Environment in Which Programme is Being Executed, Programme Variety in Terms of Diversity of Jobs and Skill Sets Required, Interdependence of Activities and Projects Within the Programme

Table 5.61 Model Summary Identification of Risks vs Programme Complexity

As seen in the model summary above, the coefficient of correlation is 0.742 which means that 74.2% variability of the model could be predicted using the variables of this model. The difference between R-square and Adj R-square is 0.005 (0.551-0.546) which means the sample used for survey is 95% and is a good predictor of the population.

The null hypothesis is:

H33 Identification of Risks is Affected by the Programme Complexity

The sub hypotheses are:

H33a Identification of Risks is Affected by Programme Size

H33b Identification of Risks is Affected by Programme Variety in Terms of Diversity of Jobs and Skill Sets Required

H33c Identification of Risks is Affected by Interdependence of Activities and Projects within the Programme

H33d Identification of Risks is Affected by Programme Context or the Environment in which Programme Is Being Executed

H33e Identification of Risks is Affected by Rigidity of the Sequence of Activities and Sequence of Projects Being Executed in the Programme

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.564	.220		11.641	.000
Programme Size	-.102	.025	-.145	-3.992	.000
Programme Variety in Terms of Diversity of Jobs and Skill Sets Required	.050	.051	.045	.975	.330
1 Interdependence of Activities and Projects Within the Programme	-.169	.050	-.159	-3.369	.001
Programme Context of the Environment in Which Programme is Being Executed	.742	.034	.718	21.864	.000
Rigidity of the Seq of Acts and Seq of Proj Being Exec In The Prog	-.092	.040	-.103	-2.322	.021

a. Dependent Variable: Identification of Risks

Table 5.62 Identification of Risks vs Programme Complexity (Detail)

Based on the analysis, the sub-hypotheses that are accepted are 33a, 33c, 33d, and 33e.

Therefore, the main hypothesis 33 is partially accepted. Identification of risks is affected by programme size, interdependence of activities and projects within the programme, programme context or the environment in which programme is being executed, rigidity of the sequence of activities, and sequence of projects being executed in the programme.

5.5.8 Managing Change vs Programme Complexity

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.600 ^a	.360	.354	.45009

a. Predictors: (Constant), Rigidity of the Seq of Acts and Seq of Proj Being Exec In The Prog, Programme Size, Programme Context of the Environment in Which Programme is Being Executed, Programme Variety in Terms of Diversity of Jobs and Skill Sets Required, Interdependence of Activities and Projects Within the Programme

Table 5.63 Model Summary Managing Change vs Programme Complexity

As seen in the model summary above, the coefficient of correlation is 0.6 which means that 60% variability of the model could be predicted using the variables of this model. The difference between R-square and Adj R-square is 0.006 (0.360-0.354) which means the sample used for survey is 94% and is a good predictor of the population.

The null hypothesis is:

H34 Managing Change is Affected by the Programme Complexity

The sub hypotheses are:

H34a Managing Change is Affected by Programme Size

H34b Managing Change is Affected by Programme Variety in Terms of Diversity of Jobs and Skill Sets Required

H34c Managing Change is Affected by Interdependence of Activities and Projects within the Programme

H34d Managing Change is Affected by Programme Context or the Environment in which Programme Is Being Executed

H34e Managing Change is Affected by Rigidity of the Sequence of Activities and Sequence of Projects Being Executed in the Programme

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	3.600	.278		12.946	.000
Programme Size	-.186	.032	-.244	-5.802	.000
Programme Variety in Terms of Diversity of Jobs and Skill Sets Required	.422	.064	.350	6.553	.000
Interdependence of Activities and Projects Within the Programme	.293	.063	.253	4.627	.000
Programme Context of the Environment in Which Programme is Being Executed	.396	.043	.351	9.233	.000
Rigidity of the Seq of Acts and Seq of Proj Being Exec In The Prog	-.775	.050	-.797	-15.519	.000

a. Dependent Variable: Managing Change

Table 5.64 Managing Change vs Programme Complexity (Detail)

Based on the analysis, the sub-hypotheses that are accepted are 34a, 34b, 34c, 34d, and 34e.

Therefore, the main hypothesis 34 is fully accepted. Managing change is affected by programme size, programme variety in terms of diversity of jobs, skill sets required, interdependence of activities and projects within the programme, programme context or the environment in which programme is being executed, rigidity of the sequence of activities, and sequence of projects being executed In the programme.

5.5.9 Managing Critical Interfaces vs Programme Complexity

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.648 ^a	.420	.415	.40860

a. Predictors: (Constant), Rigidity of the Seq of Acts and Seq of Proj Being Exec In The Prog, Programme Size, Programme Context of the Environment in Which Programme is Being Executed, Programme Variety in Terms of Diversity of Jobs and Skill Sets Required, Interdependence of Activities and Projects Within the Programme

Table 5.65 Model Summary Managing Critical Interfaces vs Programme Complexity

As seen in the model summary above, the coefficient of correlation is 0.648 which means that 64.8% variability of the model could be predicted using the variables of this model. The difference between R-square and Adj R-square is 0.005 (0.420-0.415) which means the sample used for survey is 95% and is a good predictor of the population.

The null hypothesis is:

H35 Managing Critical Interfaces is Affected by the Programme Complexity

The sub hypotheses are:

H35a Managing Critical Interfaces is Affected by Programme Size

H35b Managing Critical Interfaces is Affected by Programme Variety in Terms of Diversity of Jobs and Skill Sets Required

H35c Managing Critical Interfaces is Affected by Interdependence of Activities and Projects within the Programme

H35d Managing Critical Interfaces is Affected by Programme Context or the Environment in which the Programme Is Being Executed

H35e Managing Critical Interfaces is Affected by Rigidity of the Sequence of Activities and Sequence of Projects Being Executed in the Programme

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	3.770	.252		14.933	.000
Programme Size	-.195	.029	-.268	-6.696	.000
Programme Variety in Terms of Diversity of Jobs and Skill Sets Required	.345	.059	.300	5.889	.000
Interdependence of Activities and Projects Within the Programme	.330	.058	.298	5.730	.000
Programme Context of the Environment in Which Programme is Being Executed	.434	.039	.404	11.155	.000
Rigidity of the Seq of Acts and Seq of Proj Being Exec In The Prog	-.793	.045	-.855	-17.493	.000

a. Dependent Variable: Managing Critical Interfaces

Table 5.66 Managing Critical Interfaces vs Programme Complexity (Detail)

Based on the analysis, the sub-hypotheses that are accepted are 35a, 35b, 35c, 35d, and 35e. Therefore, the main hypothesis 35 is fully accepted. Managing critical interfaces is affected by programme size, programme variety in terms of diversity of jobs skill sets required, interdependence of activities and projects within the programme, programme context or the environment in which programme is being executed, rigidity of the sequence of activities, and sequence of projects being executed in the programme.

5.5.10 Quality Control and Assurance vs Programme Complexity

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.719 ^a	.517	.512	.34833

a. Predictors: (Constant), Rigidity of the Seq of Acts and Seq of Proj Being Exec In The Prog, Programme Size, Programme Context of the Environment in Which Programme is Being Executed, Programme Variety in Terms of Diversity of Jobs and Skill Sets Required, Interdependence of Activities and Projects Within the Programme

Table 5.67 Model Summary Quality Control and Assurance vs Programme Complexity

As seen in the model summary above, the coefficient of correlation is 0.719 which means that 71.9% variability of the model could be predicted using the variables of this model. The difference between R-square and Adj R-square is 0.005 (0.517-0.512) which means the sample used for survey is 95% and is a good predictor of the population.

The null hypothesis is:

H36 Quality Control and Assurance is Affected by the Programme Complexity

The sub hypotheses are:

H36a Quality Control and Assurance is Affected by Programme Size

H36b Quality Control and Assurance is Affected by Programme Variety in Terms of Diversity of Jobs and Skill Sets Required

H36c Quality Control and Assurance is Affected by Interdependence of Activities and Projects within the Programme

H36d Quality Control and Assurance is Affected by Programme Context or the Environment in which the Programme Is Being Executed

H36e Quality Control and Assurance is Affected by Rigidity of the Sequence of Activities and Sequence of Projects Being Executed in the Programme.

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	3.341	.215		15.522	.000
Programme Size	-.160	.025	-.235	-6.438	.000
Programme Variety in Terms of Diversity of Jobs and Skill Sets Required	-.026	.050	-.024	-.516	.606
Interdependence of Activities and Projects Within the Programme	-.162	.049	-.157	-3.313	.001
Programme Context of the Environment in Which Programme is Being Executed	.065	.033	.064	1.950	.052
Rigidity of the Seq of Acts and Seq of Proj Being Exec In The Prog	.576	.039	.666	14.910	.000

a. Dependent Variable: Quality Control and Assurance

Table 5.68 Quality Control and Assurance vs Programme Complexity (Detail)

Based on the analysis, the sub-hypotheses that are accepted are 36a, 36c, and 36e. Therefore, the main hypothesis 36 is partially accepted. Quality control and assurance is affected by programme size, interdependence of activities and projects within the programme, rigidity of the sequence of activities, and sequence of projects being executed in the programme.

5.5.11 Employee Welfare vs Programme Complexity

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.696 ^a	.484	.479	.37720

a. Predictors: (Constant), Rigidity of the Seq of Acts and Seq of Proj Being Exec In The Prog, Programme Size, Programme Context of the Environment in Which Programme is Being Executed, Programme Variety in Terms of Diversity of Jobs and Skill Sets Required, Interdependence of Activities and Projects Within the Programme

Table 5.69 Model Summary Employee Welfare vs Programme Complexity

As seen in the model summary above, the coefficient of correlation is 0.696 which means that 69.6% variability of the model could be predicted using the variables of this model. The difference between R-square and Adj R-square is 0.005 (0.484-0.479) which means the sample used for survey is 95% and is a good predictor of the population.

The null hypothesis is:

H37 Employee Welfare is Affected by the Programme Complexity

The sub hypotheses are:

H37a Employee Welfare is Affected by Programme Size

H37b Employee Welfare is Affected by Programme Variety in Terms of Diversity of Jobs and Skill Sets Required

H37c Employee Welfare is Affected by Interdependence of Activities and Projects within the Programme

H37d Employee Welfare is Affected by Programme Context or the Environment in which the Programme Is Being Executed

H37e Employee Welfare is Affected by Rigidity of the Sequence of Activities and Sequence of Projects Being Executed in the Programme

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
1	(Constant)	2.662	.233		11.421	.000
	Programme Size	-.162	.027	-.227	-6.004	.000
	Programme Variety in Terms of Diversity of Jobs and Skill Sets Required	.059	.054	.052	1.093	.275
	Interdependence of Activities and Projects Within the Programme	-.097	.053	-.089	-1.822	.069
	Programme Context of the Environment in Which Programme is Being Executed	.101	.036	.096	2.802	.005
	Rigidity of the Seq of Acts and Seq of Proj Being Exec In The Prog	.529	.042	.583	12.643	.000

a. Dependent Variable: Employee Welfare

Table 5.70 Employee Welfare vs Programme Complexity (Detail)

Based on the analysis, the sub-hypotheses that are accepted are 37a, 37d, and 37e. Therefore, the main hypothesis 37 is partially accepted. Employee welfare is affected by programme size, programme context or the environment in which programme is being executed, rigidity of the sequence of activities, and sequence of projects being executed in the programme.

5.5.12 Employee Counselling vs Programme Complexity

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.706 ^a	.498	.493	.39225

a. Predictors: (Constant), Rigidity of the Seq of Acts and Seq of Proj Being Exec In The Prog, Programme Size, Programme Context of the Environment in Which Programme is Being Executed, Programme Variety in Terms of Diversity of Jobs and Skill Sets Required, Interdependence of Activities and Projects Within the Programme

Table 5.71 Model Summary Employee Counselling Vs Programme Complexity

As seen in the model summary above, the coefficient of correlation is 0.706 which means that 70.6% variability of the model could be predicted using the variables of this model. The difference between R-square and Adj R-square is 0.005 (0.498-0.493) which means the sample used for survey is 95% and is a good predictor of the population.

The null hypothesis is:

H38 Employee Counselling is Affected by the Programme Complexity

The sub hypotheses are:

H38a Employee Counselling is Affected by Programme Size

H38b Employee Counselling is Affected by Programme Variety in Terms of Diversity of Jobs and Skill Sets Required

H38c Employee Counselling is Affected by Interdependence of Activities and Projects within the Programme

H38d Employee Counselling is Affected by Programme Context or the Environment in which the Programme Is Being Executed

H38e Employee Counselling is Affected by rigidity of the Sequence of activities and Sequence of Projects Being Executed in the Programme

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.632	.242		10.859	.000
Programme Size	-.141	.028	-.187	-5.025	.000
Programme Variety in Terms of Diversity of Jobs and Skill Sets Required	-.067	.056	-.056	-1.191	.234
1 Interdependence of Activities and Projects Within the Programme	-.011	.055	-.010	-.204	.838
Programme Context of the Environment in Which Programme is Being Executed	.017	.037	.015	.445	.656
Rigidity of the Seq of Acts and Seq of Proj Being Exec In The Prog	.630	.044	.658	14.465	.000

a. Dependent Variable: Employee Counselling

Table 5.72 Employee Counselling vs Programme Complexity (Detail)

Based on the analysis, the sub-hypotheses that are accepted are 38a, and 38e. Therefore, the main hypothesis 38 is partially accepted. Employee counselling is affected by programme size, rigidity of the sequence of activities, and sequence of projects being executed in the programme.

5.5.13 Negotiations Within and Outside the Programme vs Programme Complexity

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.603 ^a	.364	.358	.38959

a. Predictors: (Constant), Rigidity of the Seq of Acts and Seq of Proj Being Exec In TheProg, Programme Size, Programme Context of the Environment in Which Programme is Being Executed, Programme Variety in Terms of Diversity of Jobs and Skill Sets Required, Interdependence of Activities and Projects Within the Programme

Table 5.73 Model Summary Negotiations Within and Outside the Programme vs Programme Complexity

As seen in the model summary above, the coefficient of correlation is 0.603 which means that 60.3% variability of the model could be predicted using the variables of this model. The difference between R-square and Adj R-square is 0.006 (0.364-0.358) which means the sample used for survey is 94% and is a good predictor of the population.

The null hypothesis is;

H39 Negotiations within and Outside the Programme is Affected by the Programme Complexity

The sub hypotheses are:

H39a Negotiations Within and Outside the Programme is Affected by Programme Size

H39b Negotiations Within and Outside the Programme is Affected by Programme Variety in Terms of Diversity of Jobs and Skill Sets Required

H39c Negotiations Within and Outside the Programme is Affected by Interdependence of Activities and Projects within the Programme

H39d Negotiations Within and Outside the Programme is Affected by Programme Context or The Environment in which Programme Is Being Executed

H39e Negotiations Within and Outside the Programme is Affected by Rigidity of the Sequence of Activities and Sequence of Projects Being Executed in the Programme

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error			
(Constant)	3.154	.241		13.104	.000
Programme Size	-.281	.028	-.424	-10.114	.000
Programme Variety in Terms of Diversity of Jobs and Skill Sets Required	.097	.056	.093	1.737	.083
1 Interdependence of Activities and Projects Within the Programme	.131	.055	.130	2.388	.017
Programme Context of the Environment in Which Programme is Being Executed	.420	.037	.430	11.325	.000
Rigidity of the Seq of Acts and Seq of Proj Being Exec In The Prog	-.155	.043	-.184	-3.590	.000

a. Dependent Variable: Negotiations Within and Outside the Programme

Table 5.74 Negotiations Within and Outside the Programme vs Programme Complexity (Detail)

Based on the analysis, the sub-hypotheses that are accepted are 39a, 39c, 39d, and 39e.

Therefore, the main hypothesis 39 is partially accepted. Negotiations within and outside the programme is affected by programme size, interdependence of activities and projects within the programme, programme context or the environment in which programme is being executed, rigidity of the sequence of activities, and sequence of projects being executed in the programme.

5.5.14 Effective Leadership vs Programme Complexity

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.392 ^a	.154	.146	.26752

a. Predictors: (Constant), Rigidity of the Seq of Acts and Seq of Proj Being Exec In The Prog, Programme Size, Programme Context of the Environment in Which Programme is Being Executed, Programme Variety in Terms of Diversity of Jobs and Skill Sets Required, Interdependence of Activities and Projects Within the Programme

Table 5.75 Model Summary Effective Leadership vs Programme Complexity

As seen in the model summary above, the coefficient of correlation is 0.392 which means that 39.2% variability of the model could be predicted using the variables of this model. The difference between R-square and Adj R-square is 0.008 (0.154-0.146) which means the sample used for survey is 92% and is a good predictor of the population.

The null hypothesis is:

H40 Effective Leadership is Affected by the Programme Complexity

The sub hypotheses are:

H40a Effective Leadership is Affected by Programme Size

H40b Effective Leadership is Affected by Programme Variety in Terms of Diversity of Jobs and Skill Sets Required

H40c Effective Leadership is Affected by Interdependence of Activities and Projects within the Programme

H40d Effective Leadership is Affected by Programme Context or the Environment in which the Programme Is Being Executed

H40e Effective Leadership is Affected by Rigidity of the Sequence of Activities and Sequence of Projects Being Executed in the Programme

Since the coefficient of correlation is less than 0.6, the null hypothesis is rejected.

5.5.15 Managing Project Managers vs Programme Complexity

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.501 ^a	.251	.244	.33750

a. Predictors: (Constant), Rigidity of the Seq of Acts and Seq of Proj Being Exec In The Prog, Programme Size, Programme Context of the Environment in Which Programme is Being Executed, Programme Variety in Terms of Diversity of Jobs and Skill Sets Required, Interdependence of Activities and Projects Within the Programme

Table 5.76 Model Summary Managing Project Managers vs Programme Complexity

As seen in the model summary above, the coefficient of correlation is 0.501 which means that 50.1% variability of the model could be predicted using the variables of this model. The difference between R-square and Adj R-square is 0.007 (0.251-0.244) which means the sample used for survey is 93% and is a good predictor of the population.

The null hypothesis is:

H41 Managing Project Managers is Affected by the Programme Complexity

The sub hypotheses are:

H41a Managing Project Managers is Affected by Programme Size

H41b Managing Project Managers is Affected by Programme Variety in Terms of Diversity of Jobs and Skill Sets Required

H41c Managing Project Managers is Affected by Interdependence of Activities and Projects within the Programme

H41d Managing Project Managers is Affected by Programme Context or the Environment In which the Programme Is Being Executed

H41e Managing Project Managers is Affected by Rigidity of the Sequence of Activities and Sequence of Projects Being Executed in the Programme.

Since the coefficient of correlation is less than 0.6, the null hypothesis is rejected.

5.5.16 Time Management vs Programme Complexity

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.539 ^a	.290	.283	.30113

a. Predictors: (Constant), Rigidity of the Seq of Acts and Seq of Proj Being Exec In The Prog, Programme Size, Programme Context of the Environment in Which Programme is Being Executed, Programme Variety in Terms of Diversity of Jobs and Skill Sets Required, Interdependence of Activities and Projects Within the Programme

Table 5.77 Model Summary Time Management vs Programme Complexity

As seen in the model summary above, the coefficient of correlation is 0.539 which means that 53.9% variability of the model could be predicted using the variables of this model. The difference between R-square and Adj R-square is 0.007 (0.29-0.283) which means the sample used for survey is 93% and is a good predictor of the population.

The null hypothesis is:

H42 Time Management is Affected by the Programme Complexity

The sub hypotheses are:

H42a Time Management is Affected by Programme Size

H42b Time Management is Affected by Programme Variety in Terms of Diversity of Jobs and Skill Sets Required

H42c Time Management is Affected by Interdependence of Activities and Projects within the Programme

H42d Time Management is Affected by Programme Context or the Environment in which the Programme Is Being Executed

H42e Time Management is Affected by Rigidity of the Sequence of Activities and Sequence of Projects Being Executed in the Programme

Since the coefficient of correlation is less than 0.6, the null hypothesis is rejected.

5.5.17 Team Building vs Programme Complexity

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.701 ^a	.492	.487	.38489

a. Predictors: (Constant), Rigidity of the Seq of Acts and Seq of Proj Being Exec In The Prog, Programme Size, Programme Context of the Environment in Which Programme is Being Executed, Programme Variety in Terms of Diversity of Jobs and Skill Sets Required, Interdependence of Activities and Projects Within the Programme

Table 5.78 Model Summary Team Building vs Programme Complexity

As seen in the model summary above, the coefficient of correlation is 0.701 which means that 70.1% variability of the model could be predicted using the variables of this model. The difference between R-square and Adj R-square is 0.005 (0.492-0.487) which means the sample used for survey is 95% and is a good predictor of the population.

The null hypothesis is:

H43 Team Building is Affected by the Programme Complexity

The sub hypotheses are:

H43a Team Building is Affected by Programme Size

H43b Team Building is Affected by Programme Variety in Terms of Diversity of Jobs and Skill Sets Required

H43c Team Building is Affected by Interdependence of Activities and Projects within the Programme

H43d Team Building is Affected by Programme Context or the Environment in which the Programme Is Being Executed

H43e Team Building is Affected by Rigidity of the Sequence of Activities and Sequence of Projects Being Executed in the Programme

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	2.533	.238		10.650	.000
Programme Size	.052	.027	.071	1.900	.058
Programme Variety in Terms of Diversity of Jobs and Skill Sets Required	.163	.055	.141	2.951	.003
Interdependence of Activities and Projects Within the Programme	.193	.054	.174	3.568	.000
Programme Context of the Environment in Which Programme is Being Executed	.675	.037	.625	18.422	.000
Rigidity of the Seq of Acts and Seq of Proj Being Exec In The Prog	-.614	.043	-.658	-14.375	.000

a. Dependent Variable: Team Building

Table 5.79 Team Building vs Programme Complexity (Detail)

Based on the analysis, the sub-hypotheses that are accepted are 43b, 43c, 43d, and 43e.

Therefore, the main hypothesis 43 is partially accepted. Team building is affected by programme variety in terms of diversity of jobs, skill sets required, interdependence of activities and projects within the programme, programme context or the environment in which programme is being executed, rigidity of the sequence of activities, and sequence of projects being executed in the programme.

5.5.18 Effective Communication vs Programme Complexity

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.731 ^a	.535	.530	.36264

a. Predictors: (Constant), Rigidity of the Seq of Acts and Seq of Proj Being Exec In The Prog, Programme Size, Programme Context of the Environment in Which Programme is Being Executed, Programme Variety in Terms of Diversity of Jobs and Skill Sets Required, Interdependence of Activities and Projects Within the Programme

Table 5.80 Model Summary Effective Communication vs Programme Complexity

As seen in the model summary above, the coefficient of correlation is 0.731 which means that 73.1% variability of the model could be predicted using the variables of this model. The difference between R-square and Adj R-square is 0.005 (0.535-0.530) which means the sample used for survey is 95% and is a good predictor of the population.

The null hypothesis is:

H44 Effective Communication is Affected by the Programme Complexity

The sub hypotheses are:

H44a Effective Communication is Affected by Programme Size

H44b Effective Communication is Affected by Programme Variety in Terms of Diversity of Jobs and Skill Sets Required

H44c Effective Communication is Affected by Interdependence of Activities and Projects within the Programme

H44d Effective Communication is Affected by Programme Context or the Environment in which the Programme Is Being Executed

H44e Effective Communication is Affected by Rigidity of the Sequence of Activities and Sequence of Projects Being Executed in the Programme

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	2.682	.224		11.971	.000
Programme Size	.079	.026	.110	3.058	.002
Programme Variety in Terms of Diversity of Jobs and Skill Sets Required	.224	.052	.196	4.308	.000
Interdependence of Activities and Projects Within the Programme	.022	.051	.020	.427	.669
Programme Context of the Environment in Which Programme is Being Executed	.711	.035	.669	20.608	.000
Rigidity of the Seq of Acts and Seq of Proj Being Exec In The Prog	-.585	.040	-.637	-14.545	.000

a. Dependent Variable: Effective Communication

Table 5.81 Effective Communication vs Programme Complexity (Detail)

Based on the analysis, the sub-hypotheses that are accepted are 44a, 44b, 44d, and 44e.

Therefore, the main hypothesis 44 is partially accepted. Effective communication is affected by programme size, programme variety in terms of diversity of jobs, skill sets required, programme context or the environment in which programme is being executed, rigidity of the sequence of activities, and sequence of projects being executed in the programme.

5.5.19 Effective Sequencing of Projects vs Programme Complexity

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.706 ^a	.499	.494	.40965

a. Predictors: (Constant), Rigidity of the Seq of Acts and Seq of Proj Being Exec In The Prog, Programme Size, Programme Context of the Environment in Which Programme is Being Executed, Programme Variety in Terms of Diversity of Jobs and Skill Sets Required, Interdependence of Activities and Projects Within the Programme

Table 5.82 Model Summary Effective Sequencing of Projects vs Programme Complexity

As seen in the model summary above, the coefficient of correlation is 0.706 which means that 70.6% variability of the model could be predicted using the variables of this model. The difference between R-square and Adj R-square is 0.005 (0.499-0.494) which means the sample used for survey is 95% and is a good predictor of the population.

The null hypothesis is:

H45 Effective Sequencing of Projects is Affected by the Programme Complexity

The sub hypotheses are:

H45a Effective Sequencing of Projects is Affected by Programme Size

H45b Effective Sequencing of Projects is Affected by Programme Variety in Terms of Diversity of Jobs and Skill Sets Required

H45c Effective Sequencing of Projects is Affected by Interdependence of Activities and Projects within the Programme

H45d Effective Sequencing of Projects is Affected by Programme Context or the Environment in which Programme Is Being Executed

H45e Effective Sequencing of Projects is Affected by Rigidity of the Sequence of Activities and Sequence of Projects Being Executed in the Programme

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	.861	.253		3.400	.001
Programme Size	.105	.029	.133	3.575	.000
Programme Variety in Terms of Diversity of Jobs and Skill Sets Required	.278	.059	.224	4.741	.000
Interdependence of Activities and Projects Within the Programme	.219	.058	.184	3.806	.000
Programme Context of the Environment in Which Programme is Being Executed	.743	.039	.641	19.047	.000
Rigidity of the Seq of Acts and Seq of Proj Being Exec In The Prog	-.519	.045	-.519	-11.409	.000

a. Dependent Variable: Effective Sequencing of Projects

Table 5.83 Effective Sequencing of Projects vs Programme Complexity (Detail)

Based on the analysis, the sub-hypotheses that are accepted are 45a, 45b, 45c, 45d, and 45e.

Therefore, the main hypothesis 45 is fully accepted. Effective sequencing of projects is affected by programme size, programme variety in terms of diversity of jobs, skill sets required, interdependence of activities and projects within the programme, programme context or the environment in which programme is being executed, rigidity of the sequence of activities, and sequence of projects being executed in the programme.

5.5.20 Conducting Meetings vs Programme Complexity

The model summary is:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.755 ^a	.570	.566	.36667

a. Predictors: (Constant), Rigidity of the Seq of Acts and Seq of Proj Being Exec In The Prog, Programme Size, Programme Context of the Environment in Which Programme is Being Executed, Programme Variety in Terms of Diversity of Jobs and Skill Sets Required, Interdependence of Activities and Projects Within the Programme

Table 5.84 Model Summary Conducting Meetings vs Programme Complexity

As seen in the model summary above, the coefficient of correlation is 0.755 which means that 75.5% variability of the model could be predicted using the variables of this model. The difference between R-square and Adj R-square is 0.004 (0.570-0.566) which means the sample used for survey is 96% and is a good predictor of the population.

The null hypothesis is:

H46 Conducting Meetings is Affected by the Programme Complexity

The sub hypotheses are:

H46a Conducting Meetings is Affected by Programme Size

H46b Conducting Meetings is Affected by Programme Variety in Terms of Diversity of Jobs and Skill Sets Required

H46c Conducting Meetings is Affected by Interdependence of Activities and Projects within the Programme

H46d Conducting Meetings is Affected by Programme Context or the Environment in which the Programme Is Being Executed

H46e Conducting Meetings is Affected by Rigidity of the Sequence of Activities and Sequence of Projects Being Executed in the Programme

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.827	.227		8.063	.000
Programme Size	-.103	.026	-.135	3.923	.000
Programme Variety in Terms of Diversity of Jobs and Skill Sets Required	.129	.053	.108	2.458	.014
1 Interdependence of Activities and Projects Within the Programme	-.166	.052	-.144	3.221	.001
Programme Context of the Environment in Which Programme is Being Executed	.062	.035	.055	1.778	.076
Rigidity of the Seq of Acts and Seq of Proj Being Exec In The Prog	.686	.041	.710	16.865	.000

a. Dependent Variable: Conducting Meetings

Table 5.85 Conducting Meetings vs Programme Complexity (Detail)

Based on the analysis, the sub-hypotheses that are accepted are 46a, 46b, 46c, and 46e. Therefore, the main hypothesis 46 is partially accepted. Conducting meetings is affected by programme size, programme variety in terms of diversity of jobs, skill sets required, interdependence of activities and projects within the programme, rigidity of the sequence of activities, and sequence of projects being executed in the programme.

5.6 Findings

The intent behind the series of multiple regression analysis presented earlier was to establish the relationship between different project manager and programme manager competencies.

Also this section establishes link between project manager competencies and project complexity as well as programme manager competencies and programme complexity.

5.6.1 Project Manager Competencies vs Programme Manager Competencies

The first success criteria used for connecting the programme manager and project manager competencies is timely completion. The result is indicated in Table 5.86 below.

Project Competencies		Programme Competencies
Technical Competencies	Timely Completion	Planning the Programme
Behavioural Competencies		Managing Programme Activities
Contextual Competencies		Programme Control
		Designing the Programme
		Planning Day to Day Activities
		Managing Change
		Employee Welfare
		Team Building
		Effective Communication
		Effective Sequencing of Projects

Table 5.86 Project Manager Competencies vs Programme Manager Competencies for Timely Completion

For completion within budget, the link is in table 5.87.

Project Competencies		Programme Competencies
Technical Competencies	Within Budget	Managing Programme Activities
Behavioural Competencies		Designing the Programme
Contextual Competencies		Planning Day to Day Activities
		Identification of Risks
		Managing Critical Interfaces
		Quality Control and Assurance
		Employee Welfare
		Employee Counselling
		Negotiations Within and Outside the Programme
		Employee Welfare
		Employee Counselling
		Negotiations Within and Outside the Programme
		Team Building
		Effective Communication

Table 5.87 Project Manager Competencies vs Programme Manager Competencies for Within Budget

For completion of the project within specification, the results are indicated in Table 5.88

Project Competencies		Programme Competencies
Technical Competencies	As Per Specification	Planning the Programme
Behavioural Competencies		Managing Programme Activities
Contextual Competencies		Programme Control
		Forecasting
		Identification of Risks
		Quality Control and Assurance
		Employee Welfare
		Employee Counselling
		Effective Communication
		Effective Sequencing of Projects

Table 5.88 Project Manager Competencies vs Programme Manager Competencies for As Per Specification

In order to ensure good risk assessment and management the results are indicated in Table 5.89.

Project Competencies		Programme Competencies
Technical Competencies	Good Risk Assessment and Management	Planning the Programme
Behavioural Competencies		Managing Programme Activities
Contextual Competencies		Programme Control
		Forecasting
		Designing the Programme
		Planning Day to Day Activities
		Identification of Risks
		Managing Change
		Managing Critical Interfaces
		Quality Control and Assurance
		Employee Welfare
		Employee Counselling
		Negotiations Within and Outside the Programme
		Effective Communication
		Effective Sequencing of Projects
		Conducting Meetings

Table 5.89 Project Manager Competencies vs Programme Manager Competencies for Good Risk Assessment and Management

For meeting stakeholder satisfaction, the related competencies are highlighted in Table 5.90.

Project Competencies		Programme Competencies
Technical Competencies	Meet Stakeholder Satisfaction	Managing Programme Activities
Behavioural Competencies		Managing Change
Contextual Competencies		Quality Control and Assurance
		Employee Welfare
		Employee Counselling
		Effective Communication

Table 5.90 Project Manager Competencies vs Programme Manager Competencies for Meeting Stakeholder Satisfaction

In order to satisfy project objectives, the link between competencies are indicated in Table 5.91.

Project Competencies		Programme Competencies
Technical Competencies	Satisfaction of Project Objectives	Planning the Programme
Behavioural Competencies		Programme Control
Contextual Competencies		Planning Day to Day Activities
		Identification of Risks
		Managing Change
		Managing Critical Interfaces
		Negotiations Within and Outside the Programme
		Team Building
		Effective Communication
		Effective Sequencing of Projects
		Time Management

Table 5.91 Project Manager Competencies vs Programme Manager Competencies for Satisfaction of Project Objectives

The result for benefits to the organisation is indicated in Table 5.92. As seen from the analysis, there are no project manager competencies; so this success criteria will not be considered for further analysis.

Project Competencies		Programme Competencies
	Benefits to Organisation	Planning the Programme
		Managing Programme Activities
		Programme Control
		Forecasting
		Planning Day to Day Activities
		Managing Change
		Managing Critical Interfaces
		Quality Control and Assurance
		Employee Welfare
		Employee Counselling
		Team Building
		Effective Communication
		Conducting Meetings

Table 5.92 Project Manager Competencies vs Programme Manager Competencies for Benefits to Organisation

For the success criteria benefits to the community, Table 5.93 documents the associated competencies.

Project Competencies		Programme Competencies
Behavioural Competencies	Benefits to Community	Forecasting
Contextual Competencies		Identification of Risks
		Managing Change
		Managing Critical Interfaces
		Quality Control and Assurance
		Employee Welfare
		Employee Counselling

Table 5.93 Project Manager Competencies vs Programme Manager Competencies for Benefits to Community

For the effective and streamlined implementation process, the links between the competencies is as follow in Table 5.94.

Project Competencies		Programme Competencies
Contextual Competencies	Project/Programme Implementation Process	Planning the Programme
		Managing Programme Activities
		Programme Control
		Forecasting
		Designing the Programme
		Identification of Risks
		Employee Welfare
		Negotiations Within and Outside the Programme
		Team Building
		Effective Communication

Table 5.94 Project Manager Competencies vs Programme Manager Competencies for Implementation Process

For customer satisfaction, the relationships are as indicated in Table 5.95. Since there are no project management competencies, this success criteria will not be considered for any further analysis.

Project Competencies		Programme Competencies
	Customer Satisfaction	Managing Programme Activities
		Programme Control
		Designing the Programme
		Planning Day to Day Activities
		Managing Change
		Employee Welfare
		Effective Communication
		Effective Sequencing of Projects

Table 5.95 Project Manager Competencies vs Programme Manager Competencies for Customer Satisfaction

The link between the project complexity and project management competencies is as follows in Table5.96.

Project Complexity	Project Competencies
Project Size	None
Project Variety, Diversity of Jobs Skill Sets Required	Technical and Contextual
Interdependence of Activities Within the Project	Technical and Contextual
Project Context or the Environment in Which Project is Being Executed	None
Rigidity of the Sequence of Activities	Technical and Contextual

Table 5.96 Project Complexity vs Project Competencies

The link between programme manager competencies and programme competencies is indicated in the Table 5.97 below with “X” in the relevant cells.

	Programme Size	Programme Variety In Terms of Diversity of Jobs and Skill Sets Required	Interdependence of Activities and Projects Within the Programme	Programme Context of the Environment in Which Programme is Being Executed	Activities and Sequence of Projects Being Executed in the Programme
Planning the Programme				X	X
Managing Programme Activities	X	X		X	X
Programme Control			X	X	
Forecasting	X	X	X	X	X
Designing the Programme					
Planning Day to Day Activities	X		X	X	X
Identification of Risks	X		X	X	X
Managing Change	X	X	X	X	X
Managing Critical Interfaces	X	X	X	X	X
Quality Control and Assurance	X		X		X
Employee Welfare	X				X
Employee Counselling	X				X
Negotiations Within and Outside the Programme	X		X	X	X
Effective Leadership					
Time Management					
Team Building		X	X	X	X
Effective Communication	X	X		X	X
Effective Sequencing of Projects	X	X	X	X	X
Conducting Meetings	X	X	X		X

Table 5.97 Programme Manager Competencies vs Project Manager Competencies

This chapter has done an extensive job of establishing relationships between competencies, complexity, and success criteria. The relationships will be helpful to trace the progression of a project manager to programme management positions later in their career. The next chapter looks at programme manager position and the evolution of careers after a project manager becomes a programme manager.

Chapter VI

Programme Management Analysis

6.0 Introduction

As established earlier, not every programme management competency is equally important. There are some that act as cause competencies and there are others that act as effect competencies. In order to establish which ones are the causes and which ones are the effects an MCDM technique called DEMATEL is going to be applied. This chapter summarises that analysis.

6.1 Use of DEMATEL Technique

The next step to follow was to take the programme manager competencies and establish which of these are the more important. These could be identified as the competencies for the first level position of program management and the second level would be the competencies at the second level of director of programme management. Two directors of programme management, both with more than 20 years of experience were chosen to provide a rating and establish relationship between the programme management competencies. The two decision makers gave their opinions on a 0 to 4 scale. The influence relationship of all factors by taking any two factors at one time is by the following matrix. The first matrix represents the influence relationship marked by Director Project Management 1: DPM1. The second matrix represents the influence relationship marked by Director Project Management 2: DPM2. Both these matrices are shown in Tables 6.1 and 6.2.

DPM1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1		4	4	4	4	4	4	2	2	1	0	0	3	1	1	1	2	1	4	2
2	1		4	1	1	3	2	3	4	3	1	1	3	2	3	4	2	3	1	4
3	1	3		4	2	4	3	4	3	3	1	0	3	4	3	4	3	3	3	4
4	4	3	3		4	1	2	1	1	0	0	0	2	1	2	3	2	1	1	2
5	4	3	4	1		3	2	0	0	2	0	0	1	0	0	1	1	3	4	0
6	1	3	3	3	2		3	3	3	4	1	0	1	1	2	2	1	1	3	4
7	2	3	3	2	3	3		4	1	2	2	2	1	1	0	0	0	3	1	1
8	0	2	2	2	1	3	1		2	0	0	2	3	3	3	2	2	1	1	0
9	1	2	2	2	2	2	1	1		1	2	2	4	2	4	2	2	4	2	3
10	0	0	2	1	1	1	2	2	2		1	2	3	1	1	1	1	1	3	2
11	1	2	1	1	1	3	3	3	2	3		4	1	2	1	2	1	3	0	1
12	0	1	2	0	0	2	3	2	3	2	4		0	1	1	0	1	4	0	0
13	2	2	3	2	3	3	1	0	2	2	1	1		3	4	2	4	2	3	3
14	4	2	2	0	1	2	2	4	3	0	1	3	4		4	3	2	3	0	1
15	1	3	3	0	2	3	2	3	3	2	0	0	3	2		3	3	2	2	2
16	3	4	4	2	2	4	2	2	2	2	0	0	1	3	3		2	3	3	4
17	0	2	1	1	1	1	0	1	1	0	0	1	1	3	3	1		3	1	3
18	1	3	3	1	3	4	3	3	4	2	2	2	4	1	1	0	0		1	3
19	3	3	3	4	4	2	1	1	3	1	1	1	2	1	2	3	2	2		0
20	3	3	3	3	0	3	1	3	4	2	2	2	4	4	4	3	3	4	1	

Table 6.2-Decision matrix 1

DPM2	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1		3	4	4	3	4	3	1	1	2	0	0	4	1	0	1	1	1	3	2
2	2		3	1	1	4	1	4	3	4	0	1	4	1	4	3	1	2	2	4
3	0	4		3	1	3	4	3	3	3	1	1	4	3	4	4	3	3	2	4
4	3	4	3		4	1	2	1	1	0	0	0	2	1	3	3	2	1	1	1
5	4	4	2	1		1	2	0	0	2	0	0	1	2	0	2	1	3	3	1
6	2	4	3	4	1		3	4	4	3	1	0	2	2	2	1	1	0	4	3
7	1	4	3	1	2	3		3	2	1	2	1	1	0	0	0	0	4	1	2
8	0	1	2	1	1	4	1		2	0	0	2	4	4	3	1	3	2	1	1
9	0	2	2	1	2	1	0	1		1	3	2	2	1	3	1	2	2	2	4
10	0	1	1	0	0	1	1	2	1		1	2	4	1	2	2	1	2	4	3
11	1	2	1	0	2	3	3	4	1	4		3	1	2	2	2	3	2	0	0
12	0	1	2	0	1	1	4	1	4	1	4		0	1	1	0	1	3	1	1
13	1	1	4	1	1	2	0	0	2	1	1	0		4	3	1	3	1	4	4
14	4	4	4	2	0	1	1	3	4	0	2	1	3		3	4	1	2	0	0
15	0	3	2	1	1	4	1	4	1	1	1	0	2	1		3	4	2	2	2
16	2	3	4	1	1	3	1	1	1	1	2	1	0	2	2		1	4	2	3
17	1	1	1	2	3	0	1	0	2	0	2	0	2	4	2	2		4	2	4
18	2	2	2	0	2	3	4	4	3	1	1	1	3	2	0	1	1		0	2
19	2	2	4	3	4	1	2	1	2	2	0	3	1	2	1	4	1	1		1
20	2	4	4	4	1	2	0	2	3	1	1	1	3	3	3	4	4	2	2	

Table 6.3-Decision matrix 2

A mean value of their opinions is calculated by taking the average value of the corresponding elements of two matrices. The average initial direct influence matrix, $Z_{n \times n}$ is formulated as of formula in Eq (1), where Z_{ij} represents the influence of element i on element j (Table 6.3).

Average score of 2 respondents																					
	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00	17.00	18.00	19.00	20.00	Total
1.00		3.50	4.00	4.00	3.50	4.00	3.50	1.50	1.50	1.50	0.00	0.00	3.50	1.00	0.50	1.00	1.50	1.00	3.50	2.00	41.00
2.00	1.50		3.50	1.00	1.00	3.50	1.50	3.50	3.50	3.50	0.50	1.00	3.50	1.50	3.50	3.50	1.50	2.50	1.50	4.00	45.50
3.00	0.50	3.50		3.50	1.50	3.50	3.50	3.50	3.00	3.00	1.00	0.50	3.50	3.50	3.50	4.00	3.00	3.00	2.50	4.00	54.00
4.00	3.50	3.50	3.00		4.00	1.00	2.00	1.00	1.00	0.00	0.00	0.00	2.00	1.00	2.50	3.00	2.00	1.00	1.00	1.50	33.00
5.00	4.00	3.50	3.00	1.00		2.00	2.00	0.00	0.00	2.00	0.00	0.00	1.00	1.00	0.00	1.50	1.00	3.00	3.50	0.50	29.00
6.00	1.50	3.50	3.00	3.50	1.50		3.00	3.50	3.50	3.50	1.00	0.00	1.50	1.50	2.00	1.50	1.00	0.50	3.50	3.50	42.50
7.00	1.50	3.50	3.00	1.50	2.50	3.00		3.50	1.50	1.50	2.00	1.50	1.00	0.50	0.00	0.00	0.00	3.50	1.00	1.50	32.50
8.00	0.00	1.50	2.00	1.50	1.00	3.50	1.00		2.00	0.00	0.00	2.00	3.50	3.50	3.00	1.50	2.50	1.50	1.00	0.50	31.50
9.00	0.50	2.00	2.00	1.50	2.00	1.50	0.50	1.00		1.00	2.50	2.00	3.00	1.50	3.50	1.50	2.00	3.00	2.00	3.50	36.50
10.00	0.00	0.50	1.50	0.50	0.50	1.00	1.50	2.00	1.50		1.00	2.00	3.50	1.00	1.50	1.50	1.00	1.50	3.50	2.50	28.00
11.00	1.00	2.00	1.00	0.50	1.50	3.00	3.00	3.50	1.50	3.50		3.50	1.00	2.00	1.50	2.00	2.00	2.50	0.00	0.50	35.50
12.00	0.00	1.00	2.00	0.00	0.50	1.50	3.50	1.50	3.50	1.50	4.00		0.00	1.00	1.00	0.00	1.00	3.50	0.50	0.50	26.50
13.00	1.50	1.50	3.50	1.50	2.00	2.50	0.50	0.00	2.00	1.50	1.00	0.50		3.50	3.50	1.50	3.50	1.50	3.50	3.50	38.50
14.00	4.00	3.00	3.00	1.00	0.50	1.50	1.50	3.50	3.50	0.00	1.50	2.00	3.50		3.50	3.50	1.50	2.50	0.00	0.50	40.00
15.00	0.50	3.00	2.50	0.50	1.50	3.50	1.50	3.50	2.00	1.50	0.50	0.00	2.50	1.50		3.00	3.50	2.00	2.00	2.00	37.00
16.00	2.50	3.50	4.00	1.50	1.50	3.50	1.50	1.50	1.50	1.50	1.00	0.50	0.50	2.50	2.50		1.50	3.50	2.50	3.50	40.50
17.00	0.50	1.50	1.00	1.50	2.00	0.50	0.50	0.50	1.50	0.00	1.00	0.50	1.50	3.50	2.50	1.50		3.50	1.50	3.50	28.50
18.00	1.50	2.50	2.50	0.50	2.50	3.50	3.50	3.50	3.50	1.50	1.50	1.50	3.50	1.50	0.50	0.50	0.50		0.50	2.50	37.50
19.00	2.50	2.50	3.50	3.50	4.00	1.50	1.50	1.00	2.50	1.50	0.50	2.00	1.50	1.50	1.50	3.50	1.50	1.50		0.50	38.00
20.00	2.50	3.50	3.50	3.50	0.50	2.50	0.50	2.50	3.50	1.50	1.50	1.50	3.50	3.50	3.50	3.50	3.50	3.00	1.50		49.00
Total	29.50	49.00	51.50	32.00	34.00	46.50	36.00	40.50	42.50	30.00	20.50	21.00	43.50	36.50	40.00	38.00	34.00	44.00	35.00	40.50	

Table 6.4- Average decision matrix $Z_{20 \times 20}$

The twenty rows and the twenty columns of $Z_{20 \times 20}$ are added separately and results are shown as R(sum) and C(sum) in the Table 3 t in the last row and column. The normalized matrix, $X_{20 \times 20}$ as in Eq (3) will be calculated by dividing all the elements of the matrix $Z_{20 \times 20}$ by the value 54 (max (54, 51.5)). The results are shown in Table 6.4.

LAMBDA (λ)= 1/highest TOTAL value= 1/54.00= 0.01852																				
Multiply each cell in average matrix by LAMBDA (0.018) to get normalised matrix																				
Normalised Matrix (X)																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	0.000	0.065	0.074	0.074	0.065	0.074	0.065	0.028	0.028	0.028	0.000	0.000	0.065	0.019	0.009	0.019	0.028	0.019	0.065	0.037
2	0.028	0.000	0.065	0.019	0.019	0.065	0.028	0.065	0.065	0.065	0.009	0.019	0.065	0.028	0.065	0.065	0.028	0.046	0.028	0.074
3	0.009	0.065	0.000	0.065	0.028	0.065	0.065	0.065	0.056	0.056	0.019	0.009	0.065	0.065	0.065	0.074	0.056	0.056	0.046	0.074
4	0.065	0.065	0.056	0.000	0.074	0.019	0.037	0.037	0.019	0.019	0.000	0.000	0.037	0.019	0.046	0.056	0.037	0.019	0.019	0.028
5	0.074	0.065	0.056	0.019	0.000	0.037	0.037	0.000	0.000	0.037	0.000	0.000	0.019	0.019	0.000	0.028	0.019	0.056	0.065	0.009
6	0.028	0.065	0.056	0.065	0.028	0.000	0.056	0.065	0.065	0.065	0.019	0.000	0.028	0.028	0.037	0.028	0.019	0.009	0.065	0.065
7	0.028	0.065	0.056	0.028	0.046	0.056	0.000	0.065	0.028	0.028	0.037	0.028	0.019	0.009	0.000	0.000	0.000	0.065	0.019	0.028
8	0.000	0.028	0.037	0.028	0.019	0.065	0.019	0.000	0.037	0.000	0.000	0.037	0.065	0.065	0.056	0.028	0.046	0.028	0.019	0.009
9	0.009	0.037	0.037	0.028	0.037	0.028	0.009	0.019	0.000	0.019	0.046	0.037	0.056	0.028	0.065	0.028	0.037	0.056	0.037	0.065
10	0.000	0.009	0.028	0.009	0.009	0.019	0.028	0.037	0.028	0.000	0.019	0.037	0.065	0.019	0.028	0.028	0.019	0.028	0.065	0.046
11	0.019	0.037	0.019	0.009	0.028	0.056	0.056	0.065	0.028	0.065	0.000	0.065	0.019	0.037	0.028	0.037	0.037	0.046	0.000	0.009
12	0.000	0.019	0.037	0.000	0.009	0.028	0.065	0.028	0.065	0.028	0.074	0.000	0.000	0.019	0.019	0.000	0.019	0.065	0.009	0.009
13	0.028	0.028	0.065	0.028	0.037	0.046	0.009	0.000	0.037	0.028	0.019	0.009	0.000	0.065	0.065	0.028	0.065	0.028	0.065	0.065
14	0.074	0.056	0.056	0.019	0.009	0.028	0.028	0.065	0.065	0.000	0.028	0.037	0.065	0.000	0.065	0.065	0.028	0.046	0.000	0.009
15	0.009	0.056	0.046	0.009	0.028	0.065	0.028	0.065	0.037	0.028	0.009	0.000	0.046	0.028	0.000	0.056	0.065	0.037	0.037	0.037
16	0.046	0.065	0.074	0.028	0.028	0.065	0.028	0.028	0.028	0.028	0.019	0.009	0.009	0.046	0.046	0.000	0.028	0.065	0.046	0.065
17	0.009	0.028	0.019	0.028	0.037	0.009	0.009	0.009	0.028	0.000	0.019	0.009	0.028	0.065	0.046	0.028	0.000	0.065	0.028	0.065
18	0.028	0.046	0.046	0.009	0.046	0.065	0.065	0.065	0.065	0.028	0.028	0.028	0.065	0.028	0.009	0.009	0.009	0.000	0.009	0.046
19	0.046	0.046	0.065	0.065	0.074	0.028	0.028	0.019	0.046	0.028	0.009	0.037	0.028	0.028	0.028	0.065	0.028	0.028	0.000	0.009
20	0.046	0.065	0.065	0.065	0.009	0.046	0.009	0.046	0.065	0.028	0.028	0.028	0.065	0.065	0.065	0.065	0.065	0.056	0.028	0.000

Table 6.4- Matrix after division with 54

The normalized matrix , $X_{6 \times 6}$ as in Eq (3) will be calculated by dividing all the elements of the matrix $Z_{20 \times 20}$ by the value 54 (max (54, 51.5)).The results are shown in Table 6.5.

Identity Matrix (I)																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
12	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
13	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
14	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000
15	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000
16	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000
17	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000
18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000
19	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000
20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000

Table 6.5- The Identity Matrix

The matrix (I – X) is calculated by subtracting all the elements of matrix X from the identity matrix, I and the members of this matrix are represented in Table 6.6.

Resultant Matrix (I-X)																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	1.000	-0.065	-0.074	-0.074	-0.065	-0.074	-0.065	-0.028	-0.028	-0.028	0.000	0.000	-0.065	-0.019	-0.009	-0.019	-0.028	-0.019	-0.065	-0.037
2	-0.028	1.000	-0.065	-0.019	-0.019	-0.065	-0.028	-0.065	-0.065	-0.065	-0.009	-0.019	-0.065	-0.028	-0.065	-0.065	-0.028	-0.046	-0.028	-0.074
3	-0.009	-0.065	1.000	-0.065	-0.028	-0.065	-0.065	-0.065	-0.056	-0.056	-0.019	-0.009	-0.065	-0.065	-0.065	-0.074	-0.056	-0.056	-0.046	-0.074
4	-0.065	-0.065	-0.056	1.000	-0.074	-0.019	-0.037	-0.019	-0.019	0.000	0.000	0.000	-0.037	-0.019	-0.046	-0.056	-0.037	-0.019	-0.019	-0.028
5	-0.074	-0.065	-0.056	-0.019	1.000	-0.037	-0.037	0.000	0.000	-0.037	0.000	0.000	-0.019	-0.019	0.000	-0.028	-0.019	-0.056	-0.065	-0.009
6	-0.028	-0.065	-0.056	-0.065	-0.028	1.000	-0.056	-0.065	-0.065	-0.065	-0.019	0.000	-0.028	-0.028	-0.037	-0.028	-0.019	-0.009	-0.065	-0.065
7	-0.028	-0.065	-0.056	-0.028	-0.046	-0.056	1.000	-0.065	-0.028	-0.028	-0.037	-0.028	-0.019	-0.009	0.000	0.000	0.000	-0.065	-0.019	-0.028
8	0.000	-0.028	-0.037	-0.028	-0.019	-0.065	-0.019	1.000	-0.037	0.000	0.000	-0.037	-0.065	-0.065	-0.056	-0.028	-0.046	-0.028	-0.019	-0.009
9	-0.009	-0.037	-0.037	-0.028	-0.037	-0.028	-0.009	-0.019	1.000	-0.019	-0.046	-0.037	-0.056	-0.028	-0.065	-0.028	-0.037	-0.056	-0.037	-0.065
10	0.000	-0.009	-0.028	-0.009	-0.009	-0.019	-0.028	-0.037	-0.028	1.000	-0.019	-0.037	-0.065	-0.019	-0.028	-0.028	-0.019	-0.028	-0.065	-0.046
11	-0.019	-0.037	-0.019	-0.009	-0.028	-0.056	-0.056	-0.065	-0.028	-0.065	1.000	-0.065	-0.019	-0.037	-0.028	-0.037	-0.037	-0.046	0.000	-0.009
12	0.000	-0.019	-0.037	0.000	-0.009	-0.028	-0.065	-0.028	-0.065	-0.028	-0.074	1.000	0.000	-0.019	-0.019	0.000	-0.019	-0.065	-0.009	-0.009
13	-0.028	-0.028	-0.065	-0.028	-0.037	-0.046	-0.009	0.000	-0.037	-0.028	-0.019	-0.009	1.000	-0.065	-0.065	-0.028	-0.065	-0.028	-0.065	-0.065
14	-0.074	-0.056	-0.056	-0.019	-0.009	-0.028	-0.028	-0.065	-0.065	0.000	-0.028	-0.037	-0.065	1.000	-0.065	-0.065	-0.028	-0.046	0.000	-0.009
15	-0.009	-0.056	-0.046	-0.009	-0.028	-0.065	-0.028	-0.065	-0.037	-0.028	-0.009	0.000	-0.046	-0.028	1.000	-0.056	-0.065	-0.037	-0.037	-0.037
16	-0.046	-0.065	-0.074	-0.028	-0.028	-0.065	-0.028	-0.028	-0.028	-0.028	-0.019	-0.009	-0.009	-0.046	-0.046	1.000	-0.028	-0.065	-0.046	-0.065
17	-0.009	-0.028	-0.019	-0.028	-0.037	-0.009	-0.009	-0.009	-0.028	0.000	-0.019	-0.009	-0.028	-0.065	-0.046	-0.028	1.000	-0.065	-0.028	-0.065
18	-0.028	-0.046	-0.046	-0.009	-0.046	-0.065	-0.065	-0.065	-0.065	-0.028	-0.028	-0.028	-0.065	-0.028	-0.009	-0.009	-0.009	1.000	-0.009	-0.046
19	-0.046	-0.046	-0.065	-0.065	-0.074	-0.028	-0.028	-0.019	-0.046	-0.028	-0.009	-0.037	-0.028	-0.028	-0.028	-0.065	-0.028	-0.028	1.000	-0.009
20	-0.046	-0.065	-0.065	-0.065	-0.009	-0.046	-0.009	-0.046	-0.065	-0.028	-0.028	-0.028	-0.065	-0.065	-0.065	-0.065	-0.065	-0.056	-0.028	1.000

Table 6.6- Results of matrix (I-X)

Then the inverse of this matrix is deduced; the elements of $(\mathbf{I}-\mathbf{X})^{-1}$ are shown in Table 6.7.

Inverse of Matrix (I- X)																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	1.078	0.187	0.202	0.159	0.149	0.186	0.148	0.127	0.133	0.105	0.047	0.047	0.173	0.111	0.114	0.119	0.114	0.123	0.156	0.145
2	0.105	1.134	0.203	0.111	0.108	0.191	0.120	0.175	0.182	0.145	0.064	0.073	0.188	0.134	0.181	0.171	0.127	0.162	0.129	0.192
3	0.106	0.219	1.166	0.168	0.133	0.210	0.168	0.193	0.192	0.148	0.081	0.074	0.206	0.184	0.199	0.198	0.166	0.190	0.158	0.210
4	0.126	0.165	0.161	1.070	0.141	0.117	0.106	0.100	0.104	0.064	0.037	0.037	0.127	0.095	0.129	0.135	0.107	0.107	0.095	0.117
5	0.126	0.153	0.149	0.083	1.065	0.122	0.102	0.076	0.080	0.094	0.034	0.035	0.102	0.084	0.074	0.099	0.078	0.129	0.130	0.090
6	0.103	0.187	0.185	0.149	0.113	1.118	0.138	0.166	0.171	0.139	0.067	0.053	0.144	0.123	0.145	0.131	0.109	0.118	0.154	0.171
7	0.083	0.157	0.153	0.093	0.109	0.147	1.071	0.145	0.113	0.090	0.074	0.068	0.109	0.083	0.082	0.077	0.068	0.144	0.088	0.111
8	0.057	0.120	0.133	0.089	0.081	0.149	0.083	1.078	0.120	0.057	0.039	0.072	0.146	0.135	0.136	0.102	0.112	0.108	0.086	0.093
9	0.074	0.143	0.148	0.098	0.108	0.130	0.085	0.108	1.096	0.086	0.089	0.080	0.151	0.111	0.154	0.115	0.115	0.148	0.113	0.156
10	0.049	0.090	0.113	0.066	0.066	0.096	0.083	0.103	0.101	1.050	0.053	0.071	0.136	0.083	0.098	0.093	0.079	0.099	0.122	0.115
11	0.074	0.132	0.120	0.073	0.091	0.148	0.125	0.147	0.115	0.124	1.043	0.105	0.108	0.110	0.109	0.110	0.103	0.132	0.072	0.095
12	0.042	0.092	0.111	0.048	0.060	0.100	0.118	0.096	0.130	0.077	0.106	1.037	0.070	0.075	0.081	0.058	0.070	0.131	0.060	0.075
13	0.099	0.144	0.183	0.108	0.115	0.152	0.090	0.097	0.139	0.098	0.064	0.055	1.107	0.152	0.163	0.125	0.147	0.129	0.147	0.164
14	0.139	0.171	0.178	0.098	0.090	0.145	0.111	0.161	0.167	0.074	0.075	0.083	0.172	1.093	0.165	0.155	0.114	0.148	0.088	0.117
15	0.075	0.162	0.159	0.086	0.101	0.167	0.102	0.153	0.133	0.095	0.052	0.045	0.146	0.115	1.097	0.142	0.141	0.132	0.117	0.136
16	0.120	0.187	0.201	0.114	0.111	0.181	0.116	0.134	0.139	0.106	0.067	0.059	0.126	0.139	0.151	1.102	0.115	0.168	0.135	0.172
17	0.065	0.115	0.110	0.084	0.094	0.092	0.069	0.082	0.104	0.052	0.053	0.045	0.107	0.129	0.119	0.098	1.063	0.138	0.087	0.136
18	0.092	0.154	0.160	0.085	0.118	0.168	0.139	0.154	0.160	0.097	0.073	0.073	0.164	0.112	0.105	0.096	0.088	1.096	0.091	0.141
19	0.114	0.158	0.180	0.138	0.149	0.133	0.107	0.108	0.139	0.096	0.053	0.078	0.127	0.110	0.120	0.151	0.105	0.125	1.084	0.108
20	0.131	0.206	0.213	0.159	0.108	0.182	0.110	0.165	0.190	0.115	0.085	0.084	0.196	0.175	0.190	0.180	0.167	0.179	0.132	1.130

Table 6.7- Inverse matrix of (I – X)

The matrix $X*(I - X)^{-1}$ is computed by multiplying all the elements of matrix X by the elements of matrix $((I - X)^{-1})$, (Table 6.8).

TOTAL RELATION MATRIX = X (I - X) ⁻¹																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	SUM (D)	D+R	D-R	
1	0.078	0.187	0.202	0.159	0.149	0.186	0.148	0.127	0.133	0.105	0.047	0.047	0.173	0.111	0.114	0.119	0.114	0.123	0.156	0.145	2.623	4.48	0.77	C
2	0.105	0.134	0.203	0.111	0.108	0.191	0.120	0.175	0.182	0.145	0.064	0.073	0.188	0.134	0.181	0.171	0.127	0.162	0.129	0.192	2.895	5.97	-0.18	E
3	0.106	0.219	0.166	0.168	0.133	0.210	0.168	0.193	0.192	0.148	0.081	0.074	0.206	0.184	0.199	0.198	0.166	0.190	0.158	0.210	3.370	6.60	0.14	C
4	0.126	0.165	0.161	0.070	0.141	0.117	0.106	0.100	0.104	0.064	0.037	0.037	0.127	0.095	0.129	0.135	0.107	0.107	0.095	0.117	2.140	4.22	0.06	C
5	0.126	0.153	0.149	0.083	0.065	0.122	0.102	0.076	0.080	0.094	0.034	0.035	0.102	0.084	0.074	0.099	0.078	0.129	0.130	0.090	1.902	4.01	-0.21	E
6	0.103	0.187	0.185	0.149	0.113	0.118	0.138	0.166	0.171	0.139	0.067	0.053	0.144	0.123	0.145	0.131	0.109	0.118	0.154	0.171	2.686	5.62	-0.25	E
7	0.083	0.157	0.153	0.093	0.109	0.147	0.071	0.145	0.113	0.090	0.074	0.068	0.109	0.083	0.082	0.077	0.068	0.144	0.088	0.111	2.066	4.26	-0.13	E
8	0.057	0.120	0.133	0.089	0.081	0.149	0.083	0.078	0.120	0.057	0.039	0.072	0.146	0.135	0.136	0.102	0.112	0.108	0.086	0.093	1.995	4.57	-0.57	E
9	0.074	0.143	0.148	0.098	0.108	0.130	0.085	0.108	0.096	0.086	0.089	0.080	0.151	0.111	0.154	0.115	0.115	0.148	0.113	0.156	2.308	5.02	-0.40	E
10	0.049	0.090	0.113	0.066	0.066	0.096	0.083	0.103	0.101	0.050	0.053	0.071	0.136	0.083	0.098	0.093	0.079	0.099	0.122	0.115	1.766	3.68	-0.15	E
11	0.074	0.132	0.120	0.073	0.091	0.148	0.125	0.147	0.115	0.124	0.043	0.105	0.108	0.110	0.109	0.110	0.103	0.132	0.072	0.095	2.136	3.39	0.88	C
12	0.042	0.092	0.111	0.048	0.060	0.100	0.118	0.096	0.130	0.077	0.106	0.037	0.070	0.075	0.081	0.058	0.070	0.131	0.060	0.075	1.637	2.91	0.36	C
13	0.099	0.144	0.183	0.108	0.115	0.152	0.090	0.097	0.139	0.098	0.064	0.055	0.107	0.152	0.163	0.125	0.147	0.129	0.147	0.164	2.479	5.28	-0.33	E
14	0.139	0.171	0.178	0.098	0.090	0.145	0.111	0.161	0.167	0.074	0.075	0.083	0.172	0.093	0.165	0.155	0.114	0.148	0.088	0.117	2.545	4.90	0.19	C
15	0.075	0.162	0.159	0.086	0.101	0.167	0.102	0.153	0.133	0.095	0.052	0.045	0.146	0.115	0.097	0.142	0.141	0.132	0.117	0.136	2.356	4.97	-0.25	E
16	0.120	0.187	0.201	0.114	0.111	0.181	0.116	0.134	0.139	0.106	0.067	0.059	0.126	0.139	0.151	0.102	0.115	0.168	0.135	0.172	2.641	5.10	0.18	C
17	0.065	0.115	0.110	0.084	0.094	0.092	0.069	0.082	0.104	0.052	0.053	0.045	0.107	0.129	0.119	0.098	0.063	0.138	0.087	0.136	1.482	3.67	-0.71	E
18	0.092	0.154	0.160	0.085	0.118	0.168	0.139	0.154	0.160	0.097	0.073	0.073	0.164	0.112	0.105	0.096	0.088	0.096	0.091	0.141	2.366	5.07	-0.34	E
19	0.114	0.158	0.180	0.138	0.149	0.133	0.107	0.108	0.139	0.096	0.053	0.078	0.127	0.110	0.120	0.151	0.105	0.125	0.084	0.108	2.384	4.63	0.14	C
20	0.131	0.206	0.213	0.159	0.108	0.182	0.110	0.165	0.190	0.115	0.085	0.084	0.196	0.175	0.190	0.180	0.167	0.179	0.132	0.130	3.097	5.77	0.42	C
SUM (R)	1.857	3.077	3.227	2.081	2.110	2.934	2.193	2.570	2.707	1.913	1.256	1.273	2.805	2.352	2.611	2.459	2.187	2.707	2.245	2.673				

Table 6.8- Result of matrix T

Table 6.8 provides the direct and indirect effects of the six main factors. The threshold value can be calculated by taking the average value of all the elements of the matrix T. The threshold value is 0.118. While drawing a digraph, the values less than this threshold value can be dropped to remove the negligible effects. The array after dropping the values less than the threshold value turns into the following array of numbers. In Table 6.9 all values of coloured cells are deleted for the computation purpose because these coloured cell values are less than the threshold value.

	Maintaining Programme Activities	Designing the Programme	Planning Day to Day Activities	Identification of Risks	Managing Change	Managing Critical Interfaces	Quality Control and Assurance	Negotiations Within and Outside the Programme	Managing Project Managers	Team Building	Effective Communication	
	EFFECT											
CAUSE	2	5	6	7	8	9	10	13	15	17	18	
1	0.187	0.149	0.186	0.148	0.127	0.133	0.105	0.173	0.114	0.114	0.123	Planning the programme
3	0.219	0.133	0.210	0.168	0.193	0.192	0.148	0.206	0.199	0.166	0.190	Programme Control
4	0.165	0.141	0.117	0.106	0.100	0.104	0.064	0.127	0.129	0.107	0.107	Forecasting
11	0.132	0.091	0.148	0.125	0.147	0.115	0.124	0.108	0.109	0.103	0.132	Employee Welfare
12	0.092	0.060	0.100	0.118	0.096	0.130	0.077	0.070	0.081	0.070	0.131	Employee Counselling
14	0.171	0.090	0.145	0.111	0.161	0.167	0.074	0.172	0.165	0.114	0.148	Effective Leadership
16	0.187	0.111	0.181	0.116	0.134	0.139	0.106	0.126	0.151	0.115	0.168	Time Management
19	0.158	0.149	0.133	0.107	0.108	0.139	0.096	0.127	0.120	0.105	0.125	Effective Sequencing of Projects
20	0.206	0.108	0.182	0.110	0.165	0.190	0.115	0.196	0.190	0.167	0.179	Conducting Meetings

Table 6.9- Matrix representing more than threshold value

The magnitude of values in the matrix in Table 8 indicates the magnitude of relationship. If we take the top three effects of each cause then the table below presents the most important relationships between causes and effects in terms of programme management competencies.

	Maintaining Programme Activities	Designing the Programme	Planning Day to Day Activities	Identification of Risks	Managing Change	Managing Critical Interfaces	Quality Control and Assurance	Negotiations Within and Outside the Programme	Managing Project Managers	Team Building	Effective Communication
Planning the programme	X		X					X			
Programme Control	X		X					X			
Forecasting	X	X							X		
Employee Welfare	X		X		X						X
Employee Counselling				X		X					X
Effective Leadership	X					X		X			
Time Management	X		X								X
Effective Sequencing of Projects	X	X				X					
Conducting Meetings	X					X		X	X		

Table 6.10: The Top Cause and Effect Relationships

Looking at the Table 6.10, one can see that planning the programme effectively will lead to better maintenance of programme activities, planning of day to day activities, and negotiations within and outside the programme boundaries. Effective programme control will also lead to better maintenance of programme activities, planning day to day activities, and negotiations both within and outside the programme. Effective forecasting will lead to better maintenance of programme activities, better designing of programme taking into account inputs from forecast, and effective management of the project managers within the

programme. The welfare of employees is a key responsibility of the programme manager. This is a major element of social sustainability these days. Welfare of employees will take precedence in most of the maintenance of day to day activities. Employee welfare will have to be taken into account while planning all the day to day activities, managing change, and maintenance of appropriate level of communication within the programme. Employee counselling is another important competency for programme manager. This will lead to identification of risks while briefing and debriefing. It will also help in management of critical interfaces and effective communication because during the dialogue any barriers to communication and maintenance of critical interfaces could be identified, planned for, and prevented. Providing an effective leadership to the programme is very important in maintaining day to day activities in the programme. The leadership will also provide managing critical interfaces and negotiations within and outside the programme. This will help in addressing ways of managing all the potential stakeholders within the programme. Time management is a competency that will lead to effective management of day to day activities, efficient planning of long term programme activities, and effective communication. Proper sequencing of programme activities is an important element of managing programme activities, designing of the programme, and management of critical interfaces. Finally, the competence dealing of conducting programme meetings effectively will lead to maintaining programme activities, managing critical interfaces within the programme, negotiations within and outside the programme, and management of project managers efficiently.

6.2 Summary and the Way Forward

The three analysis chapters of this thesis have provided a strong footing to move forward with the formulation of the framework for looking at project manager progression from the role of an entry level project manager to director of programme. The next chapter will

compile the results of the data analysis of the three chapters presented so far and formulate a framework that could be used by the government departments in Abu Dhabi. The framework will provide a good starting point for individual departments who can develop and populate their own respective frameworks. The chapter following the framework development chapter will compile the major conclusions for this research.

Chapter VII

Result and Discussion

7.0 Introduction

This thesis has gone through multiple data collection exercise to develop a progression framework for project managers in their profession. After analysing the data collected at multiple stages and combining the results of the data collection, the framework for project manager career progression will be compiled in this chapter. In addition, this chapter will present discussion on different aspects of implementation of this framework. The rest of this chapter presents discussion on the steps followed and the final framework formulated as part of the data analysis from this research.

7.1 Summarising the Research Steps

This research started with the goal of developing a career progression path for project managers in Abu Dhabi government departments. A typical project manager will start as a graduate project manager and will eventually be promoted to a director of programmes. However, at the moment there is no formal framework that is available to ensure that the progression path is documented and a formal process followed that is specific to project management. Currently, most of the progression and promotion follows a generic assessment regime that is not specific to project management. The framework developed as part of this thesis will provide a competence based methodology that can be utilised to objectively assess the ability to progress on the career path.

The first step followed in this research was a review of literature. The literature review resulted in the compilation of project manager and programme manager competencies. It also provided the added dimension of project and programme complexity to evaluate the level of attainment of a certain level of competence. After compiling information from the review of literature, the next step was to understand the specific context of the Abu Dhabi government sector. In order to capture the context, the researcher conducted six semi-structured interviews in Abu Dhabi. Each of the participants had approximately 10 years of experience working on projects or programmes. They were promoted from project to programme managers to section heads and to vice presidents for projects or programmes. Each of the interviews lasted about 55 minutes and along with follow-up calls. There were eight questions in total that were asked. This exercise led to the development of a more thorough understanding of specific issues within the Abu Dhabi government departments and helped in formulating a more objective career path for the project managers moving on to become programme managers in their careers.

After developing an understanding of the Abu Dhabi context, the next step was to look at individual competencies and see how they could be related between a project manager and a programme manager. In order to assess the relationship and understand the issue more, two surveys were compiled with input from the literature review step. There were two separate survey instruments, one for project managers and one for programme managers. The survey was administered through [surveymonkey.com](https://www.surveymonkey.com). An email to all the Abu Dhabi government project managers and programme managers was sent to inform them about the respective instruments on [surveymonkey.com](https://www.surveymonkey.com). About 3000 project managers and 1200 programme managers were contacted. In all 460 completed responses from project managers and 282 from programme managers were received. For the survey of project managers, a multiple

regression analysis which considered project manager competencies as dependent variable and project success criteria as independent variables was conducted. In the earlier step of compiling the context about Abu Dhabi, it was highlighted that the use of success criteria could be undertaken as a means of establishing a link between project manager and programme manager competencies. With similar success criteria for projects and programmes in place, another multiple regression analysis utilising the data from the programme managers was conducted. This regression analysis also used programme manager competencies as dependent variable and programme success criteria as independent variables. In addition to this analysis, another set of multiple regressions was conducted using competencies and complexity as variables. In both cases the complexity variables were used as independent variables and the competency variables were used as dependent variables.

The analysis of survey data provided a good insight into relationships between competencies and success criteria. However, since the career path of a programme manager in the Abu Dhabi government involves two levels, it was important to further breakdown the competencies to identify the more important ones. One of the techniques used in Multi Criteria Decision Making (MCDM) domain is DEMATEL. In order to apply this technique, it was important to collect data from two very experienced experts. Two directors of programme management, both with more than 20 years of experience were chosen to provide a rating and establish a relationship between programme management competencies. The DEMATEL analysis helped divide the programme manager competencies into cause and effect. The causes are important to achieve in order to perform the fundamental programme manager duties. The effects are the next level of competencies that one can acquire easily if the causes are acquired competently. Therefore, this step helped provide us with a clear career path during the time an employee was a programme manager.

This chapter brings the findings from all the three steps of data collection together in order to compile a career progression framework for employees within the Abu Dhabi government.

7.2 Developing the Framework

The framework developed within the context of the Abu Dhabi government is presented in Chapter 4 is in Figure 7.1.

				Level 4
			Level 3	Senior Programme Manager
	Level 1	Level 2	Level 3	
	Novice Project Manager	Experienced Project Manager	Programme Manager	
Alignment to Abu Dhabi Government Titles	Project Coordinator	Project Manager	Programme Manager	Director

Fig 7.1: Levels of Positions in Abu Dhabi Government

Based on the inputs provided by experts in Chapter 4 and the subsequent analysis that has been conducted, the competencies will be identified at a different level which should be assessed before an individual is promoted.

Looking at the competencies and how they have been assessed, it is interesting to note that behavioural competencies of a project manager are not related to project complexity. This is an interesting finding. This indicates that prior to joining the project management profession,

an individual should already have a high level of attainment of these behavioural competencies. In order to be recruited into a government department within Abu Dhabi, an individual has to undergo very comprehensive aptitude tests that are assessed through a series of exams, interviews and activities. Different departments will have different criteria given the nature of job. Therefore, even before joining as an entry level project manager, an individual needs to have a high level of attainment along these behavioural competencies. Therefore, behavioural competencies would be considered to be pre-requisites to starting a career as a project manager. Once the individual is appointed as the project manager in the Abu Dhabi government, then the other two major competencies of project management, namely technical and contextual become important to complete their jobs successfully. Once appointed at the post of project coordinator, they could be assigned projects that are low in complexity along the four major complexity variables: project variety, diversity of jobs skill sets required, interdependence of activities within the project, and rigidity of the sequence of activities. Once they have successfully demonstrated their technical and contextual competencies at low levels of complexity, then only should they be promoted to the project manager position from a project coordinator position. The levels of attainment for technical competencies and contextual competencies are document in Tables 7.1 and 7.2.

		Project Complexity								
		Project Variety, Diversity of Jobs Skill Sets Required			Interdependence of Activities Within the Project			Rigidity of the Sequence of Activities		
		Novice	Experienced		Novice	Experienced		Novice	Experienced	
		Low	Medium	High	Low	Medium	High	Low	Medium	High
Technical Competencies	Fundamental Knowledge About Project Management									
	Project Success and Benefits Management									
	Stakeholder Management									
	Requirements Management									
	Project Risk Management									
	Estimating Budget and Time									
	Developing Business Case									
	Marketing and Sales of Project Idea and Concept									
	Conducting Periodic Project Reviews									
	Developing Project									

Definitions									
Scope Management									
Modelling and Testing of Alternatives									
Developing Methods and Procedures for Project Execution									
Project Quality Management									
Project Scheduling									
Project Resource Management									
Information Management and Reporting on a Project									
Development of Project Management Plan									
Configuration Management									
Change Management									
Managing Implementation Activities on the Project									
Technology Management									
Budget and Cost Management		C							
Project Procurement									
Issues and Threat Management to Project Success									

Project Development to Ensure the Optimal Solution Evolves									
Value Management									
Earned Value Management									
Value Engineering									
Handover and Closeout Process Management									

Table 7.1: Technical Competencies and Levels of Attainment

		Project Complexity								
		Project Variety, Diversity of Jobs Skill Sets Required			Interdependence of Activities Within the Project			Rigidity of the Sequence of Activities		
		Novice	Experienced		Novice	Experienced		Novice	Experienced	
		Low	Medium	High	Low	Medium	High	Low	Medium	High
Contextual Competencies	Project Sponsorship Management									
	Health, Safety and Environmental Management									
	Project Lifecycle Management									
	Project Finance and Funding									
	Legal Awareness									
	Definition and Understanding of Organisational Roles on a Project									
	Development of Appropriate Project Organisation Structure									
	Governance of Project Management									

Table 7.2: Contextual Competencies and Levels of Attainment

Once a project manager has attained success in demonstrating his technical and contextual competencies, for highly complex projects, then they should be considered for programme manager role. Although Tables 7.1 and 7.2 present a comprehensive list of competencies, individual Abu Dhabi government departments might give different weightage to different competencies depending on their area of application. For example, project managers within Abu Dhabi Police (ADP) might need a different group of competencies compared to the project managers in Abu Dhabi Education Council (ADEC). Therefore, individual departments can take the tables and remove the competencies in the list that are not applicable to them. This was one of the issues that were highlighted by the experts during the first data collection exercise in Chapter 4. Within each department there also might be different priorities for different units. For example, people managing IT projects will need different sets of competencies compared to people managing human resource development kind of projects. All of this should be taken into account by individual departments and business units within them while assessing project managers for either the project coordinator role or the project manager role. A project coordinator should have demonstrated success at the low levels of complexity along the three complexity parameters. Generally, on an average an individual will spend about two to three years at the project coordinator role. Then they get promoted to a project manager. During this two to three year period, it is quite feasible to demonstrate high levels of competence at the low levels of complexities of a project. Once promoted to a project manager, on an average an individual could remain in that position for five to seven years. During this period, they need to demonstrate success at high levels of complexity of projects along different types of competencies.

Once they have demonstrated success in highly complex projects, they are ready to move on to a programme manager position. Using the success criteria and for the context of Abu

Dhabi, project manager competencies were able to be connected to programme manager competencies. At the programme manager level nine competencies were identified as the cause competencies. These cause competencies are the ones that will be the focus for promoting someone to a programme manager position. Table 7.3 lists the competencies of project and programme managers that are related.

Project Manager Competencies	Programme Manager Competencies
Technical Competencies	Planning the programme
	Programme Control
	Employee Welfare
	Employee Counselling
	Forecasting
	Effective Sequencing of Projects
	Conducting Meetings
	Time Management
Contextual Competencies	Planning the programme
	Programme Control
	Employee Welfare
	Employee Counselling
	Forecasting
	Effective Sequencing of Projects
	Conducting Meetings
	Time Management

Table 7.3: Relating Project Manager and Programmer Manager Competencies

Table 7.3 lists the causal programme manager competencies that are related to the project manager competencies. In order to start a job as a programme manager, an individual will have to demonstrate their ability in nine causal competencies. Out of these nine, eight could be related back to technical and contextual competencies of a project manager. So once a project manager has demonstrated successful attainment of technical and contextual competencies in highly complex projects, they could be promoted to a programme manager role. The only programme manager causal competency that is not related to technical and contextual competencies is the competency about effective leadership. Leadership has clear

relationship with behavioural competencies of project managers which are considered pre-requisites to even start a project coordinator role. However, the level of competency along the leadership parameter might be very different from managing teams of 50 or 100 people, which would be typical of a normal project. A programme manager will have to manage significantly larger groups of individuals which would include customers, consumers, employees, and contractors, etc. They will also need to have a very long term strategic vision about the programme itself with ideas about changing the conditions of micro and macro environment. Therefore, the leadership competency in a programme manager entails a lot wider horizon than a project manager. Therefore, for the purpose of promotion to a programme manager role a separate assessment method would have to be devised for testing effective leadership.

These causal programme manager competencies would have to be observed over different levels of complexities of a programme. Table 7.4 indicates the relationship between different causal programme manager competencies and different complexity variables. The “X”s in different cells indicates that there exists a relationship between the programme manager competency and programme complexity. For example, the ability to deal with different programme sizes by a programme manager could be affected by his competency in effective forecasting, effective sequencing of projects, conducting programme meetings, awareness towards employee welfare and counselling due to more complex human relationships involved in large size projects.

	Programme Size	Programme Variety In Terms of Diversity of Jobs and Skill Sets Required	Interdependence of Activities and Projects Within the Programme	Programme Context of the Environment in Which Programme is Being Executed	Rigidity of the Sequence of Activities and Sequence of Projects Being Executed in the Programme
Planning the Programme				X	X
Programme Control			X	X	
Forecasting	X	X	X	X	X
Employee Welfare	X				X
Employee Counselling	X				X
Effective Leadership					
Time Management					
Effective Sequencing of Projects	X	X	X	X	X
Conducting Meetings	X	X	X		X

Table 7.4: Relationship between Causal Programme Manager Competencies and Programme Complexity

Dividing the complexity from low, medium and high magnitude, it is important that a programme manager is able to demonstrate successfully their grasp of the programme management competency for highest order complex projects before they could be considered for promotion at a director level. Table 7.5 shows the different levels of complexity. Where there is no relationship between programme manager competency and programme complexity, those cells have been blacked out and do not have to be considered for further analysis.

	Programme Size			Programme Variety In Terms of Diversity of Jobs and Skill Sets Required			Interdependence of Activities and Projects Within the Programme			Programme Context of the Environment in Which Programme is Being Executed			Rigidity of the Sequence of Activities and Sequence of Projects Being Executed in the Programme		
	L	M	H	L	M	H	L	M	H	L	M	H	L	M	H
Planning the Programme															
Programme Control															
Forecasting															
Employee Welfare															
Employee Counselling															
Effective Leadership															
Time Management															
Effective Sequencing of Projects															
Conducting Meetings															

Table 7.5: Level of Attainment for Programme Manager Competencies

Programme manager competencies that have been classified as the “effect” group of competencies would be affected by high levels of attainment of causal group of competencies. The causal group of competencies are more crucial for a programme manager to succeed. The effect group of competencies are also important, but there is a high possibility that once the competencies that have been classified as cause competencies have been successfully demonstrated, some level of effect group of competencies have also been attained. Individuals who are at the director level of programme management generally oversee very complex and highly strategic projects for Abu Dhabi. To be promoted to that position, one must have demonstrated causal competencies at the highest levels of

programme complexity and effect group of competencies at least medium levels of programme complexity. Table 7.6 tabulates the relationship between programme manager competencies and different levels of programme complexity. Where there is no relationship, the cells have been blacked out.

	Programme Size		Programme Variety In Terms of Diversity of Jobs and Skill Sets Required Interdependence of Activities and Projects Within the Programme				Programme Context of the Environment in Which Programme is Being Executed Rigidity of the Sequence of Activities and Sequence of Projects Being Executed in the Programme			
	L	M	L	M	L	M	L	M	L	M
Managing Programme Activities										
Designing the Programme										
Planning Day to Day Activities										
Identification of Risks										
Managing Change										
Managing Critical Interfaces										
Quality Control and Assurance										
Negotiations Within and Outside the Programme										
Team Building										
Effective Communication										

Table 7.6: Effect Group of Programme Competencies and Programme Complexity

Once promoted to a director level in a programme management setting, the individual would have to sustain the causal programme manager competencies at the highest levels of

complexity and would have to endeavour to demonstrate higher levels of effect group of competencies at the most complex programmes. Figure 7.2 presents an integrated picture of career progression for the Abu Dhabi government departments.

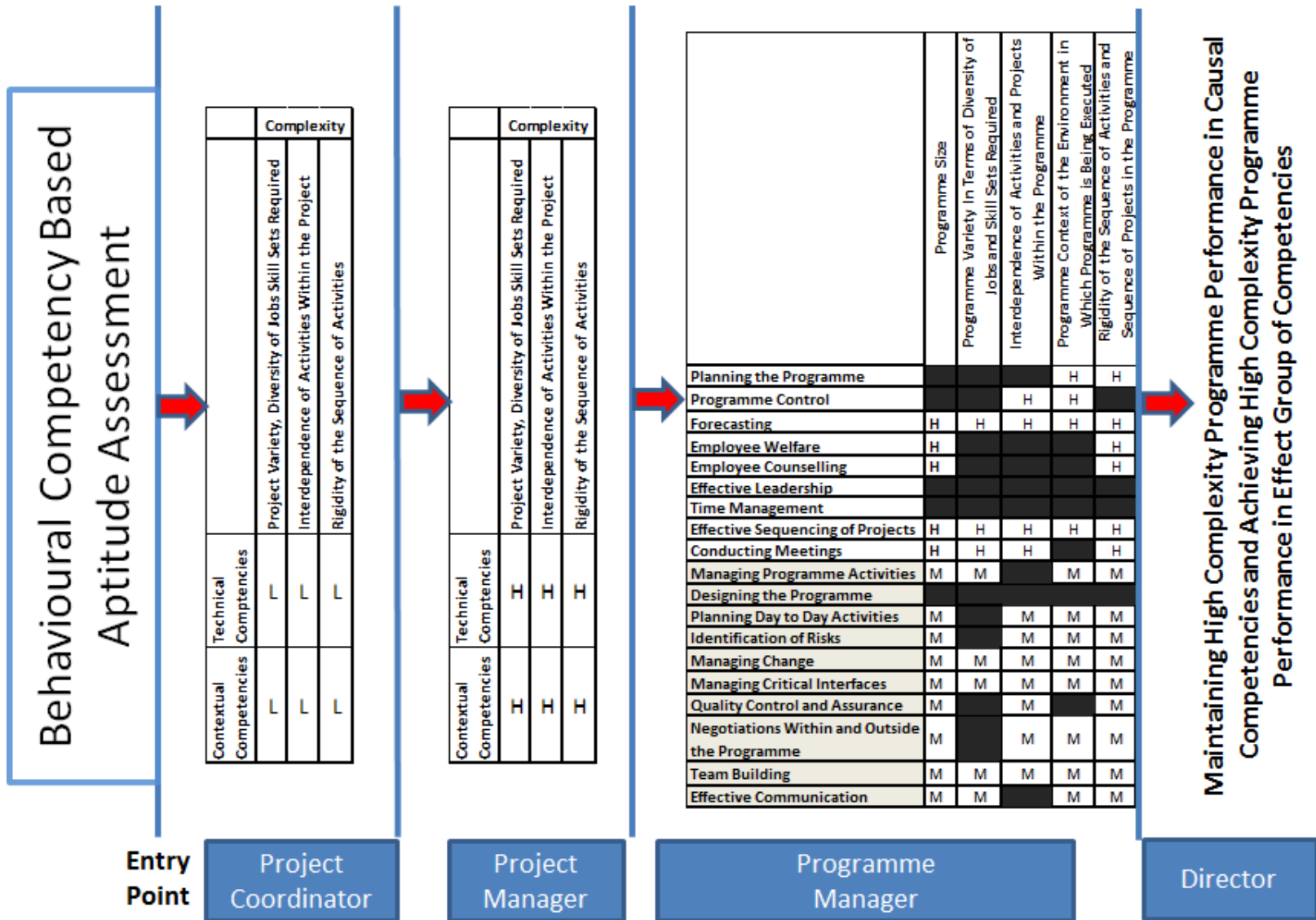


Fig 7.2: Proposed Conceptual Progression Framework

7.3 Validating the Framework

Once this framework was conceptualised, it was presented to two experts for validation.

These two experts were the same individuals who had done the DEMATEL analysis for this thesis. Both of them were directors of programme management, and both had more than 20 years of experience. They both were brought together in the same room and the overall findings of the whole research so far were shared with them. They were also provided with the results of their own DEMATEL analysis. In addition, they were provided a copy of the framework presented in Figure 7.2. For an hour they evaluated different aspects of the problem and the conceptual framework.

After looking at the framework, they mentioned that currently at the entry level, there is an aptitude test that has been compiled by the government human resource departments. Each government department has a different aptitude test. The tests differ from one area to another; so therefore, the test is different depending on the needed expertise for the job. For example for the Abu Dhabi police, one would be expected to be given a physical conditioning assessment along with other assessments. However, there is no project management specific aptitude test. It is important to develop a behavioural competency based project management aptitude test. The Abu Dhabi government departments could look at the APM body of knowledge to develop such a framework. In addition, to the project management competence assessment, individual Abu Dhabi government departments can add their application specific tests in addition to the behavioural competency based tests that will be compiled through the project management framework proposed. Therefore, this framework is quite robust in the sense that it provides a basic common structure of assessment and provides the capability to add additional competencies based on the area of application.

On an average an individual would spend about two-three years at the project coordinator level. Prior to their appointment every individual will have to go through an aptitude test. These aptitude tests are different for different departments based on their area of application. The two experts then looked at the technical and contextual project management competencies as a group. After studying the list of competencies, the two experts had few comments. There are generally two major categories of projects. The first one is the actual development of physical infrastructure. This includes the projects that involve actual construction of buildings or renovation or in cases establishment of IT infrastructure. The second kind involves the development of softer kind of capabilities such as development of human capital through training and education. Some projects involve the raising of awareness; an example is raising awareness about specific diseases by the health department. All these projects will have project coordinators and project managers assigned to them. However, within the group of technical and contextual competencies, there will be a different weightage to individual competencies. An example is that of technical competencies such as earned value management might be easier to apply for projects where a physical infrastructure is being developed. Such projects might also be vulnerable to higher price fluctuations in times when the cost of building materials fluctuate. This will require much more attention in cost management and estimation. Projects that are capability development or awareness raising see a lot less fluctuation; and hence, there is lesser emphasis on monitoring costs because they don't use much raw materials. So the estimation and cost control needs to be less in such projects.

Similar issues are also in place for competencies such as technology management. This competency again becomes more significant in IT projects where technology evolves very fast and compatibility of hardware and software always remains an issue. One of the technical competencies that probably have less importance is marketing and sales. However, being good at selling could also mean a better ability to convince people about your ideas and outcome so some of that competency will still be needed. The experts felt that the contextual competencies project sponsorship are also very important and even becomes more important at the project manager role rather than project coordinator role because one has to deal with project sponsors directly at the project manager position compared to the project coordinator position. However, what is important is that individual departments and units within these departments be given flexibility to select required skill sets is important for them and then take necessary steps to monitor and the overall achievement of these competencies in a project.

Both the experts agreed with the proposal to successfully demonstrate the attainment of the relevant competencies at low levels of complexity at the project coordinator role. At project manager they will have to demonstrate it at lot higher level of complexity. An individual remains at a project manager position between five and seven years, but that also depends upon the government department and availability of vacant positions for a programme manager position. In some departments the tenure at project manager level could be up to 10 years. However, that could be different for different departments and individual departments can decide how to take the years of service into account while deciding on applying this framework. Once an individual becomes a programme manager, then there is altogether a different type of operating environment that one has to deal with. However, the experts agreed that the link that has been accomplished between the project management

competencies and programme management competencies clearly demonstrates that there are links between these two sets of competencies. This link can provide an easy way to assess the readiness of an individual at a certain level of programme management competency based on their attainment of project management competency. They also agreed that leadership competency is related to behavioural competencies of a project manager. The experts felt that this is a competency that they would have even before they start their job as project coordinator. Over the time that they are project coordinator and project managers this competency will actually improve. The time an individual may spend in project management might be anywhere from 8 to 14 years; and furthermore, this will have been sufficient time for them to enhance their leadership skills if they have been successful at managing projects. Someone may remain a programme manager for 10-15 years because open director positions are few in number. So, it is not possible to move to a programme director position for a majority of programme managers. However, given the importance of this number and the competitiveness for this promotion, the experts felt that having achieved success at medium level of complexity programmes on effect competencies is not acceptable. They were of the opinion that an individual should have proved themselves as being successful at the highest level of complexity at both the cause and effect competencies before they can be promoted to a director level. Once someone becomes a director and they are not retiring within next few years, then they move on to important positions such as a chief secretary in a ministry.

As a director, one has to do more general and strategic level management. They might not be involved in day to day programme management activities. However, they need to have a high level of competence in programme management to oversee all the programme managers. There is also an element of respect that they will command if they are a highly competent programme manager before they became director. So the experts wanted a slight change in

the framework and wanted all the competencies whether they are cause or effect to be demonstrated at the highest level of programme complexity before one becomes a director. Hence, this input was incorporated and the framework revised to what is documented in Figure 7.3.

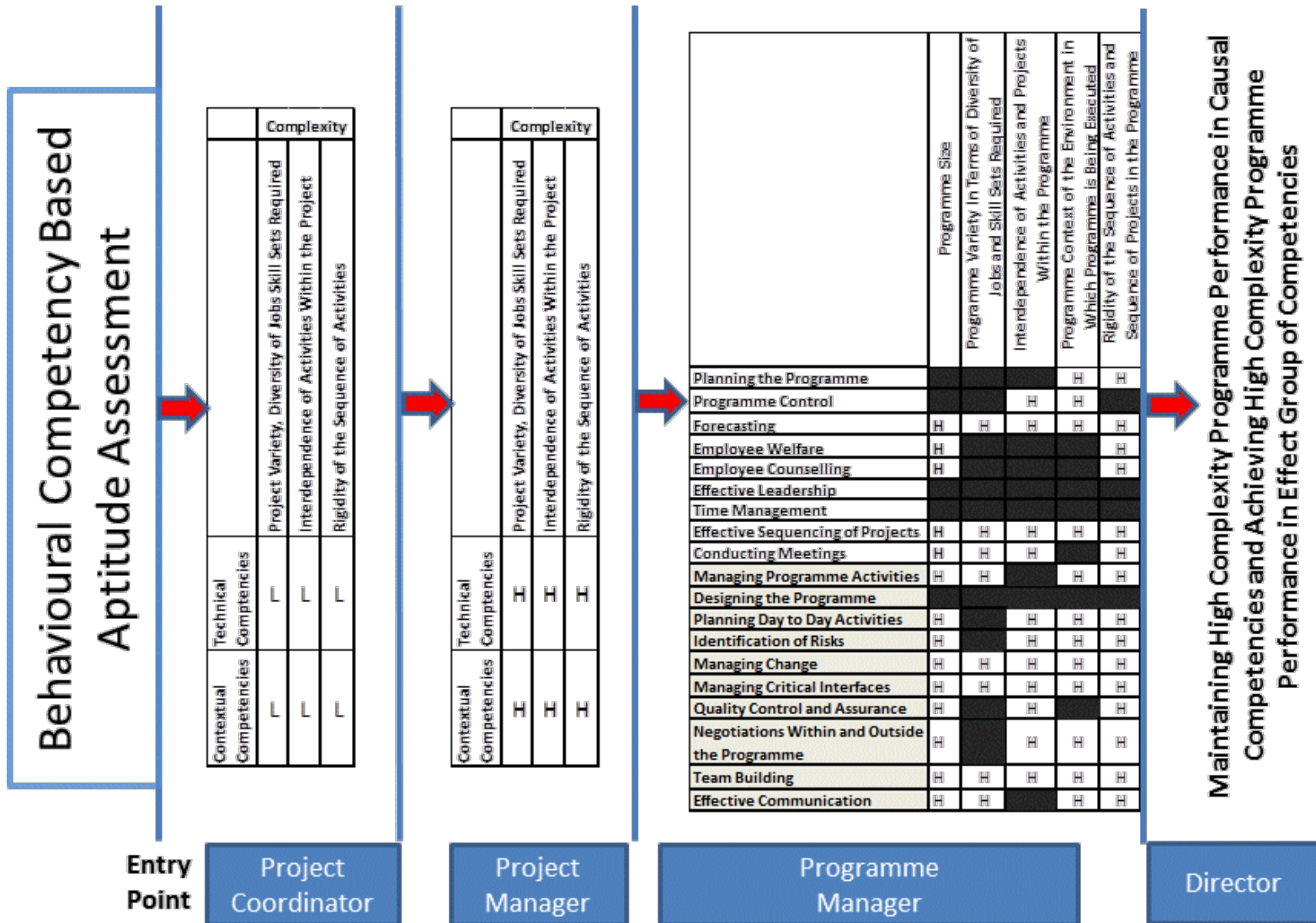


Fig 7.3: Revised Progression Framework for Project Management

7.4 Discussion

Pinto and Kharbanda (1995) had referred to project management as an “accidental profession”. This was an indication of practice at that time where people were inserted into project management roles just because they were good at some technical aspect which dominated that particular project, and as a consequence there was a spate of project failures in most of the sectors (Crawford, 2005). In the Abu Dhabi government departments, due to lack of a project management specific competency evaluation system, there were a number of project managers who have ended up in their roles “accidentally”. This research looked at the overall the progression path of a project manager from entry level to the time of their retirements as director of programmes. One of the major findings of this research is that not anyone should be put into a project management role. The issue of behavioural competency of the individual should be considered. A good level of competence in the behavioural competency domain is required as a pre-requisite for the project management role. This echoes the findings of Fisher (2011). It also supports one of the challenges that Carbone and Gholston (2004) have highlighted, which is that project managers are being selected for their technical competencies and not their behavioural competencies that then leads to project failures in the future.

In order to accomplish this, it was important to understand the concept of careers and career paths. According to Arthur et al. (1989), a career is “the evolving sequence of a person’s work experience over time”; and the concept of career path explicitly accepts the idea of evolution over time which is a series of career moves (Inkson, 2004). There are different types of career paths that Brousseau et al. (1996) have proposed in four distinct career patterns: spiral, expert, linear, and transitory. According to them, a spiral career happens to be one in which a person would make a move across occupational areas that might have some

level of link but not so much of a direct link. It could be a move to a sub or super speciality in the discipline. Under this classification of career patterns, a linear career would consist of progressive series of steps forward and possibly upwards in the organisation hierarchy with more authority and responsibility added at every step. This kind of career path requires a level of motivation to exploit opportunities in order to achieve more power in the roles and within the organisation. This research has shown that the career path of a project manager is quite linear considering the definition of Brousseau et al. (1996).

During this research, it was found that project managers in Abu Dhabi evolve into their roles and are promoted into programme manager roles. It was also realised that the transition from the project management to programme manager role is solely based on number of years of experience. Shehu and Egbu (2007) have pointed out the disconnect between project management and programme management competencies and lack of research that looks at the transition interface. However, this research has managed to bridge that research gap by looking at project and programme success to establish this relationship. Gidado (1996) and Baccarini (1996) have discussed extensively the concept of project complexity. Cicmil et al. (2009) have tried to relate complexity to project management practices and competencies. This thesis has further elaborated on that relationship and through this correlation has managed to document a career path that helps in assigning project managers to a project with an appropriate level of complexity. The relationship with complexity is also used to document the progression in the programme management domain once the project manager gets promoted as a programme manager. This research has combined a wide array of different areas of research within the domains of career paths, project management competency, programme management competency, project complexity, programme complexity, and project and programme success factors to formulate a comprehensive progression framework for the Abu Dhabi government departments.

7.5 Chapter Summary

This chapter has brought the analysis from different data collection exercises together to propose a single framework that could be used for a project manager career path progression in the Abu Dhabi government departments. After compiling the framework, an expert panel of two senior directors of programme management who had more than 20 years of experience each. Their inputs were invaluable and led to a modification of the framework that was conceptualised earlier. Through the involvement of these two senior programme directors we achieved a level of validation and confidence in the framework. The general consensus among the two directors of programme management was that this is a valuable framework. This is comprehensive and incorporates the best practices from across the globe because it is based on the APM competency framework which is used quite frequently in Abu Dhabi. In addition, they felt that the framework provided enough flexibility to different government departments to modify the framework as needed to suit their individual needs. The incorporation of behavioural competencies at the initial aptitude tests that are performed for entry level project coordinators already incorporates quite a few behavioural competencies. The technical and contextual competencies of project managers as specified by the APM framework are something that needs to be assessed at different levels during the project management activities. Using project complexity to assess the level of success achieved is a good way to accomplishing the competency assessment.

Once an individual has demonstrated all the relevant competencies at the highest level of project complexity, then they are ready to be promoted to a programme manager level. Among the programme manager competencies, there are two types of competencies for programme managers. They are cause and effect. Competencies in the cause group are fundamental to the ability to perform the programme manager function. Since there is a

causal relationship between these two groups of competencies. Achievement in cause group will lead to achievement at some level of the effect group. An individual will remain at the programme manager position for several years. The ability to move to a director level is limited because each Abu Dhabi government department has only one or two directors. So, not every programme manager will make it to the director of programmes position. However, the ones that do will be at the top level demonstrating their competencies in very complex programmes. These individuals who become directors will have to do strategic level management and will be involved in establishing long term vision for several programmes that are underway.

Governance and strategic planning type of activities will be the key activities that directors of programme management. These individuals will either retire after being at this position for few years or will go on to become chief secretary in a ministry. This takes them to a different career path altogether. However, this framework will be a good basis to take an individual from the start of their careers to the last leg of their careers. This is also going to provide an objective way of assessing and promoting individuals in their careers. This framework will be extremely beneficial for the Abu Dhabi government. Once it has been implemented, then other emirates within the UAE can adopt this framework. This framework can also be adopted in different Gulf Cooperation Council (GCC) countries which are similar in demographics, operating environment, and business practices to Abu Dhabi.

The initial intended aim of developing the framework has been achieved in this thesis. The following chapter presents the major conclusions and summarises for the main findings of this research. The next chapter also presents recommendations and future research. It also

presents the journey undertaken as part of this research and has summarised the limitations and qualified the findings.

Chapter VIII

Conclusions and Recommendations

8.0 Introduction

This thesis started with an aim of developing a framework for facilitating the progression along the project management career path in the Abu Dhabi government departments. In order to satisfy this aim, the following objectives were set:

1. To document the current path followed in the careers of project managers in the Abu Dhabi government departments.
2. To document the competencies needed during different roles undertaken by project managers along their career paths.
3. To document the success metrics and factors that lead to complexity in projects and programmes resulting in challenges for the project manager during their careers.
4. To conceptualise a framework for assessing the project manager career path progression in the Abu Dhabi government departments.
5. To validate the frameworks for assessing the project manager career path progression in the Abu Dhabi government departments.
6. To draw conclusions and recommendations.

The first objective was initially intended to be satisfied using review of the literature. This would have provided a basis for contextualisation. However, not much exists in terms of refereed literature for Abu Dhabi. The researcher wanted to take published research about GCC or other Middle Eastern countries and draw a similarity with Abu Dhabi. However, it was realised that the projectisation of activities in the government departments is quite unique

and new to Abu Dhabi. Hence, there was a need to establish the context through some primary data. In order to accomplish that, semi-structured interviews of six senior project managers were conducted. This led to the development of the context and the satisfaction of the first objective.

The second objective was satisfied through an extensive review of the literature. This review of literature helped establish the competencies that project managers need during their roles as project managers as well as their role as programme managers. Research also highlighted that the transition from project to programme manager is not very clear and more needs to be done. Therefore, this was something that was attempted to be accomplished for this research.

The third objective was about the success metrics for project and programme management. It also included the documentation of variables that add complexity to a project. This was accomplished through a review of literature. This helped develop the understanding and develop data collection instruments that had to be used for further analysis.

The fourth objective of conceptualising a framework that helps document the progression of a project manager along their career path was met through a series of primary data collection and analysis. Semi-structured interviews helped in establishing the context and a survey and a second round of expert interviews helped develop the progression path for project managers. The progression path starts at the entry level project manager position and ends at the senior programme manager role where one might be near the end of their career.

The fifth objective was the validation of the framework and providing more insights on the implementation. This was accomplished again through expert interviews. The final framework which was validated for the Abu Dhabi context was presented in Chapter 7.

The last objective of conclusions and recommendations is presented in this chapter.

8.1 Conclusions

Through this work all the initial objectives that were the aim of this thesis have been satisfied.

The conclusions from this work are as follows:

8.1.1 The Career Path

This research has managed to firmly establish the profile of the career path of project manager, which is quite linear. The current knowledge base considers a break in the career paths of project and programme manager. However, this research has found that in fact there is continuity between the two career paths. So a successful project manager who progresses along their career path will end up at the programme management position and programme management; natural evolution in the career path. This needs to be clearly taken into account when designing promotion assessment instruments and processes for project managers in their careers. Based on the review of literature conducted so far, this is the first research to firmly establish the profile for project manager career path.

8.1.2 Add-on responsibility

One of the issues that is often highlighted in the literature is that a project manager is like an add-on responsibility to technical managers. Through this study, it has been concluded that it is not an add-on role, but a career in itself. The project manager role is not an “accidental” role, but should be a more formal and thought out role while selecting project managers for the job. Given the direction that the Abu Dhabi government has gone, where the

responsibility of the government is to manage projects that are executed by contractors, the profession of project management requires even more important significance.

8.1.3 Behavioural Competencies

At the entry level of a project an individual should have a high level of behavioural competencies. This is a significant conclusion because most of the literature talks about the importance of behavioural competencies in a project manager but do not establish it as a pre-requisite of taking that role. These competencies include: communication, teamwork, leadership, conflict management, negotiation, human resource management, behavioural characteristics, learning and development, and professionalism and ethics.

8.1.4 Relationship between success criteria and success factors

There is a clear relationship between project success criteria and programme success criteria. Since projects success leads to programme success, this relationship could be used to establish the transition between a project manager and a programme manager's role. Although this sounds quite logical; however, in the literature it has not been established explicitly. The framework developed as part of this research has managed to accomplish this task based on the extensive review of literature; and furthermore, it seems to be the first framework of its kind.

8.1.5 Technical competency

The technical competencies of a project manager result in the completion of a project on time; within budget, as per specification, with good risk analysis and management, satisfying the stakeholders and the overall project objectives. These competencies further evolve and as they evolve the individual could be given more complex projects to handle. The literature discusses the relationship between competencies and complexity, but what the current

literature has not done is to provide any milestones in terms of level of complexity that could be used to promote project managers.

8.1.6 Contextual competency

The contextual competencies in a project manager result in completion of a project on time; within budget, as per specifications, with good risk analysis and management, satisfying the stakeholders and benefiting the overall community for which the project was intended. This becomes even more significant since we are talking about government departments, who endeavour to benefit the public and profit is a secondary motive in their projects. As discussed above, this thesis has managed to establish the evolution of contextual competency along the project manager career path and established its relationship with the complexity.

8.1.7 The three variables

There are three variables in project complexity that have a relationship with both technical and contextual competencies of a project manager. These are: project variety, diversity of jobs skill sets required, interdependence of activities within the project, and rigidity of the sequence of activities. For the first time these variables have been established as significant for Abu Dhabi government. However, for other countries and the private sector they might be slightly different.

8.1.8 The Extensive link

There is an extensive link between different programme manager competencies and the success of the programmes. The most important competencies are: planning the programme, managing programme activities, programme control, forecasting, designing the programme,

planning day to day activities, identification of risks, managing change, managing critical interfaces, quality control and assurance, employee welfare, employee counselling, negotiations within and outside the programme, effective communication, effective sequencing of projects, and conducting meetings.

8.1.9 Cause/Effect group of competencies

Within the programme management there are some competencies that can be regarded as the cause group of competencies, and others that could be regarded as the effect group of competencies. Planning the programme, programme control, forecasting, employee welfare, employee counselling, effective leadership, time management, effective sequencing of projects, conducting meetings. The competencies that are included in the effect group of competencies are: maintaining programme activities, designing of the programme, planning day to day activities, identification of risks, managing change, managing critical interfaces, quality control and analysis, negotiation skills, managing project managers, team building and effective communication. The cause group of competencies have to be satisfied at the time of entry into the programme management role and the effect group of competencies are to be developed during the tenure as a programme manager. There are quite a few researchers who have listed and documented a range of programme manager competencies, However, what this research has done, which is unique, is to identify those groups which would help researchers focus their efforts accordingly.

8.1.10 Assessment of competencies

Complexity both of projects and programmes could be used to assess the attainment of competencies in a project manager. This is something that one cannot find explicitly stated in the current literature. Complexity as a measure to assess the career path of the programme

manager will act as a useful benchmark for HR departments to review during promotion. A project manager at entry level should be able to successfully handle projects which have low levels of complexity in terms of project variety, diversity of jobs skill sets required, interdependence of activities within the project, and rigidity of the sequence of activities. Once they have demonstrated this dexterity, then they should move to the next level of project management where they would be responsible for intermediate and high level project complexity along the above stated parameters.

8.1.11 Demonstration of causal competencies

The manager should be able to demonstrate the causal competencies at a high level of programme complexity when they enter into a programme management role. As their career proceeds, they would be developing and using their effect group competencies and demonstrating them in different levels of complex programmes. However, given that there are very few positions at the top, they should be able to demonstrate all the cause and effect group of programme competencies in highly complex programmes before they become a director of programme management; the highest position one can achieve within a project organisation. Through this research it would be easy to ensure that only the top performers make it to the director level of project management organisations and will result in effective delivery of projects and programmes.

8.2 Contributions of This Research

There are several major contributions of this research. Some of them are for the Abu Dhabi government departments and some of them are for the project management profession in general.

8.2.1 Continuity

This research has established continuity between the role of a project and programme manager and has developed an objective way to assess that continuity. This was one of the major gaps identified in the literature. This clearly indicates linearity in the project management profession. This has been missing from the literature so far.

8.2.2 As a profession or as a role

There is quite a bit of debate about “project management as a profession or as a role” within a technical task. This research has clearly established the importance of project management as a profession and has documented a career path that could be followed for progression along this profession.

8.2.3 A framework

This research has provided a framework that could be used as a starting point by any Abu Dhabi government department to develop and populate details of their own project management career progression framework.

8.2.4 Links

This research has also established links between project and programme complexities and the competencies required by project and programme managers to deal with these complexities in the project.

8.3 Limitations of This Research

There are some limitations that are associated with this study.

1. The study is limited to Abu Dhabi government departments and cannot be generalised universally until more studies are conducted for other countries and regions of the world.

2. Use of semi-structured interviews and MCDM techniques such as DEMATEL come with their own limitations of individual biases that might filter in. Although, having a multiple layer of data collection and analysis can minimise it, it cannot be completely eliminated.
3. The survey sample was limited and the framework is a high level framework for government departments. What each individual department will have to do is to customise it for their own use. However, the framework offers a very good starting point.

8.4 Future Areas of Research

There are several areas of future research that researchers can pursue taking this thesis as the starting point. One of them is the development of more intermediate milestones within project and programme manager career paths. At the moment for Abu Dhabi government departments, there are two stages each at the two levels. However, it is envisioned that there could be more intermediate milestones and one needs to develop more objective measures to establish those. The semi-structured interviews and the interviews conducted were tested with a very small sample of experts. Although the experience levels of these experts is significant, there is a possibility that given the breadth of activities undertaken by the Abu Dhabi government departments, some parameters might have been overlooked. Therefore, a future study that includes experts from each of the government departments would enhance the output or lead to a wider acceptance of results presented in this thesis. This study is limited to Abu Dhabi which means future researchers can look at other regions and countries of the world to take the work done in this study forward and establish some kind of universal framework. It is also anticipated that a similar study in the private sector might highlight a

new sets of issues. Therefore, there is a case to be made to replicate this study in the private sector.

Each sector of the industry might highlight some issues which are limited to that particular sector. Therefore, it is important to do a sector specific study and test the findings of this study in different sectors. These studies can also be undertaken using this thesis as the starting point. One of the areas that is often associated with the establishment of career paths is the identification of training needs. In order to actually provide support to individuals and facilitate their professional development, it is important that some sort of training needs analysis be conducted and training programmes developed to support individuals at different stages of their project management career. Therefore, one could look at Bloom's Taxonomy or the Kirkpatrick model to identify some sort of continuous professional development mechanism to help project managers. This could be a good area of future research.

APPENDIX A

QUESTIONNAIRE FOR PROJECT MANAGERS

SURVEY QUESTIONNAIRE ON COMPETENCY OF PROJECT MANAGERS

1. Please click the appropriate age group you fall into
 - a. 18-22 years,
 - b. 22-30 years
 - c. 30-40 years
 - d. 40-50 years
 - e. 50+
2. Gender
 - a. Male
 - b. Female
3. Educational Qualification
 - a. GCSE/High School
 - b. HND
 - c. Bachelor's Degree
 - d. Master's Degree
 - e. PhD
4. How many years have you been working for this company?
 - a. 0-3 Years
 - b. 3-6 Years
 - c. 6-10 Years
 - d. 10-20 Years
 - e. 20 Years +
5. How many years have you participated/known about/managed projects, (this job or previous jobs)
 - a. 0-3 Years
 - b. 3-6 Years
 - c. 6-10 Years
 - d. 10-20 Years
 - e. 20+ Years
6. How will you categorise your job role?
 - a. Entry level Project Management
 - b. Mid-Level Project Management
 - c. Upper or Senior Level Project Management
 - d. Senior Position in the Organisation

One a 5 point scale rate each competency on how it impacts the success or failure of a project performed by the Abu Dhabi Government. **5 Very Important, 4 Important , 3 Neither Important Nor Unimportant, 2 Unimportant 1 Very Unimportant.**

CORE SYSTEMS FACTORS						
	Variable	1 Very Unimportant	2 Unimportant	3 Neither Important Nor Unimportant	4 Important	5 Very Important
7	Fundamental Knowledge About Project Management					
8	Project Success and Benefits Management					
9	Stakeholder Management					
10	Requirements Management					
11	Project Risk Management					
12	Estimating Budget and Time					
13	Developing Business Case					
14	Marketing and Sales of Project Idea and Concept					
15	Conducting Periodic Project Reviews					
16	Developing Project Definitions					
17	Scope Management					
18	Modelling and Testing of Alternatives					
19	Developing Methods and Procedures for Project Execution					
20	Project Quality Management					
21	Project Scheduling					
22	Project Resource Management					
23	Information Management and Reporting on a Project					
24	Development of Project Management Plan					
25	Configuration Management					
26	Change Management					
27	Managing Implementation Activities on the Project					
28	Technology Management					
29	Budget and Cost Management					
30	Project Procurement					
31	Issues and Threat Management to Project Success					
32	Project Development to Ensure the Optimal Solution Evolves					
33	Value Management					
34	Earned Value Management					
35	Value Engineering					
36	Handover and Closeout Process Management					
37	Project Communication					
38	Project Leadership					
39	Project Teamwork					
40	Conflict Management					
41	Negotiation					
42	Human Resource Management					
43	Behavioural Characteristics					

	Management of the Stakeholders					
44	Learning and Development of Project Team					
45	Professionalism and Ethics					
46	Project Sponsorship Management					
47	Health, Safety and Environmental Management					
48	Project Lifecycle Management					
49	Project Finance and Funding					
50	Legal Awareness					
51	Definition and Understanding of Organisational Roles on a Project					
52	Development of Appropriate Project Organisation Structure					
53	Governance of Project Management					
Based on your opinion and using the Same 5 Point Scale as above rate the importance of the following success criteria in the Abu Dhabi Government projects						
		1 Very Unimportant	2 Unimportant	3 Neither Important Nor Unimportant	4 Important	5 Very Important
54	Timely Completion					
55	Within Budget					
56	As per Specifications					
57	Good Risks Assessment and Management					
58	Meets Stakeholder Satisfaction					
59	Satisfaction of Project Objectives					
60	Benefits to Organization					
61	Benefits to Community					
62	Project Implementation Process					
63	Customer Satisfaction					
Rate the Importance of the variables that on how they contribute to project complexity on the same 5 point scale as above						
		1 Very Unimportant	2 Unimportant	3 Neither Important Nor Unimportant	4 Important	5 Very Important
64	Project Size					
65	Project Variety in Terms of Diversity of Jobs and Skill Sets Required					
66	Interdependence of Activities Within the Project					
67	Project Context or the Environment in Which Project is Being Executed					
68	Rigidity of the Sequence of Activities					

APPENDIX B

QUESTIONNAIRE FOR PROGRAMME MANAGERS

SURVEY QUESTIONNAIRE ON COMPETENCY OF PROGRAMME MANAGERS

7. Please click the appropriate age group you fall into
 - a. 18-22 years,
 - b. 22-30 years
 - c. 30-40 years
 - d. 40-50 years
 - e. 50+
8. Gender
 - a. Male
 - b. Female
9. Educational Qualification
 - a. GCSE/High School
 - b. HND
 - c. Bachelor's Degree
 - d. Master's Degree
 - e. PhD
10. How many years have you been working for this company?
 - a. 0-3 Years
 - b. 3-6 Years
 - c. 6-10 Years
 - d. 10-20 Years
 - e. 20 Years +
11. How many years have you participated/known about/managed projects, (this job or previous jobs)
 - a. 0-3 Years
 - b. 3-6 Years
 - c. 6-10 Years
 - d. 10-20 Years
 - e. 20+ Years
12. How will you categorise your job role?
 - a. Entry level Project Management
 - b. Mid-Level Project Management
 - c. Upper or Senior Level Project Management
 - d. Senior Position in the Organisation

On a 5 point scale rate each competency on how it impacts the success or failure of a project performed by the Abu Dhabi Government. **5 Very Important, 4 Important , 3 Neither Important Nor Unimportant, 2 Unimportant 1 Very Unimportant.**

CORE SYSTEMS FACTORS						
	Variable	1 Very Unimportant	2 Unimportant	3 Neither Important Nor Unimportant	4 Important	5 Very Important
7	Planning the programme					
8	Maintaining Programme Activities					
9	Programme Control					
10	Forecasting					
11	Designing the Programme					
12	Planning Day to Day Activities					
13	Identification of Risks					
14	Managing Change					
15	Managing Critical Interfaces					
16	Quality Control and Assurance					
17	Employee Welfare					
18	Employee Counselling					
19	Negotiations Within and Outside the Programme					
20	Effective Leadership					
21	Managing Project Managers					
22	Time Management					
23	Team Building					
24	Effective Communication					
25	Effective Sequencing of Projects					
26	Conducting Meetings					
Based on your opinion and using the Same 5 Point Scale as above rate the importance of the following success criteria in the Abu Dhabi Government programmes						
		1 Very Unimportant	2 Unimportant	3 Neither Important Nor Unimportant	4 Important	5 Very Important
27	Timely Completion					
28	Within Budget					
29	As per Specifications					
30	Good Risks Assessment and Management					
31	Meets Stakeholder Satisfaction					
32	Satisfaction of Programme Objectives					
33	Benefits to Organization					
34	Benefits to Community					
35	Programme Implementation Process					
36	Customer Satisfaction					
Rate the Importance of the variables that on how they contribute to programme complexity on the same 5 point scale as above						
		1 Very Unimportant	2 Unimportant	3 Neither Important Nor Unimportant	4 Important	5 Very Important
37	Programme Size					

38	Programme Variety in Terms of Diversity of Jobs and Skill Sets Required					
39	Interdependence of Activities and Projects Within the Programme					
40	Programme Context or the Environment in Which Programme is Being Executed					
41	Rigidity of the Sequence of Activities and Sequence of Projects Being Executed In The Programme					

APPENDIX C

SAMPLE INTERVIEW TRANSCRIPTS

Respondent.#.1

Q1. Some key success criteria for a project are: Timely Completion, Within Budget, As per Specifications, Good Risks Assessment and Management, Meets Stakeholder Satisfaction, Satisfaction of Program Objectives, Benefits to Organization, Benefits to Community, Program Implementation Process, and Customer Satisfaction

Which one of these also are a measure of successful Program achievement and why?

Response:

Respondent 1 categorically mentioned that although are the measures of Program achievement. However the most important amongst them are confidence, completion of tasks. Ability to adapt and build consensus are essential too.

It is extremely important that the program must be complete on time and it must meet the objective stated.

A particular entity was running incomplete 124 projects and during an audit review, it was noted the project purpose was not clear and the project was embarked without a clear need or enough market research. Yet times in such projects it was difficult to derive a value proposition

Other important measure is the customer satisfaction itself. The success of the program again depends on success of all its projects. Therefore to is essential to achieve the success of all projects relating to a program.

Q2. How do you see the difference in roles of project and Program managers in Abu Dhabi government?

Response:

Project Manager focuses on issues of a specific project

The decision and negotiations are of smaller scale when compared to Programs

Program Manager requires having an overall understanding or perspectives of the organization

He must be able to envisage political and strategic view

Decision and negotiable skills required are of higher nature

Q3. How does a project manager evolve in his career to become a Program manager? What competencies do you see in a project manager for considering them to be promoted to a Program manager?

Response:

A project manager should focus on building the following skills:

People Management

Communication

Adaptable and an open mind

Develop good Awareness of Needs

Avail Certifications and engage in workshops and seminars

Issue management skills

Coordination of outsourced projects

Negotiations

Q4. What are the major challenges a new Program manager faces after being promoted from a project manager and how does AD government departments provide them support and training to deal with these challenges?

New Program managers challenge revolves around making the program and projects profitable. They also face problem with decision making and changing the mind-sets. They experience lack of management support and team support. Often they are unaware of team or program objective and there is no clarity on program goals or objectives

Q5. If you were to classify the different types of projects what would they be? How would you measure the success of these projects differently?

The projects can be classified according to priorities. These include:

- Projects aligning with PMOs Strategic plans or Government Projects
- Budget of the project
- Complexity of the project (e.g., Number of programs sharing a project). For eg different entities such as Municipality, civil defence and Education council may be working on a program that has a common project
- Scope of the project for example if it is a project related to health or any other important issues

In each of these projects the success factors have success factors. For example The PMO project success would include timely delivery, meeting the objectives and should be able to derive a value.

The Budget projects indeed are high value projects. They need to be meeting the stakeholder requirements and impact study is a measure for scope related projects

Q6. If you were to classify the different types of programs what would they be? How would you measure the success of these Programs differently?

The programs can be classified as of presidential priority, high value or the one that have complex procedures for approval.

Q7. What factors lead to complexity in a Program? What makes it difficult and complicated to manage and execute?

The projects get complex because of following reasons

-Lack of right polices and procedure or by laws

-Recruitment mechanism

-Technology

-Change complexity

Public reluctance to acceptance

Q8. What are the unique cultural and national factors of AD that impact upon the performance of project and Program managers?

The ability to build consensus and very informal nature of individuals and team sprit hugely has an impact on success of the projects.

Respondent #.2

Q1. Some key success criteria for a project are: Timely Completion, Within Budget, As per Specifications, Good Risks Assessment and Management, Meets Stakeholder Satisfaction, Satisfaction of Program Objectives, Benefits to Organization, Benefits to Community, Program Implementation Process, and Customer Satisfaction

Which one of these also are a measure of successful program achievement and why?

Response:

Respondent 2 categorically mentioned that timely completion, stakeholder satisfaction play a key role in the success of the project. Stakeholder satisfaction is so important that satisfaction must be assessed during every phase to ensure the requirements are met. The customer satisfaction is integrated within the stakeholder satisfaction. Next important measure is the benefits to community. It should have required infrastructure. The Risks are measured weak and due to limited time and experience will have an impact on stakeholder satisfaction. However, the project successes are programme success are related.

Q2. How do you see the difference in roles of project and Program managers in Abu Dhabi government?

Response:

Project Manager focuses on tasks related to a project. Typical project Manager is experienced with specifics of a typical project from start to a closure of project. He mostly does a vertical management and therefore they are experienced to tackle issues that internal to the project and lack cross functional expertise.

Program Manager on the other hand has experience of cross functional teams. He builds of not only vertical management but also expands his knowledge of the organization horizontally. Besides a Program Manager must possess advanced skills relating to budget management, negotiation and experience of meeting the strategic objectives or of meeting the stated outcomes of the project. Most importantly Program Manager should have a ability to make a strategic alignment of the program. Program Manager should also be familiar with the frameworks, methodologies that are available to apply to

program management depending on the focus of the organization. Process to be used from initiation to closure should be known and Program manager should be well versed.

Q3. How does a project manager evolve in his career to become a Program manager? What competencies do you see in a project manager for considering them to be promoted to a Program manager?

Communication skills and the ability to deliver the project on time are also necessary. Gradually movement of the project Manager to Program Manager should focus on improving the communication, negotiation, liaison with senior management, leadership charisma, Be strategic and be able to chart the vision. New Program managers challenge revolves around making the program and projects profitable. They also face problem with decision making and changing the mind-sets. They experience lack of management support and team support. Often they are unaware of team or program objective and there is no clarity on program goals or objectives

Q4. What are the major challenges a new Program manager faces after being promoted from a project manager and how does AD government departments provide them support and training to deal with these challenges?

The major challenges that a program manager faces is the lack of commitment from organizational leaders. Yet times, Program Managers need to deal with delays in previous programs. They are naïve to building the knowledge on portfolios. They lack financial and risk skills. They lack the exposure to other departments. The cross factional expertise and making internal external integrations are among the challenge. Some of the other challenges include:

- skills to measure the projects
- estimate the benefits of the project or the program
- ability to analyse the project data
- allocation of the HR resources
- managing the interdependences of the projects

The support to build up to this role often is very stagnant as there is no job description. Although trainings are provided yet times may not be correct. However a program

from a vendor was useful. More that kind is needed. There is no plan for competency building

Q5. If you were to classify the different types of projects what would they be? How would you measure the success of these projects differently?

The projects can be classified as Administrative such as HRD projects which require success measures timely completion and customer satisfaction

Construction and Infrastructure Projects whose success can be measured by timely completion, meeting the specifications of the program, return on Investments

IT projects have success measures such as selection of software and end user satisfaction

Maintenance projects that have success measures such as service availability, response time, quality of job and meeting the customer satisfaction

Q6. If you were to classify the different types of Programs what would they be? How would you measure the success of these Programs differently?

Again categories could be same as above However the success measures would be rate of compliance to the government rules and regulations, its strategic alignment, timely completion, benefit realization, ROI, Right outcomes etc.

Q7. What factors lead to complexity in a Program? What makes it difficult and complicated to manage and execute?

The factors that lead to the complexity of the project are – Infrastructure, resources allocation, lack of regulations an program standards. The reasons what make them complexity are shortage of right resources, imbalance of demand and supply and the lack of appropriate plan for execution.

Q8. What are the unique cultural and national factors of AD that impact upon the performance of project and Program managers?

The rigid procurement system kill the innovative ability; Blind rules hinder the project performance.

Respondent # 3

Q1. Some key success criteria for a project are: Timely Completion, Within Budget, As per Specifications, Good Risks Assessment and Management, Meets Stakeholder Satisfaction, Satisfaction of Program Objectives, Benefits to Organization, Benefits to Community, Program Implementation Process, and Customer Satisfaction

Which one of these also are a measure of successful Program achievement and why?

The success criteria project are risk, planning, value execution, time cost quality and safety.

Time means money therefore delivery of the project will have to be within the stipulated time. Delays projects may also lose its value. Money and time are also interrelated that the delay may cause loss of money as well. Each delay will also have resources implication. Delaying project would mean delaying the programme it is part of.

Q2. How do you see the difference in roles of project and Program managers in Abu Dhabi government?

A project Manager focuses on issues in side a project and such he is responsible for tasks with in project that are small, less complicated in nature. He may have to have technicality know how of a project in terms of handling contracts etc.

A program manager will have to manage a larger team of diverse skills. He is responsible for making strategic decisions and he should be able to execute the program strategy that is wider in nature

Q3. How does a project manager evolve in his career to become a Program manager? What competencies do you see in a project manager for considering them to be promoted to a Program manager?

A project manager should have handled at least 1 major project with at least of 5 years of experience prior to commencing a program manager's role. He should be involved in managing complex project and gain experience of critical issues. He needs to have good language skills and prepare himself through a professional program or attain towards some certifiations.

He should be problem solver, should be flexible enough to take the views of the team members, ability to form a winning team and should be good negotiator. He should also be decision maker and involved fully in the project. He should be committed and should set realistic objectives for the project

Q4. What are the major challenges a new Program manager faces after being promoted from a project manager and how does AD government departments provide them support and training to deal with these challenges?

He should understand the complex nature of the programs and must have a good leadership skills. He needs to provide direction to the team and should have ability to manage the senior level executives as that of CEOs; he should have good understanding of the companies or organizations or possess good environmental knowledge. He should be able to manage the people in the hierarchy and decide upon a strategy to deal with various stakeholders.

Government departments should provide help with allowing access to be involved in managing projects, provide feedbacks and trainings.

Q5 How do you want to classify the different types of projects what would they be? How would you measure the success of these projects differently?

According to the value of the project they can be classified as minor or long service projects. According to the nature of the projects, they can be classified as core projects for example oil and gas and EPC projects.

Generally each of them would have similar success criteria however their order of priority might change.

Q6. If you were to classify the different types of Programs what would they be? How would you measure the success of these Programs differently?

According to value and nature the core and high value projects.

Q7. What factors lead to complexity in a Program? What makes it difficult and complicated to manage and execute?

The factors that complicate a project are a wrong team in place, lack of involvement of the team members or lack of trainings

Respondent # 4

Q1. Some key success criteria for a project are: Timely Completion, Within Budget, As per Specifications, Good Risks Assessment and Management, Meets Stakeholder Satisfaction, Satisfaction of Program Objectives, Benefits to Organization, Benefits to Community, Program Implementation Process, and Customer Satisfaction

Which one of these also are a measure of successful Program achievement and why?

All these parameters are necessary to the success of the project. Any idea can fail if they are not equipped with budget and resources. The programs are of a wider scope and therefore the programs priorities change. Mainly the success of the programs are to be assessed through its outcomes that to set the key performance indicators and then to assess if they are achieved and these KPI depend on the nature and the objectives and the deliverables required of a program. There is a link between project and programme success.

Q2. How do you see the difference in roles of project and Program managers in Abu Dhabi government?

Response: A project is smaller part of the program. A program would have larger scope . project has activities to be monitored it the end In a program each project is different and has a different context. Therefore A program manager must have higher level of skills of the same skills required as that of a project manager for example a project manager should have intermediate level of skills concerning each stage of project while a program manager s should have advanced level of skills and the focus in a program management is different.

Q3. How does a project manager evolve in his career to become a Program manager? What competencies do you see in a project manager for considering them to be promoted to a Program manager?

Program manager needs to widen his skills and enhance his competency. Program management is art rather than a science. It is essential that a program manager is able to utilize his earnings well to practice a good mix. He should be able to clearly define the roles of team members. Should identify milestones clearly. Delegate the jobs clearly. He should have the strategic leadership and team work. He should lead teams and lead people. He

should know the culture how to win people. He should be proactive and should atleast spend 2 years with successful projects prior to be considered for a program management

In general a program manager should

1. Ability to do higher order thinking skills
2. Ability to negotiate
3. Ability to build and maintain rapport
4. Ability to lead regardless of position or location
5. Ability to coach and mentor
6. Ability to communicate ideas and manage change soft skills

Others

1. Ability to think and plan strategically
2. Ability to define the objectives and outcomes
3. Ability to initiate projects
4. Ability to execute and follow up and bring projects closure
5. Ability to control and manage interfaces
6. Ability to lead by influence rather than authority

Q4. What are the major challenges a new Program manager faces after being promoted from a project manager and how does AD government departments provide them support and training to deal with these challenges?

The major challenge is about the accountability. Management support is essential. How soon a program manager can adapt to culture or requirement of the program is very important. Essential one should have a free mind set. It is essential to get the buy-in of the program or project stakeholders. Need to work extensively with the senior executives. Attitudes are often different “Why she and not me” are typical hindrances. These have to be successfully managed?

There must be freedom to make the decisions and support of the budget is essential

Support in managing the change request.

Q5. If you were to classify the different types of projects what would they be? How would you measure the success of these projects differently?

Depending on the nature, they can be classified as mega and small projects they correspond to value, budget or the size of the project team. Depending on the value and impact also they can be classified as small or big.

Project success depends on meeting objectives

Q6. If you were to classify the different types of Programs what would they be? How would you measure the success of these Programs differently?

Meeting the outcomes

Q7. What factors lead to complexity in a Program? What makes it difficult and complicated to manage and execute?

Interdependency of the Programs makes it challenging for eg if a program is shared with other organizations it gets complicated because their vision may not be aligned .commitment of the people in this case would be difficult to achieve, although ,networking and official approach are way to get ahead of it it can hinder the success. While external organizations are involved, it is often that they to have their strategic projects in execution and there often their commitment and involvement will deter.

Lack of authority to make decisions in due time

Cost of the project – higher the cost the more complex layers of project approvals

Authenticity and originality of the project – when projects are new to the organization they will have social or economic or political impact, sometimes have to deal with the unknown reaction of the society, impact on economy or the technology needed or the calibre to be deployed sometimes makes it complicated.

Q8. What are the unique cultural and national factors of AD that impact upon the performance of project and Program managers?

Familiarity or known people; don't like to answer really

Respondent # 5

Q1. Some key success criteria for a project are: Timely Completion, Within Budget, As per Specifications, Good Risks Assessment and Management, Meets Stakeholder Satisfaction, Satisfaction of Program Objectives, Benefits to Organization, Benefits to Community, Program Implementation Process, and Customer Satisfaction

Which one of these also are a measure of successful Program achievement and why?

Response:

Respondent 3 categorically mentioned that timely completion, within budget and meeting the stake holder requirements and safety particularly in HSE project as the key success factors of a project. While the Satisfaction of Program Objectives, Benefits to Organization, Benefits to Community, Program Implementation Process, and Customer Satisfaction are associated with the program success. These are considered to be key success factors mainly because of the reason that they are related to the quality dimensions particularly to the safety. The success of the program or of the project should be long lasting and therefore require robust measures and these constitute as robust measures. They are indeed extremely important because in the absence of such criteria projects are prone to failures.

Q2. How do you see the difference in roles of project and Program managers in Abu Dhabi government?

Response:

A program manager's role is more strategic while project managers concentrate on specific aspects of a project. A project manager typically should have ability to improve the project schedule, adhere to standard design and his focus would be on improvement of procurement cycle. Education new developers and improving the project cycle are typical tasks a project manager would undertake. Program managers targets are bigger. A project Manager will focus mainly on start to end of project activities and managing the issues within the project and are specific to the project.

The program manager being strategic, he would have to obtain much wider experience than a project manager and typically experience of handling multiple projects. While his focus would also have to be solving issues developing fresher and his work scope thus is wider. The key aspects of his role would include developing processes, measuring the success, assessments for improvement are intense. He at large would have to manage the big risks.

Project Manager typically deals with decisions in relation to a project and therefore will have to have skills related to decision making ,negotiation, time, cost and manage the constraints wisely and manage the variance in project scope etc.

Q3. How does a project manager evolve in his career to become a Program manager? What competencies do you see in a project manager for considering them to be promoted to a Program manager?

Program Manager requires to understand project management competencies. This is to say that he would have had good lessons learnt from the project management experience. Besides should demonstrate the rich experience earned while handling the projects. He should be focusing on building his skills to pursue the project and explain the projects to all its stakeholders specially in dealing with experienced stakeholders of a Program

Q4. What are the major challenges a new Program manager faces after being promoted from a project manager and how does AD government departments provide them support and training to deal with these challenges?

The challenges that a program manager would face are to do with building a team, explaining or providing clarity on project objectives. The success of the program manager depends much on the management support. Program managers require appraise resources allocations and they must develop an ability to convince the various people involved. They should be agreeing to carry out the intense work and must have analytical abilities to analyze the project success from time to time. They should be committed as well.

Yet times, it is essential that there is systematic transition of role. During which ability or competences must be monitored. Appropriate help in the form of training requires to be given although it is case in some instances that support does exist but it required to be robust.

Q5. If you were to classify the different types of projects what would they be? How would you measure the success of these projects differently?

The projects can be classified as Administrative such as HRD projects which require success measures timely completion and customer satisfaction

Based on the nature of the project they can be classified Master plan projects that mainly focus on evaluating the existing facilities , green filed projects that focus on new development or the third kind is the sustaining filed projects .Each projects have success criteria and they mainly include the quality, budget safety as one fatality can ruin the entire project.

Q6. If you were to classify the different types of Programs what would they be? How would you measure the success of these Programs differently?

Programs are again can be classified as per their objectives as in case of the projects.

Q7. What factors lead to complexity in a Program? What makes it difficult and complicated to manage and execute?

The factors that lead to the complexity of the project are – targets, resources management support and unreasonable schedules complicate the projects. Tight schedules and many objectives make them complicated. These factors make them complicated because each of them will have a direct impact on the output of the project particularly the success measures of timeliness, budget constraint and customer satisfaction. They factors will have an negative impact . Since they are very crucial and hard to achieve it becomes difficult and complicated to manage the program

Q8. What are the unique cultural and national factors of AD that impact upon the performance of project and Program managers?

The special attitudes such as welcoming improvements, encouragement for creativity and good systems and clear map for career ladder and productive and good measures are some of the unque cultural and national factors that contribute to the performance of the projects or

Programs

Respondent 6:

Q1. Some key success criteria for a project are: Timely Completion, Within Budget, As per Specifications, Good Risks Assessment and Management, Meets Stakeholder Satisfaction, Satisfaction of Program Objectives, Benefits to Organization, Benefits to Community, Program Implementation Process, and Customer Satisfaction

Which one of these also are a measure of successful Program achievement and why?

The above question confuses issues between projects and Programs.

Projects are measured by output and Programs are measured by outcomes. However, their successes are related. Projects are executed to deliver specific output as outlined in the deliverables of the project. Programs are undertaken to provide benefit to stakeholders or communities and could consist of series of projects. The key success factors for a project are deliverables within time and budget, while key success factors for Programs are benefits and outcomes to stakeholders or communities.

The key benefits of a Program should be defined in the business case of the Program and be regularly monitored by the Program manager to ensure that these benefits are delivered. Any deviation in the Program should be closely reviewed to see if the benefits or the outcomes are affected. The benefits are closely tied to the Time, Budget and Quality of the projects within the Program; however these by themselves do not always result in successful Program achievements. They define whether the projects within the program were delivered effectively and efficiently but they do not measure the Program effectiveness in meeting the required outcomes and stakeholders' expectations.

Q2. How do you see the difference in roles of project and Program managers in Abu Dhabi government?

A Program may contain many projects. Each project delivering an important subset of deliverables that feed into the Program. The Program manager therefore has much more of a strategic role looking at delivering the overall outcomes of the Program, whereas the project manager has a more of an operation role focused on delivering the output of the projects. The roles would be different in that the Program manager must be more senior with strategic views and leadership skills looking at the timeframe, budget, quality and other factors across the entire Program, ensuring the benefits are delivered across multiple projects. The project manager is responsible about the project output with a focus on the delivery of technical

elements or specified work packages within timeframe and budget. The Program manager may also be part of the Program board, or a steering committee, managing stakeholders' relations and community expectations.

Q3. How does a project manager evolve in his career to become a Program manager? What competencies do you see in a project manager for considering them to be promoted to a Program manager?

Program manager role is more strategic whereas project manager role is more operational. Therefore, transition from project manager role to Program manager role has to be very structured ensuring the development of specific set of skills. These skills include: leadership skills; stakeholder management skills; decision making skills; organisational risk management skills; financial management skills and quality assurance skills.

Q4. What are the major challenges a new Program manager faces after being promoted from a project manager and how does AD government departments provide them support and training to deal with these challenges?

The main challenge facing a new Program manager would be managing stakeholders' expectations and satisfaction. The appointment of an advisor with significant experience in Program management to give coaching and guidance for the new Program manager would be the best practice in Abu Dhabi government.

Q5. If you were to classify the different types of projects what would they be? How would you measure the success of these projects differently?

Following are different types of projects:

- Construction
- ICT
- Industrial
- Maintenance
- New Product Development
- Event & Exhibition
- Marketing & Promotion
- Research & Development

The success of any project is based on the time, budget and quality of the product that is being delivered.

Q6. If you were to classify the different types of Programs what would they be? How would you measure the success of these Programs differently?

Following are different types of Programs:

- Infrastructure
- Services
- Education & Culture
- Health & wellbeing
- Environment & nature

The success of any Program is based on delivering the required outcomes and benefits to stakeholders and community. The success measure of outcomes is normally defined in the Program planning stage. These measures of success should be aligned to the vision, mission and strategy of the government.

Q7. What factors lead to complexity in a Program? What makes it difficult and complicated to manage and execute?

Complexity of Programs can be affected by a range of parameters as follows:

- Stability of scope
- Degree of uncertainty
- Conflict between different entities of the government
- Lack of support of stakeholders
- Change in legislation
- Crises and economic stability
- International partnership

Q8. What are the unique cultural and national factors of AD that impact upon the performance of project and Program managers?

Some Program and project managers have limited experience obtained through theoretical workshops rather than practical experience. At the project manager level, the situation can be compensated through the appointment of a highly skilled Program manager to oversee the execution of these projects within the Program.

However, at the Program manager level, it is very important to support new Program managers with coaching and guidance especially in the decision making process through the appointment of highly skilled advisors.

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