Project Management Certification Programmes: How appropriate are they?

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DECLARATION

I, Natisha Gareeb, Student Number 72221259, hereby declare that the dissertation entitled **Project Management Certification Programmes: How appropriate are they?** is a result of my own investigation and research, and presents my own work unless specifically referenced in the text. This work has not been submitted in part or in full for any other degree or to any other University.

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A special thanks to my husband Prashil, and my two beautiful sons, Yashad and Dhiran for their moral support.

"RESEARCH IS TO SEE WHAT EVERYBODY ELSE SEES, AND TO THINK WHAT NOBODY ELSE HAS THOUGHT."

…… **Albert Szent-Gyorgyi**

ABSTRACT

The competences of project managers are a vital role in projects success. An extensive literature survey was conducted to determine the constitution of an adequate knowledge base for would-be project managers.

A detailed literature study was conducted. The literature review discussed how to assess project management competencies. Technical skills and social cultural skills were identified from the literature review. A comprehensive list of criteria was used to generate the critical success factors.Based on the critical success factors that were obtained from the literature in the content for the knowledge base was constructed.

This research then started to address what constitutes certification requirements. Certification programs were identified globally for the study. This study identified what the certification programs offered.

This research started by proposing a knowledge base and using the “grounded theory approach” used content analysis to compare the proposed knowledge base with project management certification programs.

The study concluded with recommendations on the gaps that exist in project management certification programs.

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LIST OF ABBREVIATIONS AND ACRONYMS

PM	-	Project Management
PMP	-	Project Management Programme
PMI	-	Project Management Institution
C3PM	-	Certified Program and Project Management Portfolio
AACE	-	American Institute of Cost Engineering
CESB	-	Council of Engineering and Scientific Specialty Board
IPMA	-	International Project Management Association
ICB	-	International Project Management Association Competency Base-line
PMP	-	Project Management Professionals
MA	-	Member Association
AAPM	-	American Association of Project Management
AIPM	-	Australian Institute for Project Management
NCSPM	-	National Competency Standards for Project Management
RTO	-	Registered Training Organization
PMSA	-	Project Management South Africa
SGB	-	Standards Generating Body
PMSGB	-	Project Management Standard Generating Body
ICC	-	International Interim Cost Consultant
KB	-	Knowledge Base

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CHAPTER ONE: GENERAL INTRODUCTION

1.1 Introduction

This research project developed an appropriate generic knowledge base to develop competent project managers. The importance of project management, project management in the organizations, the right knowledge base, project management certification, competency, the problem statement, research objectives and research questions are discussed.

1.1.1 Importance of project management

According to Thomas and Mullaly (2009a):

> *"If project management had no value, people wouldn't use it. The trouble is, nobody knows exactly what the value is. And many are starting to ask."*

The authors adopted five dimensions of value in their study of more than half of 65 participating project organizations. This constituted of satisfaction, alignment, process outcomes, business outcomes, and return on investment. They found that the first four could be measured directly, but the value of return on investment could only be derived from the other measures.

Thomas and Mullaly (2009a) concluded that project management showed value but organisations choose to implement project management not because of rationally defined business case but because someone at senior level decided that order was better than chaos. Thomas and Mullaly (2009b) stated that value comes from understanding ultimately.

Thomas and Mullaly (2009 a, b) statements are bold and out there to be discussed, a few points on the importance of project management are discussed below.

The importance of project management is to deliver a successful project while managing both the technical and social cultural aspects that are present during the project.

Successful project management can be measured using the technical issues faced during the project. The technical aspects are to ensure that the project is completed within schedule, allocated budget, and meeting performance criteria. When the project management systems are in place it is easier to identify areas of improvement and see the gaps. The social cultural issues ensure that there is coordination between integration of teams and time, that resource are put to good use, risks are identified and managed, and communication is maintained. The most important factor of project management is the anticipation of even better profit than planned.

Srivannaboon (2006) stated that project management is a specialized form of management that is used to accomplish a series of business goals, strategies, and work tasks within schedule and time. Smith (2003) and Srivannaboon (2006) recognized that the strategic importance of project management in the corporate world is accelerating and one reason may be a strong belief by business leaders that have aligned project management with business strategy. This can significantly enhance the achievement of organizational goals, strategies, and performance.

1.1.2 **Importance of the right knowledge base**

Project management was developed originally from the technical fields (engineering and construction) but now can be applied to a variety of activities (Smith 1999).

Smith (1999) claimed that most project managers started in the technical field of study, become ‘accidental project managers’ but lacked the managerial functions to manage project work.

The research surrounding project management competencies by Hartman and Skulmoski (1999) suggested that if the competencies are improved then the likelihood of the project success is also improved.

In order for project managers to successfully deliver the business objects through project management, they needed the right knowledge base to start therefore this research identified the constitution of the right knowledge base for project managers.

1.1.3 **Competency**

Different authors have different perspective of what competencies really mean. The definition of competency varied depending on the stakeholders and the agenda. Hoffman (1999) indicated that there are three definitions of the term:

> *"Competencies are either defined as observable performance, or the standards or quality of the outcome of the person's performance, or the underlying attributes of a person."*

Mirabile (1997) defined competencies as:

> *"……knowledge, skill, ability or characteristics associated with high performance on a job, such as problem solving, analytical thinking, or leadership".*

McLagan (1989) suggested that:

> *"…..for the purpose of training and development, a competency is a cluster of interrelated knowledge, skills, and attitudes that correlates with effective job performance, can be measured and evaluated and that can be improved through training and development."*

Association for the Advancement of Cost engineering AACE (2011) defined competency as:

> *"….the quality or state of being functionally adequate characterized by marked or sufficient aptitude + attitude + skill+ strength + knowledge ".*

Hoffman (1999) concluded that the purpose of defining competencies is to improve human work performance.

Gareis and Huemann (1999) suggested that project management competencies can be further developed after attainment of the ideal project management knowledge

base. Instruments for further development can include PM self-assessments, PM benchmarking, and significant PM research initiatives.

The common attributes of what competencies mean is knowledge, skill, attitudes and experience. Theses can be measured through outcomes that can be measured. The competent individual needs to continuously develop their knowledge to keep up to date with research, technology and tools on project management.

The literature review conducted by Ahadzie (2009) indicated the following to be the strategic importance of competency based measure:

- Focus primarily on what mangers do that makes them successful or not. This should therefore help to establish what makes them (i.e. managers) effective and /or ineffective and also accountable for their actions.
- Provide the psychological and understanding needed for selecting and predicting human performance.
- Resonate well with the potential expectation of HR managerial dynamics have been shown to maximize developmental efficacy.
- Have the potential for achieving genuine economic value for organizations, which is why there is an increasingly important recognition in their use in the examination of managerial effectiveness.

Based on a study by Rwelamila (2007a) there are six competencies that a project manager should possess. These are:

- Sense of ownership and mission – responsible for the project and other broader organizational issues.
- Political awareness – knows who the influential players are, what they want and how best to work with them.
- Relationship development – spends time and energy getting to know project sponsors, users and contractors.
- Strategic influence – builds coalitions and orchestrates situations to overcome obstacles and obtain support.
- Interpersonal assessment – identifies specific interests, motivations, strengths and weaknesses of others.

- Action orientation – reacts to problems energetically and with a sense of urgency.

Section 1.1.3 dealt with what competence really means, the strategic importance of competence, and what competencies a project manger should posses. Literature indicated that competence is not a static concept but can be developed constantly. A few instruments were discussed for continuous development.

1.1.4 **Project management certifications**

The right professional certification is important and can add value to the certificate holder, but this will depend on the type of knowledge base it uses or owns (i.e. it must have the right knowledge base to add value to their members) and the reputability of the certification body (i.e. have a set of standards and the ethical behaviours of the selection process).

To be recognised in the market place a professional certification body need the following (Smith 2003):

- *a body of knowledge*
- *a commitment to the ethical behaviours defined by characteristic of the profession*
- *a set of defined minimum standards that must be met for entry into the profession*

Professionals usually require a review of their qualifications to determine if standards of knowledge and achievement are met (Smith 2003). The purpose of a certification is to acknowledge competencies in a professional.

Some organisations that provide project management certification are the Association for the Advancement of Cost engineering (AACE), The Project Management Institute (PMI), The UK Association for Project Management (UK APM), The International Project Management Associations (IPMA), The Australian Institute of Project Management (AIPM), The America Academy of Project Management (AAPM), and the International Association for Project and Program Management (IAPPM).

The basic core competencies of the AACE (2011) focused on the project management process, legal skills, computer measurement, costing and risks. The candidate needs to register with the AACE and pass the International Interim Cost Consultant (ICC) exam to obtain the AACE certificate.

PMI (2011) published Project management body of knowledge (PMBOK) a knowledge base for project mangers. The candidate that passes the entry requirement must write a two hundred multiple-choice exams based on the nine knowledge areas in PMBOK; the candidate must have a record of experience and graduate qualification. The candidate will receive a project management professional (PMP) certificate if the PMP requirements are met.

The UK APM (2011) assesses the candidate based on his needs to demonstrate a high level of competence across the entire project life cycle and goes for an assessment process against specific criteria. This ends with a peer review. The candidate then obtains a certified project management certificate.

The IPMA (2011) is based on a competence baseline and based on the levels of project management experience; the hours spent managing projects; self assessments, interviews; formal examinations the individual can be grouped as a certified project director, certified senior project manager, certified project manager or a certified project management associate.

The AIPM (2011) focused on outcomes. The AIPM issues a certificate based on the outcomes and the number of years as a practicing project manager.

The AAPM (2011) was the first to introduce postgraduate certification in project management. The candidate needs a graduate degree, project management training or passes the AAPM examination to obtain a MPM (Master's in Project management).

The IAPPM (2011) adds value to their members by allowing them to manage projects and programs successfully. The IAPPM uses its CPPMBok (Certified project and program management body of knowledge) as a knowledge base. IAPPM offers three-level certified project and program management credentials based on their guidelines

and candidates can register as the certified project professional (CPP), the certified project manager (CPM) or the certified project director (CPD).

Most professional associations have their own body of knowledge relevant to their needs. The associations above will be discussed in detail in Chapter 2 of this research report.

1.2 **Definitions**

1.2.1 **Project**

PMI (2004) defined a project as:

> *"…..as a temporary endeavor undertaken to create a unique product, service or result. "*

AACE (2011) defined mega project as:

> *"…. with characteristics include requirements to manage numerous and concurrent activities (sub-projects), complex procurement, high risks and uncertainties, social and environmental impacts, and project execution time exceeding 48 months. Typically, a mega-project will also exceed $1 billion dollars. However, much smaller projects could also be classified as mega-projects because of project execution complexities."*

UK APM (2011) defined a project as:

> *"... a unique, transient endeavour undertaken to achieve a desired outcome."*

The common themes for what a project means are a temporary endeavour to achieve a desired outcome.

1.2.2 **Project management**

PMI (2004) defined Project management as:

> *"....the application of knowledge, skills, tools, and techniques to project activities in order to meet or exceed stakeholder needs and expectations from a project. Meeting or exceeding stakeholder needs and expectations involves balancing competing demands among: scope, time, cost and quality, stakeholders with differing needs and expectations, identified requirements (needs) and unidentified requirements (expectations)."*

AACE (2011) defined Project management as:

> *"…the utilization of skills and knowledge in coordinating the organizing, planning, scheduling, directing, controlling, monitoring and evaluating of prescribed activities to ensure that the stated objectives of a project, manufactured product, or service, are achieved."*

Levene (2011) defined Project management as:

> *"....the processes of managing change by planning the work, executing it, and coordinating the contribution of the people and organizations with an interest in the project. Project management is required when introducing any new entity or making a change that involves moving from one state to another. "*

UK APM (2011) defined Project management as:

> *"Project management is the process by which projects are defined, planned, monitored, controlled and delivered such that the agreed benefits are realised. Projects are unique, transient endeavours undertaken to achieve a desired outcome. Projects bring about change and project management is recognised as the most efficient way of managing such change. "*

The common themes for what project management means are using skill and knowledge through the process planning, executing, monitoring and controlling activities within a project to meet or exceed stakeholder expectation.

1.2.3 **Project manager**

AACE (2011) defined a project manager as:

> *"….an individual who has been assigned responsibility and authority for accomplishing a specifically designated unit of work effort or group of closely related efforts established to achieve stated or anticipated objectives, defined tasks, or other units of related effort on a schedule for performing the stated work funded as a part of the project. The project manager is responsible for the planning, controlling, and reporting of the project."*

UK APM (2011) defined Project manager as:

> *"The individual responsible and accountable for the successful delivery of the project."*

Pivac, Pivac and Ravlic (2011) stated that:

> *"Project managers carry the major role in project completion and represent the main responsible factor of a project success."*

The common themes for what a project manager means is an individual whom is responsible for the planning, monitoring, controlling and reporting of activities within the project to achieve successful delivery of the project.

1.2.4 **Skill**

Hogan (2011) defined skill as the

> *"…proficiency on a specific task".*

Hogan (2011) stated that the definition included an evaluation of the level of proficiency (e.g., highly skilled) and the task to be accomplished that are acquired through learning and experience.

Esposto (2008) stated that:

> *"…the Macquarie Dictionary defines skill as 'the ability that comes from knowledge, practice, aptitude, etc., to do something well'. The basis of the definition appears to have embedded in it the idea of competence, proficiency- to basically do something well and effectively. The definition also contains a dimension of learning by doing or of incremental ability. "*

Spector (2011) stated that

> *"Skill refers to a person's current level of proficiency on a particular task or family of tasks. Skills can be classified as either mental (e.g., report writing) or physical (running a machinist's lathe), although most job tasks involve elements of both. Skill reflects a person's current level of proficiency. In contrast, ability reflects the capability or capacity to develop a skill. Skills can be assessed by a variety of devices, including assessment centres, psychological tests, situational tests, and work sampling"*

The common themes for what skill means, is that it's the ability that comes knowledge, practice, aptitude to do something well. Skill refers to a person's current level of proficiency. Skills can be improved by knowledge and experience.

1.2.5 **Knowledge**

Audi (1995) defined knowledge as

> *"…justified true belief"*

Adam (2011) defined knowledge as:

> *"Truth and belief, though independent, are both required for knowledge. Knowledge requires that these two things, otherwise independent, come together."*

Zagzebski (2011) stated that

> *"Knowledge is a highly valued state in which a person is in cognitive contact with reality."*

The common attributes for what knowledge means are a highly valued state that comes from truth and belief.

1.2.6 **Body of knowledge** (knowledge base)

UK APM (2011) defined BoK as:

> *"An inclusive term that describes the sum of knowledge within the profession of project management. As with other professions, such as law and medicine, the body of knowledge rests with the practitioners and academics that apply and advance it."*

Livari, Hirschheim and Klein (2004) stated that:

> *"It is common for applied disciplines, especially established ones, to possess a body of knowledge (BoK). Applied disciplines have established such a BoK, which codifies the accumulated knowledge of the discipline."*

Stretton (2010) stated that

> *"Knowledge standards or guides, which typically take the form of bodies of knowledge, focus primarily on what project management practitioners need to know to perform effectively. The most compelling argument for having a body of knowledge for project management is to help overcome the "reinventing the wheel" problem. A good body of knowledge should help practitioners do their job better, by both direct referencing and by use in more formal educational processes."*

PMI (2011) stated that there are five attributed of a professional body:

- *"An identifiable and independent project management body of knowledge (PMBOK standards).*
- *Supporting educational programs by an accredited institution (Accreditation).*
- *A qualifying process (Certification).*
- *A code of conduct (Ethics)*
- *An institute representing members with a desire to serve"*

The common attributes of what a body of knowledge means are that it comes from practitioners and academics and the purpose of BoK is to codify the accumulated knowledge of the discipline. A good body of knowledge helps practitioners do their job better and doesn't allow them to reinvent the wheel.

1.2.7 **Project management competencies**

Project management competencies are not well understood. Very few authors have looked at both project management and project management competencies.

Hartman and Skulmoski (1999) stated that:

> *"Project management competence research has focused on project management skills and on the competences of the project manager and that project participant competence is mainly used in organisations to help guide decision-making on its human resources."*

Project management literature surrounding competency is described in Hartman and Skulmoski (1999), as "simplistic, anecdotal or theoretical". Not much information is available on which competencies are most important for task performance and project success. This observation is shared by the author.

Section 1.2 looked at the definitions of terms that will be used through out this research report. Project, project management, project manager, skill, knowledge, body of knowledge was defined. Competence was defined in section 1.1.3. This section defined both project management and project management competencies.

1.3 **The problem statement**

Bigelow's (2004) stated that industry research from Gartner Inc. showed that a deficient project management workforce is one of the leading culprits for an astounding $75 billion in profit loss each year. Poor project management competencies accounts for 60% of the project failures.

Rwelamila's (2007b) study on SA public sector organizations stated that at face value project oriented organizations purport to be fully fledged POO and performing as

competent PM organizations, but really are dependant on accidental project managers. Rwelamila's (2007b) study indicated that there is a lack of competent project managers within SA and a need for competence in project management.

Bigelow's (2004) and Rwelamila's (2007b) argued that there is a lack of project management competencies and this is linked to project failure. Therefore it is important for project managers to have the right knowledge base. Project management certification is important for project managers because the purpose of a certification is to acknowledge competencies in a professional. The lack of project management knowledge can be addressed by studying the certification programmes globally. Therefore this research addressed if project management associations provides adequate knowledge to the base for project management practitioners.

This research focused on the following four questions.

- Are the PM voluntary associations or certification institutes providing adequate PM knowledge base for their members?
- What constitute PM certification requirements?
- Are there any gaps between the ideal PM knowledge base and PM Certification requirements?
- Do PM Certification requirements need to be reviewed towards providing adequate PM knowledge base?

Figure 1.1: Focus of this research report

The focus of this research report is depicted in Figure 1.1.

1.4 **Research objectives**

The main questions of the research report are to:

i. Determine the content of the existing project management certification programmes.
ii. Propose (an) ideal generic Project Management knowledge base & skills.
iii. Determine the gaps between the ideal project management knowledge base and the project management certification programme base.
iv. Identification of initiatives for the development of common pm competencies.

1.5 **Contribution of the study in relation to the existing body of knowledge**

This research addressed at a global level the project management certification programmes that are available and the proposed of an ideal project management knowledge base. This research addressed the lack of a competent knowledge base. Most project mangers gain knowledge through experience, experience doesn't determine if the manger is practicing the right project management principles. Therefore the aim of the study was to access the existing project management knowledge base through project management certification programmes and proposed a more appropriate base.

1.6 **Delimitation of the study**

In brief, this research is limited to certification programmes only; therefore this research does not cover project management degrees that are obtained from higher learning institutions and diplomas.

Also this study does not cover the success rate of project managers with a project management certification and project managers without certification.

1.7 **Brief methodology**

The problem statement was discussed in section 1.3 and the questions were discussed in section 1.4. A detailed literature review was completed to determine an ideal project management knowledge base (Chapter 2). A content analysis was con

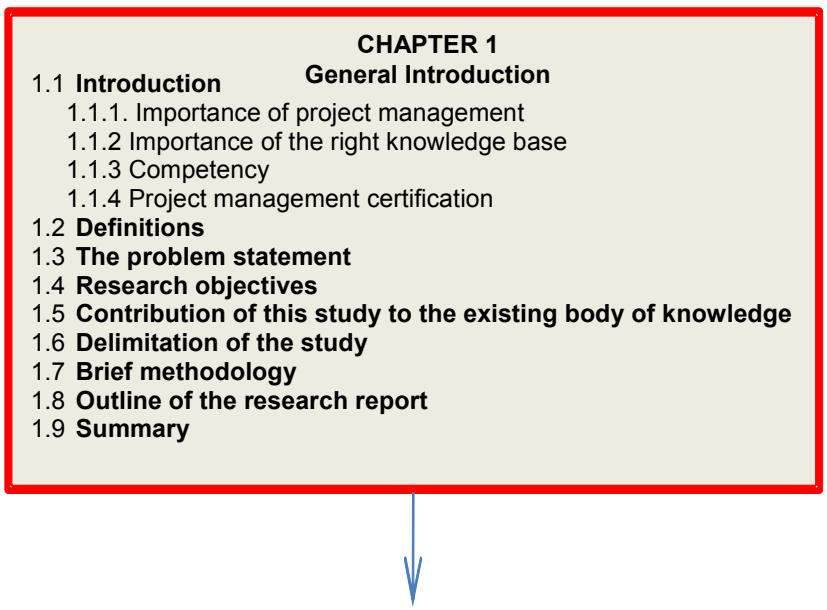
ducted to look at each certification programme and access how appropriate they are compared to the proposed ideal base.

1.8 **Outline of the research report**

Table 1.1 and Figure 1.2 provided the outline of this research report. This research report consisted of five chapters as indicated in Table 1.1.

TABLE 1.1: Chapter outline

Chapter 2: Theory and Practice of Project Management Certification Programs	Constitutes the theory and practice of project management certification programmes.
Chapter 3: Research Design and Methods	Constitutes the types of methodologies and the methodology used in the study, the data collected and analysed in this research report.
Chapter 4: Results and Discussions	Constitute the results and the discussions.
Chapter 5: Conclusion and Recommendations	Constitutes the conclusion and the recommendation.



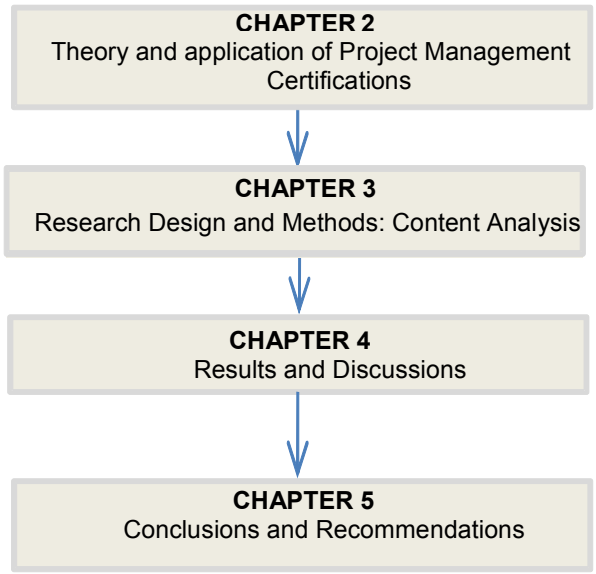


Figure 1.2: Chapter one in context with the overall research report

1.9 **Summary**

This chapter clearly describes what the research report is about and a brief approach to the research problem. The problem statement was described in section 1.3 and the research questions in section 1.4. Brief definitions, the methodology, and limitations are discussed.

Definitions for project management and competencies were discussed and it was noted that different authors have different perspective of the term competency. The most common attributes of competencies were picked up from the various definitions and grouped together.

CHAPTER TWO: THEORY AND PRACTICE OF PROJECT MANAGEMENT CERTIFICATION PROGRAMS

Chapter one provided the conditions for this research study. This chapter explored literature on how project managers should be assessed, how institutions approach project management certification, merits and demerits of certification, attributes of a good project manager, project success factors and a knowledge base for project managers. The chapter layout is provided in Figure 2.1.

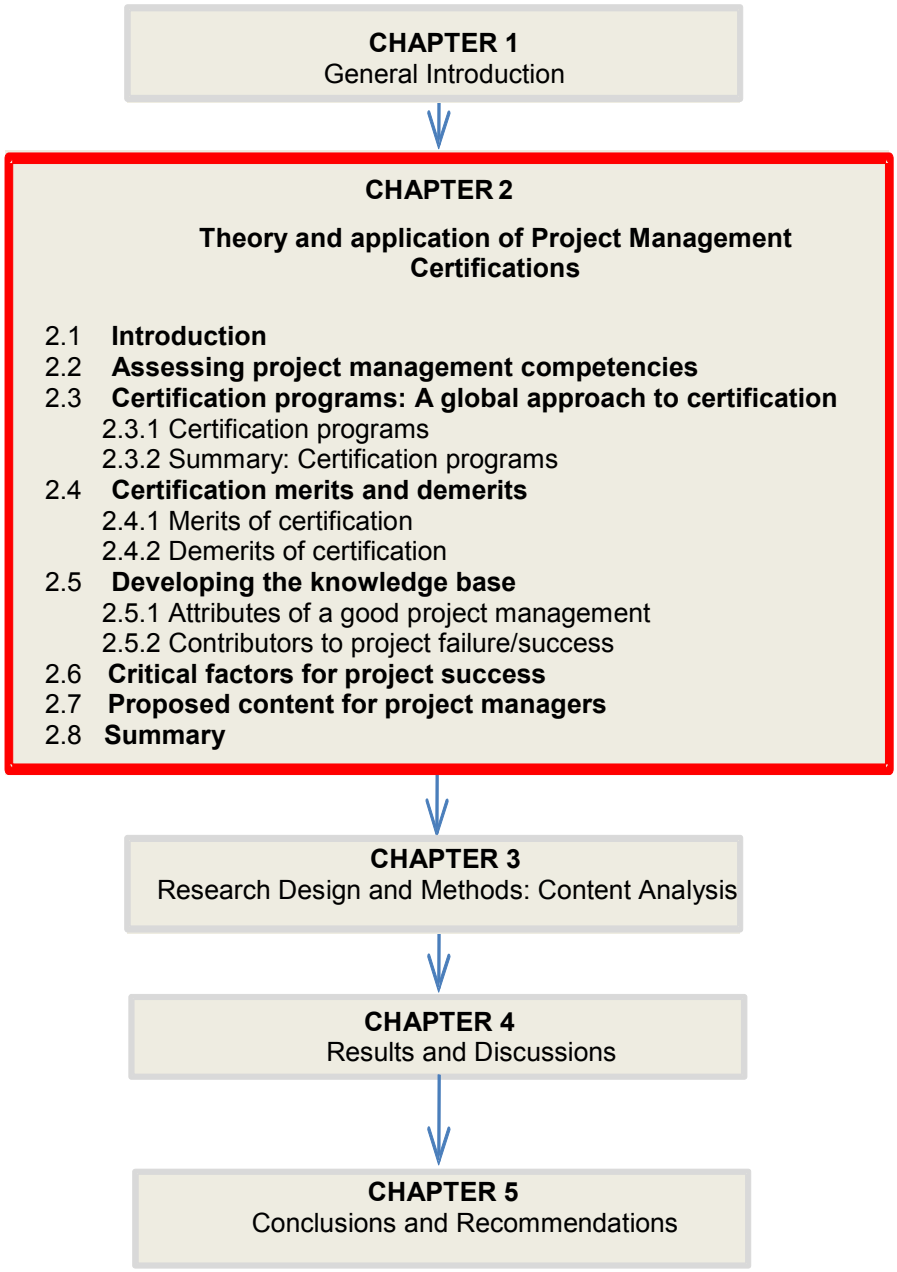


Figure 2.1: Chapter two in context with the overall research report

2.1 **Introduction**

The following represents a brief summary of the theoretical and practical research covered on project management certification programs. The early 1950s were noted, as the project management era, where project management tools and techniques were used for complex engineering projects. Prior to the 1950s projects were managed on an adhoc basis using mostly Gantt charts (Kumar 2005).

Project management has moved to encompass techniques other than those of the planning and scheduling of activities. There have been many developments over the past fifty years to extend project management by incorporating detailed methods for the management and control of cost, resources, quality, and performance.

Project management evolved from the 1950, since when project management association were formed. This chapter entailed a closer look at what were the project management associations that were formed, the certification programs that are available, and what are the curriculum and the criteria to join in the respective associations.

2.2 **Assessing project management competencies**

Project management competencies assessments are important because this forms the starting point for the project management associations to certify applicants. This section deals with the theory on project management assessment.

Skills management and the assessment of skills are gaining popularity in human resource management (Homer 2001). Project management and project management competence were defined in Section 1.2.

To assess competencies of employees and determine skill gaps allow organisations to apply more cost effective; significant training and development practices; determine changes in individuals and team performances; and select better candidates (Hoffmann 1999).

Hoffmann (1999) suggested that if the performance standards are set and have been achieved this means that competency has been achieved.

Homer (2001) stated that people skills are one of the most important foundations for a company because they impact on every aspect of corporate process and ultimately profit.

Crawford (2008) concluded that performance-based inference of competencies are concerned with demonstration of the ability to do something at a standard considered acceptable in the workplace, with an emphasis on threshold rather than high performance or differentiating competencies. Threshold competencies are units of behaviour that are essential to do a job but that are not causally related to superior job performance

Historically employers have hired and measured employees abilities and skill based on intelligent quotient (IQ) alone. IQ was used to measures one's ability to learn, problem solve, and understand information. Intelligence has evolved to encompass both IQ and emotional quotient (EQ).

Gordon (2010) defined EQ as the ability to identify and manage emotional information in one self and others and focuses energy on required behaviour. These skills complement the cognitive skills.

Carrick (2010) stated that Daniel Goleman introduced EQ as a yardstick to measure leadership success, and there is a consensus that EQ can be developed through learning and development.

Paterson (2011) stated that emotional intelligence plays a vital role at leadership level and when star performers were compared with average performers at senior levels then nearly 90% of the difference in their profiles was attributable to emotional intelligence skills rather cognitive ability or technical skill.

Hartman and Skulmoski (1999) suggested that assessment of competencies can be examined by a model (Figure 2.2) for project management competencies, which

include inputs, processes and outputs. Where inputs (can include and not limited to knowledge; skills; traits; motives; self image; social role; and behaviour), process competencies (examples of project management processes include planning; controlling and closing a project) and outputs (can include project performance metrics such as budget and schedule compliance and project success criteria like customer satisfaction). Hartman and Skulmoski (1999) discussed three components that are needed for effective project management competencies that deal with outcomes. The competencies included:

- Tools to help manage a project
- Process that allows to pick the right tools and use them well
- Knowledge (theory and experience) that provides the safeguards against failure and promotes more reliable success.

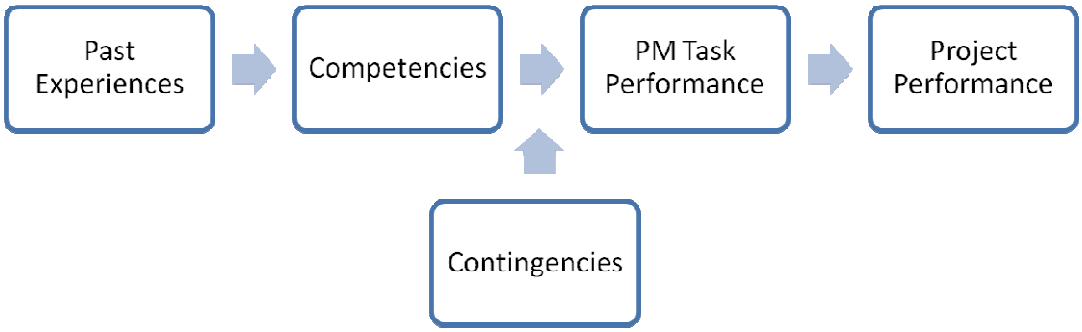


Figure 2.2: Preliminary project managers competency framework

Source: Hartman and Skulmoski (1999)

Section 2.2 involved the types of assessment for project managers' assessments and a number of views on how to assess the project manager. The common attributes from section 2.2 indicated that by doing a something at standard threshold rather than superior performance means that competency is achieved.

An individual needs to possess both IQ and EQ to be competent, were IQ is the technical ability and EQ is the emotional quotient.

Secondly there are many ways to measure competencies through outcomes or examinations this gives an indication on the technical abilities and EQ can be measured by psychometric assessments. The EQ can be developed through training and development.

After discussing competence and the measurement thereof the next section is going to cover a global approach to project management certification programs.

2.3 **Certification programs: A global approach to project management**

Professional standards are important for project management professionals. Certification is necessary to practice or demonstrate competence in project management.

Gareis and Huemann (1999) stated that different societies are becoming more projects orientated. Their study looked at a plan on how to assess project management competencies in project –oriented societies.

Different societies are offering different project management content and this can be gained from studying the content of project management professional association. This has been conducted in Section 2.3.1.

Smith (2003) presented the requirements of a professional certification body. These requirements were mapped to the certification programmes to determine if they comply with the criteria.

To be recognised in the market place a professional certification body need the following (Smith 2003):

a) *a body of knowledge*
b) *a commitment to the ethical behaviours defined by characteristic of the profession*
c) *a set of defined minimum standards that must be met for entry into the profession*

a) **Body of knowledge**

A body of knowledge plays a significant role in project management because knowledge is a principle source of competitive advantage. Lin (2010) concluded that a good knowledge base can improve competitive advantage and generates new knowledge effectively.

The body of knowledge should be composed of acceptable standards. Crawford (2008) stated that there are a number of benefits that come with standardization which are encouragement of technological innovation, guaranteeing marketplace choice, competition, convenience, strategy for fostering economic growth via the broad diffusion of technology and technical rules, and shaping foreign markets according to the specification of local technologies.

Therefore the project management associations should possess a BoK were they can keep their standards that contribute to their core competencies.

b) **Ethical behaviours**

The project management association should abide by some ethical standard and have code of conducts in place on how the employees, members, board of directors conduct themselves and their financial reporting. The association should abide by ethical standards in the way they select candidates and the process of certifications.

There is no international recognized ethical code that is standardised for project management associations, although each association abide by their own code of practices.

c) **Defined minimum standards**

There is a distinction between licensure and minimum standards. The distinctions between these standards is that when licensure is required the professional may not legally practice without a license while in the situation were professional certification is used that government agency may certify that an individual has certain skills but

may not prevent the practice of an occupation using these skills by people who do not have such a certificate (Crawford and Pollack 2008).

To attain professional status, professional associations must be given legal responsibility to determine who is qualified to practice. If there are no effective certification schemes then it will be impossible for practitioners to lay claim to any sort of special status or privilege (Zwerman and Thomas 2006).

The term that is defined as minimum standard that Smith (2003) mentioned are considered to be minimum quality standards used to identify those who have met the standard, but not to prohibit those who have not.

2.3.1 **Certification programs**

The certification programs listed below offer project management certification to organizations and individuals. The purpose of a certification program is to acknowledge the competencies of individual in a professional area (Smith 2003). The following certification institutes are discussed in this research report.

i. Association for the Advancement of Cost engineering (AACE)
ii. The Project Management Institute (PMI)
iii. The UK Association for Project Management (UK APM)
iv. The International Project Management Associations (IPMA)
v. The Australian Institute of Project Management (AIPM)
vi. The American Academy of Project Management (AAPM)
vii. The International Association for Project and Program Management (IAPPM)

A detailed view of how the association was formed, the code of conduct it followed by the association, entry requirements, process for certification, core competencies and the certification obtained will be examined for each of these associations.

i The American Association of Cost Engineers

Background

The AACE was one of the first project management associations to form in 1957. Early practitioners of project management that were specialists in planning and scheduling, cost estimating, and cost/schedule control (project control) formed the AACE (Amos 2005). The AACE released in 2006 the first integrated process for portfolio, program and project management (Total Cost Management Framework). The AACE demonstrates expertise in the knowledge of cost engineering.

Their certification program is accredited by the Council of Engineering and Scientific Specialty Board as an engineering certificate (AACE 2011).

Professionalism

The AACE abide by the Canon of Ethics by having a defined body of knowledge and code of ethics that managers need to abide by. The AACE has a certification process and standards in place for certification of their professionals.

Entry requirements

The entry requirement to the AACE is a four year minimum degree and four years of applicable experience or eight years of cost engineering, project management experience.

Process for certification

Step 1: Must meet the entry requirements

Step 2: Must submit application instruction and fees

Step 3: Must submit a professional paper

The professional paper must consist of a minimum of 2500 word. The paper is a technical paper that must be submitted electronically to the AACE staff. AACE recommends that the technical paper topic that the applicant is familiar with or a project that the applicant has already completed. The AACE has help guideline for the process of putting the paper together.

Step 4: The applicant must then pass the AACE International Interim Cost Consultant (ICC) exam.

The ICC examination consists of a four part-part exam of 7 hours in total. The exam consists of long answer, true/false and multiple-choice questions. The long answer section consists of five questions where the applicant will select two out of the five questions depending on their expertise. Of which the passing grade is 70%.

Core competencies

The basic core competencies of the AACE (2011) can be obtained from the following*:*

- AACE International Certification Study Guide, 3rd edition
- Recommended Practices
- Skills & Knowledge of Cost Engineering, 5th edition
- TCM Framework: An Integrated Approach to Portfolio, Program and Project Management.

Section 1: Costs

This section consists of what are the cost elements, pricing, materials, labour, engineering, engineering parts and tools economic costs and the activity-based cost management

Section 2: Cost estimating

This section consists of cost estimating, process product manufacturing and discrete product manufacturing

Section 3: Planning and scheduling

This section consists of how to plan and schedule projects

Section 4: Progress and cost control

This section consists of progress measurement and earned value for variable budgets, tracking cost and schedule performance and performance and productivity management.

Section 5: Project management

This section consists of the project management fundamentals, project organisation structure, project planning, project labour cost control, leadership and management

of project people, quality management, value analysis, contracting for capital projects and strategic asset management

Section 6: Economic analysis
This section consists of the basic engineering economics and applied engineering economics.

Section 7: Statistics, probability and risk
This section consists of concepts of statistics and probability, basic concepts in descriptive statistics and risk management.

Certification obtained

If the applicant manages to proceed through steps 1-3 successfully they will obtain the:

- Certified Cost Engineer (CCE) used by engineers
- Certified Cost Consultant (CCC) used by non engineers

Comments by scholars

Skulmoski (2001) indicated that the AACE is a good example of a professional organisation that has well established certification programs and that certification from the AACE indicated demonstrable expertise in the most current skills and knowledge. The author goes on to state that processes that contribute to project success can be described in both the AACE International Certifications guide and the PMI's PMBOK guide.

Skulmoski (2001) further indicated that the certified cost engineer has the basic understanding of cost engineering skills and knowledge but the same cost engineer however cannot be able to safely create a workable project schedule.

Observations

Although the CCE/CCC certification is accredited by both the Council of Engineering and Specialty Boards and the International Cost Engineering Council, the focus of the AACE is more cost estimation and controls, focusing more on economic analysis. The cost engineering are used mostly for applications of scientific principles and

techniques to cost estimating, controls, business planning and management science, profitability analysis, project management, planning and scheduling.

This program like most associations requires that the candidate plan and organise the requirements that need to take place for certification. If employers are in support of this certification it makes it easier for the candidates to get certification.

ii **The Project Management Institute**

Background

The PMI was formed in 1969 in the USA. PMI published "*A Guide to the Project Management Body of Knowledge*" (*PMBOK Guide*), which described project management practices that are common. PMI also offers multiple certifications programs. PMI was formed due to the fact that were many management practices that were common to projects, these practices were then documented as "standards" and thus the procedures and concepts necessary to support project management was formed. The PMI certification is a standalone certification program.

Despite the lack of accreditation from an independent accrediting body, the certification has gained wide acceptance from government and corporations (Chen 1999).

Professionalism

The PMI (2011) abide by their Code of Ethics by identifying and documenting a body of knowledge (PMBOK). PMI has also established a code of ethics concerning ethical behaviors for managers. The PMI has a certification program and exam that professional need to achieve to attain certification.

Entry requirement

The applicant needs to have a four-year degree and at least three years of project management experience, with 4,500 hours leading and directing projects and 35 hours of project management education, or A secondary diploma with at least five

years of project management experience, with 7,500 hours leading and directing projects and 35 hours of project management education (PMI 2011).
The hours of project management work must be recorded and the project management work consists of leading and directing project tasks. If multiple projects are worked during the same time, all the hours spent leading and directing project tasks counts towards the total.

Where 35 contact hours addresses the learning objectives in project management. One hour of classroom instruction equals one contact hour. The course hours may include content on project quality, project scope, project schedule, project budget, project communications, project risk, project procurement, and project integration management (PMI 2011).

The applicant for the PMP credential must:

- Perform their duties under supervision and are responsible for all aspects of the project for the life of the project.
- Lead and direct cross functional teams to deliver projects within the constraints of schedule, budget, and scope. (Leading and directing project tasks are identified in the PMP examinations specification. The applicant needs to have experience in all five process group areas across all the project management cycle. The five process areas are discussed in step 2).
- Demonstrate sufficient knowledge and experience to appropriately apply a methodology to projects that have a reasonably well-defined requirements and deliverables.

Process for certification

The process for certification is depicted in Figure 2.3 and the steps are listed as follows:

Step 1: If the applicant meets the entry requirements then the applicant can apply using the PMP application form on the PMI (2011) website. PMP Handbooks are also available.

Step 2**:** The applicant then must write multiple choice examinations and must obtain a pass mark of 69% of the total examination.

The examination consists of 200 multiple choice questions and is usually a computer-based test.

PMI core competencies are defined in PMBOK (PMI 2004). PMI (2004) defined project management as encompassing five process groups:

- *Initiating process*
- *Planning process*
- *Executing process*
- *Controlling process*
- *Closing process*

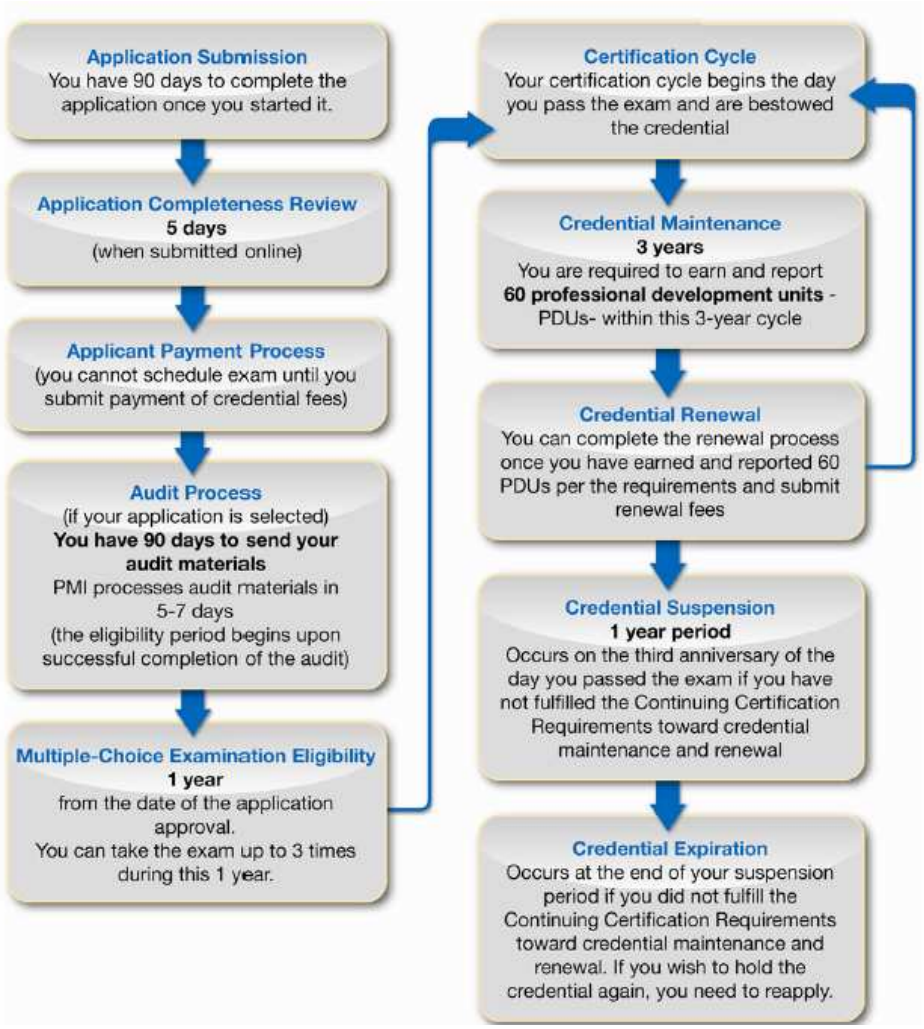


Figure 2.3: PMP process

Source: PMI (2011)

Core competencies

The core competencies of PMP support these five processes and are defined in the guide to the Project Management Body of Knowledge (PMI 2004).

PMBOK has nine knowledge areas and depicted in Figure 2.4. The knowledge areas listed in PMBOK (PMI 2004) are:

- Project integration management describes the processes required to ensure that the various elements of project are properly coordinated. It consists of project plan development, project plan execution, and overall change control.
- Project scope management describes the processes required to complete the project successfully. It consists of initiation, scope planning, scope definition, scope verification, and scope change control.
- Project time management describes the processes required to ensure timely completion of the project. It consists of activity definition, activity sequencing, activity duration estimating, schedule development, and schedule control.
- Project cost management describes the processes required to ensure that the project is completed within the approved budget time. It consists of resource planning, cost estimating, cost budgeting and cost control.
- Project quality management describes the processes required to ensure that the project will satisfy the needs for which it was undertaken. It consists of quality planning, quality assurance, and quality control.
- Project human resource management describes the processes required to make the most effective use of people involved with the project. It consists of organisational planning, staff acquisitions, and team development.
- Project communications management describes the processes required to ensure timely and appropriate generation, collection, dissemination, storage, and ultimate disposition of project information. It consists of communications planning, information distribution, performance reporting, and administrative closure.
- Project risk management describes the processes concerned with identifying, analysing, and responding to project risk. It consists of risk identification, risk quantification, risk response development, and risk response control.

- Project procurement management describes the processes required to acquire goods and services from outside the performing organisation. It consists of procurement planning, solicitation planning, solicitation, source selection, contract administration, and contract close-out.

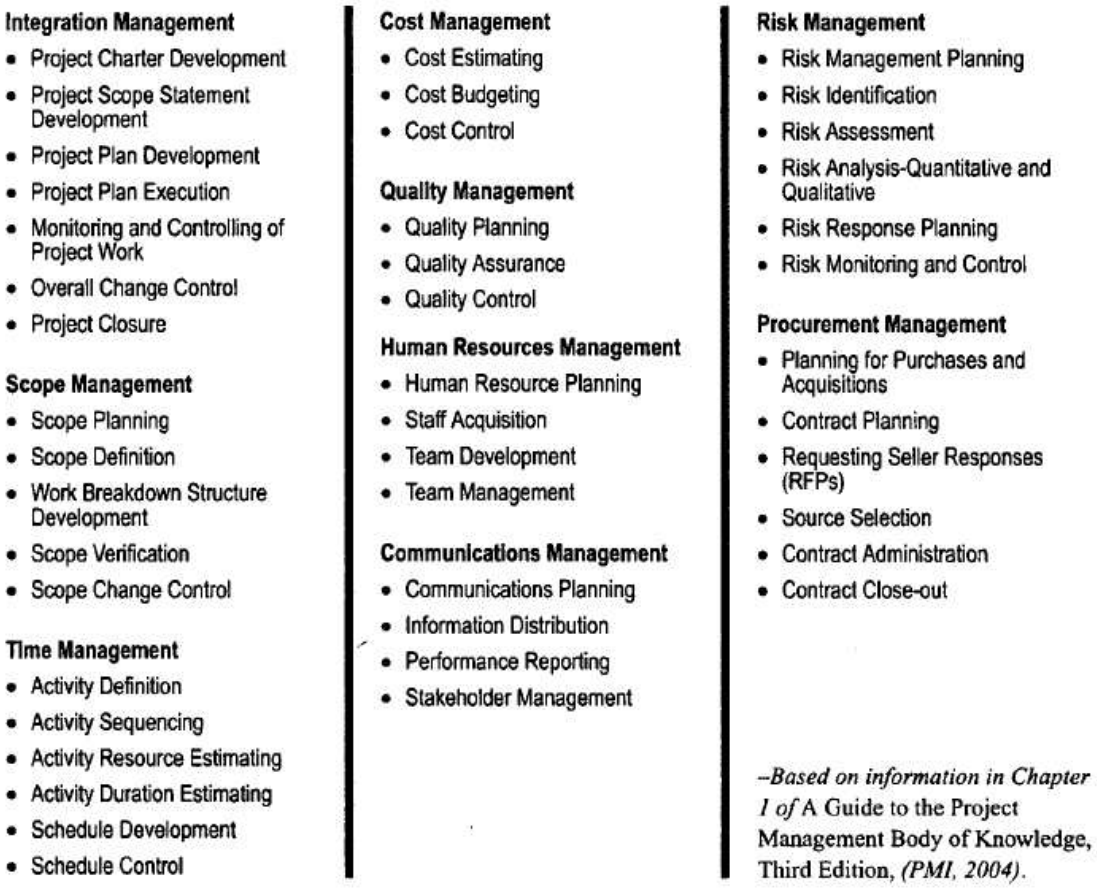


Figure 2.4: The project management processes by knowledge areas

Source: Stretton (2010)

Certification obtained

If the applicant meets all the requirements and is successful then they obtain a Project management professional Certification (PMP).

Bolles (2002) discussed the fundamental class for minimum project management requirements for a project management course. He states that the following should be required.

- The history of project management as a professional
- Definitions of key word and terms
- Review of PMBOK Guide framework
- Overview of scope management processes and templates
- Overview of time management processes and templates
- Overview of communication management processes and templates
- Overview of risk management processes and templates
- Introduction of use of scheduling software (MS Project)

Comments by scholars

PMI has significant membership and is the largest of the project management professional associations (Crawford and Pollack 2008).

Crawford and Pollack (2008) stated that PMI has developed arguably the most significant project management standard, the PMBOK guide. The authors reiterate that PMBOK is approved as an American National Standard by ANSI and is recognized by the Institute of Electrical and Electronics Engineers as an IEEE standard.

Crawford and Pollack (2008) also argued that because PMBOK has been developed in North America and is predominantly for the North American audience.

Smith (2003) indicated that PMI's accreditation fosters the attainment and maintenance of excellence in graduate education programs for project management in terms of standards and performance and further notes that PMI's accreditation interests lies exclusively within the field of project management.

Sawaya and Trapanese (2004) noted that PMI has become known as the project management certification of choice for many organisations and is one of the most widely used certification program to measure project management skills.

Craig (2002) stated that in the PMBOK guide there are a lot of statements of principle and facts that could be disagreed upon, but PMI does care and you need to

adjust your thinking to suit what's in PMBOK or you won't be able to pass the PMP's exam.

Alam, Gale, Brown, and Khan (2010) suggested that the focus on PMBOK through the iterations has been centred on the technical skills deemed necessary for managing projects relegating the social cultural skills to the background. From their literature study there is criticism from other authors considering that PMBOK essentially focuses on project delivery and largely ignoring the front end stage of projects.

Chin, Yap and Spowage (2010) indicated that:

- Comprehensive knowledge base covering widely proven practices.
- it is a misconception that project managers just follow a process and the project will take care of itself
- Has been argued that the PMBoK processes are rather bureaucratic and may hinder the creativity of the project manager.
- A prescriptive application of PMBoK involves a lot of documentation and reports as the primary communication mechanism within its framework.
- The nature of PMBoK make it difficult for project managers using PMBoK to react quickly to unprecedented situations which is considered essential in creative or changeable project environments.

Observations

Although the PMP is a widely recognised certificate and the largest membership as indicated by Crawford and Pollack (2008) there are some flaws as noted by literature above and my observations below.

Firstly the body of knowledge only caters to certain specific audience as stated by Crawford and Pollack (2008) this indicates that PMBoK is not as versatile as it is portrayed and may not be adapted easily to international projects that do adopt the PMBoK way of conducting a project.

Secondly as suggested by Craig (2002) you need to adjust your thinking to suit PMBoK to pass the PMP exam but by merely passing an exam doesn't equip the future PM in the work environments to conduct projects successfully.

Thirdly PMBoK only focuses on the technical skills as indicated by Alam, Gale, Brown, and Khan (2010) and not the social cultural skills required by PM's managing projects successfully.

iii **The UK Associations of Project management**

Background

The AMP was founded in 1972 as an educational charity and standard setter. The APM is committed to developing and promoting project and programme management for project management professional through qualifications and membership. The APM (2011) has five dimensions of professionalism that can benefit its members which breadth, depth, achievement, commitment and accountability. APM (2011) is in the process of applying for the Royal Charter so that their project management professional have chartered status.

The purpose of the Chartered status is to acknowledge project management professionals, provide a framework for improving project performance, and raise the profile and value of project management. UK APM is aligned with the IPMA 4 level certification programme.

Professionalism

The UK APM (2011) has the APM Code of Professional Conduct and their professional body of knowledge APMBoK. The professional have to abide by the APM codes of professional conduct. The UK APM professional need to undergo a certification program that constitutes training, experience and an interview to qualify for the certification.

Entry requirement

To become a member of APM the applicant needs to have 5 years experience as a project management practitioner, teacher or researcher. The application is reviewed then by an APM membership panel. The applicant must show practical experience in managing projects or key control functions within a larger project, or

teaching and/or researching project management from a practical and professional position. The guide to the category of application is listed in Table 2.1

Process for certification

The assessment must be completed within 6 months of your initial application.

Step 1: This phase consist of submission of application forms. The applicant needs to complete an application forms, a self assessment form including a statement of strengths and weaknesses, curriculum vitae and a project outline. This must include the appropriate fee.

Step 2: Completion of a project report.

Step 3: An interview with a panel of assessors.

TABLE 2.1 Guide to the RPP registrations

Source: UK APM (2011)

If the applicant holds any of the following APM qualifications or memberships					
Requirement	**Introductory Certificate**	**APMP**	**Practitioner Qualification**	**CPM**	**MAPM**
Demonstrate Core competences	Must complete all competence statements	Must complete all competence statements	Must complete all competence statements	Satisfies requirements	Must complete all competence statements
Demonstrate Complementary competences	Must be completed	Satisfies requirements	Satisfies requirements	Satisfies requirements	Satisfies requirements
CPD	(14 hours) Partially satisfies requirement if achieved within previous 12 months	Satisfies requirement if achieved within previous 12 months	(20 hours) Partially satisfies requirement if achieved within previous 12 months	Satisfies requirement if achieved within previous 12 months >1 year, CPD records required	Must be completed
Project Track Record	Must be completed	Must be completed	Must be completed	250 word statement demonstrating currently professionally active or Project CV	Must be completed
Interview	Must be completed	Must be completed	Must be completed	Not required	Must be completed

Core competencies

UK APM core competencies in project management are the APMBoK and are depicted in Figure 2.5.

The APM Body of Knowledge is a key component of the APM Five Dimensions of Professionalism. It defines the areas required to manage any successful project and forms the basis of APM's qualifications, accreditation, research, and publications.

APM Registered Project Professionals will demonstrate capability in 29 core competences which are categorised as behavioural, technical and contextual

Behavioural competence

- Leadership – The ability to establish vision and direction, to influence and align towards a common purpose, and empower and inspire people to achieve project success.
- Professionalism and ethics- Professionalism is demonstrable awareness and application of qualities and competencies covering knowledge, appropriate skills and behaviours. Ethic covers the conduct and moral principles.
- Communication- Communication is the giving, receiving, processing and interpretation of information.
- Teamwork- Teamwork is the process whereby people work collaboratively towards a common goal as distinct from other ways that individuals can work within a group.
- Conflict management-Conflict management is the process of identifying and addressing difference that, if unmanaged would affect the project objectives.
- Negotiation- is a search for agreement, seeking acceptance, consensus and alignment of views. In a project it can take place on an informal basis throughout the project lifecycle or on a formal basis.

- Behavioural characteristics- are elements that separate and describe a person's preferred way of acting, interacting and reacting in a variety of situations.

Technical competence

- Stakeholder management- Stakeholder management is the systematic identification, analysis and planning of actions to communicate with, negotiate with and influence stakeholders.
- Project risk management-is a structured process that allows individual risk events and overall project risks to be understood and managed proactively, optimising project success.
- Project quality management-is the discipline that is applied to ensure that both the outputs of the project and the processes by which the outputs are delivered meet the required needs of the stakeholders.
- Scheduling is the process used to determine the overall project duration and when activities and events are planned to happen.
- Resource management- identifies and assigns resources to activities so that the project is undertaken using appropriate levels of resources and within acceptable duration.
- Project management plan- brings together all the plans for the project.
- Information management and reporting- is the collection, storage, dissemination, archiving and appropriate destruction of the project information.
- Change control- is the process that ensures all changes made to a project's baseline scope, time, cost and quality objectives or agreed benefits are identified, rejected, approved or deferred.
- Budgeting and cost management- is the estimating of costs and the setting of an agreed budget, and the management of actual and forecast costs against the budget.

- Project reviews- project reviews take place throughout the project life-cycle to check the likely or actual achievement of the objectives specified in the project management plan.
- Scope management- is the process by which the deliverables and work to produce them are identified and defined.
- Issue management – is the process by which concerns that threaten the project objectives and cannot be resolved by the project manager are identified and addressed.
- Project success and benefits management – is the satisfaction of stakeholder needs and is the measured by the success criteria as identified and agreed at the start of the project.
- Requirement management- is the process of capturing, analysing and testing the documented statement of stakeholder and user wants and needs.
- Estimating- uses a range of tools and techniques to produce estimates.
- Business case- provides justification for undertaking a project.

Contextual competence domain

- Project life cycle- consists of a number of distinct phases. The lifecycle allows the project to be considered as a sequence of phases which provide structure and approach.
- Organisational roles- are roles performed by individuals or groups in a project. Both roles and responsibilities within the project must be defined.
- Governance of project management- is concerned of areas of corporate governance that are specifically related to the project activities.
- Project sponsorship – is an active senior management role, responsible for identifying the business need, problem or opportunity.

- Health safety and environmental management- is the process of determining and applying appropriate standards and methods to minimize the likelihood of accidents, injuries or environmental impact during the project and during the operation of its deliverables.
- Organisational structure – is the organisational environment within which the project takes place.

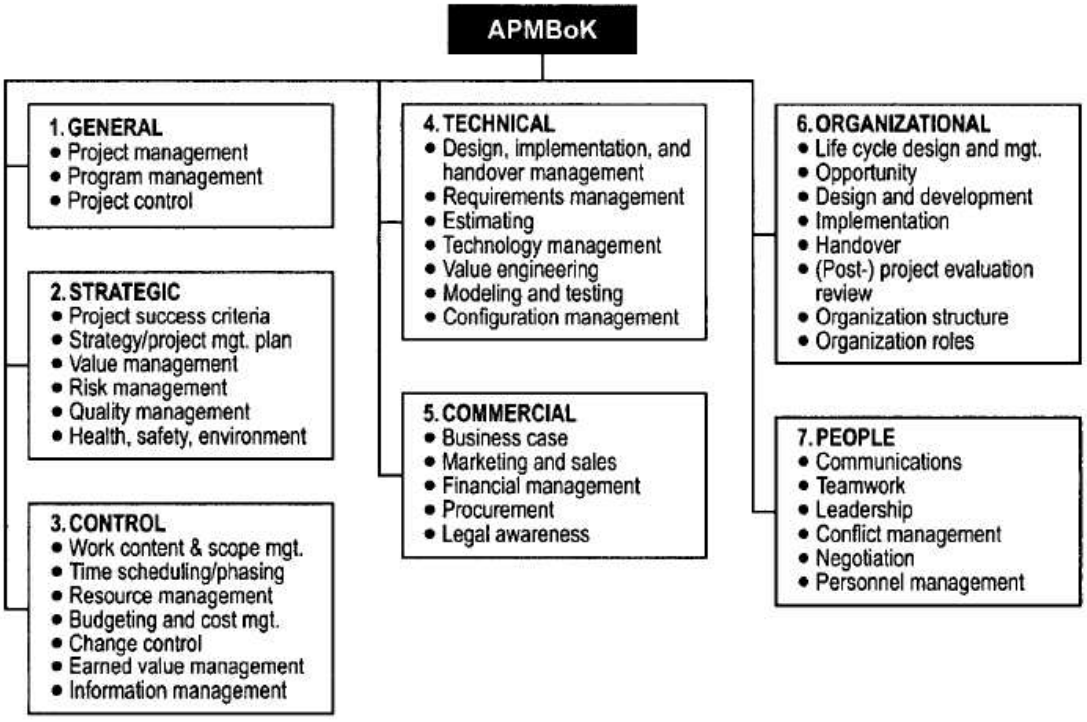


Figure 2.5: The association of project management body of knowledge

(Source: Stretton 2010)

Certification obtained

Certificated Project Manager with the APM Registered Project Professional (RPP).

Comments by scholars

Crawford and Pollack (2008) stated that APM developed an independent body of knowledge standard, the APM body of knowledge and stated that the

document takes a significantly different perspective on project management in terms of what is considered to be relevance and how information is conveyed.

Stretton (2010) indicated in his literature review that when UK launched its certification program in the 1990's, they did this because they felt that PMI's PMBoK did not adequately reflect the knowledge base that project management professional needed and stated that the reason why APM did not use PMBOK is because PMI's models are focused on generic processes required to accomplish a project "on time, in budget and to scope" APM reflects a wider view of the discipline to address both the context of project and the technological, commercial, and general management issues which APM believe are successful to the completion of a project.

One of the key differences in PMBOK and APM is that PMBOK knowledge areas focus on knowledge and practice that are applicable to most projects most of the time while contextual issues are discussed in the framework section while APMBOK includes knowledge and practice that may apply to some projects and/or part of the time, which is a much more inclusive approach. This is noted where PMBOK excludes safety whereas APM specifically includes safety (Stretton 2010).

Alam, Gale, Brown, and Khan (2010) suggested that the realisation of the importance of social-cultural skills was reasonably noted by UK APM when they established UK APMBoK. The important aspects relating to people skills such as communication, team work, leadership, conflict management, negotiations, human resource management, behavioural characteristics, learning and development, and professionalism and ethics. The authors further stated that the APMBoK is used as a major guide in British management education.

Chin, Yap and Spowage (2010) indicated that:

- Most influential publication of what constitutes the knowledge base of a profession.
- APMBoK is targeted more to people whom are already involved with project management having both the required knowledge and experience.

- Claiming to be a practical document, it lacks the focus of in addressing technical, commercial or environmental issues that may relate to the impact of the project environment.
- APMBoK has been referred to as a more proper set of practices commonly to govern projects and its emphasis in the management of people rather than being manager focused.

Observations

APMBoK was formed because they didn't agree with PMBoK totally as stated by Stretton (2010) and APMBoK introduced measures on how to assess the social cultural skills required by project managers. APMBoK recognises that project management is not just simply applying tools and techniques in a mechanical manner. APMBoK looks at the people related skills that are required by PM's as well.

iv **The International Project Management Associations**

Background

The IPMA was founded in Europe in 1967 as a federation of national project management association. IPMA (2011) represents more than fifty project management associations from continents of the world and promotes project management to business and organisations. The main aim of IPMA is to certify project managers, award successful project teams and research projects, and provide a number of project management publications.

Figure 2.6: ICB competency baseline

Source: IPMA (2011)

The IPMA Competence Baseline (IPMA 2011) indicated in Figure 2.6 covers:

> *"Technical competences, contextual competences, and behavioural competences..... The ICB sets out the knowledge and experience expected from the members of the association. It contains basic terms, practices, methods and tools for professional project management, as well as specialist knowledge and experience."*

Professionalism

The rules and regulations governing the operation of the certification system can be found in the ICRG (IPMA Certification Regulation and Guidelines). The IPMA has the ICB version 3 has its body of knowledge and professional need to comply with the code of conduct. IPMA has a certification and program that professional need to achieve this is discussed in the process for certification.

Entry requirement

The type of certification is based on the four levels listed in Figure 2.7 and Table 2.2 (IPMA 2011). The IPMA Competence Baseline (ICB) is the basis for the IPMA 4 Level certification system.

Figure 2.7: Levels of competencies required by the IPMA

Source: IPMA (2011)

TABLE 2.2: IPMA levels to accompany Figure 2.7 above

Source: IPMA (2011)

IPMA Level A- Certified Projects Director	The candidate has at least five years of experience in portfolio management and/or programme management with strategic relevance, of which three years were is responsible leadership functions in the management of complex portfolios or programmes and has two years of experience in managing projects.
IPMA Level B - Certified Senior Project Manager	The candidate has at least five years of project management experience, of which three years were in responsible leadership functions of complex projects.
IPMA Level C - Certified Project Manager	The candidate has at least three years of project management experience in responsible leadership functions of projects with limited complexity.
IPMA Level D- Certified Project	The candidate has experience in the

Management Associate	project management competence elements is not compulsory; but it is an advantage if the candidate already has applied his project management knowledge to some extent.

Process for certification

IPMA is a global project management certification program. To apply candidates need to contact the Member Association (MA) in the country where certification is an independent third party assessment based on a level-specific combination of self-assessment, a written exam, a report on the management of a project, programme or portfolio and an interview. The IPMA certification is based on four levels of certification programs and is designed as an on-going competence development process.

The assessor will assess the aspects listed in Figure 2.8 but the basic core competencies of the IPMA are the ICB Version 3. The steps for certification are as follows:

Step 1: The candidate need to contact the MA in your country to get application forms.

Step 2: Apply online by paying the membership fees

Step 3: An assessor will be assigned to the candidate to ensure that documentation are in order. The assessment is based on the three competence ranges, behavioural, technical and contextual. The candidate needs to fill out self-evaluation forms. The self evaluation forms assess the personal qualities of the candidate. The assessor will have an interview with the candidate. The candidate will then require writing the IPMA exam based on ICB version 3.

Step 4: The assessor will evaluate the candidate's results from the self evaluation forms, interview and exam to fit the candidate to Figure 2.7 and Table 2.2. The candidate will be notified of the results from the assessor.

To achieve the IPMA certification, candidates must demonstrate an acceptable level of understanding, knowledge and practical experience of project management as defined by the IPMA Competence Baseline as depicted in Figure 2.7 and Table 2.2.

Core competencies

ICB version 3 contains the following topic.

- Handling specific project management phases:
  - Effective preparation and start-up of projects
  - Auditing and health checks of project management

- Performing project management disciplines:
  - Managing project risk, uncertainty and value in new ways
  - Coaching and facilitation as a lever for efficiency in projects
  - Intercultural management competence for project success
  - Leading projects from a distance

- Managing corporate programmes and projects processes:
  - Programme management to innovate effectively
  - Managing the corporate project portfolios

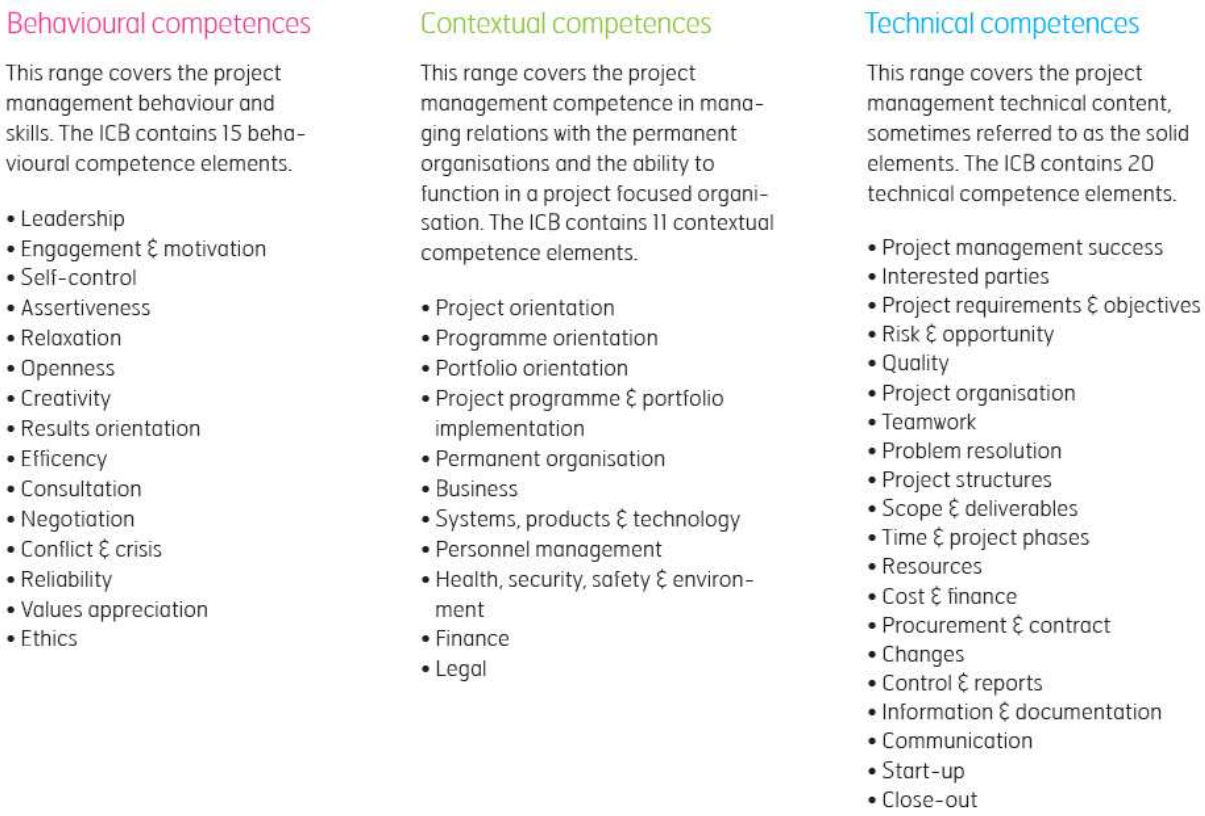


Figure 2.8: IPMA eye of competence

Source: IPMA (2011)

Certification obtained

Based on the applicant's experience (refer to Figure 2.7 and Table 2.2) the applicant can qualify for the following certification after the assessments:

Certified Projects Director
Certified Senior Project Manager
Certified Project Manager
Certified Project Management Associate

Comments by scholars

The largest member of the IPMA is the UK APM, which has had considerable influence on the development of the IPMA. An earlier version of the *APM Body of Knowledge* (APM, 2006) was one of the key documents referenced in writing of the *ICB: IPMA Competence Baseline* (IPMA, 1999). So far, the successes of the IPMA have been hampered by its federated structure, by the differing priori-

ties of its national association members, and by lack of funds available for international and global development (Crawford, 2004b, p. 1393).

After the compilation of UK APMBOK the European countries started to develop their own BOK in 1993. The purpose of the ICB was to harmonize the then existing European bodies of knowledge with the primarily purpose of providing a reference base for its member associations to develop their own National Competence Baseline (NCB) this provides the basis for certification of their project managers (Stretton 2010).

Alam, Gale, Brown, and Khan (2010) indicated that IPMA produced an amalgam of the national Bok's called the IPMA ICB in order to harmonise the national project management qualifications. The authors further indicated that ICB has created version 3 which cater for the social-cultural skills of a project manager. The ICB version 3 is based on the latest project management theory combined with modern practices and demands from 40 member associations from all over the world. Managing a project successfully require a mix of conceptual, technical and behavioural competencies.

Chin, Yap and Spowage (2010) indicated that:

- World's oldest project management organisation
- The certification tends to enforce project management experience as mandatory certification aspects.
- The IPMA cover knowledge, experience and personal attitude and is supported by a qualification process which includes training and coaching. However the certification tends to enforce project management experiences as mandatory certification aspects.
- IPMA contents are moderately detailed and delivered in a high level structure in contrasts with PMI's PMBoK.
- In comparison PMI with over 200 000 members and the accepted de facto standard, IPMA stands at 40 000 members

Observations

IPMA came up with ICB version 3 to amalgamate BoKs as stated by the following authors Crawford (2004), Stretton (2010) and Alam, Gale, Brown, and Khan (2010). IPMA assesses professional based on their eye of competence that looks at the behavioural, contextual and technical aspects of the individual. Also the IPMA assesses projects from an international project management competence.

v **The Australian Institute of Project Management**

Background

The first project managers that organized to manage project in Australia was the Project Managers Forum (PMF) which was formed in 1976.

PMF growth created a demand for professionalism. The decision to turn the PMF into a professional Institute was made in 1987 to AIPM. The purpose of the AIPM was for the recognition of a project management qualification of world standard. In 1997 AIPM instituted 'Registered Project Manager' status to members who satisfy the AIPM criteria. The qualification is based on 'National Competency Standards', which have been defined. The AIPM measures outcomes to demonstrate a candidate's competence (AIPM 2011).

Professionalism

The AIPM (2011) has the Code of Ethics for members of the AIPM. The AIPM has adopted the PMBoK has their knowledge base and professionals need to abide by professional code of conduct. AIPM has a certification program that is based on outcomes approach.

Entry requirement

A qualification issued by a registered training organisation (RTO) and at least five years relevant experience in pm. AIPM (2011) has made changes to the levels of certification and this is depicted in Figure 2.9.

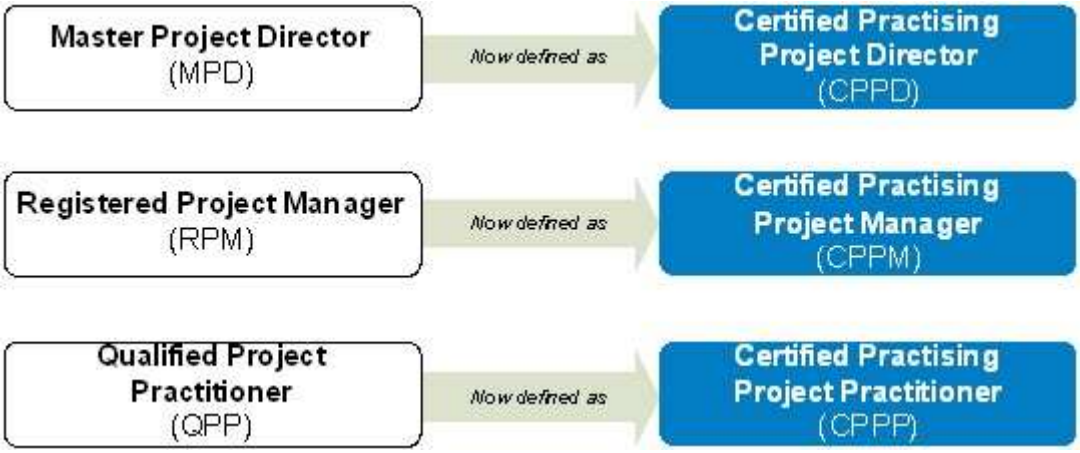


Figure 2.9 AIPM levels for project management (Previous and Current Levels)

Source: AIPM (2011)

Process for certification

The assessor will assess the aspects listed in Figure 2.10 but the basic core competency of the AIPM is the PMBoK (AIPM 2011). The steps for certification are as follows:

Step 1: The applicant needs to become a member with the AIPM by sending a basic CV, application forms and paying the AIPM registration fees.

Step 2: The applicant needs to log in and complete the RegPM online application forms.

Step 3: The applicant needs to contact and work with an assessor whom is a registered RegPM.

Step 4: The applicant needs to complete the assessment from the RegPM.

Step 5: The assessor will submit and assessment report, which will be certified, by the assessment manager and the process will be checked for completion.

Step 6: After three years the certification needs to be renewed through the continuous professional development program.

Guide to RegPM Levels

Function	Project Practitioner (Apply)	Project Manager (Plan and Manage)	Project Director (Direct and Manage)
Scope	• Contribute to scope definition • Apply project scope controls	• Define the project context • Guide the development of project scope definition activities • Implement scope controls	• Define, plan and direct program/ project scope throughout life cycle • Direct program/ project scope • Direct scope change activities • Direct program/ project exit criteria
Time	• Contribute to the development of project schedules • Monitor agreed schedule • Update agreed schedule • Contribute to implementation of project schedules • Participate in assessing time management outcomes	• Determine project schedule • Implement project schedule • Assess time management outcomes	• Develop project/program schedules • Direct project/program schedules • Analyse time management outcomes
Cost	• Contribute to the development of the project budget • Monitor project costs • Contribute to project budget reconciliation processes	• Determine project budget • Monitor and control project budgets and costs • Conduct project financial completion activities	• Direct project/program budget development • Direct program/ project costs and accounting • Direct program/ project budget reconciliation including at completion
Quality	• Contribute to quality planning • Apply quality policies and procedures • Contribute to continuous improvement process	• Determine quality requirements • Implement quality assurance • Implement project quality improvements	• Identify quality requirements • Conduct program/ project quality assurance • Manage the quality management process
Human Resources	• Assist with determination of human resource requirements • Establish and maintain productive working relationships • Contribute to team building • Assist with human resource control • Contribute to conclusion of human resource practices	• Implement human resource and stakeholder planning activities • Implement staff training and development • Manage the project team and stakeholders • Assess human resource outcomes	• Ensure effective human resource systems • Ensure effective systems for project organisation and staffing • Ensure effective systems for staff performance management process • Manage organisational change implications • Understand program participants and other stakeholders • Provide program team leadership • Monitor program team workload • Monitor and maintain program team and individual performance • Build program team cohesion • Develop project staff • Assess human resource outcomes
Communications	• Contribute to communications planning • Conduct information management activities • Communicate project information • Contribute to assessment of communications management outcomes	• Plan communications processes • Manage information • Manage project reporting • Assess communications management outcomes	• Plan program/ project communications • Direct program/ project information • Direct program/ project communications • Analyse communications management outcomes
Risk	• Assist with risk analysis and planning • Perform risk control activities • Contribute to assessing risk management outcomes	• Determine project risk events • Monitor and manage opportunities • Monitor and manage project risk • Assess risk management outcomes	• Plan for the management of risk • Direct program/ project risk • Assess risk management outcomes
Procurement	• Assist with contract and procurement planning • Contribute to contractor selection process • Conduct contracting and procurement activities or services • Conduct finalisation activities	• Determine procurement requirements • Follow agreed procurement processes • Conduct contracting and procurement activities • Implement contract and/or procurement • Manage contract and procurement finalisation procedures	• Plan program/ project contracting and procurement • Direct set up of contract and procurement • Direct contract and procurement process • Direct finalisation of contracts
Integration	Not required at this level	• Agree and establish life cycle reporting and measurement systems • Manage integration of all project management functions • Coordinate internal and external environments • Implement project activities throughout life cycle • Assess project integration outcomes	• Direct integration of all functions of project management • Direct the internal program/ project environment to meet external needs & expectations • Guide and direct program/ projects throughout project life cycles

Figure 2.10 Guide to the RegPM registrations

Source: AIPM (2011)

Core competencies

AIPM core competencies in project management are the National Competency standards for project management (NCSPM).

The AIPM adopted the PMBOK as the knowledge-base for the NCSPM. Competency units within the NCSPM are established against the Certificate IV, Diploma and Advanced Diploma qualifications levels set out within the Government accredited Australian Qualifications Framework.

The NCSPM is structured around nine units of knowledge

- Integration management
- Scope management
- Time management
- Cost management
- Quality management
- Human resources management
- Communications management
- Risk management
- Procurement management

Certification obtained

Registered Project Manager (RegPM)

Comments by scholars

Crawford and Pollack (2008) stated that AIPM remained unopposed as the national project management associations until 1996, by 2003 PMI chapters were most in all Australian capital cities and that relationship between AIPM and the Australian PMI varies from friendly cooperation to active competition.

Skulmoski (2001) indicated that the AIPM has the most developed out-put based competency standards and these standards contain performance criteria which specify outcomes that demonstrate competent performance.

Stretton (2010) states that the main reason for the AIPM to develop their own competency standards was the recognition that the possession of knowledge about a subject does not necessarily mean competence in applying the knowledge in practice. The Australian Government was very active in promoting the national competency standards for their professionals.

The format of the AIPM is to promote the performance orientated recognition of competence in the work place and includes the following main components:

- Units of competency: the significant major functions of the profession
- Elements of competency: the building blocks of each unit competency
- Performance criteria: the type of performance in the work place that would constitute adequate evidence of personal competence
- Indicator range: describe more precisely the circumstances in which the performance criteria would be applied.

The AIPM content is no different from PMI content and the ANCSPM align with the nine knowledge areas of the PMBOK guide.

Observations

The AIPM uses the PMBoK body of knowledge, AIPM just assess their project managers through outcomes based approach. The same comments that apply to PMI apply to AIPM because they are using the same body of knowledge.

vi The American Academy of Project Management

Background

The American Academy of Project Management (AAPM) International Board of Standards 1996 was the first to institute post-graduate certifications such as the Master Project Manager (MPM). The AAPM also issues the post-graduate standards body of knowledge for executives.

The AAPM Global Board of Standards issues *Project Management - Board Certification* to qualified applicants who have met the requirements of: education, training, experience, industry knowledge, ethics, and continuing education.

Professionalism

The AAPM (2011) has the AAPM ^{TM} Professional Ethics. The AAPM has their body of knowledge in their MPM handbook and the professionals need to abide by the professional code of conduct. The AAPM has a certification program that is based post graduate qualifications.

Entry requirement

Three years of project management experience and PM training for the application of the Master Project Manager (MPM), or if the candidate has a master's degree, qualified Project management training and experience an executive waiver can be applied.

Process for certification

Step 1: The candidate needs to have an approved AAPM degree, training or pass the AAPM examination. If the candidate has three years and greater of project management experience and the required education, he may apply for MPM board certification.

Step 2: The candidate must submit their resume to the board for approval. If the candidate does not have the above he may write an AAPM exam and obtain a pass mark of 70% or higher then he can apply for the board certification

Core competencies

The AAPM core competencies are present in the MPM Handbooks The MPM handbook is derived from actual reviews of mission critical information systems projects. The MPM states that it sets out a concise, high-level framework for project management.

AAPM has the MPM handbook in conjunction with the accredited training providers:

- **Meeting the mission:** This section consists of the purpose of the project, identifying the stakeholders and the customers. Managing expectation of the customers. The expectations of the project. How does the mission fit into the company's mission? The purpose of this section is to align activities with strategies, people and processes.
- **Strategies:** This section consists of articulating the business objectives, the technical environment, and the project plan.

- **People:** This section identifies the project participants and how are they organised. This section also deals with communicating with the organisational leadership, the project leadership, the team members, the stakeholders and the customers.
- **Processes:** This section teaches the applicant how to define the planning processes, the technology management, and the control of tasks.

Certification obtained

The applicant that meets the entry requirements and is successful with the certification procedure will obtain Master Project Manager (MPM).

Comments by scholars

Kinkus (2007) stated that AAPM offer accreditation for project managers whom did not plan their careers far enough to earn a graduate degree before gaining their job title

Observations

AAPM was the first certification program that offered post graduate qualifications in project management.

There is not much scholarly comment about the AAPM only a few stating the certification and offering of the program as indicated by Kinkus (2007).

vii **The International Association of Project and Program Management**

Background

The IAPPM is a worldwide leading project and program organisation that offers certification to individuals and corporate that has project management experience and knowledge. IAPPM supplements existing bodies of knowledge with practical methods for achieving project success.

Professionalism

The IAPPM has its own code of professional ethics. The IAPPM has created their body of knowledge the CPPM BoK and the professionals need to abide by the code of conduct according to the IAPPM. The IAPPM has a certification program that is discussed further in the process for certification listed below.

Entry requirement

The type of certification is based on the three levels listed in Figure 2.11.

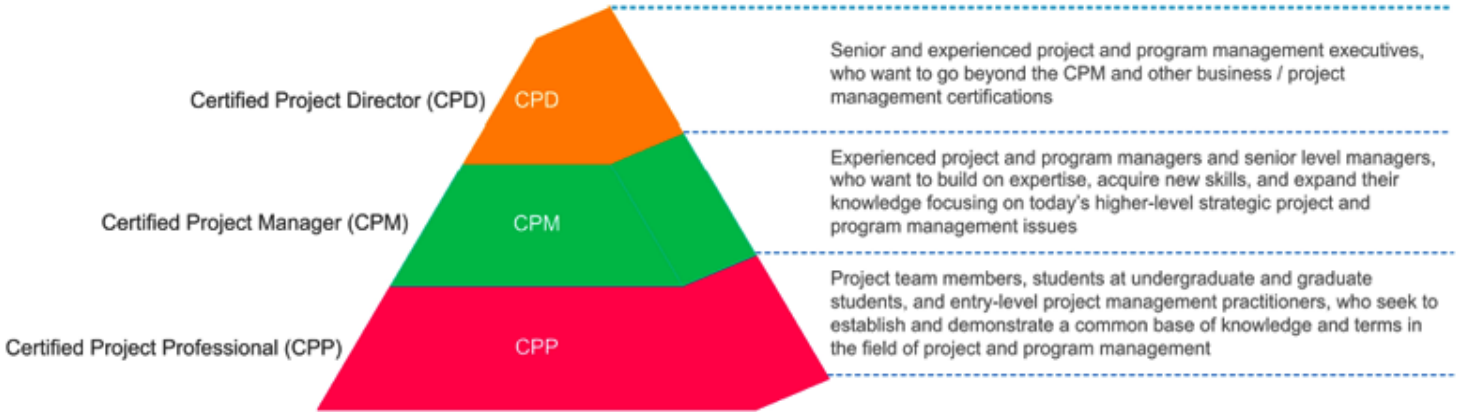


Figure 2.11: IAPPM Project and Program Management Certification Framework

Source: IAPPM (2011)

Where the following refers to the Figure 2.11

Certified Project Manager (CPM) - The Certified Project manager (CPM) credential is for experienced project and program managers and senior level managers, who want to build upon their expertise, acquire new skills, and expand their knowledge on project management

Certified Project Professional (CPP) - The Certified Project Professional (CPP) credential is designed to recognize individuals who seek to establish and demonstrate a common base of knowledge and terms in the field of project and program management, such as project team members, students at undergraduate and graduate students, and entry-level project management practitioners who will use CPP as a stepping-stone to achieve Certified Project Manager (CPM) credential.

Certified Project Director (CPD) - The Certified Project Director (CPD) is the globally recognized and most prestige level of project and program management credential, which is designed for senior and experienced project and program management executives. The CPD certification allows experienced senior managers and executives to acquire new skills and advanced techniques in managing and controlling today's complex project and program management

Process for certification

Experienced project management candidates who are interested to achieve the CPM credential are required to meet the following requirements, complete the comprehensive project and program management training, and exams prior to submitting a CPM credential application.

At the time of the application, the candidate must hold a minimum university bachelor's degree or above. The candidate is required to complete the following four (4) tracks in order to attain the CPM credential.

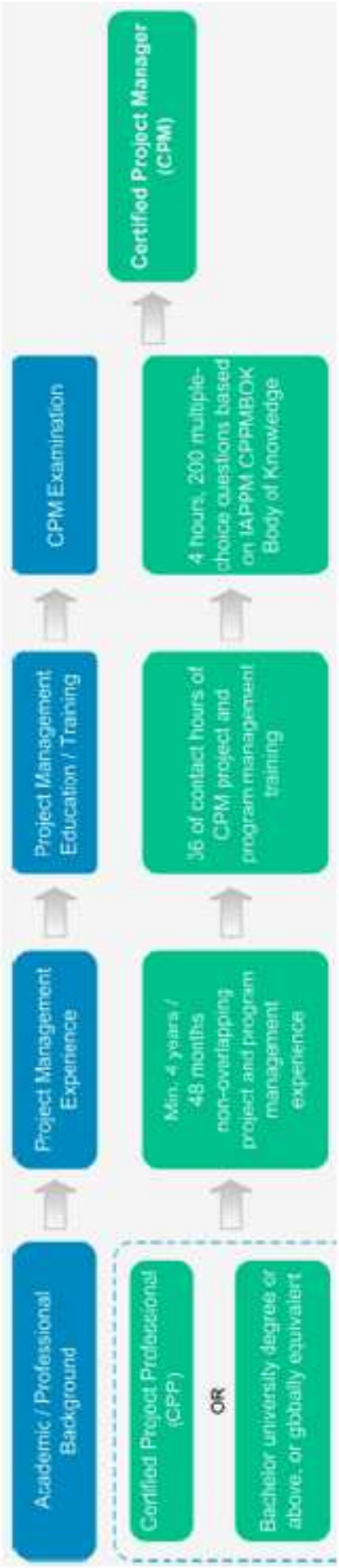


Figure 2.12: IAPPM Certified Project Manager: certification track

TABLE 2.3: Process for IAPPM Figure 2.12 above certification requirement Source: IAPPM (2011)

CPM Credential Track	Description
Track 1: Academic / Professional Background	Bachelor's university degree or above, or globally equivalent; OR Certified Project Professional (CPP); AND
Track 2: Project Management Experience	Minimum 4 years / 48 months non-overlapping project and program management experience during which at least 5,000 hours are spent leading and directing project tasks in all project and program management domains; AND
Track 3: Project Management Education and Training	36 of contact hours of CPM project and program management training on CPPMGuide syllabus; AND
Track 4: CPM Examination	Pass the 3- hour CPM Examination, which is comprised of questions based on the IAPPM CPPMGuide Body of Knowledge

Core competencies

IAPPM core competencies are the CPPM BoK which is their body of knowledge in project management. This consists of the following modules.

001 - General Project & Program Management

002 - Risk & Crisis Management

003 - Requirements Management

004 - Human Resources Management

005 - Communications Management

006 - Quality Management

007 - Information Technology

008 - Teamwork and Motivation

009 - Portfolio and PMO's

010 - Governance Management

Certification obtained

The applicant if successful will obtain the Certified Project Manager (CPM) Credential.

Comments by scholars

Cappel (2009) stated that the IAPPM provides three levels of PM certification as discussed in the above from section process for certification.

Observations

There is not much scholarly comment about the IAPPM only a few stating the certification and offering of the program as indicated by Cappel (2009).

IAPPM (2011) feel that although there are bodies of knowledge that are available there is still a need to supplement theses guides. IAPPM (2011) claim that they focus on all stakeholders in a project and not only the project managers as the traditional bodies of knowledge.

IAPPM (2011) also claim that they do not wish to just copy an existing body of knowledge because “no single BoK will ever be fully complete or comprehensive”.

2.3.2 **Summary: certification programs**

Section 2.3.1 looked at the professionalism, entry requirements, process for certification, core competencies and certification that are obtained once the applicant is successful. This section concluded with Table 2.4 that provided a summary of what was covered throughout section 2.3.1 and also provides the current trends for certification.

Certification trends:

Towards a global approach of competency based standards for project managers

A global effort for the development of a framework of Global performance based standards for project management personnel (GPBSPMP) was initiated in 2000. Representatives from major international project management associations had been facilitated by Dr L.H. Crawford to develop a maximally inclusive emerging standards that will incorporate inputs from virtually all project management knowledge and competency standards (Stretton 2010).

Future trends on certification are indicating a global standard for certification and one standard process for certification. This will enable project managers to have standard competencies and methodologies. This will assist projects that are conducted on an international basis immensely.

Project management organisational certification

Few organisations are practicing organisational certification because even for the most mature organisations people need to be competent. The PMI is developing the organisational project management maturity models (OPM3).

Future trends for certification are also indicating organisational certification. This is quite a difficult task because project managers and accidental project managers need to be competent.

The next section is going to provide merits and demerits of certification programs.

TABLE 2.4: Summary of Certification Programs

	AACE	IPMA	PMI	AAPM	AIPM	UK APM	IAPPM
Entry Requirements	A four year minimum degree or three year applicable experience and the degree is waivered.	The type of certification is based on the four levels listed in Figure 2.3 and Table 2.1 obtained from the website.	A degree and at least three years of pm experience, or a diploma with five years of pm experience.	Three years of pm experience and pm training waivered if the candidate has a Master's degree.	A qualification issued by a registered training organisation (RTO) at least and at least five years relevant experience in PM.	The applicant needs to have 5 years experience as a project management practitioner, teacher or researcher.	the candidate must hold a minimum university bachelor's degree
Core Competencies	The core competencies of the AACE can be obtained from the Skill and Knowledge for cost engineering, 3rd edition.	The IPMA *Competence Baseline (ICB)* is the basis for the IPMA 4 Level certification system.	Processes are defined in the guide to the, Project Management Body of Knowledge (PMBOK)	(AAPM) International Board of Standards for post-graduate certifications (MPM), (PME), CEC), and (CIPM).	National Competency standards for project management (NCSPM)	APM Registered Project Professionals will demonstrate capability in 29 core competences and knowledge of 18 complementary competences.	IAPPM core competencies are the CPPM BoK
Process for Certification	Must write a behavioural examination and the AACE Internationa Interim exam.	To apply candidates need to contact MA in the country where certification is an inde-	Must write a two hundred multiple choice examination	Has three years and greater of pm experience and the required education.	Determined by their work experience, qualifications, and certifications and desired	The applicant needs to complete all application forms and self assessment, complete	The candidate is required to complete the following four (4) tracks in order to attain

		pendent third party assessment based on a level-specific combination of self-assessment, written exam, report on the management of a project, programme or portfolio and an interview		Or Write an AAPM exam	benefits.	project report. And an interview with a panel of assessors.	the CPM credential as depicted in Figure 2.9
Course Content	Costs Cost Estimating Planning and Scheduling Progress and Cost Control Project management Economic Analysis Statistics, probability and Risk	Handling specific project management phases: Performing project management disciplines Managing corporate programmes and projects processes:	Project integration management Project scope management Project time management Project cost management Project quality management Project human re-	Seminar on the Basics of Project Management Principles, Standards and Practices of Project Management (MPM Master Certification Class) Project Management Test Prep (for any general project management evaluation) Effective Project Management for	Integration management Scope management Time management Cost management Quality management Human resources	Behavioural Technical Conceptual	General Project & Program Management Risk & Crisis Management Requirements Management Human Resources Management Communications Management Quality Management Information Technology Teamwork and Motivation Portfolio

			source management Project communications management Project risk management Project procurement management	Contractors Team Leadership Principles for Project Managers (for Lead PM and other managers and teams)	management Communications management Risk management Procurement management		and PMO's Governance Management

2.4 **Project management certification merits and demerits**

Project management focuses on project management processes. Literature related to project management certification focuses on the assumption that project management certification adds value (Gokaydin 2007). The following listed literature describes the merits and demerits of project management certification.

2.4.1 **Merits of certification**

The value of project management certification is supported by Ireland (2003) president of the American Society for the Advancement of Project Management. Ireland (2003) pointed out that certifications in project management benefit both the individual and the organisation. Ireland (2003) stated that project stakeholders gain return on investment because of quality of work, well thought out decisions and the capability to deliver quality, and timely and cost effective products and services.

Marsan (2007) stated experts agree that some technical certifications are still worth time and effort. There is a demand for Six Sigma and PMI certification. A salary survey was conducted and 159 certified and 156 non-certified skills to see which affect salaries the most. The results indicated that employees with certifications were earning more than those with non-certified skills for some time and the last time non-certified skills but experience was valued than certification during the third quarter of 2001.

Mochal (2002), the president of Ten Step, Inc., a project management consulting and training firm, pointed out that the focus for project managers needs to be delivering value, not just process. Mochal (2002) described three groups of thoughts related to project management. Pointing out that some people believe that regardless of the context of the project, a project manager can manage any project. Conversely, other people believe that project managers need to be subject matter experts to manage a specific project. The third group believes that they do not need to follow any particular type of project management processes to deliver a successful project.

2.4.2 **Demerits of certification**

Coatello (2009) stated that certification programs are becoming more of a "check of the box" type of an approach and stated that there has being abuse by all parties concerned. The author stated that he values credentials but is appalled by the abdication around the topic. His argument is based on that organisations drive firms to select individuals on the basis of certification but are doing a poor job of owning the responsibility of ensuring they've properly vetted and leveraged.

Glassie (2003) stated that the conclusions about individual professional competence cannot be reached based on certification status, as certification only measures factors that tend to indicate competence, instead of measuring competence directly.

Zwerman and Thomas (2006) stated that knowledge-based certifications that exist today simply show that you have some background knowledge and can pass an examination, not that you can successfully manage projects on any clearly definable criteria.

2.5 **Developing the knowledge base**

This section builds the knowledge base for project managers.

Figure 2.13 indicated that the competency required by a project manager can be identified from working backwards by identifying the critical success factors. The same philosophy as indicated in Figure 2.13 will be used to generate the knowledge base.

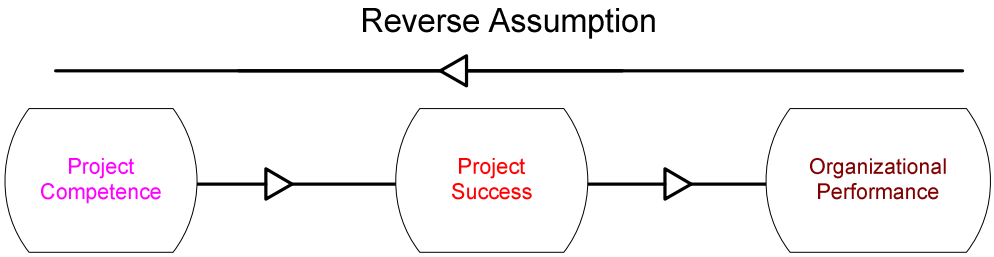


Figure 2.13: Linking competence and project success/ organisation performance

Source: Adapted from Crawford (2005)

The following section will look at the attributes of a good project manager, contributors to project failure and success to generate critical factors that could then be associated with what constituents the appropriate knowledge base.

2.5.1 **Attributes of a good project manager**

The attributes of what makes a good project manager was used as the first criteria to establish the critical factors that contributed to what constitutes the knowledge base.

A study by Tiwari and Kaushik (2011) indicated that the most desired person in the industry will have the following attributes as depicted in the pyramid in Figure 2.14. The authors further stated that an ideal candidate would have the right mix of all the skills and that would hit the ground running and be productive from day 1.

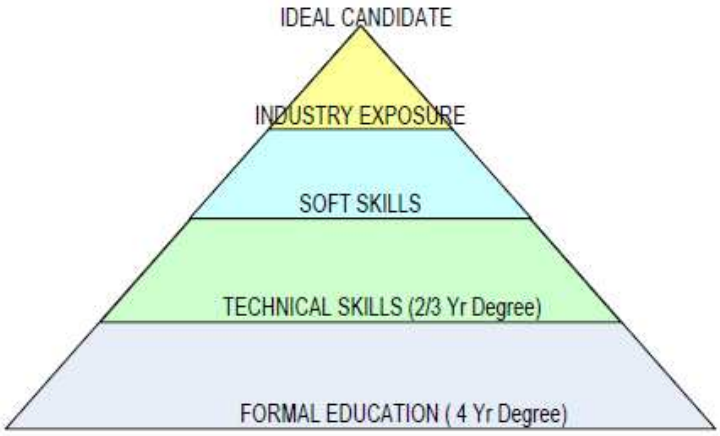


Figure 2.14: Qualification pyramid

Source: Tiwari and Kaushik (2011)

The study by Tiwari and Kaushik (2011) can also be used to depict the right combination of skills that a project manager requires to conduct successful projects. The project manager needs an undergraduate degree, industry technical skills, soft skills and industry exposure.

The observations from Kerzner (2006) suggested that projects fail to meet time and cost targets due to poor morale, lack of motivation, poor human relations, poor productivity, and lack of commitment from employees. Therefore it is evident from Kerzner's observation that people-related issues play a crucial role in project performance.

Hartman and Skulmoski (1999) discussed that with improved project competencies the more successful a project. Gareies (2000) and Gareies and Huemann (2000) discussed the role description of the project manager, which is listed in Figure 2.15. These attributes was used as a second criteria to build the success factors of what constitutes the knowledge base.

Functions in the project start process

- Organisation of the project start process (together with the core team members)
- Know-how transfer from the pre-project phase into the project together with the project team members
- Agreement on project objectives together with the project team members
- Development of adequate project plans together with the project team members
- Design of an adequate project organisation together with the project team members
- Development of a project culture, establishment of the project as a social system together with project team members
- Performance of risk management and discontinuity management together with the project team members
- Design of project-context-relations together with project team members
- Implementation project marketing together with project team members

Functions in the project coordination process

- Disposition of resources for the performance of work packages
- Controlling the results of work packages, ensurance of quality of work packages
- Approval of work package results
- Communication with members of the project organisation
- Communication with representatives of relevant environments
- Continuous project marketing

Functions in the project controlling process

- Organisation of the project controlling process (together with the core team members)
- Determination of the project status together with the project team members
- Agreement on or planning of corrective actions together with the project team members
- Further development of the project organisation and the project culture together with the project team members
- Re-definition of project objectives together with the project team members
- Redesign of project-context-relations together with the project team members
- Project marketing together with the project team members
- Preparation of progress reports together with the project team members

Functions in the project discontinuity management process

- Organisation of the discontinuity management process (crisis or chance management) together with the project owner
- Contributions regarding the crisis resolution or the chance together with the project team members

Functions in the project close-down process

- Organisation of project close down-process together with the project core team
- Emotional close-down of the project and regarding the contents together with the project team members
- Transfer of know-how into the line organisation together with project team members and representatives of the line organisation
- Final project marketing together with the project team members

Figure 2.15: Role description "project manager"

Source: Gareies (2000) and Gareies and Huemann (2000)

This section looked at attributes of a good project manager.

2.5.2 **Contributors to project failure/ success**

The second criteria that was used to build the success factors was to look at what makes a project fail and what makes a project succeed. Analysing what constitutes project success and failures helped contributed towards building the success factors.

Andreev (2011) suggested that certain factors determine the success or failure of projects, determination of these critical success factors needs to be based on a comparative analysis of the specific features of successful and unsuccessful projects.

"Success" defined by Andreev (2011) as

> *"…as an aspect of firm performance that largely corresponds to proper assessment of innovations"* or
>
> *"… as the attainability of the desired results of the innovation processes"*

Project success depends on many factors. Many have defined criteria for project success. A project is successful when it passes four criteria i.e. when it is completed within schedule, within budget, within the original set of performance and quality standards and the client's satisfactions criterion, where it is accepted by the end user.

This section identified some of the critical success factors that allow the project to be completed successfully as defines above. Success factors can be attributed to many factors and can be classed as technical and social-cultural skills that are required by the project manager to successfully complete a project. The technical skills required are discussed in section 2.5.2 (c) and the social-cultural skills required are discussed in section 2.5.2 (d).

a) **Project failure**

The inverse of project success is project failure; therefore most of the factors that cause a project to fail can be related to what can cause a project to be successful. Figure 2.16 indicated the percentage of failed projects in the IS sector and the most frequent failure factors in descending order of frequency. Although Figure 2.16 was focused on the IS sector but these factors can be applied generally to project management failures for all sectors.

The failure factors are found in at least sixty percent of projects. Cerpa and Verner (2009) stated that projects did not suffer from just one failure factor but had multiple problems and many of the factors are related to each other. The study shows that the most frequent factors are.

1. *Delivery date impacted the development process*
2. *Project was underestimated*
3. *Risk were not re-assessed, controlled, or managed through the project, and*
4. *Staff was not rewarded for working long hours.*

Software Project Failure Factors	Percentage of Projects (%)		
	In-house	Outsourced	Overall
Delivery date impacted the development process	93.9	90.5	92.9
Project under-estimated	83.7	76.2	81.4
Risks were not re-assessed, controlled, or managed through the project	73.4	80.9	75.7
Staff were not rewarded for working long hours	81.6	57.1	74.3
Delivery decision made without adequate requirements information	83.7	47.6	72.9
Staff had an unpleasant experience working on the project	83.7	47.6	72.9
Customers/Users not involved in making schedule estimates	69.4	76.2	71.4
Risk not incorporated into the project plan	65.3	80.9	70.0
Change control not monitored, nor dealt with effectively	63.3	85.7	70.0
Customer/Users had unrealistic expectations	69.4	66.7	68.6
Process did not have reviews at the end of each phase	75.5	47.6	67.1
Development Methodology was inappropriate for the project	71.4	52.4	65.7
Aggressive schedule affected team motivation	69.4	57.1	65.7
Scope changed during the project	67.3	57.1	64.3
Schedule had a negative effect on team member's life	71.4	42.9	62.9
Project had inadequate staff to meet the schedule	63.3	57.1	61.4
Staff added late to meet an aggressive schedule	61.2	61.9	61.4
Customers/Users did not make adequate time available for requirements gathering	61.2	57.1	60.0

Figure 2.16: Project failures

Source: Cerpa and Verner (2009)

b) **Project success dimension identified by scholars**

Shenhur, Levy and Dvir (1997) discussed the criteria for measuring project success that must reflect the different view which included the organisation, the project team, and the end-user as depicted in Table 2.5.

TABLE 2.5: Project Success Dimensions 1

Source: Adapted from Shenhur, Levy and Dvir (1997)

Project Success Dimensions	Criteria
Meeting Design Goals	Meeting operational specifications Meeting technical specifications Meeting time goals Meeting budget goals
Impact on the customer	Fulfilling customer needs Solving major operational problems Actually used by the customer Level of customer satisfaction
Benefits to the organisation	Level of commercial success Generated a large market share Opened a new market Opened a new line of products Developed a new technology

Zxikael and Globerson (2006) did an extensive literature review and discovered the following criteria for project success.

TABLE 2.6: Project success dimensions 2

Source**:** Adapted from Zxikael and Globerson (2006)

Critical Success factors	Project plan Top Management Support Personnel Recruitment Monitoring and feedback Customer involvement Project requirement and Objectives Adequate Spending Technical tasks Communication Project Strategy Trouble Shooting High quality processes Ownership Goal commitment of project team Customer acceptance Realistic expectations Smaller project milestones On-site project manager Politics Logistics requirements

c) **Technical skills required**

Portny (2010) defined a project has been successful when it has produced the desired results within the established timeframe with the allotted resources and stated that the following three factors are essential to create the greatest chances for successfully completing a project: a clear and specific agreed-upon statement of the desired outcomes, comprehensive lists of all people who are interested in (needed to support, and/or affected by your project) and a complete and detailed listing of all required project work.

	Starting the Project	Organizing and Preparing	Doing the Work	Closing the Project
Audience List **D= Drivers** **S = Supporters**	• Specifying the business need (D) • Determining feasibility (S) • Identifying available resources (S)	• Clarifying objectives (D) • Creating the WBS (S) • Estimating resource needs (S) • Approving needed resources (S) • Assigning roles (S) • Approving project plan (S, D) • Developing the project communication plan (S, D)	• Resolving conflicts (S, D) • Providing progress reports (S, D) • Approving requested changes (S, D) • Sharing project results (S, D)	• Sharing closure information (S, D) • Obtaining final approvals and signoffs (S, D) • Distributing final project reports (S, D) • Recognizing people's performance (S, D) • Conducting the post-project evaluation (S, D)
Objectives	• Incorporating desired benefits into project objectives	• Clarifying required deliverables, products, and results • Providing basis for the WBS	• Quality testing • Progress reporting • Confirming required results are being produced • Evaluating change requests • Confirming continued need for project	• Developing final closure check list • Evaluating project performance • Planning and conducting the post-project evaluation
Work Breakdown Structure		• Assigning roles • Developing schedule • Estimating personnel needs • Estimating required funds • Estimating other resources required	• Making task assignments • Setting up schedule and resource tracking systems • Collecting schedule and cost data	• Ensuring all work is done • Closing charge accounts • Planning and conducting the post-project evaluation

Figure 2.17: Project stages taking into account audience list, objectives and work breakdown structure.

Source: Portny (2010)

Figure 2.17 lists all the tasked that must be accomplished during the project.

Client satisfaction is also a determinant for the sustainable project orientated company. Browne and Donnabhain (1999) identified key issues and concepts relevant to Client-Project manager relationship using customer service, service quality and customer satisfaction.

Hartman and Skulmoski (1999), Turner (2006) and Turner and Miller (2005) suggested that there are parallels between business and project management research and topics such as leadership, communication, teamwork, success, risks alignment are been examined by both disciplines.

Gareis and Huemann (2000) described how project orientated societies can assess, describe and further develop PM competencies. The paper puts forward a proposal of modeling a project orientated society, develops measures of PM competencies of the society, identify demands for development and evaluate ongoing transfer.

Table 2.7 represents the summary of the literature review that identified the technical skills required for project performance. With a list of several factors of understanding project management standards, risk methodology, documentation control, understanding how to take make changes in the schedule as well taking into account the impact of the changes, defined goals and objectives contract and legal aspects and financial skill are important for a project manager from a technical side.

TABLE 2.7 Summary of the technical skills required for project success

Project management standards and methodology	Zxikael and Globerson (2006); Portny (2010 Gareies (2000); Gareies and Huemann (2000); Aspden (2004); Ika, Diallo and Thuillier (2009); Elkjaer and Felding (1999)
Risk Assessments Methodology	Portny (2010); Gareies (2000); Gareies and Huemann (2000); Cerpa and Verner (2009); Elkjaer and Felding (1999)
Documentation Management (keeping proper records)	Gareies (2000); Gareies and Huemann (2000)
Scope and Change aspects and management	Cerpa and Verner (2009) Gareies (2000); Gareies and Huemann (2000)
Learning Culture and Audits in place	Zxikael and Globerson (2006); Gareies (2000) ; Gareies and Huemann (2000); Andersen, Birchall, Jessen and Money (2006)

Objectives aligned to management support	Shenhur, Levy and Dvir (1997); Zxikael and Globerson (2006)
Contract and Legal Issues	Koetsier, Grefen and Vonk (2000); Kwak,and Anbri (2009); Grefen, Aberer, Hoffer and Ludwig (2000)
Financial	Kosaroglu, M. and Hunt, R.A (2009); Cerpa and Verner (2009)

d) **Social-cultural skills required:** People related factors for Project Success

Table 2.8 represents the literature review that identified the people-related factors for project performance. With a list of several factors of project success, top management support and a clear definition of a project's mission are identified as some of the important factors.

Studies on project success identified success factors, which include clearly defined goals, top management support of resources, detailed plan and implementation processes, consultation with clients and stakeholders to determine expectations, monitoring and feedback, adequate communication with all the stakeholders including the project team, and ability to handle unexpected problems.

TABLE 2.8 Summary of the social-cultural skills required for project success

Communication *Clear Communication ** Effective team members play a role in communication ***Strong Project Commitment	Narciso and Verner (2009); Johannessen and Olsen (2011); Adenfelt (2010); Ochieng and Price (2010); Hossain and Wu (2009); Vance (2009); Ponnappa-Brenner (2008) ; Henderson *(2008);* Ayers (2007); Otter and Emmitt (2007)**; (*Kraus* (2006); (Gillard and Johansen *(*2004); Andersen, Birchall, Jessen and Money (2006)***
Defined Roles and Responsibilities *Direct Managerial Support	Jacques (2008); Maire (2011); Sommerville, Craig and Hendry (2010); Wan, Nor, and Marjani (2009); De Vries (2009);*Kelley and Lee (2010)
Understand and known the Expectation	Ahlemann, Teuteberg and Vogelsang (2009); Ireland *(*1992); Zells (1983); Shah (1990)

Project Management processes	William (1993); Liberatore (1987); Gareies (2000); Gareies, and Huemann (2000); Shen-hur, Levy and Dvir (1997); Anantatmula (2010)
Trust **Stable pool of project team members	Lajiness and Feldhaus (2011); **Maurer (2010); David (2007)
Outcomes	Portny (2010); Crawford (2008); Hartman and Skulmoski (1999)

This section looked at literature that causes a project to fail and be successful. This section assisted as one of the criteria that were used in establishing the project success factors.

2.6 Critical factors for project success

Taking into account project success factors, what makes a project fail and attributes of a good project manager, those criteria was used to generate the requirements of the critical success factor for a project to be successful.

TABLE 2.9 Success factors for project success

Project Success Factors	
Technical Skills Required	
PSF 1	Understand project management standards and process used from planning to implementation. En-sure that standards and procedures are followed properly and fairly. Tools and techniques can be used to enhance this success factor.
PSF 2	Risk analysis methodology to ensure identification, planning and mitigation strategies are in place. En-sure that the firm has a risk methodology that is standardized throughout the company.
PSF 3	The project manager needs to keep proper records and documentation in place for the duration of the project.
PSF 4	The project manager needs to have the ability for

	proper scheduling of activities and scope management of the project. The project manager needs to have change control to adapt be flexibility if it is required during the duration of the project
PSF 5	The project manager needs to understand the project performance measures for the project to provide feedback on the progress of the project. The project manager must be able to understand the quality requirements to be able to do audits on the project to ensure that when the project is not within cost, quality and time then he can plan to recover quickly by having the performance checks in place.
PSF 6	The project manager needs to have a learning culture in place so that he can learn from past mistakes and avoid them in future performance. He needs also to motivate his team to learn and be more effective.
PSF 7	Project objectives to be aligned with the business objects thus obtaining upper management support.
PSF 8	Contract and Legal management: the project manager needs to understand the legal implications and the contractual implications during the projects from contractors and the clients.
PSF 9	Value Analysis: Understand financial implications and the EVA, RIO, and the NPV.
Social-Cultural Skills Required	
PSF 10	Strong communication skills need to be built for conflict management, reporting, giving feedback and the work breakdown structure. Clear communication between all stakeholders during the project lifecycle and effective people/team performance

	management needs to be established which involves coaching, motivation and intercultural management.
PSF 11	The project manager needs to have clearly defined roles and responsibilities for the team that he manages. Have a clear organ gram with defined roles and responsibilities for all resources managed throughout the project lifecycle.
PSF 12	The project manger needs to understand and know the expectations of the stakeholders which include his team members. The project manager needs to know what customer expects at the end of the deliverable. The project manager needs to manage the expectation of the human resources as well as the customer throughout the project lifecycle.
PSF 13	The project manager needs to understand the project management processes and standards to conduct detailed plans and the implementation processes,
PSF 14	The project manager needs to understand the outcome of the project to ensure that he delivers what is expected. The project manager must have quality checks throughout the project lifecycle to ensure that the project is within cost, quality and time. Resource planning for productivity Time management of resource Risks Identification and Mitigation Risk identification strategies

This section identified the critical success factors for successful projects.

2.7 **Proposed content for competent project managers**

Based on the critical success factors that were obtained from the literature in Table 2.9 the content for the knowledge base was constructed in Table 2.10.

TABLE 2.10: Knowledge base for project mangers

Knowledge Areas	**Description**	**Addressing Success Factor**
1. Project Management Techniques	Understand the project management process from planning, implementation, monitoring and controlling. Understand quantity and be able to conduct risk mitigation and assessments. Techniques for conducting post project reviews thus conducted to create learning environment (Tools can be used to enhance this content e.g. Microsoft Project and Excel for the Risk Assessment.)	PSF 1, 14, 13, 2, 11, 6 and 10
2 Change and Scope Management	Techniques for change and scope management of the project. Standards and procedures needs to be defined and in place. This would enhance proper documentation and reporting thus also improving communication skills.	PSF 4, 3 and 10
3 Stakeholder Management	Techniques for understanding the requirements of stakeholders customer requirements and team expectations.	PSF 12 and 7
4 Conflict Management	Techniques needed to resolve conflict between all stakeholders including customer, contractor and team members.	PSF 11
5 Financial Management	Techniques needed to understand financial calculations such EVA, ROI, NPV.	PSF 9
6 Contract and Legal requirement	Techniques needed for understanding contracts and legal implications of contracts.	PSF 8
7 Performance Management	Techniques needed to conduct performance management for the project and team performance.	PSF 5

This section identified the knowledge base required for competent project managers.

2.8 **Summary**

This chapter began with how to assess project management competencies. Literature indicated that for a project manager to be competent a standard should be met and this doesn't require the project manager meet the standard with superior performance in meeting.

This chapter mainly focused on global project management certification programs. Seven different project management certification programs were studied in detail and are summarized in Table 2.4 with the core competencies of each project management certification program identified.

Different certification programs focused on different goals and achievements depending on the objectives of the certification organisation.

Certification merits and demerits were listed. Research showed that there is a demand for the PMI certification and those with certification earn more than those that don't. It was also argued that certification is becoming more of a "check of a box" instead of adding any value.

This chapter then covered the key project success/failures and attributes of a good project manager. The critical factors that were identified were used to map the knowledge base.

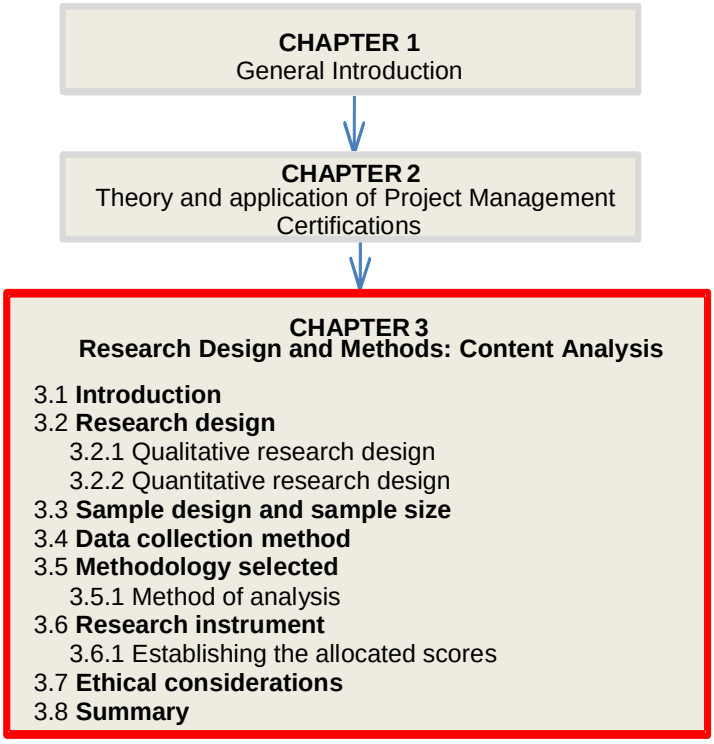
CHAPTER THREE: RESEARCH DESIGN AND METHODS

Chapter two provided the literature surrounding PM Certification Requirements, covered in Section 2.3 and the proposed ideal PM knowledge base was developed in Section 2.7 (indicating the progress thus far in Figure 3.1).

This Chapter explored the research methodologies that can be used to test the current PM certification knowledge base with the ideal PM knowledge base identified in Section 2.7.

Figure 3.1: Progress thus far

This chapter explored the literature on research methodologies and the method of analysis used in this research. The chapter layout is provided in Figure 3.2.



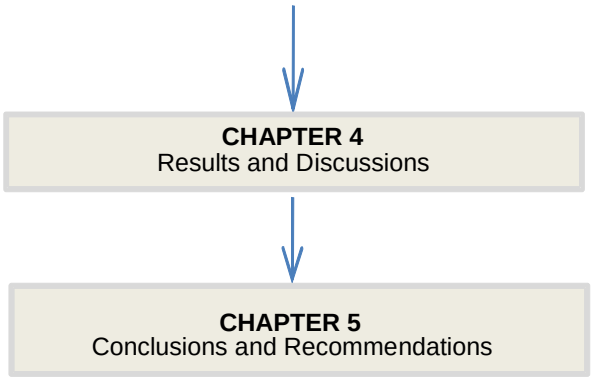


Figure 3.2: Chapter 3 in context with the overall research report

3.1 **Introduction**

This section discussed the theory of research designs, sample design and sample size, data collection method, method of analysis, selected a methodology for this study, and discussed the research instrument and the ethical considerations taken into account in this study.

There are two broad types of analysis that can be conducted i.e. Qualitative and Descriptive Research Design (Quantitative). A third analysis that can be still be conducted is the mixed method approach, which is a mixture of both qualitative and quantitative analysis.

3.2 **Research designs**

This section discussed the research design methods.

3.2.1 **Qualitative research design**

Qualitative research design's purpose is to gather a comprehensive understanding of human behavior and the reasons that govern such behavior (Leedy and Ormrod 2005).

Cassell and Symon (1994) gave the following list of defining characteristics for qualitative research.

" a focus on interpretation rather that quantification; an emphasis on subjectivity rather that objectivity; flexibility in the process of conducting research; an orientation towards process rather than outcome; a concern with context—regarding behaviour and situation as inextricably linked in forming experience; and finally, an explicit recognition of the impact of the research process on the research situation"

There are several different approaches to qualitative analysis. They all focused on a phenomenon in its natural setting in the real world and they involve studying the phenomenon in all its complexity in a multifaceted dimension.

The strength of the qualitative method: (Leedy and Ormrod 2005):

- Are useful when a subject is too complex to be answered by a simple yes or no hypothesis.
- These types of designs are much easier to plan and carry out.
- Qualitative research methods are not as dependent upon sample sizes as quantitative methods.

The weakness of the qualitative method: (Leedy and Ormrod 2005):

- This method requires a lot of careful thought and planning, to ensure that the results obtained are as accurate as possible.
- The data from qualitative analysis cannot be mathematically analyzed in the same comprehensive way as quantitative results, so this method can only give a guide to general trends.
- It is a lot more open to personal opinion and judgment.
- Any qualitative research design is usually unique and cannot be exactly re-created, meaning that they do lack the ability to be peer reviewed.

3.2.2 **Quantitative research design**

The quantitative research design is sometimes referred to as true science. They utilize traditional mathematical and statistical means to measure results.

Hopkins (2000) defined quantitative research design:

> *"…Is to determine the relationship between one thing (an independent variable) and another (a dependent or outcome variable) in a population. Quantitative research designs are either descriptive (subjects usually measured once) or experimental (subjects measured before and after a treatment). A descriptive study establishes only associations between variables. An experiment establishes causality"*

The strength of the quantitative method :(Leedy and Ormrod 2005):

- This method is an excellent way of finalizing results and proving or disproving a hypothesis.
- The quantitative structure is standard across many scientific fields and disciplines.
- Following the statistical analysis, a comprehensive answer is obtained and the results can be legitimately discussed and published.
- This method tries to filter out external factors, if properly designed, and so the results gained can be seen as real and unbiased.
- Quantitative experiments are useful for testing the results gained by a series of qualitative experiments, leading to a final answer, and a narrowing down of possible directions for follow up research to take.

The weakness of the quantitative method: (Leedy and Ormrod 2005):

- The studies must be carefully planned to ensure that there is complete randomization and correct designation of control groups.
- This method usually requires extensive statistical analysis.

3.3 **Sample design and sample size**

Project Management institutions and associations that offered PM certification programs were identified globally. All the existing global certification programs were considered. This study was then limited to the existing global certification program; therefore this research did not cover project management degrees that were obtained from higher institutions and diplomas. Seven global certification programs were identified for this study and are listed in Section 1.14 of this report.

3.4 **Data collection method**

The data was collected from the webpage's and handbooks of the PM certification program associations.

3.5 **Methodology selected**

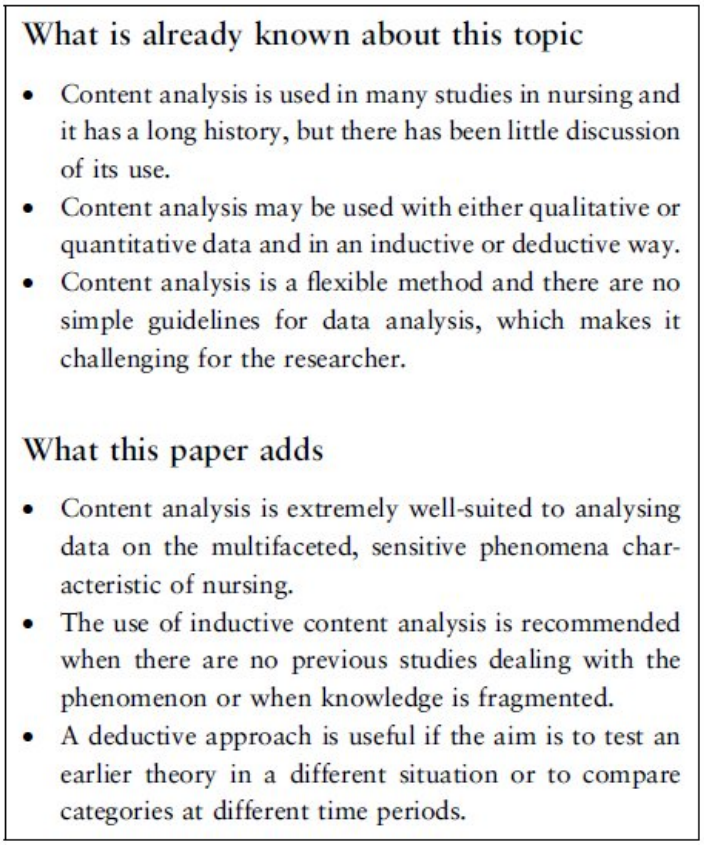
The literature in the fields of qualitative content analysis was comprehensive with researchers that are able to conduct detailed studies of a content analysis, for example:

Forman and Damscroder (2008) stated that:

> *"…in qualitative content analysis, data are categorized using categories that are generated, at least in part, inductively (derived from data), and in most cases applied to the data through close reading. Qualitative content analysis is one of many qualitative methods used to analyze textual data. It is a generic form of data analysis in that it is comprised of an a theoretical set of techniques which can be used in any qualitative inquiry in which the informational content of the data is relevant."*

Elo and Kyngas (2008) indicated in Figure 3.3 confirmed that

> *"Content analysis as a research method is a systematic and objective means of describing and quantifying phenomena. It is also known as a method of analyzing documents. Content analysis allows the researcher to test theoretical issues to enhance understanding of the data. Through content analysis, it is possible to distil words into fewer content related categories. It is assumed that when classified into the same categories, words, phrases and the like share the same meaning."*



What is already known about this topic

- Content analysis is used in many studies in nursing and it has a long history, but there has been little discussion of its use.
- Content analysis may be used with either qualitative or quantitative data and in an inductive or deductive way.
- Content analysis is a flexible method and there are no simple guidelines for data analysis, which makes it challenging for the researcher.

What this paper adds

- Content analysis is extremely well-suited to analysing data on the multifaceted, sensitive phenomena characteristic of nursing.
- The use of inductive content analysis is recommended when there are no previous studies dealing with the phenomenon or when knowledge is fragmented.
- A deductive approach is useful if the aim is to test an earlier theory in a different situation or to compare categories at different time periods.

Figure 3.3: Summary of research of qualitative content analysis

Source: Elo and Kyngas (2008)

Jauch, Osborn and Martin (1980) summarized that one asset of this method is that; other researchers can replicate the findings and investigators can compare their findings with those generated from a structured content analysis of cases and concluded with the following:

> *"We find it particularly interesting that using a somewhat novel method highlights problems in better-established data-collection techniques."*

Titscher, S. Meyer, M. Wodak, R. and Vetter, E (2000) indicated that content analysis is

> *"The longest established method of text analysis among the set of empirical methods of social investigation referred only to those methods that concentrate on directly and clearly quantifiable aspects of text content, and as a rule on absolute and relative frequencies of words per text or surface unit"*

These researchers agree that the distinguishing characteristics of content analysis must consist of characterizing the data and needs to be replicated. The content analysis focuses on the frequency with which words or concepts occur in texts or across texts.

Table 3.1 lists types of qualitative research designs methods (Leedy and Ormrod 2005). After analyzing Table 3.1 qualitative content analysis methodology was selected as the most appropriate methodology. The basic idea is to take a list of concepts and a set of texts and count the number of times each concept occurs in each text.

In order to interpret and evaluate the constitution of the knowledge base contained in the certification programs, a content analysis technique was applied. This type of qualitative analysis was used for analyzing the contents of the knowledge base from the certification programs and comparing it with the proposed base that was developed.

TABLE 3.1: Distinguishing characteristics of different qualitative designs

Distinguishing Characteristics of Different Qualitative Designs				
	Purpose	Focus	Data Collection	Data Analysis
Case Study	To understand one person or situation	One Case or a few cases within their natural setting	Observations Interviews Appropriate written documents	Categorizations and interpretation of data in terms of common themes Synthesis into an overall portrait of cases
Ethnography	To understand how behaviors reflect the culture of a group	A specific field site in which a group of people share a common culture	Participant observations Structured or unstructured interviews with informants Artifact/document collection	Identification of significant phenomena and underlying structures and beliefs Organization of data into a logical whole
Phenomenological Study	To understand an experience from participant's points of view	A particular phenomenon as it is typically lived and perceived by human beings	In-dept unstructured interviews Purposeful sampling of 5-25 individuals	Search for the 'meaning units' that reflect various aspects of the experience Intergration of the meaning units into a 'typical' experience
Grounded Theory Study	To derive a theory from data collected in a natural setting	A process including human actions and interactions and how they result from and influence one another	Interviews Any other relevant data sources	Prescribed and systematic method of coding the data into categories and identifying interrelationships. Continual interweaving of data collection and data analysis. Construction of a theory from the categories and interrelationships
Methodology Selected				
Content Analysis	To identify the specific characteristics of a body of material	Any verbal, visual or behavioral form of communication	Identification and possible sampling of the specific material to be analyzed Coding of the material in terms of predetermined and precisely defined characteristics	Tabulation of the frequency of each characteristic Descriptive or inferential statistical analysis as needed to answer research question

Source: Adapted from Leedy and Ormrod (2005)

3.5.1 **Method for analysis**

The procedure was selected from Leedy and Ormrod (2005). This procedure was aligned with Figure 3.4 obtained from Kohlbacher (2006).

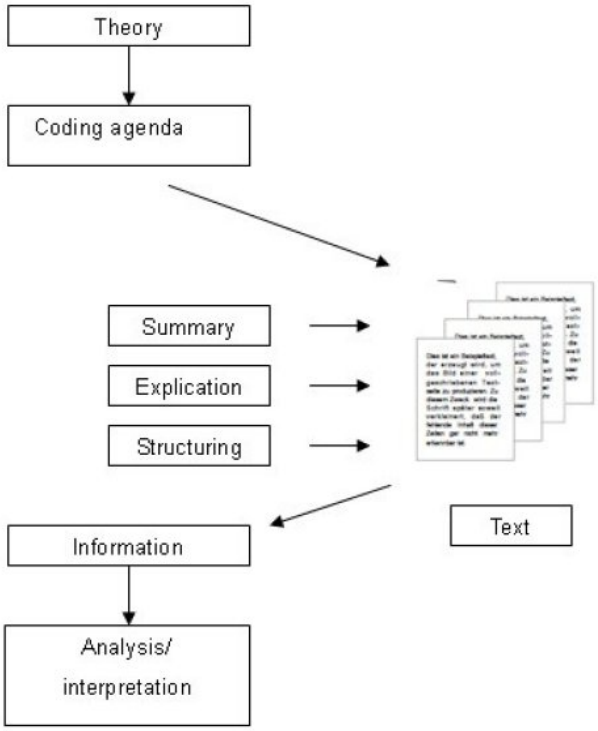


Figure 3.4: Basic proceeding of qualitative content analysis

Source: Kohlbacher (2006)

Procedure (Leedy and Ormrod (2005)

Step 1: The researcher indentifies the specific body of material to be studied.
Step 2: The researcher must define the characteristics or qualities to be examined in precise, concrete terms.
Step 3: The researcher must break down items of a complex material into small, manageable segments to be analyzed separately.
Step 4: The researcher must scrutinize the material. When the material is entirely objective, one single judgment is enough, but if subjective, more judgments may be, 2 or 3 are required, and then a composite of the judgments is used.

From the methodology mentioned above and as depicted in Figure 3.5. Steps 1 and 2 have been completed thus far. Steps 3 and 4 will be discussed further in the results section.

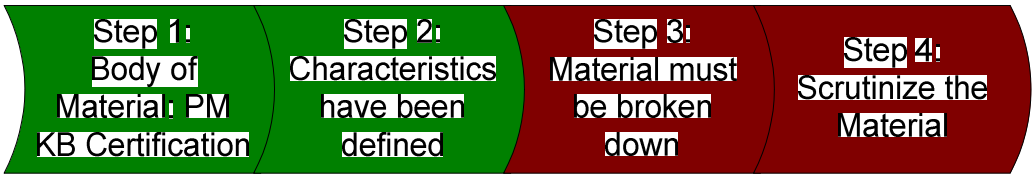


Figure 3.5: Progress from the procedure

Step 1: The contents of the knowledge base from the PM certification programs were used as the body of material that was assessed in this study. This was identified in chapter 2 under section 2.3.

Step 2: The knowledge base characteristics were defined and are listed in chapter 2 under section 2.7.

Step 3: This knowledge base from the certification programs was broken down into manageable segments.

Step 4: The knowledge base from the certification programs was compared to the proposed knowledge base that was developed in Chapter 2 under section 2.7.

3.6 **Research instrument**

The raw data was collected from the web pages and handbooks from the certification institutions. The data was structured to ensure a reliable and valid comparison of the proposed knowledge base with the certification programs knowledge base.

The methodology relied on the “grounded theory” approach, which offered response to objectivity. Under the structures of grounded theory a content analysis, through the use of a coding frame was used.

3.6.1 **Coding frame**

Carley (1993) stated that when coding a text the researcher must choose between using a predefined set of concepts and developing a list of concepts during the process of coding:

> *"Having a predefined list of acceptable concepts can be done by specifying either which concepts are to be coded or which are to be deleted."*

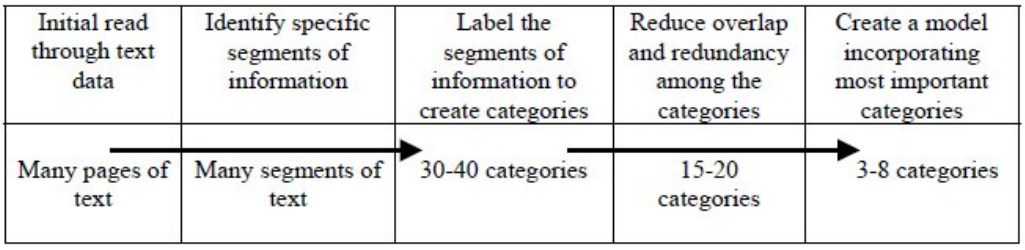


Figure 3.6: The coding process

Source: Thomas (2003)

Thomas (2003) discussed the approach to an overview for the coding process, which is depicted in Figure 3.6.

Thomas (2003) stated that:

> *"The intended outcome of the process is to create three to eight summary categories, which in the coder's view captures the key aspects of the themes in the raw data and which are assessed to be the most important themes given the research objectives. Inductive coding which finishes up with more than about eight major themes can be seen as incomplete. In this case some of the categories may need combining or the coder has not made the hard decisions about which themes or categories are most important."*

The coding frame that was used in the study is the proposed knowledge base. This was developed in Section 2.7. This study employed two attributes i.e. frequency and intensity where frequency meant counting whether something occurred or not in the content and the intensity was the strength of the themes in the content.

3.6.2 **Establishing the allocated scores**

A comprehensive scrutiny of each of the seven certification programmes was conducted to establish the extend of coverage of the knowledge areas mentioned in Table 2.10.

Theses knowledge areas defined a typical project management programme to develop competent project managers and are reproduced in Table 3.2 with the allocated scores.

Each of the seven knowledge areas were given a score of 100 points, therefore the maximum points a certification knowledge base could get would be 700 points.

TABLE 3.2: Knowledge base with allocated scores

Knowledge Areas	Description and the Allocated Scores
1 Project Management Techniques **(PMT)** *(Total = 100 %)*	Understand the project management process from planning, implementation, monitoring and controlling. *(55 %)* Understand quantity and be able to conduct risk mitigation and assessments. *(25%)* Techniques for conducting post project reviews thus conducted to create learning environment *(20%)* (Tools can be used to enhance this content e.g. Microsoft Project and Excel for the Risk Assessment.)
2 Change and Scope Management **(C&SM)** *(Total = 100 %)*	Techniques for change and scope management of the project. *(20%)* Standards and procedures needs to be defined and in place. *(50%)* Proper documentation and reporting thus also improving communication skills. *(30%)*

3 Stakeholder Management **(SM)** *(Total = 100 %)*	Techniques for understanding the requirements of stakeholder's customer requirements *(70%)* and team expectations. *(30%)*
4 Conflict Management **(CM)** *(Total = 100 %)*	Techniques needed to resolve conflict between all stakeholders including customer *(50%)*, contractor *(10%)* and team members. *(40%)*
5 Financial Management **(FM)** *(Total = 100 %)*	Techniques needed to understand financial calculations such EVA, ROI, NPV.
6 Contract and Legal requirement **(C&LR)** *(Total = 100 %)*	Techniques needed for understanding contracts *(50%)* legal implications of contracts. *(50%)*
7 Performance Management **(PM)** *(Total = 100 %)*	Techniques needed to conduct performance management for the project *(50%)* and team performance. *(50%)*

Therefore: PMT + C&SM + SM + CM + FM + C&LR + PM = 700 %

To establish whether a certification program was adequate an adequacy scale was developed based on percentage points. This scale was constructed as follows in Table 3.3:

TABLE 3.3: Adequacy scale

Scale Parameters	Extremely Inadequate	Inadequate	Moderately adequate	Adequate
Scale Percentage	0-25%	26-50%	51-75%	76-100%

3.7 **Ethical considerations**

Before considering this research topic ethical issues through all phases of the research process were considered. The data was collected from the webpage's and handbooks of the PM certification program association. One of the ethical issues of this study is whether to keep the names of the PM associations anonymous. However this data is available without restraint, therefore readers have a right to know this type of information.

3.8 **Summary**

This chapter focused on the research design and methodology. Qualitative research is often taken to mean inductive, theory generating, subjective and nonpositivist while quantitative research is often taken to mean deductive, theory testing, objective and positivist.

The method chosen for this study was the qualitative content analysis. The types of research designs, sample design and sample size, data collection method, method of analysis, research instrument and the ethical consideration were discussed. Justifications for the choice of method chosen were presented.

The next section will discuss the results and the analysis of the certification programs.

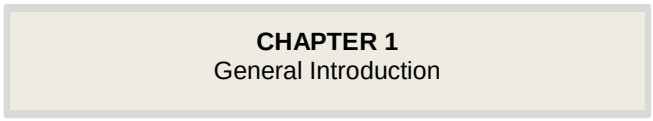
CHAPTER FOUR: RESULTS AND DISCUSSIONS

Chapter three provided the research methodology that was used in this study. Figure 4.1 provided the progress thus far i.e. determined each of the PM requirements from the certification programs and developed what could be described as an ideal knowledge base.

This chapter discussed results and the analysis from the content analysis identifying the gaps from each of the certification program compared to the knowledge base that was developed. The chapter ends with the discussion of the findings.

The chapter layout is provided in Figure 4.2 for more clarity of how Chapter 4 fits into the overall research report.

Figure 4.1 Progress thus far



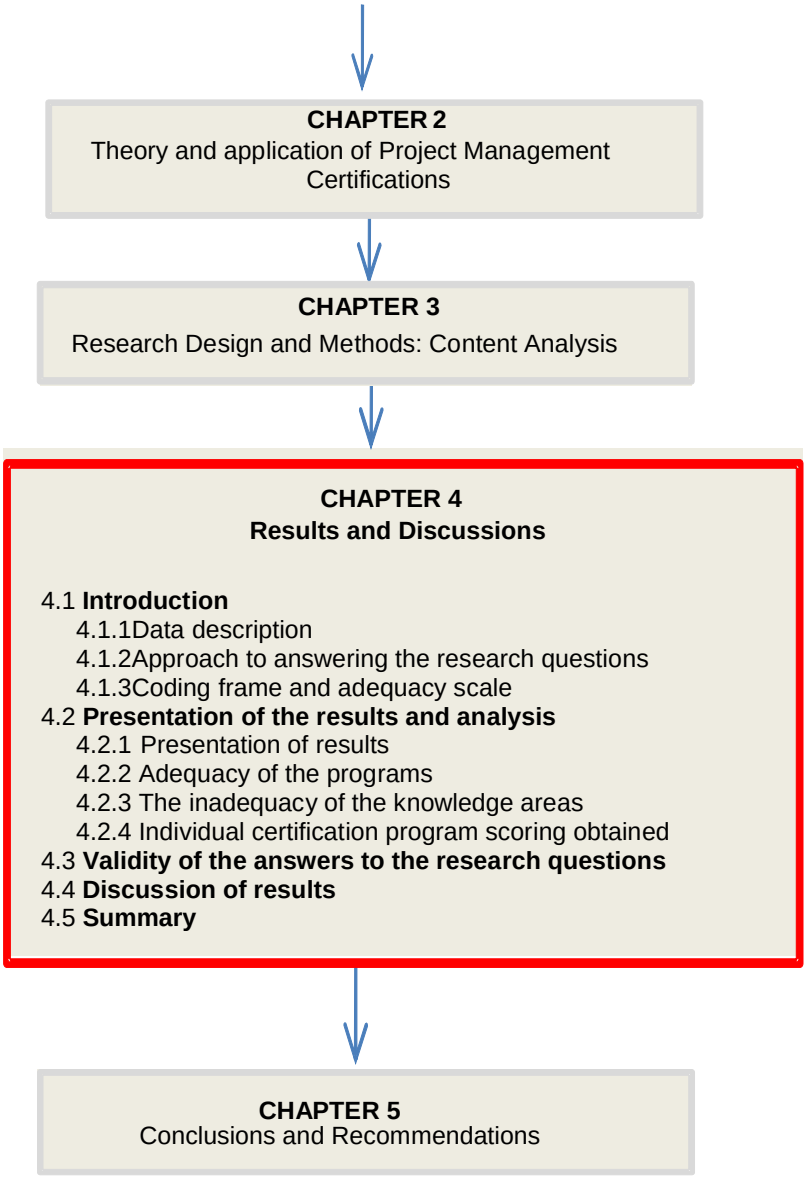


Figure 4.2: Chapter 4 in context with the overall research report

4.1 **Introduction**

This section presented the results and the analysis from the content analysis study, provided the data description, how the research questions were approached, coding frame and adequacy scale, presented the result and analysis, discussed the adequacy of the certification programs, identified the inadequacy of the knowledge areas, the analysis of the individual program scoring and discussed the validity of the answers from the research questions, discussions of the findings and ends with the summary

4.1.1 **Data description**

This research report started with four research questions that needed answers. The analysis was based on a qualitative content analysis using a coding frame.

In order to interpret and evaluate the constitution of the knowledge base contained in the certification programs, an extensive content analysis was performed. This was used for analysing the contents of the knowledge base from the certification programs and comparing it with coding frame. An adequacy scale was developed with scale parameters to establish whether a certification program was adequate or not.

4.1.2 **Approach to answering the research questions**

Research questions

Chapter one provided four research questions that required to be answered and are reproduced in Table 4.1. The first question to be answered will address the central issue of this study:

> ***Research Question 1:"Are the PM voluntary associations or certification institutes providing adequate PM knowledge base for their members?"***

After and extensive literature review a proposed ideal knowledge base was developed and this addressed the second research question:

> ***Research Question 2: "What constitute PM certification requirements?"***

The next two questions will be discussed in detail during the results and analysis section.

> ***Research Question 3:"Are there any gaps between the ideal PM knowledge base and PM Certification requirements?"***

> ***Research Question 4:"Do PM Certification requirements need to be reviewed towards providing adequate PM knowledge base?"***

Research question listing and classifications

The "grounded theory" approach was used. The end result of this research will be answers to the research questions that will describe a phenomenon. This chapter will answer the following questions.

TABLE 4.1: Results per certification program

No.	Research Question
Research Question 1	"Are the PM voluntary associations or certification institutes providing adequate PM knowledge base for their members?"
Research Question 2	"What constitute PM certification requirements?"
Research Question 3	"Are there any gaps between the ideal PM knowledge base and PM Certification requirements?"
Research Question 4	"Do PM Certification requirements need to be reviewed towards providing adequate PM knowledge base?"

4.1.3 **Coding frame and adequacy scale**

The objectives of the study were defined in chapter one. The coding frame was constructed from literature to determine pre-defined themes of interest. The themes were allocated scores. The coding frame and the adequacy scale was developed in Chapter 3, section 3.6 and reproduced in Table 4.2 and Table 4.3 for convenience. Codes and labels were attached to pieces of the raw data, which was relevant to the themes.

TABLE 4.2: Knowledge base with allocated scores

Knowledge Areas	Description and the Allocated Scores
1 Project Management Techniques **(PMT)** *(Total = 100 %)*	Understand the project management process from planning, implementation, monitoring and controlling. *(55 %)* Understand quantity and be able to conduct risk mitigation and assessments. *(25%)* Techniques for conducting post project reviews thus conducted to create learning environment *(20%)* (Tools can be used to enhance this content e.g. Microsoft Project and Excel for the Risk Assessment.)
2 Change and Scope Management **(C&SM)** *(Total = 100 %)*	Techniques for change and scope management of the project. *(20%)* Standards and procedures needs to be defined and in place. *(50%)* Proper documentation and reporting thus also improving communication skills. *(30%)*
3 Stakeholder Management **(SM)** *(Total = 100 %)*	Techniques for understanding the requirements of stakeholder's customer requirements *(70%)* and team expectations. *(30%)*
4 Conflict Management **(CM)** *(Total = 100 %)*	Techniques needed to resolve conflict between all stakeholders including customer *(50%)*, contractor *(10%)* and team members. *(40%)*
5 Financial Management **(FM)** *(Total = 100 %)*	Techniques needed to understand financial calculations such EVA, ROI, NPV.
6 Contract and Legal requirement **(C&LR)** *(Total = 100 %)*	Techniques needed for understanding contracts *(50%)* legal implications of contracts. *(50%)*
7 Performance Management **(PM)** *(Total = 100 %)*	Techniques needed to conduct performance management for the project *(50%)* and team performance. *(50%)*

TABLE 4.3: Adequacy scale

Scale Parameters	Extremely Inadequate	Inadequate	Moderately Adequate	Adequate
Scale Percentage	0-25%	26-50%	51-75%	76-100%

4.2 **Presentation of the results and analysis**

The scores were determined after an extensive content analysis for the seven knowledge areas of the selected certification programs.

Three analyses were conducted; one was to examine the adequacy of each program. The second was to get an overall comparative picture of the adequacy of the knowledge areas. The third focused on the adequacy of coverage of the content of the seven knowledge areas per individual programs. This analysis led to the gaps that exist per certification program.

4.2.1 **Presentation of results**

The results from the content analysis are presented in Table 4. 4 below and a detailed results table is present in Appendix A.

TABLE 4.4: Results per certification program

Knowledge Areas	AACE	PMI	UK APM	IPMA	AAPM	IAPPM	Aveage Score Per KA
Project Management Techniques	40	92	92	88	72	87	78.50
Change & Scope Management	49	85	86	77	75	80	75.33
Stakeholder Management	40	20	50	60	90	50	51.67
Conflict Management	30	20	60	30	60	40	40.00
Financial Management	100	80	75	54	30	40	63.17
Contract & Legal Requirements	40	30	55	30	40	20	35.83
Performance Management	40	40	60	80	40	40	50.00
Average Score per Certification Program	48.43	52.43	68.29	59.86	58.14	51.00	

4.2.2 **Adequacy of the programs**

Results of the analysis for the adequacy of all the programs are presented in Figure 4.3. The results indicated that AACE is not adequate were as the other five-certification program are moderately adequate. AACE has the lowest score of 48% and UK APM scored the highest of 68.29%.

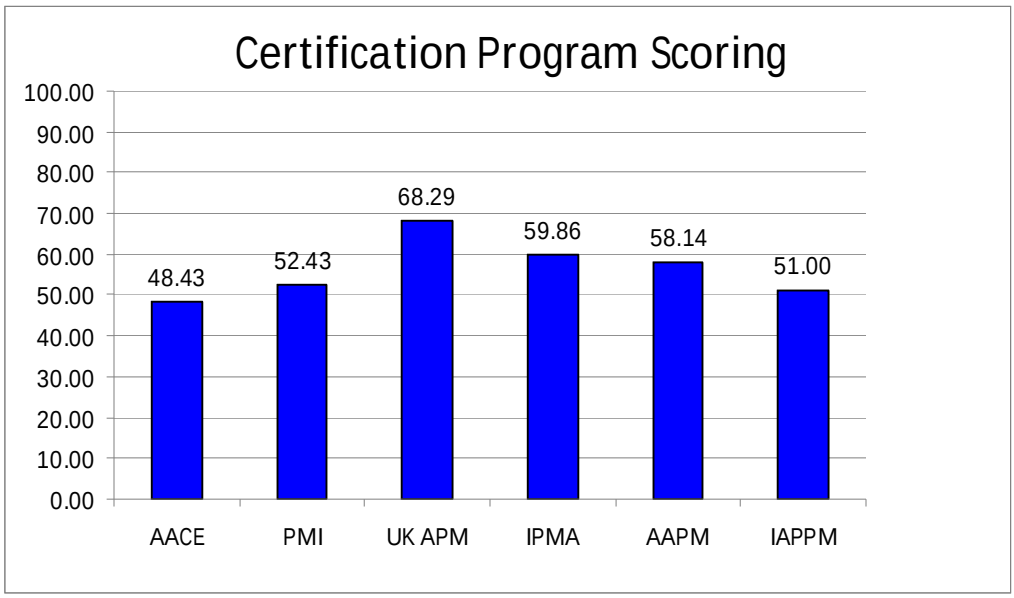


Figure 4.3: Comparative analysis of the certification program scoring

According to the analysis PMI, UK APM, IPMA, AAPM and IAPPM are in the moderately adequate band (51-75%), which indicated that theses five programs are adequate but still requires some adjustments in certain dimensions to become fully adequate.

These results provide part of the answer to the research question 1:

> ***Research Question 1:"Are the PM voluntary associations or certification institutes providing adequate PM knowledge base for their members?"***

From the results the certification programs are only moderately adequate in providing would-be competent project managers, indicating that there still are gaps. The next dimensions provide the gaps of the certification programs.

4.2.3 **The inadequacy of the knowledge areas**

Further analysis was conducted to obtain the average impression of each dimension for all programs through averaging the scores. This will answer the next research question if the knowledge areas within the certification program are adequate

> ***Research Question 2 "Are there any gaps between the ideal PM knowledge base and PM Certification requirements?"***

The results are summarised in Figure 4.4. On average the results indicated that two of the knowledge areas are adequate i.e. Project management techniques (PMT) and the Change and Scope management (C&SM). According to the measurement scale both PMT and C&SM are adequate, but this is at the lower level of the scale. This means that on average certification programs are adequate in those knowledge areas. (Note that this is an average score and the next section will provide an analysis of each individual certification program.)

According to the measurement scale Financial Management (FM) and Stakeholder Management (SM) are moderately adequate on average. This means that although theses knowledge areas are adequate there still are gaps that need to be addressed in these areas.

According to the measurement scale Conflict Management (CM), Performance Management (PM) and Contract and Legal Requirements (C&LR) are inadequate on average, this means that generally certification programs do not focus on theses aspects therefore sometimes neglecting the core knowledge areas.

Theses scores are average scores of the knowledge areas and indicated the performance of the certification programs in general. If each of the programs are isolated and analysed on their own some programs may differ from the average as indicated.

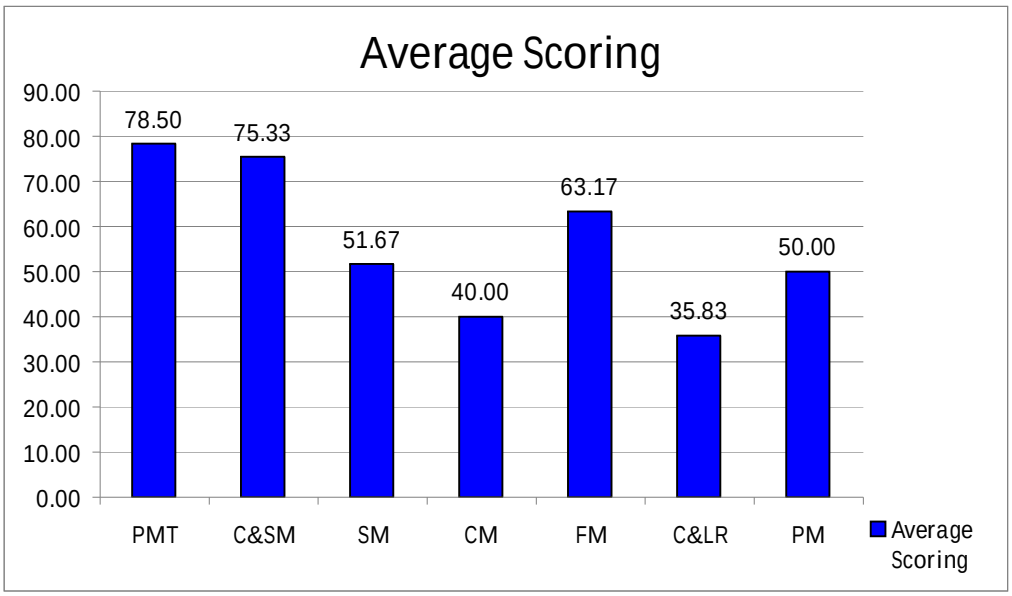


Figure 4.4: Average scoring of the knowledge areas

Each individual certification program was then analysed next focusing on the same research question to determine the gaps of each of the individual certification program against the proposed knowledge base.

4.2.4 **Individual certification program scoring obtained**

This section indicated the scoring obtained by each of the individual certification programs using the coding frame developed and the adequacy scale developed in Chapter 3, Tables 3.2 and 3.3 respectively.

(a) **Association for the Advancement of Cost engineering (AACE)**

The results presented in Figure 4.5 indicated that AACE is adequate in Financial Management (FM= 100%).

AACE is inadequate in Project Management Techniques (PMT=40%), Change and Scope Management (C&SM= 49%), Stakeholder Management (SM=40%), Conflict Management (CM=30%), Contract and Legal Requirments (C&LR=40%) and Performance Management (PM=40%).

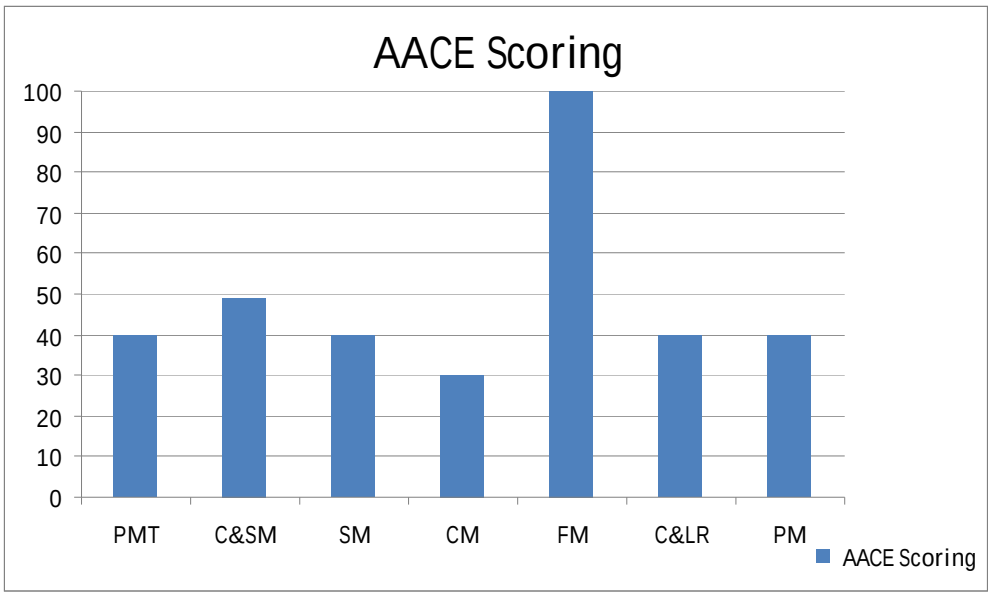


Figure 4.5: AACE scoring

The Cost Estimating Guide focuses on cost estimates inputs, cost estimate classifications, cost estimate methods, the development processes, cost outputs and cost expectations.

The supporting skills and knowledge of a cost engineer also focuses on elements of cost, elements of analysis and enabling knowledge. The first aspect focuses on the costs and the enabling knowledge focus on society, people and the organization, information management, quality management and the environment, health and safety.

AACE focus more on producing successful cost engineers therefore these individuals that get the AACE certification are competent in carrying out the costing aspects of a project but are not fully competent to carry out certain aspects of projects.

(b) **The Project Management Institute (PMI)**

The results presented in Figure 4.6 indicated that PMI is adequate in Project Management Techniques (PMT= 92%), Change and Scope Management (C&SM = 85%) and Financial Management (FM = 80%). One of the nine knowledge areas in PMBOK, Chapter 4: Project Integration allows effective PM techniques and scope and change management.

PMI is inadequate in Contract and Legal Requirements (C&LR=30%) and Performance Management (PM=40%). Chapter 12 discussed the project procurement management focusing mostly on the procurement plan, conduct procurements, administer procurement and close procurement. There is however very little focus on the contract and the legal requirements. Chapter 9 discussed HR management of the project team but focuses mostly on identifying the skills, availability and improving the competencies of the team.

PMI is extremely inadequate in Stakeholder Management with a score of (SM=20%) and Conflict Management with a score of (CM=20%).

PMI has developed a chapter in version 4 relating to stakeholder management, project integration relating to developing the stakeholder requirements. There is also mention in Chapter 10 that puts forwards a stakeholder analysis but this needs to be developed further to understand all stakeholder requirements so that all stakeholders can work in a uniformed approach. Chapter 9 focuses on HR performances; this however does not focus on the teams' expectation to determine if they are aligned with the project without proper understanding between all stakeholders deliverables will be difficult to achieve.

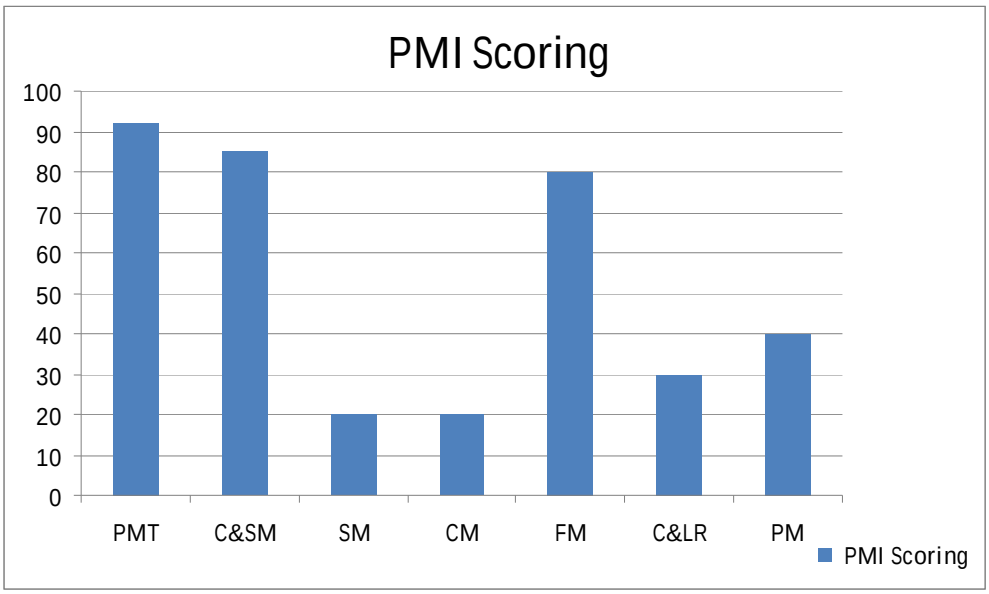


Figure 4.6: PMI scoring

(c) **The UK Association for Project Management (UK APM)**

The results presented in Figure 4.7 indicated that the UK APM is adequate in Project Management Techniques (PMT= 92%), Change and Scope Management (C&SM = 86%) and Financial Management (FM = 75%). UK APM BoK listed seven sections that deal with Project management in context, planning the strategy, Executing the strategy, Techniques, Business and Commercial, Organisation and Governance, People and the profession.

Chapter 2 focused on how the stakeholders' needs are measured and the success criteria. The project management plan and project risk management are discussed in this section. Chapter 3 focused on Scope management, scheduling and Resource management.

UK APM is moderately adequate in Conflict Management (C&LR=55%) and Performance Management (PM=60%). Chapter 7 focused on Conflict Management and it is identified in APM Bok as a process of identifying and addressing differences that when unmanaged would affect the project objectives. Conflict management needs to focus on all stakeholders as well including the customers, contractors and the team.

Section 7.6 deals with human resource management and polices that deal with retention, reward, personal development and training and career development. Therefore there is a lack of tying in how an individual is contributing to the project success and more focus on training and career development.

UK APM is inadequate in Stakeholder Management (SM=50%). The UK APM BoK has a Section 2.2 regarding stakeholder management. However more effort should be done on how Stakeholders should be managed and prioritized.

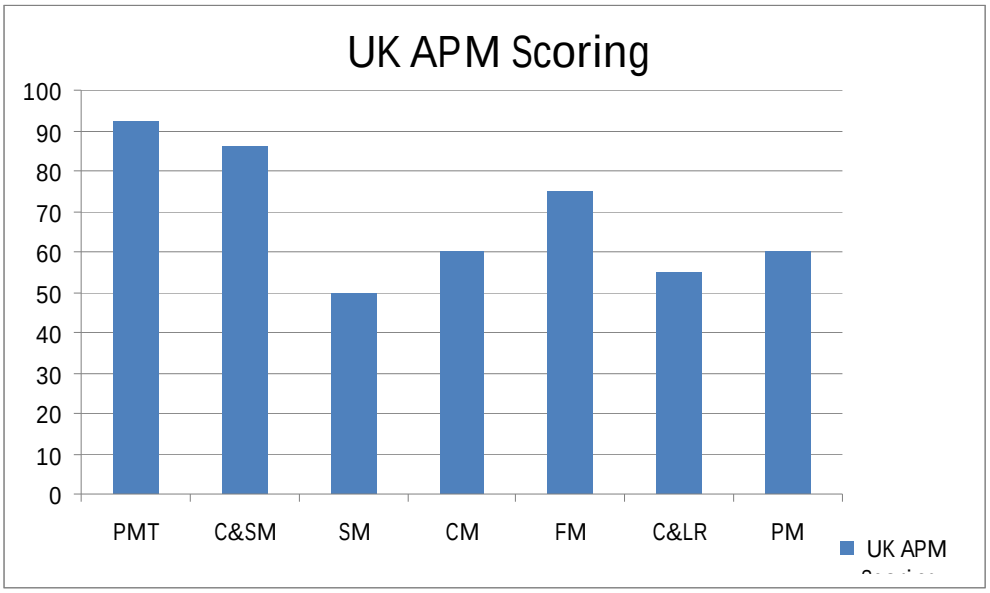


Figure 4.7: UK APM scoring

(d) **The International Project Management Associations (IPMA)**

The results presented in Figure 4.8 indicated that IPMA is adequate in Project Management Techniques (PMT= 88%), Change and Scope Management (C&SM = 77%) and Performance Management (PM = 80%). IPMA focuses mostly on the front end of the projects. IPMA has an auditing and health checks technique throughout the project.

IPMA is moderately adequate in Stakeholder Management (SM=60%) and Financial Management (PM=54%).

IPMA focuses mostly on the projects start up less emphasis is done on stakeholder analysis. There is a section that deals with Intercultural management competence that gives knowledge for working in cultural diverse teams in global environment but less effort is placed in understanding the team expectations

IPMA is extremely inadequate in Contract and Legal requirements (C&LR=30%) and Conflict Management (CM=30%). Although IPMA have sections on coaching and leading projects from a distance this focuses on a how the PM should adapt to new location requirements this does not focus on the techniques needed to resolve conflicts between all stakeholders which included the customer, contractor and the team members.

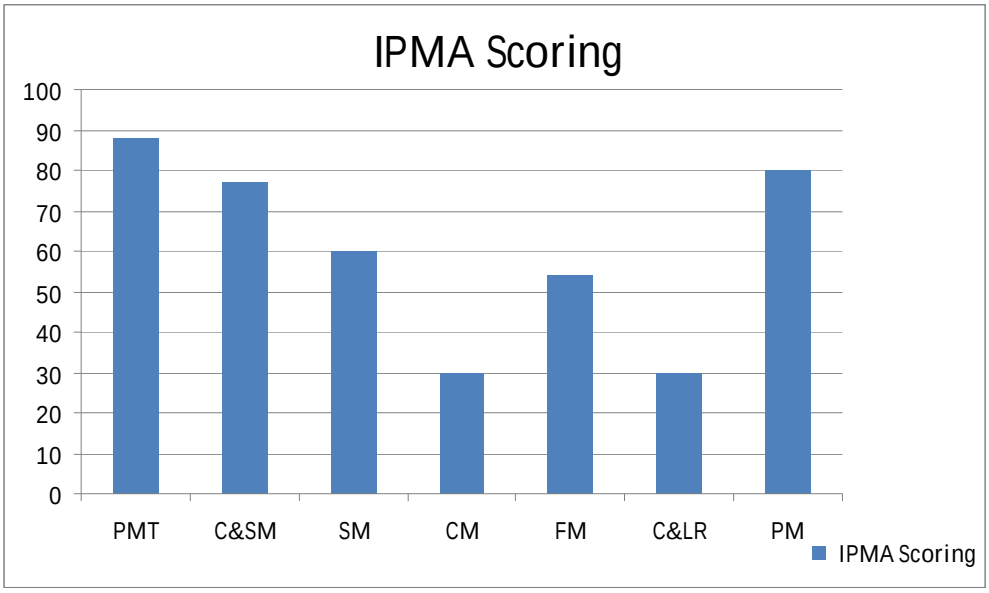


Figure 4.8: IPMA scoring

(e) **The American Academy of Project Management (AAPM)**

The results presented in Figure 4.9 indicated that AAPM is adequate in Project Management Techniques (PMT= 72%), Change and Scope Management (C&SM = 75%) and Stakeholder Management (FM = 90%).

The AAPM Bok Chapter 1 focused on making the project work, knowing the project stakeholders and amplifying the voice of the customers. Chapter 5 dealt with the project management processes.

AAPM is moderately adequate in Conflict Management (CM=60%). Not much information is mentioned on conflict management more emphasis is placed on strong project leadership where there is a central point of responsibility.

AAPM is inadequate in Financial Management (FM=30%), Contract and Legal Requirements (C&LR=40) and Performance Management (PM=40%). Not much information is mentioned on the project manager understanding Financial Management, Contract and Legal Requirements and the Performance Management.

The section that dealt with the project team members focus only internally on the performance management of the team and the core team members this needs to be interlinked with the team performance.

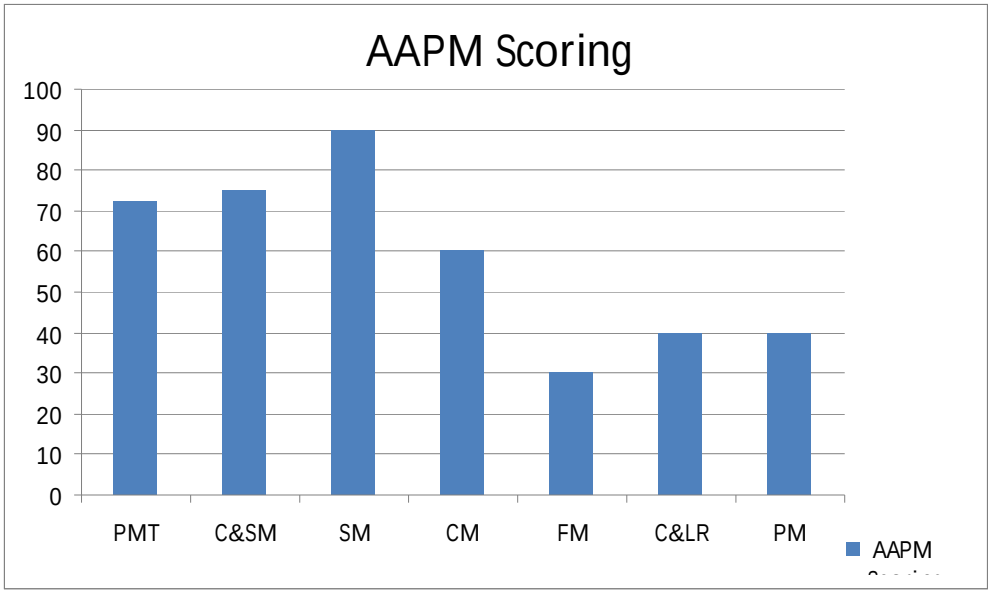


Figure 4.9: AAPM scoring

(f) **The International Association for Project and Program Management (IAPPM)**

The results presented in Figure 4.10 indicated that IAPPM is adequate in Project Management Techniques (PMT= 87%), Change and Scope Management (C&SM = 80%). The CPPM Guide has definition for project, programs and portfolios. The IAPPM have a framework for projects, programs and portfolios that are organized and aligned relation to internal or external forces. Chapter 6 of the guide discussed project management life cycle methodologies and discussed strategies for selecting a methodology to match the choice of the life cycle model.

IAPPM is inadequate in Stakeholder Management (SM=50%), Financial Management (FM=40%) and Conflict Management (CM=40%).

Not much information in the guide related to prioritising and management of stakeholders although Chapter 4 discusses the framework for identifying the external and internal forces. Not much information in the guide discussed Financial and Conflict management although some mention on managing the cultural aspects, a virtual team management and symptoms of a problematic team is mentioned in Chapter 12.

IAPPM is extremely inadequate in Contract and Legal Requirements Management (C&LR=20%). Some information is mentioned in the audit procedure about legal reviews and contract breach in Chapter 11 but this does not describe the techniques needed for understanding contracts or the legal implications of a contract.

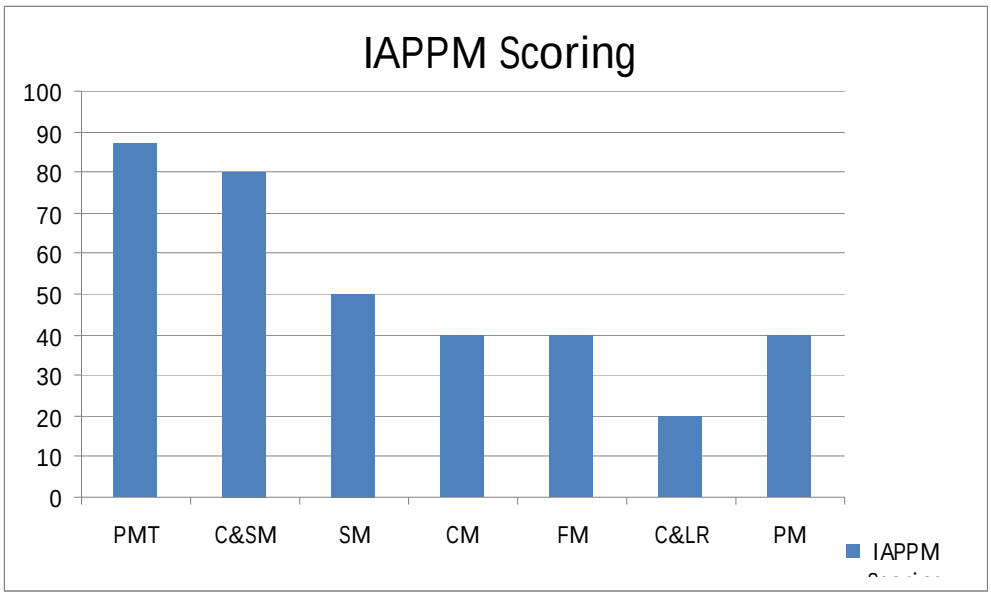


Figure 4.10: IAPPM scoring

4.3 **Validity of the answers to the research questions**

Research Question 1

> ***Research Question 1: Are the PM voluntary associations or certification institutes providing adequate PM knowledge base for their members?"***

Support for research question one was demonstrated with content analysis and averaging the scores obtained for all the knowledge areas of each certification program. The adequacy scale that was developed assisted in determining which band each program could be classed in.

The observations from Figure 4.3, the comparative analysis of the certification program scoring, indicated that five out of the six-certification program are in the moderately adequate band indicating that these programs are adequate.

The AACE is the only certification program that falls out of the adequacy band. This can be considered as an outlier.

The results indicated that although AACE provides certain aspects to project success, these individual that obtain the certification are not fully competent to carry out certain aspects of projects. Based on triangulation this confirms the results obtained by the study were Skulmoski (2001) indicated that certified cost engineers have the basic understanding of cost engineering skill and knowledge but the same cost engineer cannot be able to safely create a workable project schedule.

The five out of the six-certification programs are adequate they scored in the range of 51-68%. This is in the range 357 points – 478 points out of a total of 700 points. Therefore the certification programs do have gaps that need to be addressed. These gaps are addressed in Research Question three.

This answers research question one that the certification programs are providing adequate knowledge for project managers but they do have gaps in certain knowledge areas that need to be addressed.

Research Question 2

Research Question 2: "What constitute PM certification requirements?"

Support for research question two was demonstrated with analysing the theoretical requirements for certifications. Smith (2003) presented the requirements of a professional certification body. These criterions were mapped to the certification programmes to see if they comply with the criteria.

The criterions required three conditions to be met, a body of knowledge, ethical behaviours to be met and defined minimum entry requirements. All of the certification programs had the three criteria in place.

The body of knowledge needs to be adequate to train competent project managers. This research question is aligned with question one. The ideal knowledge base was used to test whether the certification programs provided adequate knowledge base.

This has been proved in research question one were five out of the six-certification programs provided moderately adequate knowledge base.

This answers research question two, that five out of the six-certification programs have the correct PM certification requirements in place to train competent project managers.

Research Question 3

Research Question 3: "Are there any gaps between the ideal PM knowledge base and PM Certification requirements?"

Support for research question 3 is obtained from the actual scores obtained. Although the certification programs provided moderately adequate knowledge base. They scored in the range of 51-68% or 357 points – 478 points out of a total of 700 points. This indicated that there are gaps in each of the certification programs that need to be addressed.

The average score obtained per knowledge area are listed in Table 4.5. The general trend on averages showed that gaps exists in Contract and Legal Management, which scored the lowest, Conflict Management, Performance Management, Stakeholder Management and Financial Management. These results indicated on average that although the certification programs provides adequate technical know how for would - project managers they lack on the social-cultural skills that they need. The AACE is an exception because they scored low on technical abilities but high on other areas.

TABLE 4.5: Average score per knowledge area scoring and gaps

Knowledge Areas	Scoring
Project Management Techniques	78.50%
Change and Scope Management	75.33%
Stakeholder Management	51.67%
Conflict Management	40%
Financial Management	63.17%
Contract and Legal Requirments	35.83%
Performance Management	50.00%

(a) **AACE**

The results indicated in Table 4.6 showed that the AACE was only adequate in Financial Management.

Therefore the AACE have gaps in the following areas Project Management Techniques, Change Scope management, Stakeholder Management, Conflict Management, Contract and Legal Requirements and Performance Management.

This means that AACE will produce members that cannot do critical aspects of a project. The critical aspects of the project mean planning, implementing, controlling and monitoring.

The certification holders will ***not*** be able to do:

- The basic technical abilities of planning, implementing, monitoring and controlling a project.
- Have the skills for change and scope management of projects.
- Be able to understand the stakeholders' requirements and be able to manage the stakeholder requirements.
- Understand contract and the legal implications of the contract
- Techniques to conduct performance management on the team and projects successfully.

This means that the certification holders are skewed to having knowledge on certain aspects of the projects therefore these members will find it difficult to conduct projects successfully at first and need to gain experience in the gaps mentioned.

TABLE 4.6: AACE individual scoring and gaps

Knowledge Areas	Scoring
Project Management Techniques	40%
Change and Scope Management	49%
Stakeholder Management	40%
Conflict Management	30%
Financial Management	100%
Contract and Legal Requirments	40%
Performance Management	40%

(b) **PMI**

The results in Table 4.7 indicated that PMI are adequate in Project Management Techniques, Change and Scope Management, Financial Management

Therefore PMI have gaps in the following areas, Stakeholder Management, Conflict Management, Contract and Legal Requirements and Performance Management.

This means that PMI will produce members that will know how to do the technical aspects of a project but will struggle with the social-cultural aspects of a project.

The certification holders will ***not*** be able to:

- Manage the stakeholder requirements properly.
- Understand contract and the legal implications of the contract
- Techniques to conduct performance management on the team and projects successfully.

This means that the certification holders are skewed to having technical knowledge of the projects therefore these members will find it difficult to conduct the social-cultural

aspects of the projects successfully and need to gain experience in the gaps mentioned.

Based on triangulation this confirms the results obtained in the study were Alam, Gale, Brown, and Khan (2010) stated that PMBoK only focuses on the technical skills and not the social cultural skills required by PM's managing projects successfully.

TABLE 4.7: PMI individual scoring and gaps

Knowledge Areas	Scoring
Project Management Techniques	92%
Change and Scope Management	85%
Stakeholder Management	20%
Conflict Management	20%
Financial Management	80%
Contract and Legal Requirments	30%
Performance Management	40%

(c) **UK APM**

The results indicated in Table 4.8 indicated that UK APM is adequate in Project Management Techniques, Change and Scope Management, Financial Management

Therefore UK APM have gaps in the following areas, Stakeholder Management, Conflict Management, Contract and Legal Requirements and Performance Management.

This means that UK APM will produce members that will know how to do the technical aspects of a project but will face some problems with the following aspects:

- Manage the stakeholder requirements properly.
- Understand contract and the legal implications of the contract
- Techniques to conduct performance management on the team and projects successfully.

This means that the certification holders are skewed to having technical knowledge of the projects therefore these members will find it difficult to conduct certain aspects of the projects successfully and need to gain experience in the gaps mentioned.

TABLE 4.8: UK APM individual scoring and gaps

Knowledge Areas	Scoring
Project Management Techniques	92%
Change and Scope Management	86%
Stakeholder Management	50%
Conflict Management	60%
Financial Management	75%
Contract and Legal Requirments	55%
Performance Management	60%

(d) **IPMA**

The result in Table 4.9 indicated that IPMA is adequate in Project Management Techniques, Change and Scope Management and Performance Management.

Therefore IPMA have gaps in the following areas, Stakeholder Management, Conflict Management, Contract and Legal Requirements and Financial management.

This means that IPMA will produce members that will know how to do the technical aspects of a project and the performance management aspects of the project but will struggle with the managing stakeholders, conflict, contract and legal aspects and financial aspects of a project.

The certification holders will ***not*** be able to:

- Manage the stakeholder requirements properly.
- Understand contract and the legal implications of the contract
- Understand the techniques to resolve conflict among stakeholders, contractors and team members.
- Understand fully the techniques to understand the financial calculations.

This means that the certification holders are skewed to having technical knowledge and the performance management aspects of the projects therefore these members will find it difficult to conduct certain social-cultural aspects of the projects successfully and need to gain experience in the gaps mentioned.

TABLE 4.9: IPMA individual scoring and gaps

Knowledge Areas	Scoring
Project Management Techniques	88%
Change and Scope Management	77%
Stakeholder Management	60%
Conflict Management	30%
Financial Management	54%
Contract and Legal Requirments	30%
Performance Management	80%

(e) **AAPM**

The results in Table 4.10 indicated that AAPM is adequate in, Change and Scope Management and Stakeholder Management

Therefore AAPM have gaps in the following areas Project Management Techniques, Conflict Management, Financial Management, Contract and Legal Requirements and Performance Management.

This means that AAPM will produce members that will know how to do the stakeholder management and the change and scope management aspects of a project but will struggle with social-cultural aspects of a project.

The certification holders will ***not*** be able to:

- Conduct post project reviews and create a learning environment.
- Understand contract and the legal implications of the contract
- Techniques to conduct performance management on the team and projects successfully.

- Understand fully the techniques to understand the financial calculations.
- Understand the techniques to resolve conflict among stakeholders, contractors and team members.

This means that the certification holders are skewed to having technical knowledge of the projects but not able to handle post project reviews and create a learning environment. Also these members will find it difficult to conduct the social-cultural aspects of the projects successfully and need to gain experience in the gaps mentioned.

TABLE 4.10: AAPM individual scoring and gaps

Knowledge Areas	Scoring
Project Management Techniques	72%
Change and Scope Management	75%
Stakeholder Management	90%
Conflict Management	60%
Financial Management	30%
Contract and Legal Requirments	40%
Performance Management	40%

(f) **IAPPM**

The results in Table 4.11 indicated that IAPPM is adequate in Project Management Techniques and Change and Scope Management.

Therefore IAPPM have gaps in the following areas, Stakeholder Management, Conflict Management, Contract and Legal Requirements, Financial Management and Performance Management.

This means that IAPPM will produce members that will know how to do the technical aspects of a project but will struggle with the social-cultural aspects of a project.

The certification holders will ***not*** be able to :

- Manage the stakeholder requirements properly.
- Understand contract and the legal implications of the contract
- Techniques to conduct performance management on the team and projects successfully.
- Understand the techniques to resolve conflict among stakeholders, contractors and team members.
- Understand fully the techniques to understand the financial calculations.

This means that the certification holders are skewed to having technical knowledge of the projects therefore these members will find it difficult to conduct the social-cultural aspects of the projects successfully and need to gain experience in the gaps mentioned.

TABLE 4.11: IAPPM individual scoring and gaps

Knowledge Areas	Scoring
Project Management Techniques	87%
Change and Scope Management	80%
Stakeholder Management	50%
Conflict Management	40%
Financial Management	40%
Contract and Legal Requirments	20%
Performance Management	40%

Research Question 4

Research Question 4: "Do PM Certification requirements need to be re-viewed towards providing adequate PM knowledge base?"

Support for Research Question 4 is obtained from the analysis of the gaps from the previous research question. Depending on the certification program offering this indicated knowledge areas were certifications programs were strong and weak therefore

although the overall score was indicating that the certification program was within the moderately adequate band there were also knowledge areas were certification programs scored way below the adequate levels required.

Figure 4.11 provides a view towards this question and it was noted which certification program scored better in certain knowledge areas than the others. For example the AACE are the best in Financial Management, PMI and UK APM are the best in Project Management Techniques, UK APM is the best in Change and Scope Management, AAPM is the best in Stakeholder Management, UK APM and AAPM are the best in Conflict management, UK APM is the best in Contract and Legal Requirements and IPMA is the best in Performance Management.

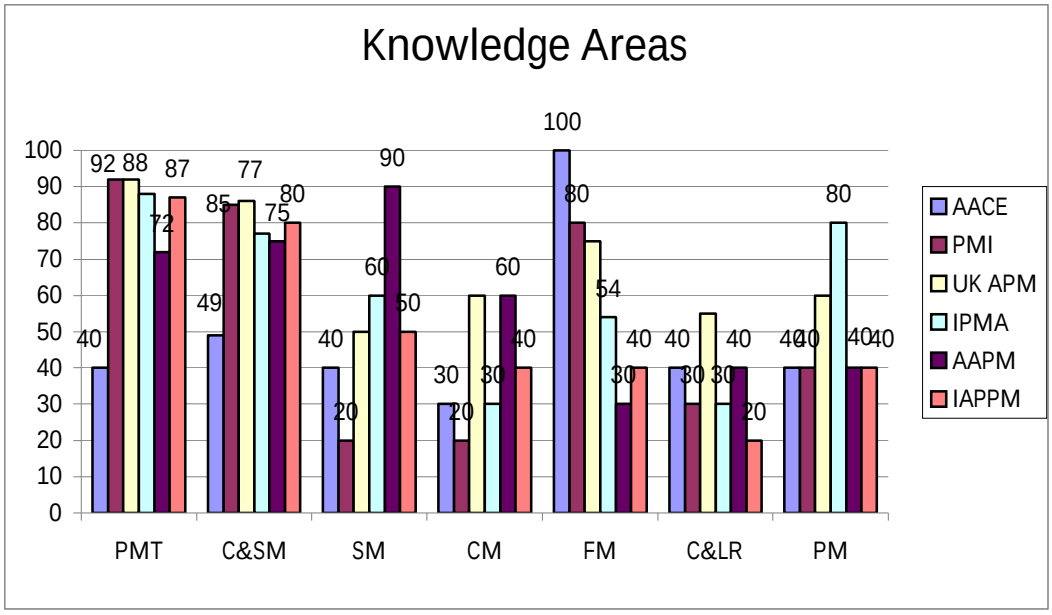


Figure 4.11: Knowledge areas

The converse for the above can also be applied. We can also identify certification programs that scored the lowest per knowledge as indicated by Figure 4.11.

For example AACE scored the worst in Project Management Techniques and Change Scope Management, PMI scored the worst in Stakeholder management and Conflict management, AAPM scored the worst in Financial Management, IAPPM

scored the worst in Contract and Legal management, AACE, PMI, AAPM and IAPPM scored the worst in Performance Management.

4.4 **Discussion of results**

The first research question of this report “Are the PM voluntary associations or certification institutes providing adequate PM knowledge base for their members?” was answered in Section 4.3 of Chapter four. This section indicated that only one certification program was not adequate were as the other five were in the moderately adequate band. This indicated that although the certifications programs were moderately adequate scoring between (51 – 68%) there were some gaps that exist to make the programs inadequate.

The second research question “What constitute PM certification requirements?” was answered in, Section 4.3. Chapter two discussed in detail the certification requirements for each program.

The third research question “Are there any gaps between the ideal PM knowledge base and PM Certification requirements?” were answered in Section 4.3. These sections indicated on average that that nearly all of the certification programs provided adequate knowledge in PMT and C&SM both scoring an average of 78.5 % and 75.3% respectively, moderately adequate in Financial Management (63.17%) and Stakeholder Management (51.67%) but not adequate in Performance Management (50%), Conflict Management (40%) and Contract and legal management (35.83%). Therefore there are gaps that exist in these areas that need to be addressed. Also an individual analysis was performed per certification program to determine were the gaps are.

The fourth research question “Do PM Certification requirements need to be reviewed towards providing adequate PM knowledge base?” This was answered in Section 4.3. It was noted that depending on the certification program offerings, each of them had their own strong knowledge areas; indicating that each certification program is competent in their own specialities and each of them have their own gaps depending on the knowledge areas.

4.5 **Sensitivity Analysis**

A sensitivity analysis was conducted in Appendix B, taking into account a 5% fluctuation in the scoring of the results therefore determining whether if the scoring increased by a 5% or decreased by 5% how robust are the findings.

From this sensitivity analysis a 5% increases in the scoring of each competency requirement causes no affect on the results.

From this sensitivity analysis a 5% decrease in the scoring of each competency requirement indicate that:

- PMI and UK APM are above the scale for “Understand the project management process from planning, implementation, monitoring and controlling.”
- IAPPM, IPMA, PMI, UK APM are above the scale for “Understand quantity and be able to conduct risk mitigation and assessments.”
- AACE is above the scale for “Techniques needed to understand financial calculations such EVA, ROI, NPV”
- UK APM is above the scale for “Techniques needed to resolve conflict between contractor ”

4.6 **Summary**

The presentation of raw results has been made in this chapter. Tables and graphs were used to analysis the data. Interpretations and the discussion of the results were also conducted. Chapter 5 will discuss the conclusions and recommendations.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

Chapter four provided the results and discussions. This chapter discusses the conclusion and recommendations. This chapter concludes the overall research investigation. Figure 5.1 indicates that all the objectives of the research have been addressed. The conclusions and the recommendation of the research are presented, after which areas of future research are proposed. The chapter layout is provided in Figure 5.2.

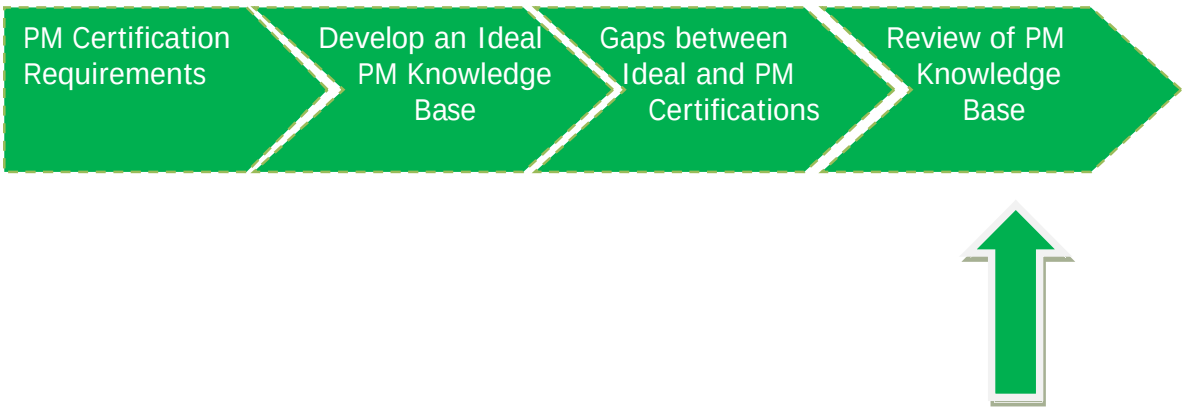
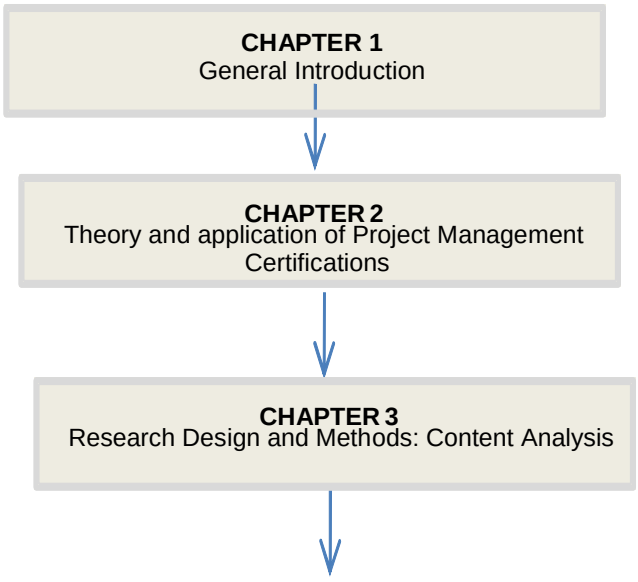


Figure 5.1 Progress thus far



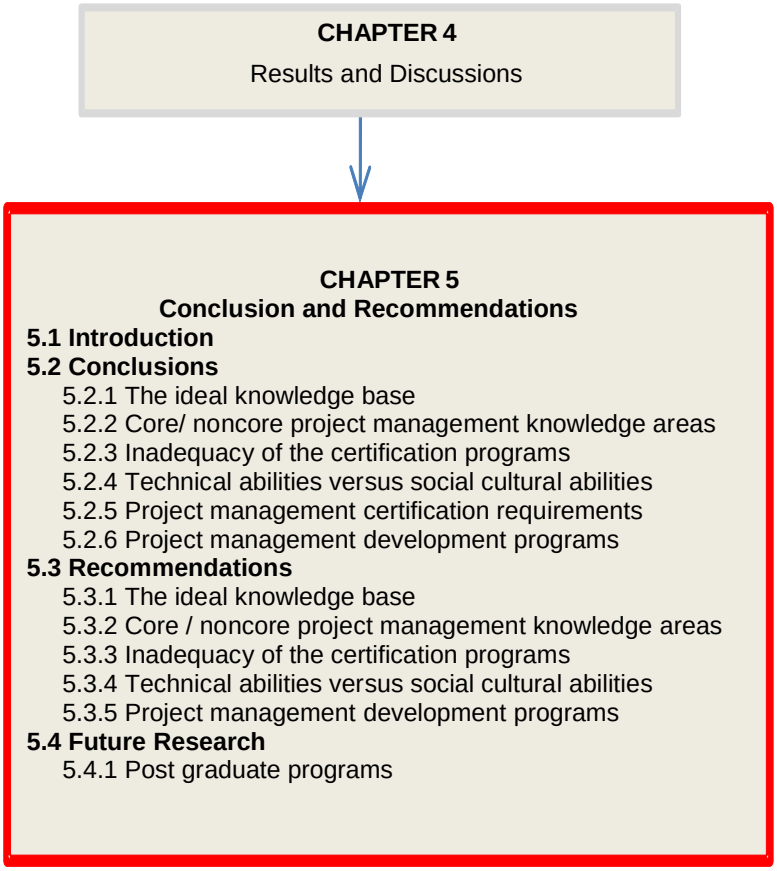


Figure 5.2: Chapter 5 in context with the overall research report

5.1 **Introduction**

This section presented the conclusions, provided recommendations and discussed further research. This chapter presented the conclusions to the research based on the detailed content analysis that was conducted and were presented in Chapter 4, provided the recommendations and future research that can be done after this re-search.

5.2 **Conclusions**

5.2.1 **The ideal knowledge base**

The Ideal knowledge base should be composed of the right mix of technical skills and social cultural skills.

The success of a project consists of project managers demonstrate that they have skills in both areas.

5.2.2 **Core / noncore project management knowledge areas**

Project management certification programs are focusing less on the core competencies that are required for project managers and are covering noncore knowledge areas.

5.2.3 **Inadequacy of the certification programs**

The scores indicated the general trend showed on average that gaps exist in Contract and Legal Management, which scored the lowest, Conflict Management, Performance Management, Stakeholder Management and Financial Management. This indicated on average that the certification programs are still lacking in the social-cultural aspects.

5.2.4 **Technical abilities versus social cultural abilities**

a) Technical skills

Most of the certification have adequate knowledge areas containing the project management technique of conducting a project. This entailed the planning, implementation, monitoring, and controlling. Most of the certification programs indicated that they have adequate knowledge base in change and scope management

b) Social cultural skills

Most certification programs indicated that knowledge areas containing the conflict management, stakeholder management and performance management are lacking.

5.2.5 **Project management certification requirements**

Most certification programs have minimum certification requirements that allow applicants to join. Most of certification minimum requirements consisted of a bachelor's degree and a number of years of experience.

Most certification programs have levels were applicants can be placed based on their current capabilities and have requirements for each level (i.e. a project management student will not have the same expertise as a project manager with 12 years of project management experience, therefore based on applicants qualification, experience, knowledge, skill an applicant will be placed in different levels.

Most certification programs have generated their own standards that applicants need to meet. These standards determine whether the candidate is competent project manager.

5.3.6 **Project management development programs**

Many organisations rely on certification programs to hire 'competent project managers'. However if the certification programs have gaps the project managers that are considered to be 'competent' by the certification programs will also have gaps in their development.

Therefore certification programs need to review their knowledge base to ensure that the development of the project managers have been achieved holistically.

5.3 **Recommendations**

5.3.1 **The ideal knowledge base**

Project management as a career attracts many individuals recently. The ideal knowledge base should be composed of the right mix of the technical aspects as well as the social cultural aspects that are required to develop project managers. The ideal knowledge base that was developed in this research addressed both aspects that are required to develop competent project managers.

5.3.2 **Core / noncore project management knowledge areas**

It is recommended that certification programs need to review their knowledge base to ensure that they focus on the core competencies. The core competencies of what's required have been addressed in Chapter 2, Table 2.10.

5.3.3 **Inadequacy of the certification programs**

The certification programs knowledge base needs to be reviewed to address the inadequacies that exist. This research could be used to improve the existing knowledge base project manager's need.

5.3.4 **Technical abilities versus social cultural abilities**

Certification programs need to start focusing on developing their social cultural aspects.

5.3.5 **Project management development programs**

Organisations should work with the certification programs in addressing the skills that are lacked and not rely exclusively on project certification programs for the development of project managers.

5.4 **Further research**

The scope of this work was limited to certification programs only. Future research can incorporate the following:

5.4.1 **Post graduate programs at learning institutions**

Similar studies can be conducted to determine whether project management post graduate programs provides adequate knowledge base to post graduate students attaining post graduate qualifications in project management. The knowledge base that has been proposed in this research could be used to compare the adequacy of the project management programs.

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APPENDIX A: Detailed Results Layout

Knowledge Area	Competence Required	Score	AACE	AAPM	IAPPM	IPMA	PMI	UK APM
Project Management Techniques (PMT)	Understand the project management process from planning, implementation, monitoring and controlling.	55	15	45	50	49	54	54
	Understand quantity and be able to conduct risk mitigation and assessments.	20	15	15	22	22	23	23
	Techniques for conducting post project reviews thus conducted to create learning environment	25	10	12	15	17	15	15
Change and Scope Management (C&SM)	Techniques for change and scope management of the project.	20	10	15	15	15	15	16
	Standards and procedures needs to be defined and in place.	50	20	35	40	42	45	45
	Proper documentation and reporting thus also improving communication skills.	30	19	25	25	20	25	25
Stakeholder Management	Techniques for understanding the requirements of stakeholder's customer requirements	70	30	65	30	35	10	30
	Techniques for understanding the requirements of team expectations.	30	10	25	25	25	10	20
Conflict Management	Techniques needed to resolve conflict between all stakeholders including customer	50	15	35	20	15	10	30
	Techniques needed to resolve conflict between contractor	10	5	5	5	5	5	10
	Techniques needed to resolve conflict between and team members.	40	10	20	15	10	5	20
Financial Management	Techniques needed to understand financial calculations such EVA, ROI, NPV.	100	100	30	40	54	80	75
Contract and Legal Management	Techniques needed for understanding contracts	50	25	20	20	15	15	30
	Techniques needed for understanding legal implications of contracts	50	15	20	20	15	15	25
Performance Management	Techniques needed to conduct performance management for the project	50	30	35	20	40	20	30
	Techniques needed to conduct performance management for team performance.	50	10	25	20	40	20	30

APPENDIX B : Sensitivity Analysis

Sensitivity Analysis - If the Scoring changed by a 5% increase

Knowledge Area	Competence Required	Score	AACE	AAPM	IAPPM	IPMA	PMI	UK APM
Project Management Techniques (PMT)	Understand the project management process from planning, implementation, monitoring and controlling.	58	15	45	50	49	54	54
	Understand quantity and be able to conduct risk mitigation and assessments.	21	15	15	22	22	23	23
	Techniques for conducting post project reviews thus conducted to create learning environment	26	10	12	15	17	15	15
Change and Scope Management (C&SM)	Techniques for change and scope management of the project.	21	10	15	15	15	15	16
	Standards and procedures needs to be defined and in place.	52.5	20	35	40	42	45	45
	Proper documentation and reporting thus also improving communication skills.	31.5	19	25	25	20	25	25
Stakeholder Management	Techniques for understanding the requirements of stakeholder's customer requirements	73.5	30	65	30	35	10	30
	Techniques for understanding the requirements of team expectations.	31.5	10	25	25	25	10	20
Conflict Management	Techniques needed to resolve conflict between all stakeholders including customer	52.5	15	35	20	15	10	30
	Techniques needed to resolve conflict between contractor	10.5	5	5	5	5	5	10
	Techniques needed to resolve conflict between and team members.	42	10	20	15	10	5	20
Financial Management	Techniques needed to understand financial calculations such EVA, ROI, NPV.	105	100	30	40	54	80	75
Contract and Legal Management	Techniques needed for understanding contracts	52.5	25	20	20	15	15	30
	Techniques needed for understanding legal implications of contracts	52.5	15	20	20	15	15	25
Performance Management	Techniques needed to conduct performance management for the project	52.5	30	35	20	40	20	30
	Techniques needed to conduct performance management for team performance.	52.5	10	25	20	40	20	30

Sensitivity Analysis - If the Scoring changed by a 5% decrease

Knowledge Area	Competence Required	Score	AACE	AAPM	IAPPM	IPMA	PMI	UK APM
Project Management Techniques (PMT)	Understand the project management process from planning, implementation, monitoring and controlling.	52	15	45	50	49	54	54
	Understand quantity and be able to conduct risk mitigation and assessments.	19	15	15	22	22	23	23
	Techniques for conducting post project reviews thus conducted to create learning environment	24	10	12	15	17	15	15
Change and Scope Management (C&SM)	Techniques for change and scope management of the project.	19	10	15	15	15	15	16
	Standards and procedures needs to be defined and in place.	47.5	20	35	40	42	45	45
	Proper documentation and reporting thus also improving communication skills.	28.5	19	25	25	20	25	25
Stakeholder Management	Techniques for understanding the requirements of stakeholder's customer requirements	66.5	30	65	30	35	10	30
	Techniques for understanding the requirements of team expectations.	28.5	10	25	25	25	10	20
Conflict Management	Techniques needed to resolve conflict between all stakeholders including customer	47.5	15	35	20	15	10	30
	Techniques needed to resolve conflict between contractor	9.5	5	5	5	5	5	10
	Techniques needed to resolve conflict between and team members.	38	10	20	15	10	5	20
Financial Management	Techniques needed to understand financial calculations such EVA, ROI, NPV.	95	100	30	40	54	80	75
Contract and Legal Management	Techniques needed for understanding contracts	47.5	25	20	20	15	15	30
	Techniques needed for understanding legal implications of contracts	47.5	15	20	20	15	15	25
Performance Management	Techniques needed to conduct performance management for the project	47.5	30	35	20	40	20	30
	Techniques needed to conduct performance management for team performance.	47.5	10	25	20	40	20	30