THE DEVELOPMENT OF A CONTEXTUAL TRAINING AND CAREER MANAGEMENT FRAMEWORK FOR ICT PROJECT MANAGERS

by

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ABSTRACT

Projects in the information and communication technology (ICT) domain fail at an alarming rate, due to the inability of project managers to deal with complexity. This inability starts with the inadequate training that many project managers receive. A thesis was developed arguing that a framework is needed that will facilitate the training and development of ICT project managers in a specific country.

As point of departure, this research was undertaken in South Africa. It took an interpretivist view and set as its aim the development of a framework that will help to interpret the current reality on ICT project management and the training and career management of project managers better. The training and career management framework was developed for ICT project managers through documentary analysis and constructed through the addition of elements and components at the end of each chapter.

The theoretical framework that was developed, together with its description, suggests that ICT project managers need to be trained and developed by considering a framework that contains the following components and elements:

- The training and development legislative framework of a specific country
- The ambit of professional bodies, as well as the certifications and qualifications that they offer (in this case Project Management)
- How projects and programmes, as well as the inclination to manage them from a portfolio perspective, can contribute to the execution of the strategy
- How the organisational design can contribute to the definition of roles and functions in a projectised organisation
- How the grouping of these roles and functions, within the concept of a job family, can contribute to the achievement of competence in ICT project managers

The entire framework is presented at the end of the study.

KEY WORDS:

Project management, programme management, portfolio management, human resources management, information and communication technology, job family, career development, training, professional bodies, organisational design, governance.

DECLARATION

I, Dirk Krüger, declare that the thesis with title,

The development of a contextual training and career management framework for ICT project managers,

is my own work and that all sources used and/or quoted have been indicated.

All the sources are acknowledged by means of a complete bibliography.

The thesis was language edited by Janine Smit, independent language practitioner, BA (English and Afrikaans), University of Pretoria (1983); Postgraduate Diploma in Translation, University of South Africa (1990).

Dirk Krüger

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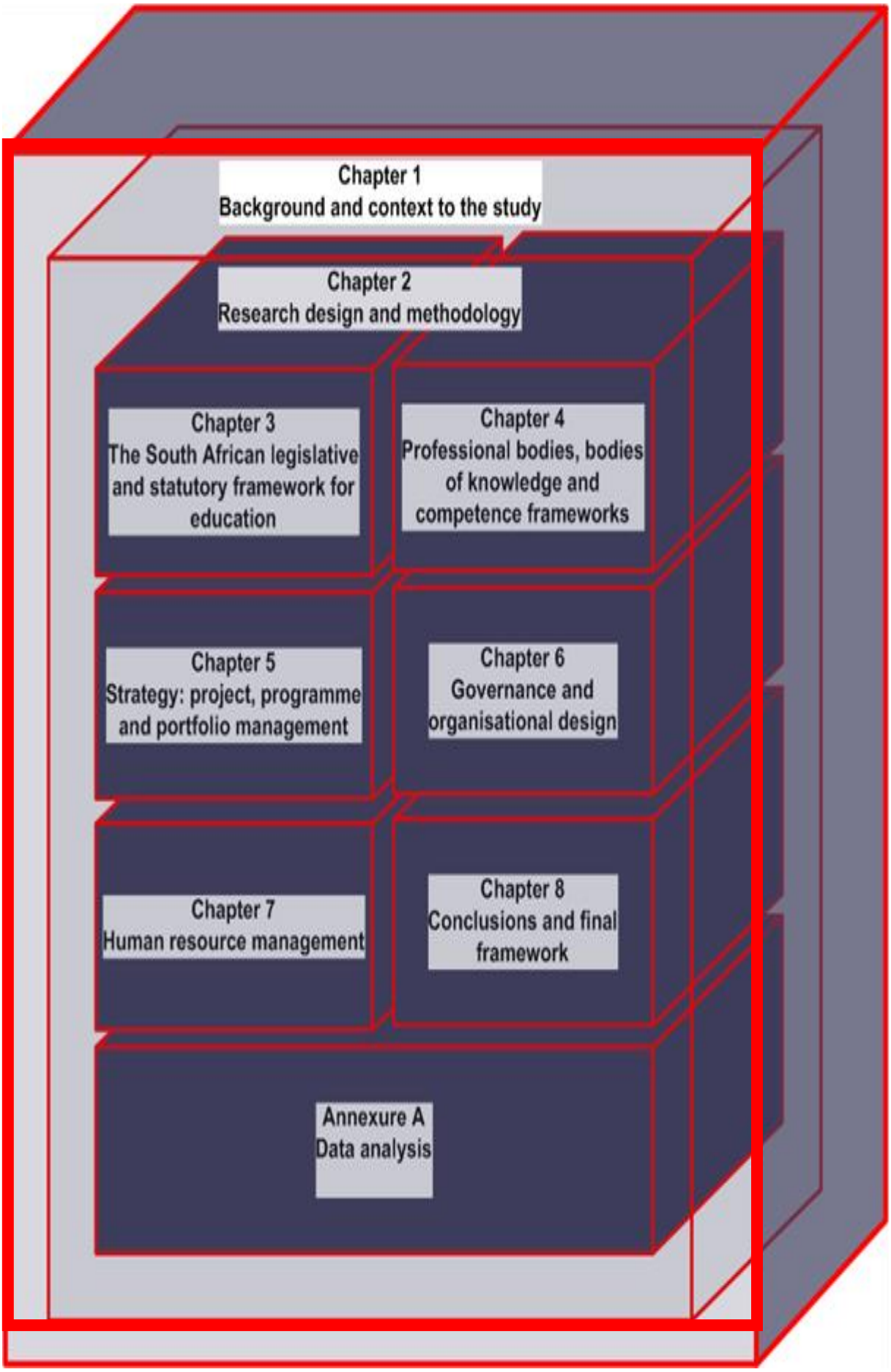
CONTENTS

LIST OF TABLES

LIST OF FIGURES

Chapter 1. Background and context to the study



1.1 Introduction

By the turn of the 18th century, the world was in the midst of the Industrial Revolution. People under serfdom were migrating to the cities where factories had sprung up because of industrialisation.

The effect of the transformation from serf to worker gave rise to new social behaviours, where people were now grouped together in a work environment, were not responsible for their own outcomes and deliverables, and had to work together to achieve a common goal in terms of production output. People like FW Taylor, Frank and Lillian Gilbreth, and Henry Fayol investigated the new social behaviour pattern that accompanied industrialisation. The outcome of this research was the establishment of a new science: scientific management (Edgel, n.d.).

Henry Ford expanded this concept of scientific management and introduced the concept of a production line to his factories and work life. The development of the scientific management approach, as well as that of Ford's production line, was sparked by the harnessing of the power of steam. For years, from the early 1900s to the mid-1950s, the scientific management approach, production lines and conducting work in accordance with job specialisation by breaking tasks up into smaller portions captivated the world. Time and motion studies were the order of the day, and people other than business owners were employed to manage the organisations and empires that were created. The world was introduced to a new type of worker: the professional manager (Edgel, n.d.).

Just as the harnessing of technology sparked the Industrial Revolution, so the world is caught up in another technology-driven revolution: information and communication technology (ICT) (Sandrone, 2014). This information technology (IT) revolution brought about a shift in the management thinking paradigm. All of a sudden information – and the speed with which it can be obtained and disseminated – began to give organisations the competitive advantage, as opposed to the productivity of a particular assembly line. A shift can also be seen in the behaviour of consumers. Within the well-established paradigm of production lines and scientific management, production runs could be long and a particular product could have a life span of several years. The marketing strategies were based on pushing products through the logistics and sales processes, and the work of management was relatively stable. Ten-year plans were the order of the day.

The IT revolution and faster flow of information changed that. Nowadays, marketers depend on a pull strategy to get products and services through the logistics and sales processes. Products mature much quicker and the decline in terms of the product life cycle is reached in a shorter time. This set the scene for the emergence of a new paradigm within which work needs to be executed that is non-standardised. Such a paradigm is required for only one type of service or a specific service, and has to be accomplished within a short period of time (Kerzner, 1995). Enter the paradigm of project management.

Kerzner (2004), as cited by Rwelamila and Asalan (2010), posits that more companies are adopting a style of managing the execution of their service or product delivery either through managing by projects or through project management. These changes necessitate a business or company developing a clear view of where, when, how and why they need to:

- employ project managers;
- be concerned about the development of project managers; or
- decide whether they should just subcontract in the required skills.

The researcher posits that, either way, other than just changing the face of production, project management has posed new challenges for human resources managers as well. Gone are the days of longevity in employment, with a stable work force that can be maintained through long-term strategies. Now, more than ever before, the human resources (HR) managers in business would be required to be knowledgeable regarding the skills levels and competencies required for employees employed in a transformed organisation where projects form the backbone of operations.

1.2 Problem statement

Due to projects being short-term ventures by nature, project managers are often developed outside the context of the permanent organisation. Thus, the organisation does not plan to maintain its project management competence and skills (Cottrell, et al., 2013). A formal framework for the development of project management skills seems to be absent in organisations.

Given this statement, it is found that organisations take refuge in the relevant and prominent bodies of knowledge regarding project management, all of which have a section on HR. However, these sections only refer to the training aspects as they

pertain to a specific project. They do not cater for the broader context of career management and continued development (Project Management Institute, 2008).

Projects and the products that organisations purport to deliver can range from simple interventions to the large-scale redesign of the way the business operates. In the process, IT and ICT (the term ICT will be used throughout, and includes IT) are usually involved as the change agents, or the ways in which the change will be introduced to the organisation. Seeing that the ICT project manager, through the delivery of a successful project, will have a significant effect on the business, it is strange that so little is known regarding the complexities involved in managing the careers and/or development paths of such individuals (Cottrell, et al., 2013).

Thus, the premise of this research is to examine the complexities involved in managing, developing and maintaining ICT project managers' careers. By applying concepts from the HR, project management and ICT domains, it will endeavour to define a contextual framework within which the career management and development of competent ICT project managers can be achieved.

It is evident from the introductory paragraphs that the world of work is perpetually changing. Henry Ford's production line brought about a stable organisation, which was functionally organised with a hierarchical design. Through the use and adoption of ICT, stable customer requirements, necessitating a production orientation, are becoming a thing of the past. Organisations are now called upon to design, deliver and bring products and services to market in a very short space of time. As opposed to the first part of the 21st century, such delivered products will most probably have a very short life span before they are replaced by new technology. The following deduction can thus be made:

> The production paradigm was suited to stable markets where changes were minimal, which necessitated and supported the functional organisational design and mind-set. However, with change and the momentum that keeps gathering speed, a different paradigm is required. It is thus suggested that the project management paradigm will, for the foreseeable future, be a requirement for business sustainability and perpetuation.

Accompanying the paradigm shift from production-orientated organisations to projectised organisations, is the change in focus of individuals' work life. The differences between the traditional production paradigm and the accompanying

general management focus, as opposed to the project-orientated environment and its accompanying project management focus, now needs to be considered.

1.2.1 History of project management development

The creationist view of how we came to being cites the earliest record of a project: God created the earth and the heavens in six days (Christian Publishing Company, 2002). Most of the components found in the definition of a modern-day project are present here:

- A definite scope of work was present (earth, heaven, animals and man)
- Time constraints were imposed and a schedule was used (six days)
- A certain quality perspective prevailed (God saw that it was good)
- There were risks involved (God gave man a choice)
- Resources were utilised (infinite)

Other than to learn from history, it took man a long time to employ the same concepts as those that have been established since the beginning of time. One can see from history that modern management has its roots in the Industrial Revolution, which gave rise to the conglomeration of people in geographical concentrations, and that the location of resources was not as limiting as under serfdom. Figure 1-1 provides an impression of the time line and development of project management as a discipline. Patterns and relationships rather than historically correct facts are emphasised. However, the facts were gathered from sources as quoted.

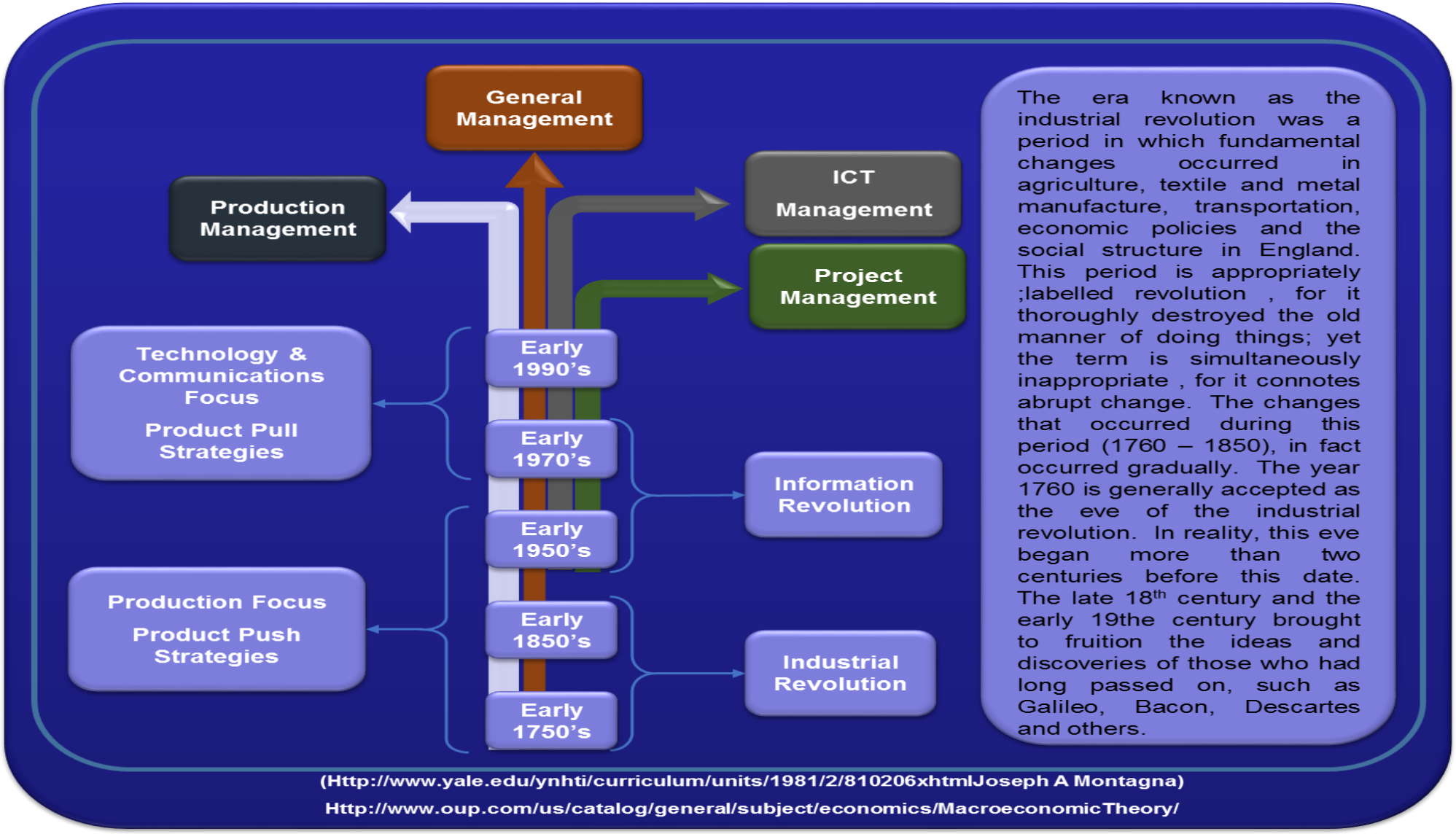


Figure 1-1: History of project management development

The following can be deduced from Figure 1-1. The development of general management has its roots in the Industrial Revolution, starting as early as 1750 and culminating in 1850. For roughly 100 years, the production focus ruled and factories were prominent. The introduction of the production line made a product push strategy eminent as it lowered production costs and facilitated mass production. Almost a century later, one sees the advent of the Information Revolution, where the first electronic computer was introduced in the early 1940s. At roughly the same time, projects – although not formally defined as such – were starting to be managed by tools such as Gantt charts (Sandrone, 2014).

The 1950s saw the development of the project management era, as developments in the engineering industry drove the development of scheduling and planning tools. The arms and space race accelerated the development of project management as the greatest developments took place during the Apollo launch and the Polaris missile programme. These developments saw the formulation of the two mainstream project management associations in the world today: the International Project Management Association (IPMA) in Europe in 1967 and the Project Management Institute (PMI) in the USA in 1968 (Sandrone, 2014).

What is interesting to note and something that became apparent as the stratified framework that forms the basis of this research developed (refer to Figure 1-1), was the following:

There is a close relationship between the development time lines of ICT and the emergence of project management as a discipline. It is thus an interesting observation that these two disciplines developed separately. The synergies between the rapid development of technology and the development of project management were only recognised later, to be facilitated through the execution of projects.

From the stated introduction and background, the focus of this chapter is determined, with further elaboration in terms of its scope.

The research focuses on project management and not the production techniques that would be employed, especially during the building/construction phase of a project. Therefore, this chapter does not discuss the various execution methods and techniques or a specific life cycle management approach. In general, such a discussion would entail a further aspect of specialisation in terms of “code production” techniques, such as the following, which are beyond the scope of this study:

- Rational unified processes (RUP)
- The Scrum Technique
- Systems Development Life Cycle (SDLC) (SDLC can also refer to Synchronous Data Link Control) (http://acronyms.thefreedictionary.com/SDLC)
- Cowboy coding
- The techniques collectively known as Agile

The following section provides contextual information regarding the researcher's observations over a period of five years.

1.2.2 The researcher's context to the problem

Since mid-2006, the researcher has been employed in a specialist department in the Project Management Centre of Excellence (PMCoE) at Eskom[1] (electricity utility in South Africa). This department is mandated to handle the strategic, as well as tactical planning for project management advancement and development across all divisions of the business. Staff in the PMCoE are generally concerned with project management. This entails all projects that are executed in the business.

The researcher's particular involvement in the PMCoE was as a specialist project management consultant, with the following areas of concern:

- Training and development
- Career path development
- Conceptual development of project management life cycle models, methods and methodologies

During the development of a database of project managers within the organisation, the researcher realised the following aspects as they pertain to project management as a career at Eskom:

- There are two mainstream project management professional bodies with which a project manager can register: the PMI and the IPMA, yet the career of a project manager is not "professionalised".
- Project management is not recognised as a profession.

[1] Eskom is the sole supplier of electricity in South Africa. It has approximately 40 000 employees and, during the period of the research, undertook two major greenfields capital expansion projects, as well as an enterprise-wide SAP reimplementation.

- Project management is a secondary career, which builds on the technical aspects of the primary career.
- Everybody remotely involved in a project is given the title of “project manager”. This is a particular problem, as there is no definition of the roles of other project team members, who might be professional in their own area of involvement on the project. The individual might not be managing the project per se, but might be involved in the project’s planning, financial or HR management.
- Less complex projects are managed on an ad-hoc basis, and are assigned to anyone who “is available at the time”, utilising non-complex tools and techniques.
- More complex projects are assigned to a so-called “project manager”, but he or she might just be the best-suited technically qualified person available. Consequently, they become a “project manager”, without following a defined course of development to handle the increased complexity of larger projects.
- No specific career or development path exists for ICT project managers (no defined training curriculum defines the approaches, methods, models and methodologies that are required to equip an ICT project manager to handle complex projects).
- Basic technical training received attention through short courses in project management, but the contextual and behavioural aspects of ICT project managers – the real ones – did not receive much attention.

This resulted in a database of approximately 200 so-called ICT “project managers” on the HR system across all aspects of functional and technical project areas.

Further analysis showed that these so-called project managers included, at the occupational level, people whose job context is project management, but whose occupation is not project management. Therefore, they are not intimately involved in managing the project per se. The current state of affairs may be due to the organisation not understanding the concept of a job family as defined by Gerber, Nel and Van Dyk (1996). An adapted graphic version is supplied as Figure 1-2 to illustrate the concept of the job family.

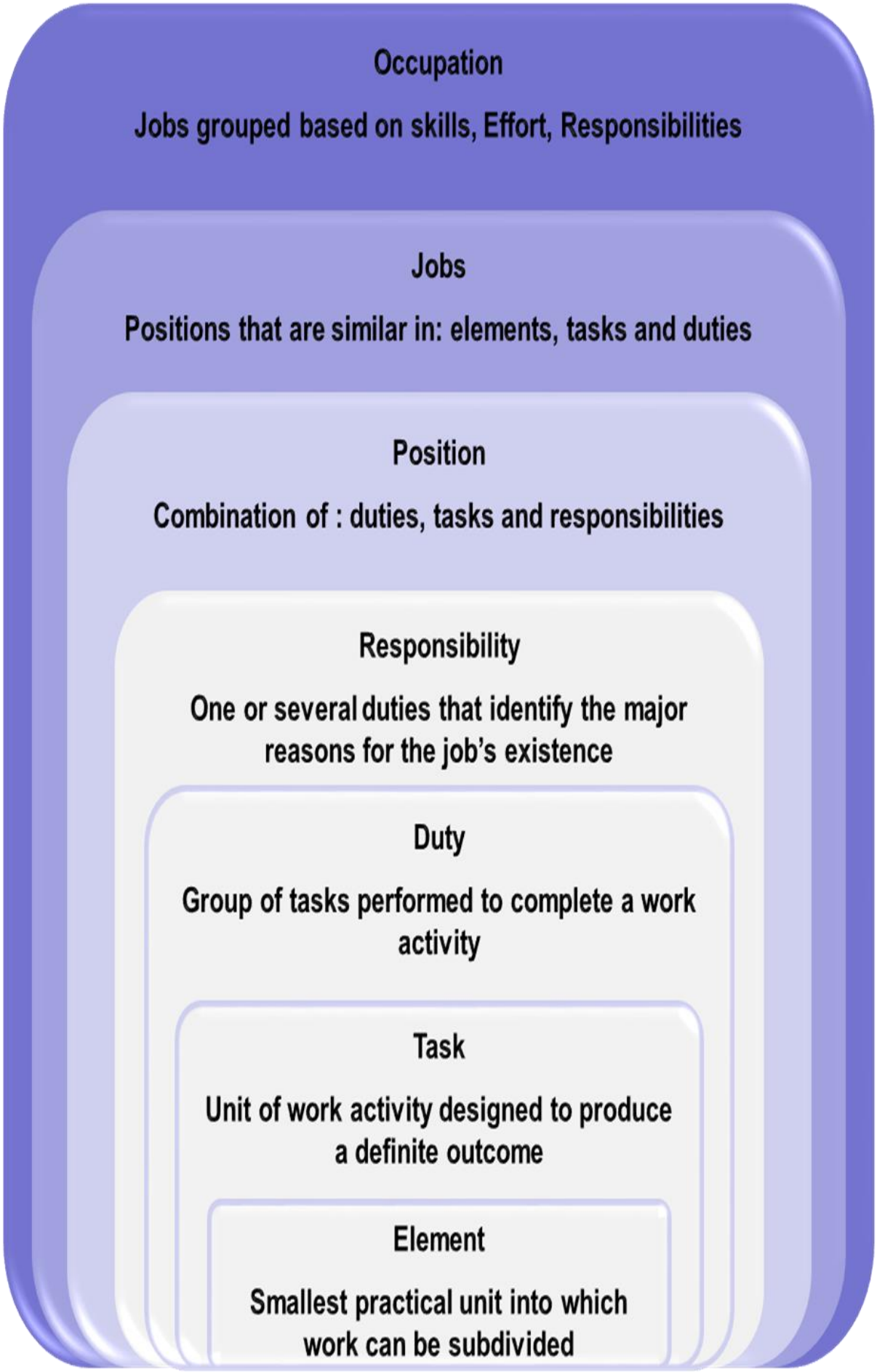


Figure 1-2: Concept of a job family (adapted from (Gerber, et al., 1996)

Gerber et al. (1996) define the levels of a job family as follows:

- The main level of a job family – this level constitutes a grouping of similar occupations
- The level of occupation – this level refers to the grouping together of occupations that share skills, effort and responsibilities
- The level of individual jobs – this level refers to positions that have similar elements, tasks and duties
- The level of positions – this element refers to duties and tasks that are combined to form meaningful work at an individual level
- The level of responsibilities – this element identifies one or several duties that identify the major reasons for the job's existence
- The level of duties – this element refers to a group of tasks performed to complete a work activity
- The level of tasks – this element refers to work activities that are designed to produce a definite outcome
- The level of task elements – this is the smallest practical unit into which a work activity can be subdivided

Furthermore, the researcher intends to investigate the addition of another level, above the one of job family, which will encompass the job context. For the purpose of this study, this will be the ICT project manager's job context level.

Despite many organisations adopting project management principles and procedures, the existence of professional organisations, the myriad of training courses that are presented and the variety of models and methodologies that exist, many organisations fail to implement ICT projects successfully and consequently attain a low level of project management maturity.

Corporate enterprises are often structured according to divisions, with autonomous authority to act within the confines of that division. The problem is compounded when there are no clear or standardised job titles under which project managers are appointed across divisions. Therefore, a situation arises where there will be a so-called project manager in one division, but he or she is only acting on a supporting level. In the absence of standardised job descriptions, the job title attached to this position will be that of project manager.

This situation is exacerbated when it comes to the title of programme or portfolio manager. Many an incumbent of a programme management position does not have a different function or focus to that of a project manager, but has been

awarded the title of programme manager, as he or she just oversees, or is involved with more than one project. Thus, when the HR records are analysed, it becomes impossible to gauge who is doing what in terms of project management due to the incongruence of job titles and job functions,. Having said this, imagine the problem of having standardised training and development for people at that same organisational level. Thus, project management as a career in the corporate environment has developed haphazardly, causing problems with the development, training and promotion of ICT project managers' careers.

From this contextual background information, the following deduction can be made:

The nature of project management is such that, in some organisations, a project manager is a position with a title, while in others, it is a temporary assignment. Whether a full-time occupation, or a role and function fulfilled in a temporary capacity, the project manager is faced with a wide variety of responsibilities.

Based on the above, the following conclusions can be made:

- Managing a project entails a broad skill set due to the handling of a variety of tasks.
- It also entails being responsible for:
  - all aspects of the feasibility, design construction and commissioning of a project with a large budget;
  - the development of a research report with a budget of less than 100 hours; or
  - a subproject that forms an element of a larger project or programme.

As the discussion thus far has contextualised the study, it is necessary to pay specific attention to the nomenclature that will be used in the rest of the discussion. For this reason, the next section will provide the generic definitions of the key concepts as and how they will affect the discussion.

The following topics will be discussed in this chapter:

- Project execution: failure and success rates
- Research postulate or thesis
- Research aim and objectives
- Research question
- Expected contribution to knowledge
- Limitations that the study was subjected to

- The assumptions that were made during the earlier parts of the research
- What the expected findings would entail
- How the results would be presented

1.2.3 Project execution: failures and success

Rwelamila and Asalan (2010) cite Fortune and White (2002), Hyvari (2006), Morris and Jamieson (2005), Zwikael (2008) and Stanley (2006), who all concur that the alignment of projects and strategic objectives are crucial. Project management should not only be seen as comprising a set of skills or competencies that require stringing together templates, tools and techniques in order to satisfy a certain need. Research done by the authors cited above shows that corporations are losing billions through failing projects and subsequent wasteful expenditure. One reason for this wasteful expenditure is that the corporate strategy was not aligned with the execution of projects to ensure proper return on investment. The authors also stated that superior business performance depends on the good execution of projects, as well as the creation of a culture that supports projects and their execution (Rwelamila & Asalan, 2010).

1.2.3.1 The reasons why projects fail

Project management is in a transition phase from being just the application of ad-hoc skills to becoming a strategic asset in the sustenance of a business. Thus, project management and the management of ICT projects will need to be transformed from what the author calls “business as usual, but in a pressure cooker” to a properly defined career with subsequent occupations, and defined outcomes and competencies for such a professional in such a profession.

For this purpose, a general list of reasons why projects fail will be presented. From this general list, those aspects pertaining to HR management will be abstracted. The issues pertaining to the development of a career path and the context of such a career path will then be identified, i.e. a job family. This will provide a better focus on the research problem statement as presented in section 1.2

For sixty odd years, individuals have devoted their work life to a phenomenon known as project management. Large amounts of money have been spent on training, development and the acquisition of skills to manage projects “the professional way”, and to avoid project management failure. For this reason, standards and more standards were developed (Rwelamila & Asalan, 2010). Was

this all worthwhile? And if it was, should it not reflect in the success rate of ICT projects?

To honestly answer these questions, the results of surveys of the success rate of ICT projects have to be analysed. The Standish Group (2001) has conducted such an analysis, and the following results were obtained.

In analysing 30 000 ICT application projects in US companies, the results of this research showed that companies continually have difficulty with ICT application projects (The Standish Group, 2001). The data on project outcomes are shown in Figure 1-3 below.

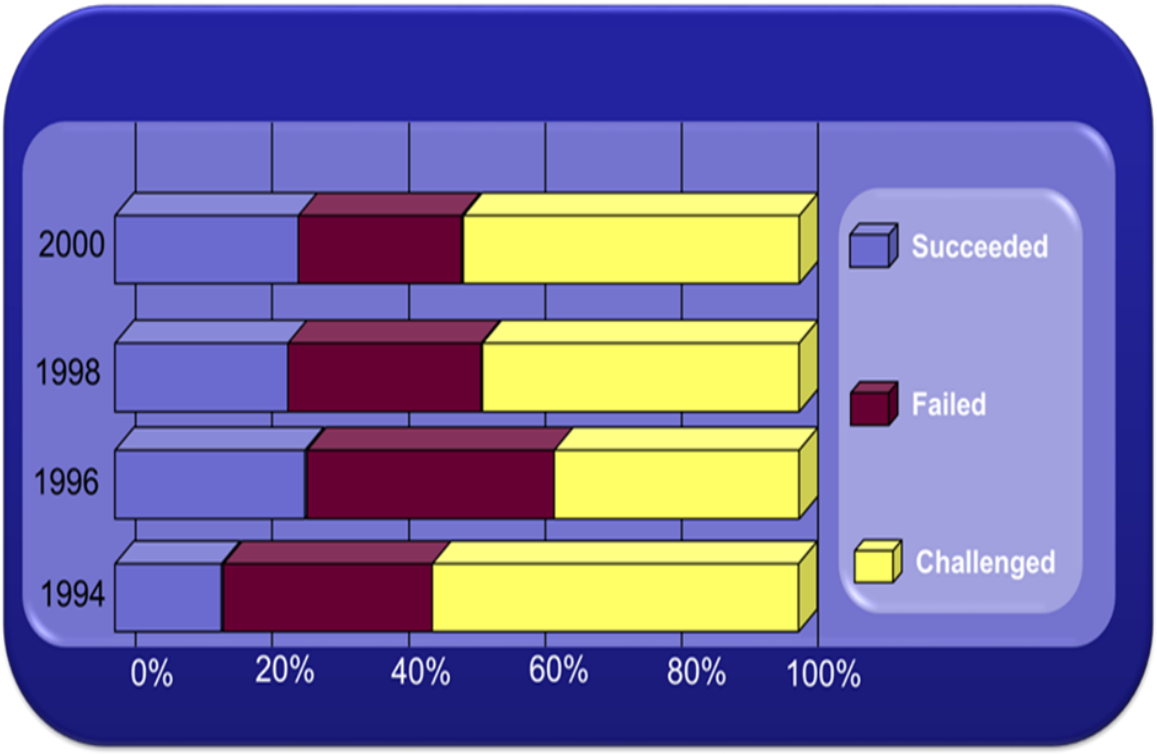


Figure 1-3: Successful, challenged and failed projects (The Standish Group, 2001)

In addition to the research of The Standish Group (2001; 2013; 2014), various other studies were conducted to determine the reasons and magnitude of ICT project failures. According to IT Cortex (n.d.), these studies entailed the following:

- The OASIG Survey (1995)
- The KPMG Canada Survey (1997)
- The Robins-Gioia Survey (2001)
- The Conference Board Survey (2001)
- The Standish Report (2013)

In the words of the reports of the Standish Group (2001; 2013; 2014), project outcomes can be placed in three categories:

- *Succeeded*: a project that gets the bouquets and champagne sprays – for it is completed on time, within budget and has met all original specs.
- *Challenged:* a project that finally made it to the deadline; yet, there were cost/time overruns and perhaps not all of the original specs were met.
- *Failed:* A project was abandoned or cancelled due to project management failure (The Standish Group, 2001; 2013; 2014).

What is even more dismal is that since The Standish Group began surveying companies for their project outcomes, the percentage of failed projects has been higher. The percentage of successful projects has been abysmally low (Al Neimat, 2005).

The UK Office of Government Commerce (OGC) (2010) provides the following additional reasons for project failure:

- Projects fail due to the discipline failure of project management.
- The project is beyond the experience and capability of the project manager (inferred that the project is too complex for the level of experience of the project manager).
- Projects fail due to the failure of the people involved in the execution.
- Projects fail due to a disconnect between the project and those who own the need for the deliverable of the project.
- The observed displayed culture in project teams tended to explain away the real risk, and to hide, and not address problems.
- The needs of the end users were not really understood, due to secrecy or haste during the definition and design phases of the project.
- Too few senior people with real authority were involved with the project and its execution (Office of Government Commerce (OGC), 2010).

Furthermore, a more comprehensive list for the failure of complex ICT projects was obtained from the article “Examining the failures of software projects information technology” (UK Essays, 2013). This source lists the following primary causes for the failure of complex ICT projects:

- Poor planning
- Unclear goals and objectives
- Objectives changing during the project

- Unrealistic time or resource estimates
- Lack of executive support and user involvement
- Failure to communicate and act as a team
- Inappropriate skills (UK Essays, 2013)

Most ICT projects require a diverse range of skills. Many teams lack the breadth and depth they require. Fichter (2003), as cited in Al Neimat (2005), posits that it is also not easy for technology-based organisations to find the experienced people they need because, sometimes, there are only a few people in the labour market with the necessary skills.

Tilmann and Weinberger (2004), as cited by Al Neimat (2005), provide a different slant on the reasons for project failure. They suggest that a misalignment of the project management process itself and the organisational cultures contributed to project failure. In addition to just the misalignment of the organisational culture, they stated that the project team, the suppliers, the customers and other stakeholders can all provide a source of failure.

Glaser (2004), as cited by Al Neimat (2005), states that complex ICT projects often involve a large amount of analysis and work. The project teams are busy and the executive management sees no progress. ICT project managers do not communicate progress regularly because they believe that the executive management will not see progress. Furthermore, the skills levels are inappropriate. This is caused by global competition and the rapid rate of change, growth in knowledge and constant changes in technology that make it difficult to predict what kind of skilled people will be needed.

Gross (2005), as cited by Al Neimat (2005), states that projects sometimes fail due to improper communication. According to Ghori (2012), the communication on a project executed for the Federal Bureau of Investigation (FBI) was difficult because of the high turnover of top ICT managers. It further stated that, in many ICT projects, there is no single person who has an overview of the whole project.

Ditzen (2008) is of the opinion that project staff frequently do not have adequate skills and that the project leader more often than not does not have any solid experience in executing projects. Furthermore, staff are not released from their previous functions or are assigned to a project for different periods. Successful support by a coach would require intensive participation, steering and acceptance of the services delivered. A clear strategy as to developing skills needed in-house

has often been lacking. The transfer of consultants' expertise has often not been stipulated in an extra contract (Ditzen, 2008).

Waters (2014), states the following reasons for project failure:

- Projects fail due to stakeholder management and team issues.
- Projects have inadequate visibility and status.
- Project teams are not staffed with adequate dedicated people, and when staff are provided, their time and effort are divided among other project-related priorities as well.
- Project team members lack experience and do not have the required skills.
- The project team lacks authority and decision-making ability.
- Projects fail due to project management issues.
- Projects fail due to weak ongoing management, inadequate training or inexperienced project managers (Waters, 2014).

Furthermore, it was found that the failure rate increased as the project size increased. This is due to increasing complexity. Thus, larger projects were more susceptible to failure (The Standish Group, 1999).

Qassim (2006, pp. 12-17) explains problems with the availability of staff as set out in the tables below. Table 1-1 discusses the 21 top reasons for project failures. Table 1-2 elaborates on aspects that could have been put in place to ensure greater success and Table 1-3 illustrates elements that are required for successful project execution.

Table 1-1: Risk ranking failure reason

Ranking	Factor
1.	Lack of top management commitment
2.	Misunderstanding of scope/objectives/requirements
3.	Lack of client/end-user commitment/involvement
4.	Changing scope/objectives
5.	Poor planning/estimation
6.	Inadequate project management
7.	Failure to manage end-users' expectations
8.	Conflict among stakeholders
9.	Change in senior management ownership
10.	Lack of adequate change control
11.	Shortage of knowledge/skills in the project team
12.	Improper definition of roles and responsibilities
13.	Artificial deadlines
14.	Specification not frozen
15.	New or radical business process/task
16.	Employment of new technology
17.	Poor control against target
18.	Number of organisational units involved
19.	Lack of effective methodologies
20.	Staff turnover
21.	Multiple vendors

Table 1-2: Ranking wise improvement factors

Ranking	Factor
A	Greater top management support
B	More commitment from users
C	More power and decision-making authority
D	Greater financial control and flexibility
E	Greater control over staff resources
F	Commitment to requirements and scope once specified
G	More project management training
H	Commitment to a stable project management method

Ranking	Factor
I	Alignment of IT project initiatives to business strategy
J	Greater understanding of project management on the part of top management, project boards and clients
K	Greater realism in setting targets. Several respondents railed against imposed rather than planned targets and deadlines
L	Establishment of a supportive project/programme office

Table 1-3: CHAOS 10 required elements for success

Ranking	Element	Relative weighting of ranking
1.	Executive support	18
2.	User involvement	16
3.	Experienced project manager	14
4.	Clear business objectives	12
5.	Minimised scope	10
6.	Standard software infrastructure	8
7.	Firm basic requirements	6
8.	Formal methodology	6
9.	Reliable estimates	5
10.	Other criteria	5

Goatham (2009) states that IT projects are more prone to failure than their counterparts in the engineering and construction domains. Goatham cites the US Government Accounting Office (GAO) that found that 49% of 840 federally funded projects were poorly planned, poorly performing or both, and the Information Systems Audit and Control Association, which found that 43% of 400 respondents admitted that their organisation had had a recent project failure.

Goatham (2009) related this to a similar situation in the training and levels of maturity of the ICT project execution sector vis-à-vis the construction and engineering professions. He states further that, in the aftermath of a failed project, one of the most common reactions is for the organisation to adopt a programme of process improvement. In theory, by defining more robust processes for the planning,

execution and control of projects, success rates can be improved. He states that process improvement is far harder to implement than it might at first appear.

1.2.3.2 Reasons why projects are successful

Other than the causal factors stated above, aspects were identified that were needed to ensure success. These factors, if in place, reduce the failure rate of projects. Accordingly, these factors will be discussed in this section. It can be seen from the discussion that what was stated by researchers as prerequisites for success are sometimes the inverse of the reasons why projects fail.

Piscopo (2009) lists the following prerequisites for a successful project:

- Proper planning: The more forward, future oriented and in detail the planning, the higher the chances of success. Each and every activity that is expected down the line gets due attention. Not only is this pre-planning well documented, but also, even after the project has taken off, the project manager does not hesitate to re-plan if things don't go according to plan, avoiding project management failure, and readily incorporates the changed circumstances in his or her new version, so that future events are controlled.
- Clear responsibility and accountability: All team members have a clear understanding of their roles and duties. There is clear awareness of what exactly is expected of them.
- Schedule control: Project managers are constantly on their toes, recording time elapsed, milestones reached, change in people/task allotments and the like. This helps to fine-tune the schedule on a real-time basis.
- Organisational design: Proper organisational design and project execution structures like having a formalised programme management function that supports the project execution function are in place.
- Project management office: A properly functioning project management office is also needed.
- Organisational culture: Organisational change management is implemented to facilitate the shift in organisational culture, with the accompanying redefinition of roles and responsibilities.

1.2.3.3 Conclusion on ICT project failures and success

The abovementioned list represents general pointers alone, and cannot be accepted as a universal diagnosis for the reason for ICT project failures. The reason for this is

that each project has its own unique complexities, role players and circumstances. However, the following can be deduced:

- Organisational culture and design affects project success
- There is a definite need for executive support during project execution
- Projects need to be aligned with the strategy of the business
- There is a need for the development of appropriate skills and competence for the project management contingent in the business
- Clear role and responsibility definition is vital

Despite many organisations adopting project management principles and procedures, the existence of professional organisations, the myriad of training courses presented and the various models and methodologies that exist, many organisations fail to implement ICT projects successfully.

1.2.4 Research thesis/problem statement

From the discussion of project failure, it is evident that complexity plays a substantial role. With the increase in complexity comes the need for increased skills and competence. Given increased competence, the following observation becomes crucial when considering the career and work life development of ICT project managers.

Most people become ICT project managers by accident. It is generally found that entry into the domain and career of project management is through the technical avenue.

Those with good technical competence in the field of ICT usually have projects assigned to them. More often than not, a high degree of focus is assigned to the technical part of the project, which is not wrong, but one should not forget that technical expertise exists, and that the technical part of the project is the part that is easier to manage. Successful technical execution, however, does not equate to project success; it is necessary, but not sufficient. The technical requirements of the project and the envisioned end product will dictate the required technical skills. However, complexities of and within the project will call for other skills and competencies, as opposed to merely being a technical expert.

With information gathered from the preliminary literature review, a better understanding was developed as to why ICT projects fail. From this understanding,

and to be able to formulate the research thesis, the following questions were formulated:

- **Question 1**: Is there a need for a specifically defined career, with defined occupations such as that of an ICT project manager where complexity becomes part of the experience and exposure frameworks?
- **Question 2**: With increased complexity, are there other occupations related to the management of ICT projects that fall within the domain of project management, but whose aim and purpose is not to manage the actual execution of the project?
- **Question 3**: Can companies maintain competitive advantages if project management is still seen as a subset of skills employed in executing general management, and disregard the issue of complexity in the development of such project management skills?

The consideration of these questions contributed to the formulation of the main research thesis.

The introductory discussion, as well as the stated questions above, led to the formulation of a research thesis that affected the definition of the aim of the research. This thesis/problem statement can be stated as follows:

In the absence of proper organisational structures and HR strategies to develop ICT project management competence and career management, all training interventions construe content, and what is lacking is a properly defined job family to serve as context for development.

With the above stated thesis and the questions underlying its formulation, it can be inferred that: if answers to the above stated questions are not found, projects are still more susceptible to failure. With reference to this study, it is important to note that organisational culture and competence are prominent.

Having developed the thesis/problem statement for the research, the method for attaining an answer or solving the problem as stated in the problem statement will be developed as the research methodology in Chapter 2. Following will be the definition of the particular phenomenon and scope on which this study will focus.

1.3 Research aim and objectives

When considering research, there can be varying research perspectives and paradigms through which a particular phenomenon can be studied.

The concept of a job family was found to be poorly implemented in HR management, and even more so when it pertains to the project management fraternity. Recognising this as a problem, and due to the high percentage of failing projects, the aim of this research will be to:

- uncover evidence;
- build a framework through which the world can be better understood; or
- deliver critique on existing frameworks in order to change them.

When the objectives of research are put on a continuum, one will find the approaches that look deterministically at the world at the one end of the continuum, thus trying to provide evidence for observed phenomena. This is called perspective positivism. In the middle of a continuum are the approaches that seek to understand the causes for observed phenomena. These are the interpretivism approaches. Approaches that are orientated towards changing frameworks or societal phenomena are called critical approaches (Avgerou, 2005). This research is perceived to be in the realm of interpretivism. It is thus aimed at providing a better understanding of observed phenomena and building a framework to better explain causes of such phenomena.

1.3.1 Research aim

Research is conducted in many fields of study. The main reason for conducting research is to reach a set aim with secondary objectives. The aim usually depends on the research paradigm, and is further broken down into the definition of an explicit research question or the definition of the research problem.

The first aspect to consider is establishing a research aim. The aim of this research is to build a theoretical framework, in accordance with the concept of a job family, that will enable better understanding of the development of ICT project managers' career growth and progression that would enhance project execution and efficiency.

Central to this aim is the concept of a job family, within which the professionalisation of project management can take place.

Following the development of the resultant problem statement, the revised research aim can be stated as follows:

To develop a contextual framework in accordance with the job family concept through which ICT project managers' careers can be managed.

Alternatively, this can be stated as follows:

To define a job family for project management, wherein contextual professional development can take place, i.e. to have a professional home for project managers within organisational structures.

In the background and context discussion to the research, it was shown that the HR management aspect of ICT project managers' development is an area that contributes to project failure. This happens despite the various project management bodies of knowledge, as well as professional bodies referring to or having a section about HR management.

1.3.2 Objectives of the research

Having stated the aim of the research, the next step is to develop the research objectives. Given that the aim entails the development of a contextual framework, the research type that was chosen was that of theory and model building. The first aspect to consider entails setting objectives for the execution of the particular research. The objective, according to the interpretive paradigm, can be stated as follows:

To build a better understanding of the complexities other than just technical aspects when considering training and development needs for project managers in organisations (Orlikowski & Baroudi, 1991).

The components that constitute the objective can then be questioned and stated as follows:

- What, in the South African governance context, are requirements for the development of ICT project managers as a strategic resource? Chapter 3 is a review of the educational governance framework: South African legal and educational framework.
- What constitutes the context of project management in terms of project, programme and portfolio management? Chapter 4 is a review of the views of the various professional bodies on the domains of portfolio, programme and project management.
- What is the current landscape in terms of project, programme and portfolio management as and how it relates to the overall strategy of the organisation? Chapter 5 is a review of the strategic value that projects and project management adds to the business.
- What happens in the organisational execution domain in terms of ICT project management and execution in terms of life cycle management as a governance

framework? Chapter 6 is a review of the importance and influence of governance and execution frameworks at the organisational level.

- Given the legal, professional bodies and life cycle management approaches, what would be the HR development criteria that would constitute a good career path and developmental framework for ICT project managers' development? Chapter 7 is a review of HR management in project management.

Each of the abovementioned objectives will be coupled to a specific focus area of the suggested framework, which will be proposed as a solution, i.e. a career path development framework that will provide the context of a job family within which the professional development of ICT project managers can take place.

This contextual framework will be used to analyse current job descriptions of incumbents in positions to determine the extent to which current positions are aligned with the developed framework.

1.4 Research question

Project management as a profession is not professionalised, even though there are professional bodies for project management. The profession of a project manager is not clearly defined.

1.4.1 Main research question

From the analysis of the reasons why projects fail, it can be seen that HR features high on the list of causes of failure. *A guide to the project management body of knowledge (PMBOK® Guide)* (Project Management Institute, 2008) cites training and development as one of its knowledge areas, but this is in the context of a particular project, and not in the context of the overall training and development of the company's HR development of the ICT project manager staff complement.

Thus, having formulated the research aim and objectives, the particular problem that this research will attempt to address is the following:

- Will the formal definition of job family help raise the level of ICT project management maturity, thereby enhancing the level of professionalism that is found among ICT project managers?

After defining the main research question, secondary questions can be developed that will guide the design and choice of the research method. These secondary questions are stated in the discussion that follows.

1.4.2 Secondary research questions

Deriving from the main research question and aim, the following secondary research questions can be formulated:

- What should be taken heed of in the context of a specific country's education framework when training and developing ICT project managers?
- What is the current state in terms of professional bodies that affects the training and development of ICT project managers?
- What is the relation of successful project execution to the business strategy of sustainability and what is the role of ICT project managers?
- How does the governance of projects and their roles and functions relate to ICT project managers' development and career paths?
- What are the relevant human resources management aspects that need to be added to the current paradigm of ICT project managers' development?

Take heed that all of these questions were asked of the concept of a job family and that the questions identified here serve as the context for the study. The main framework for the research and presentation of the results was derived from these questions. Each chapter serves to provide content to the main framework, but in its details, this content becomes a context in its own right where the above questions will be developed into a subset of questions to serve as the discussion content for that chapter.

1.5 Expected contribution

The contextual framework with the definition of the job family is necessary to ensure that both contextual training, as well as technical and behavioural training needs, are addressed. It would also further the professionalism of project managers as they would belong to their own professional group in organisational structures.

The expected contribution to knowledge resides in the synergies that the framework will show in terms of the three knowledge domains that will be researched. The expected contribution aims to form a new concept, in which the following areas are combined to form the contextual framework for the development and career management of ICT project managers:

- Project management
- HR management

- ICT management

This contextual framework will thus endeavour to do the following:

- Develop a better understanding regarding the training and development requirements for different occupations participating in ICT project execution within the concept of a job family.
- Highlight the value and importance of proper career planning and career path development for ICT project managers, from merely applying splinter skills within the ambit of general management to being recognised as a professional occupation.

It is expected that the contribution will enhance the level of professionalism for ICT project managers, as well as organisational maturity where it pertains to ICT projects and their execution.

1.6 Limitations

The following limitations were encountered:

- Availability of literature to conduct the research
- Availability of key ICT project managers with which to discuss preliminary findings

1.7 Assumptions

In conducting the research, the following assumptions were made as points of departure:

- In the absence of a defined job family, project managers and project management is hindered in attaining the desired level of recognition within organisations.
- Having a defined job family will provide a professional development home for ICT project managers.

1.8 Structure of the research

Having developed a better understanding of the reasons why projects fail, and building up to the formulation of the aim and objectives of the research, a preliminary literature review was conducted to ascertain the areas or knowledge domains that would have to be researched or investigated to build a contextual framework. This preliminary literature search and review also influenced the structure of the discussion on the research findings, as well as the presentation of the results. Thus, in the following section, a brief overview of the topics uncovered is depicted

graphically, culminating in an overview of the chapters. The discussion that culminates in the presentation of the framework is depicted graphically in Figure 1-4.

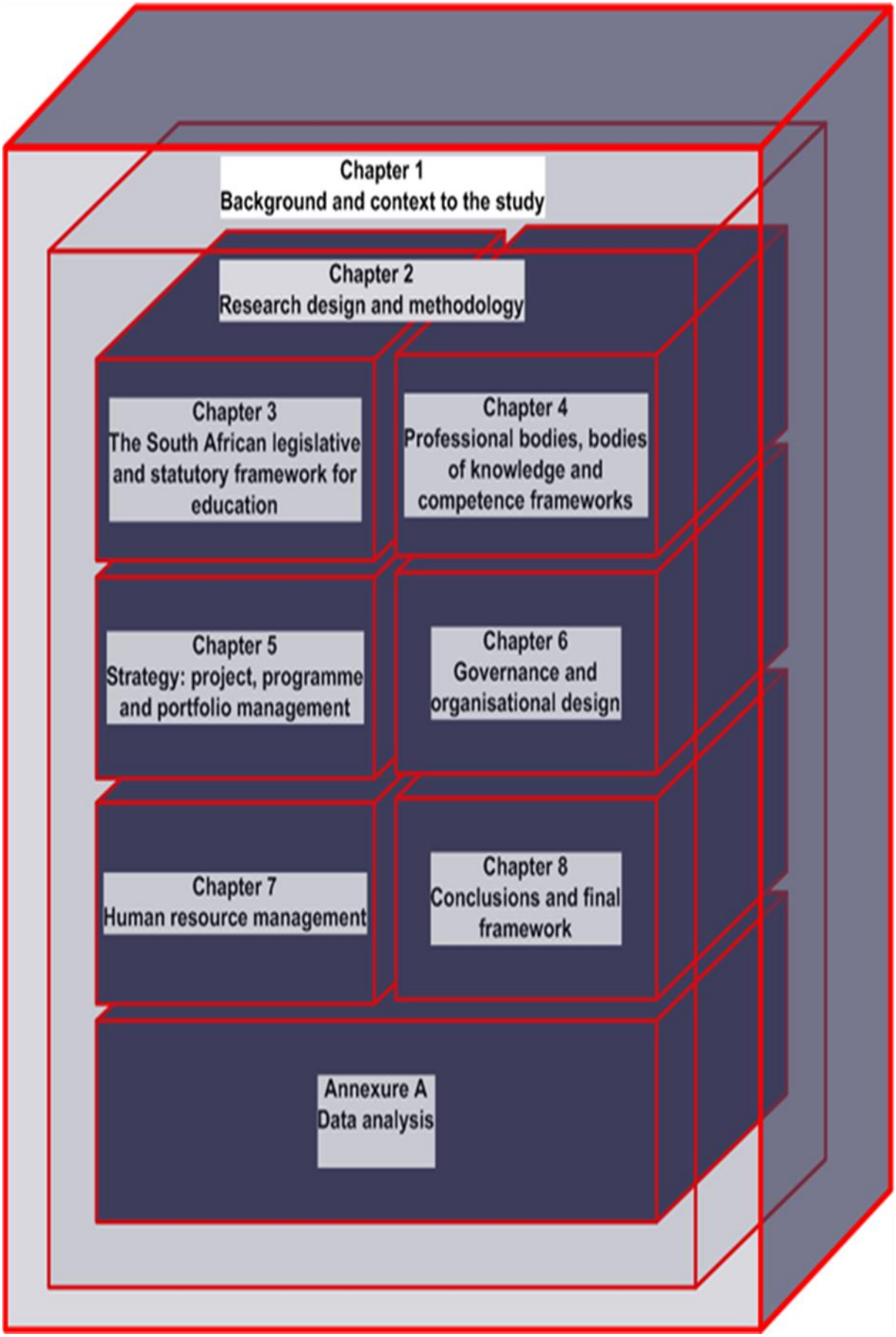


Figure 1-4: Graphic depiction of the research layout

The research document will be structured in the following manner:

Chapter 1:

The introduction to the research as addressed in this chapter. This chapter presented the problem statement, research question, basic research methodology, contribution to the field of study and the research structure.

Chapter 2:

This chapter will contain a discussion of the research design and methodology.

Chapter 3:

This chapter will present the South African legislative and statutory framework for education.

Chapter 4:

This chapter will discuss the professional bodies, bodies of knowledge and competence frameworks.

Chapter 5:

This chapter will present the strategy related to project, programme and portfolio management.

Chapter 6:

This chapter will discuss governance and organisational design in relation to project, programme and portfolio offices.

Chapter 7:

This chapter will discuss HR management in ICT project execution.

Chapter 8:

This chapter will present the final conclusions, recommendations and framework representation.

1.9 Conclusion

In this chapter, the reasons why projects fail were discussed. This gave rise to the identification of the phenomenon to be studied and the subsequent definition of the problem statement.

Flowing from the introductory part of this chapter, it was shown that there is a relationship between the development of project management vis-à-vis general management and ICT management. Consequently, one can see that the domains of

ICT and project management share a root somewhere in the late 1940s or early 1950s. The two domains developed separately, and the world is experiencing an ICT revolution, where the project management paradigm is becoming much more relevant than the traditional production management paradigm. With this comes the roles and functions that need to be redefined within the permanent organisation to facilitate effective project execution.

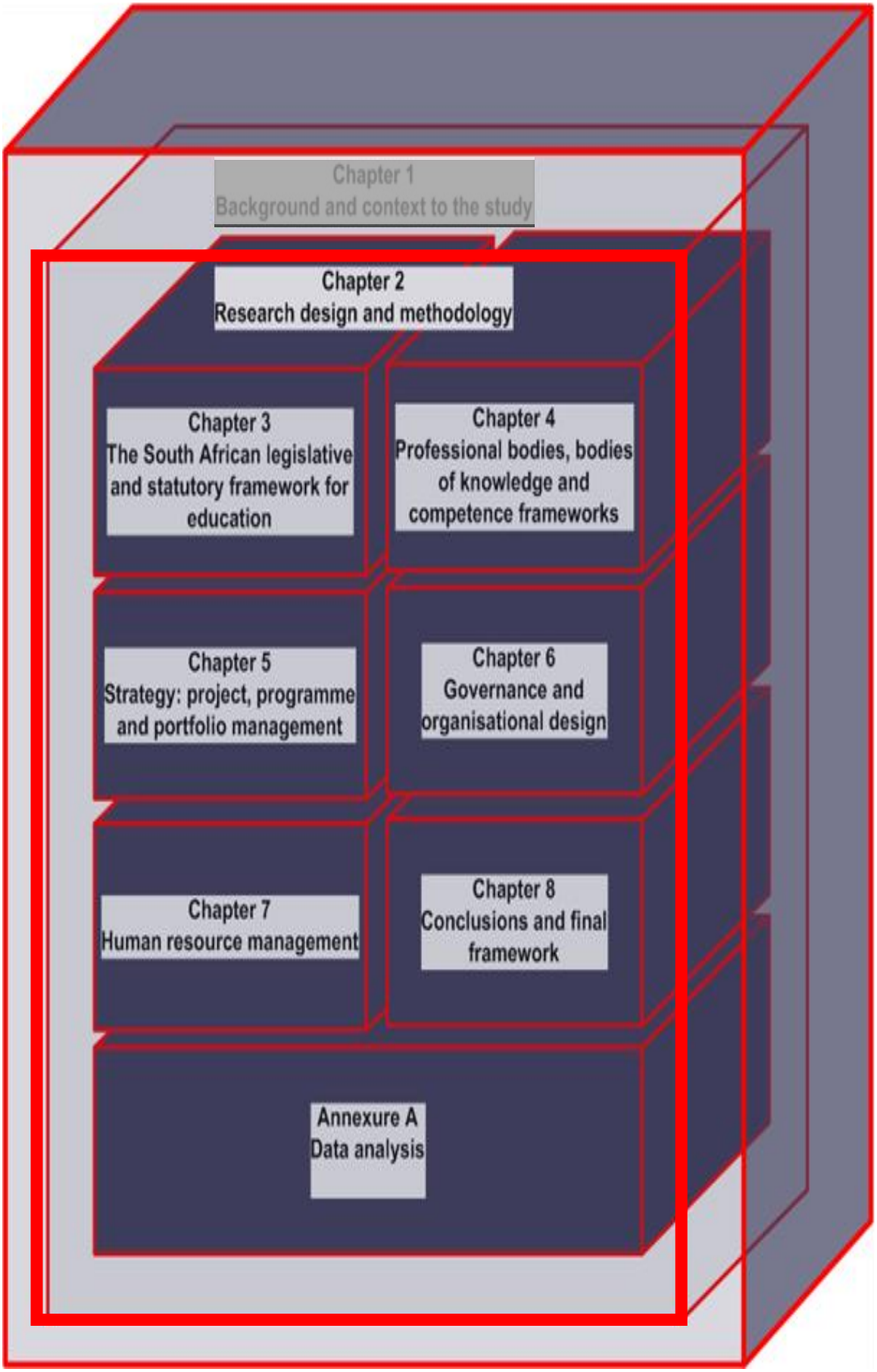
The study's background was sketched in terms of the researcher's recent history, as well as the current situation pertaining to observations in the field of ICT project execution, and its implication for the development of ICT project managers. Reasons why projects fail were examined and a relationship was established with the development of human resources. The concept of rising complexities was introduced as an aspect that needed to receive attention during the management of a career path.

After the research aim was stated, subsequent objectives were defined. This culminated in the formulation of the main research question and the development of the subsequent secondary research questions. The specific design of the research, to address the stated problem and questions, will be discussed in Chapter 2.

This chapter also elaborated on the limitations, as well as the assumptions pertaining to the research.

Lastly, the expected findings were stated, culminating in the presentation of the structure of the rest of the research document.

Chapter 2. Research design and methodology



2.1 Introduction

From Chapter 1 and the contextual background to the problem, it becomes apparent that the way in which we make observations of a particular phenomenon reflects our desire to understand, predict or explain these phenomena in terms of questions. For this reason, Chapter 1 posed the research question. It is now necessary to develop the method through which answers to this question will be sought. Volman (2007, p. 4) explains research as an activity of knowledge acquisition and representation, and that it follows a process consisting of eight specific phases:

- Reviewing the literature
- Formulating a research question
- Developing an understanding of the limitations of the research
- Establishing the methodology
- Collecting data or evidence
- Performing an analysis on the data or evidence
- Drawing conclusions from the analysed data
- Producing the results or findings of the research in terms of a research report, with subsequent recommendations

Volman (2007, p. 5), in accordance with Hussey and Hussey (1997) and Remenyi, Money and Twite (1995), comes to the conclusion that the research process can be condensed into six fundamental stages:

- Identifying the research process
- Defining the research problem
- Determining how the research is going to be conducted
- Collecting the research data
- Analysing and interpreting the research data
- Writing up the results of the research

Christie, Rowe, Perry and Chamard (2000, p. 9) give a synopsis of the various points of departure for research, as summarised in Figure 2-1 below.

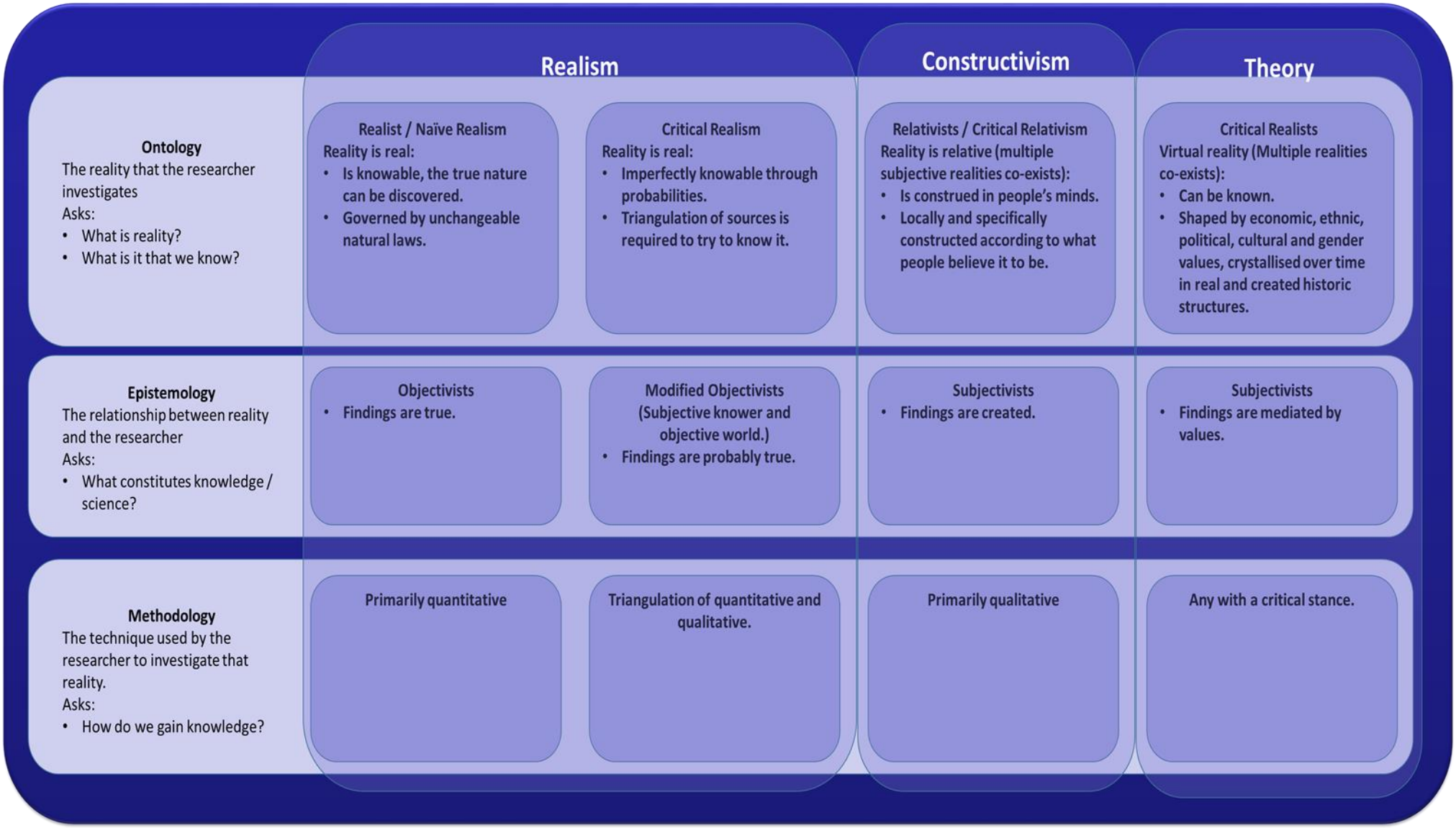


Figure 2-1: Theoretical underpinning of the various research approaches

An explanatory note to the reading of the discussion of the research design needs to be made here. The

a. The use of Reflective journals and learning: Over a period of 7 years I was extensively involved with research as a mentor, coach and study leader. During this period, I had to reflect on my own knowledge as well as the contribution that I can make in terms of giving guidance and direction to my protégés. In my professional capacity I was responsible for training and development delivery as well as development of training materials. This caused me to employ the "DIEP" approach to my work, where:

D - Describe objectively what happened

I - Interpret the events

E - Evaluate what you learned

P - Plan how this learning will be applied

Formed the basis for my work. (RMIT -SLC learning lab, 2015)

b. Member checking: Member checking occurred in and during sessions of a study group that was formed by likeminded students doing their PhD's. This group consisted of 5 people, 3 from the project management fraternity, one from the content management fraternity and one from an Organisational development perspective. This group gathered weekly, and each member had the opportunity to present their work when milestones were reached. At each presentation the rest of the members interrogated the presentation from their various perspectives.

Consultation and discussion occurred during consultative processes with ICT experts during deployments on ICT projects within the employer's organisation.

c. The aspect of self-reporting also stem from my tenure and professional position in Eskom. I was employed as a subject matter expert and involved in the design of solutions for many complex problems in the domain of project management and execution. In all of the solutions developed, there were always the underlying research, and the presentation of results to the client. In the light of the more formal academic research such as presented in this report, such learning and data sources were deemed to be self-reporting.

d. Participant observation: Form my intensive involvement in projects and project management, I had the opportunity to make observations regarding project

managers in their “natural” environment. To caution not to err on the side of hearsay, it was deemed necessary to state that some of the statements that were made in the research report were from sources that could not readily be identified, but definitely not form already gained knowledge and insights.

e. Triangulation: during the earlier stages of the research process and development of the methodology, it was deemed that some sources of information would be quantitative in nature and that the presentation would require some elementary statistical manipulation and interpretation. As a caution and pro-active measure triangulation of data, especially between qualitative and quantitative data was included.

The study was a critical analysis and not an empirical study in the sense of quantification of data, however the attempt was made to triangulate the critical points as to not miss a critical point. Triangulation happened around theoretical concepts and constructs, between theory practice and effective execution in the ICT project context.

f. the reader may form the perception that these above mentioned methods and techniques were to be used in their singularity. It was included to describe that this particular research was much more of a learning journey than just a process of producing results and a report. Over the period of six years old knowledge was renewed, new knowledge was gained and synergies between old and new knowledge was formed. During this journey all of these techniques and methods played an underlying part in the production of the end result of the research.

Having thus gained a better understanding of how the research was to be conducted and viewing it as a process, this section will elaborate on the specifics of the methodology selected, the particular research design and aspects that influenced the research.

2.2 Methodological underpinning

This section discusses the planning of the research design in accordance with the stated aim and objectives identified in Chapter 1.

2.2.1 Ontology of the research paradigm (belief about reality)

There could be a different reality for each person in each employment setting in organisations.

The researcher posits the following:

There is a subjective view and perspective on the existence of reality that is constructed and reconstructed through a human and social interaction process.

Consequently, more than just technical aspects need to be considered when investigating project managers' development and the organisational context within which it should take place. According to both the individual and the organisation, this reality differs. Furthermore, given the same data set, one researcher might construe one picture of what was found, while another might come up with a totally different view of reality (Stahl, 2005; Avgerou, 2005; Orlikowski & Baroudi, 1991).

2.2.2 Epistemology of the research paradigm (belief about knowledge)

Similar to the ontology for the research, the basic belief about knowledge and how it is gained dictates that knowledge is sometimes created by humans through social interaction, giving subjective meaning to reality. This knowledge is also considered to be scientific and valid (Orlikowski & Baroudi, 1991).

For the topic under review, the researcher should be actively involved with the subjects, and engage in conversations regarding his or her understanding of project management development, the concept of a job family, and how the combination of these two aspects will help attain a higher level of professionalisation of project management in organisations. Critique needs to be delivered on the existing frameworks and where they are lacking. Attention will thus have to be drawn to the shortfalls of the existing frameworks (Stahl, 2005; Avgerou, 2005; Orlikowski & Baroudi, 1991).

From our beliefs, we, as researchers, construct a framework for viewing the world in terms of reality and knowledge. This framework for understanding can be defined as a paradigm. The basic research paradigm requires a subjective researcher who does not merely observe what happens in a controlled environment. Thus, the basic research paradigm entails employing a triangulation or a combination of the interpretivist paradigm with elements of emancipatory criticism.

The interpretivist approach seeks to build an explanatory theory and model to gain an understanding of how to manage the careers, development and training of ICT project managers in traditional organisations.

The paradigm for the research should be practitioner based, thus interpretive research will be undertaken within the confines of the following:

- critical interpretivism
- constructivism
- theory building and modelling

A critical review of the current reality will entail gaining emancipatory knowledge regarding project management as an occupation (Avgerou, 2005).

Costly, Elliott and Gibbs (2010, pp. 3-4) echo this approach by stating that "work-based research may not transfer exactly to another situation, but it involves the application of research which has usefulness and application to a particular situation. It has usefulness to the community of practice and to the individual researcher, and it has the potential to generate theory".

2.3 The type of research

According to Stahl (2005), interpretive research can be typified as non-empirical and investigative. Hence, it can be concluded that the research type is deduced from the aim and objectives of the research. Costly et al. (2010), state that the importance of research based in a work environment is coming to the fore, as there is a growing body of evidence to suggest that work-based projects may prove immensely beneficial to the long-term success of an organisation.

The researcher therefore posits that, in accordance with the aim and objectives explained in Chapter 1, the research could be typified as interpretivist and non-empirical. The focus will be on gaining a better understanding of the phenomenon of ICT project managers' career development (Stahl, 2005; Avgerou, 2005; Orlikowski & Baroudi, 1991).

2.3.1 Theoretical underpinning

In accordance with the aim and objectives stated in Chapter 1, and having developed an understanding of the research paradigm, as well as typifying the research, the next aspect to consider would be the theoretical underpinning that would support the research. For this reason, and in accordance with the

phenomena studied, the theoretical underpinning would lay the foundation for what is to follow.

The categorisation of the research should also be considered when deconstructing the research approach to derive a method that could answer the research questions. Constructivism was found to be the most suitable method.

2.3.2 Research approach and methodology

Having developed an understanding of the type and category of research, the detail design could be considered. For this reason, the research method was considered.

In choosing the research methodology, the suggested process was considered (Remenyi, 2002). The research methodology will therefore include a literature review to strengthen the understanding of the problem. The relevant literature was thus critically analysed. The literature review also encompassed the data sources.

It is suggested that the literature review provides sufficient background to understand the competence and complexity levels that the individual project manager should develop within the defined job family, as well as within the defined occupation in that job family.

Having distilled knowledge from the various literature sources through critical analysis (the literature is seen here as a data source), another level of abstraction was added. This new level entailed the development of a framework through which career management could be instituted in an organisation that utilises a job family to create the professional development home for ICT project managers and the subsequent career path management and development within their chosen occupations.

2.4 Data handling

From the discussion thus far, the research methodology will dictate the type of data that will be collected. The manner in which the data was analysed and interpreted was also derivative of the research type, the theoretical underpinning and the research approach.

2.4.1 Data categorisation and typification

Most of the collected data can be categorised as qualitative. The data can be typified as narrative descriptive articles originating in recognised scientific journals. The emphasis on gaining an understanding and giving a description of

the situation behind what is merely observable dictated the use of qualitative data (Orlikowski & Baroudi, 1991; Weber, 2004; Chen & Hirschheim, 2004).

2.4.2 Data sources

The data originated from the following sources:

- Recognised articles in scientific journals
- Recognised websites of professional bodies
- Relevant web searches utilising Google Scholar
- Publications from established ICT businesses
- Interviews
- Textbooks

2.4.3 Methods of data collection

With the study being interdisciplinary, and encompassing three subject disciplines (the ICT environment, project management and HR management), the data collection, commensurate with the sources, was as broad as possible. Therefore, data was collected as follows (Stahl, 2005; Avgerou, 2005; Orlikowski & Baroudi, 1991):

- Literature survey
- Document analysis
- Reflective journals
- Member checking
- Self-report

2.4.4 Observations duration planning

The data was collected over a period of 36 months, and a cross-sectional duration planning was applied. The individual data items (articles) span a period of 18 years. The oldest data item came from a source dated 1996, while the most current data item was dated 2014 (the most recent sources were obtained from established blogs, where the blogger would have recognised published works that were cited on the blog).

2.4.5 Data interpretation and analysis

In the choice of data design and interpretation, the work of Avgerou (2005), Chen and Hirschheim (2004), Stahl (2005), Orlikowski and Baroudi (1991) and Weber (2004) were referenced. From this, it was decided that the main method of data analysis would be content analysis.

The data items collected were captured in an Excel spreadsheet[2]. This spreadsheet was developed into a relational matrix, and became the main tool for data analysis.

Data items were evaluated for relevance and key words, and concepts were identified and selected according to their relevance to the topic under review. This selection took place in accordance with the reflective approach (Costly, et al., 2010). This approach explicitly states that an insider-researcher is involved in the learning process. This process requires a reflection on current practice, evaluation of the research work against academic criteria and the adoption of a reflective approach. Further triangulation took place according to the methodology of participant observation (Costly, et al., 2010). Jorgenson states that this methodology is appropriate, in particular, where it concerns the study of processes, relationships among people and events, the organisation of people and events, continuities over time and patterns, as well as the immediate sociocultural contexts in which human existence unfolds. Participant observation was chosen as the researcher has observed the career and development actions of a large corporate entity over a period of seven years, in particular where it entails the social development context of individuals in their career and work-life environment. Jorgenson (2014) further states that this methodology is appropriate in situations where:

- the research problem is concerned with human meanings and interactions viewed from the insider's perspective;
- the phenomenon of investigation is observable within an everyday life situation or setting;
- the researcher is able to gain access to an appropriate setting;
- the phenomenon is sufficiently limited in size and location to be studied as a case;
- study questions are appropriate for case study; and
    - the research problem can be addressed by qualitative data gathered by direct observation and other means pertinent to the field setting (Jorgenson, 2014).

[2] A copy of this tool can be made available on request.

Given this participant and reflective approach, the key words or concepts were placed on the horizontal axis of the matrix, with the data item content on the vertical axis of the matrix. By utilising the filtering function, each key word was mapped on the matrix and marked with an “x” in its column. In total, 139 key words and associated concepts emerged from the individual data items.

The value derived from this mapping was that certain patterns emerged of how and where the key words were related to each other. With the emergence of these patterns, the content of the relevant articles was read in the context of a discussion topic, and conclusions were made. From the conclusions, recommendations were derived. These recommendations were then placed in a hierarchical order to form the various horizontal bands and strata of the envisaged framework. Thus, the framework emerged and could be validated and referenced back to a particular data item.

The matrix that relates key words and topics to each other had a total of 23 525 instances where the key words related to each other as denoted by the “x” in the columns. An example of the analysis method is given in Figure 2-2 below. The detail representation of the data patterns refers to Annexure A.

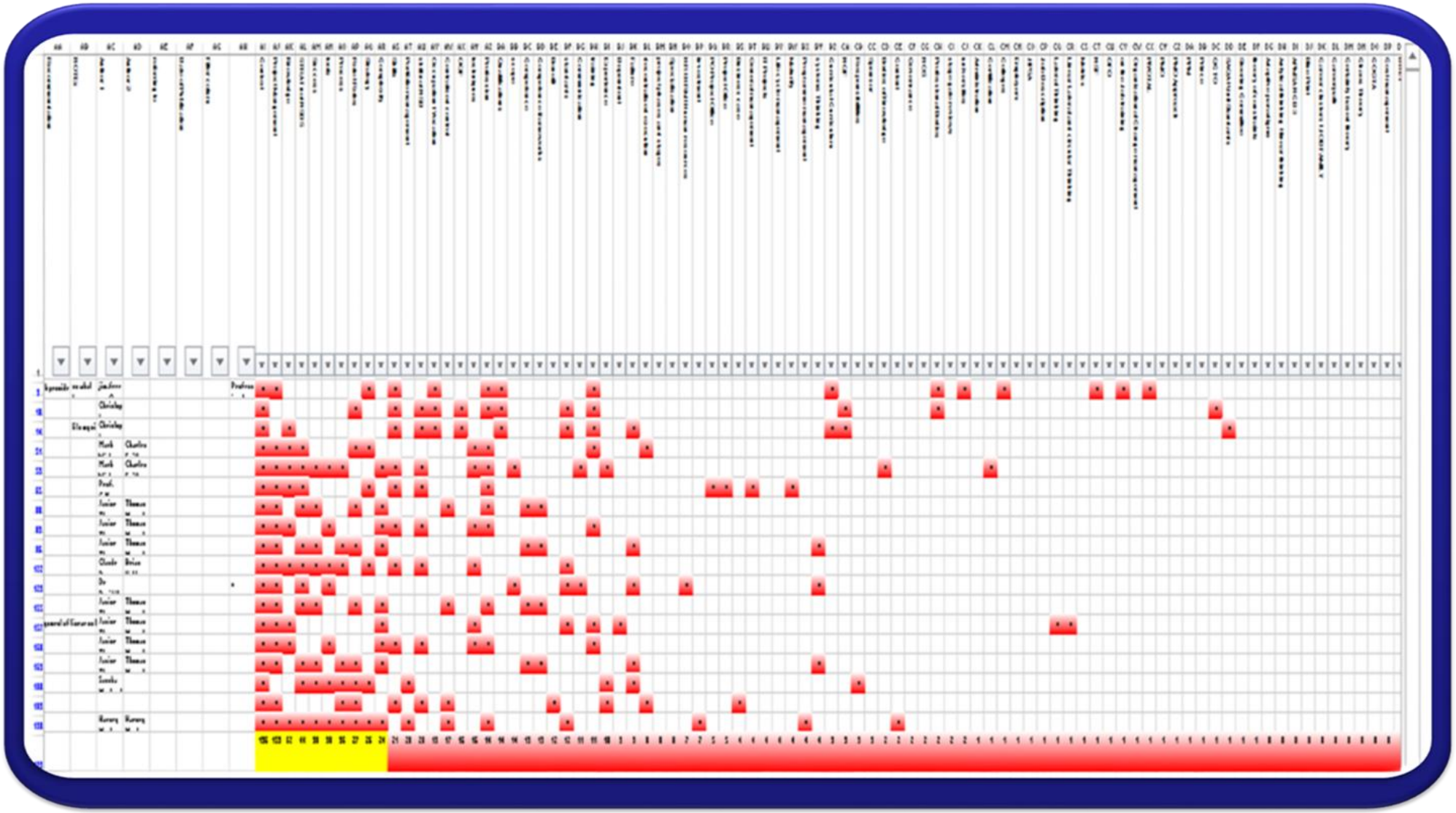


Figure 2-2: Example of data analysis and interpretation method

2.4.6 Relation of related topics and fields investigated

The research focused on three primary disciplines: ICT management, HR management and project management. To put the concepts and how they relate to the study's aim and objectives in context, the graphic depicted in Figure 2-3 below will be used. This graphic contextualises the various domain concepts. It also portrays what these concepts are and how they influenced the framework development.

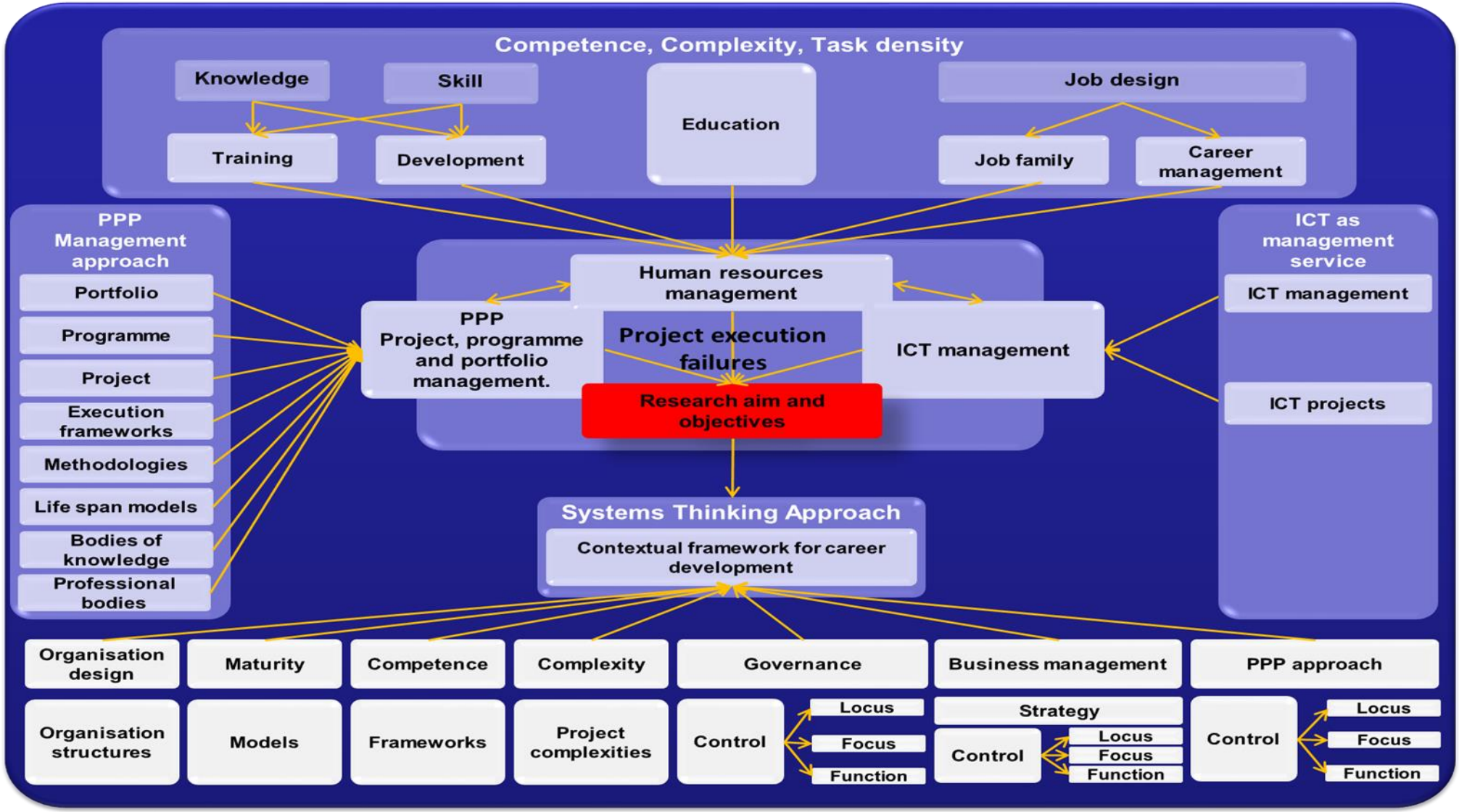


Figure 2-3: Graphic depiction of the relation of the research topics (researcher's own)

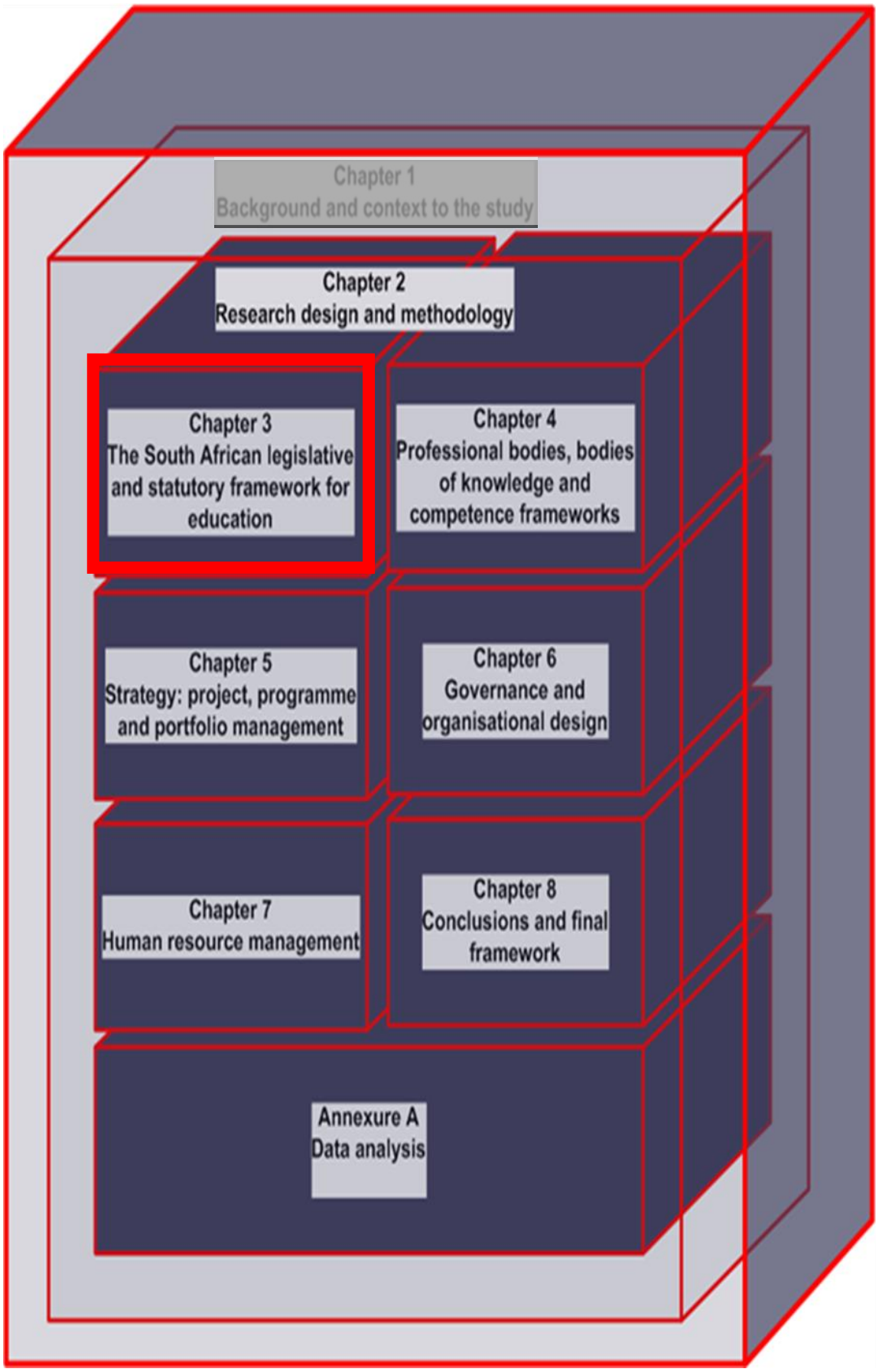
2.5 Conclusion

Research can be conducted from various perspectives. As shown in the discussion above, a golden thread is necessary that connects the various parts of the research into a synergistic whole. The research methodology was presented. Commensurate with the research aim and objectives, the beliefs of the researcher were stated in terms of the ontological and epistemological perspectives. The research paradigm, from which it was possible to categorise and typify the research, was discussed. The typification then led to the consideration of the theoretical underpinning that would contribute to the validity of the research. Detail planning in terms of the aim and objectives was then considered in terms of the research methodology and process. Next came considerations regarding data. Aspects that were considered entailed data handling in terms of categorisation, source identification, and methods of collection, interpretation and analysis.

In planning the research, various points of departure were identified for planning the research. What one author sees as a method, another might see as a design. Therefore, it became necessary to establish a unique taxonomy and hierarchy of these research concepts and terms. This taxonomy entailed taking beliefs and consideration of the various paradigms as a point of departure (refer to Figure 2-1.).

In the final analysis, it was found that a triangulated approach between the interpretivist and the critical social theorists would be the most suitable way of addressing the problems of the topic. This is based on the fact that both critical and interpretive research analyse the social content of the topic in a subjective manner. This will provide the researcher with the leeway to obtain a detailed understanding of the phenomenon in an interpretive way and conduct testing and improvement in a critical interpretive manner.

Chapter 3. The South African legislative and statutory framework for education



3.1 Introduction

South Africa is in the midst of a skills crisis (Academy of Science of South Africa, 2011). Through its various departments, government is faced with the challenge to upskill and develop the country's population to compete in the international market.

Through its legislative powers, government has enacted various initiatives to achieve its objectives. This enactment culminates in laws and prescriptive regulations that form a governance framework to which organisations should adhere. Documents such as the National Skills Development Strategy (NSDS III), (Department of Higher Education and Training, 2011), the Organising Framework for Occupations (OFO) (Department of Higher Education and Training, 2013) and the National Occupational Pathway Framework (NOPF) (Department of Labour, n.d.) all realign and redevelop the workforce of South Africa. The NOPF is aligned with the OFO and supplies augmentative information. A diagram of how the various documents and frameworks relate to each other is given in Figure 3-1.

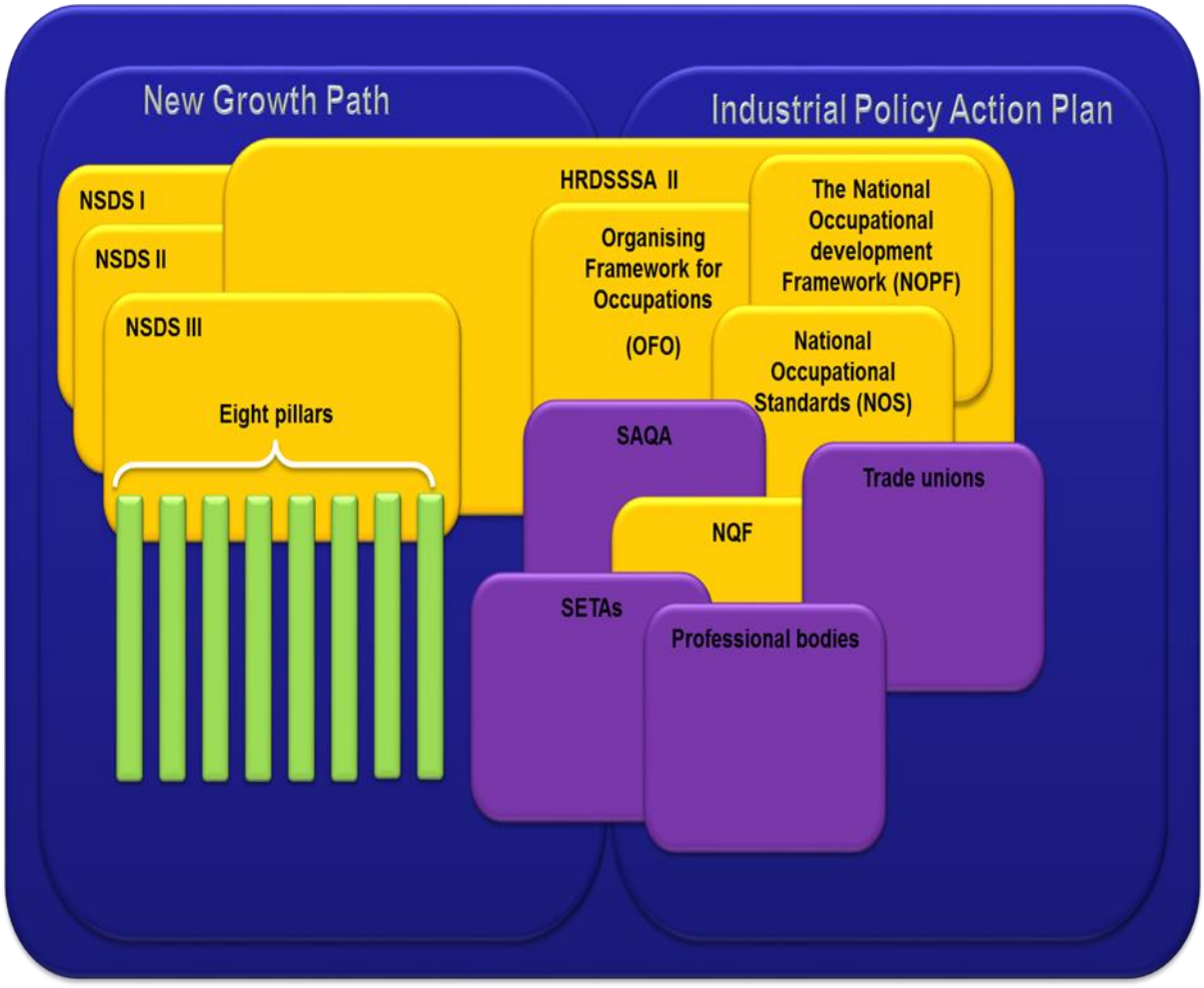


Figure 3-1: Graphic depiction of the understanding of documentation and organisations in the South African educational context

This chapter aims to discuss the relevant documents at a governance level to which there should be adherence and conformity when considering the development of the project management function and career development in an organisation.

This chapter also aims to develop a better understanding of the South African skills development landscape, and the various documents and strategies that create the context for any further skills development. For this reason, this chapter focuses on the question stated in Chapter 1: What, in the South African governance context, are requirements for the development of ICT project managers as a strategic resource? In answering this question, the following subquestions need to be addressed:

- What documents and strategies are in place from a national skills development perspective that would act as a governance framework that organisations would need to adhere to when considering the development of ICT project managers?
- Which documents and strategies would have an effect on the development of ICT project managers in their organisations?
- What is there in the greater context of the South African skills development environment that would require adherence when considering the development of ICT project managers in their respective organisations?

The literature survey uncovered various documents that form a governance framework within which the aim and objectives of skills development in the South African context should take place. These documents explain the roles and functions of various government institutions and departments. The documents entail the following:

- The National Skills Development Strategy III (NSDS III Occupational Development Framework)
- The Organising Framework for Occupations (OFO)
- The National Occupational Pathway Framework (NOPF)
- National Occupational Standards (NOS)

3.2 The South African educational context

As stated in Chapter 2, the bulk of the data came from the literature survey and subsequent review. Through identified key words and concepts, the documents were analysed to identify trends and patterns. These trends and patterns are shown in Annexure A, and will form the backdrop to guide the discussion.

3.2.1 Human Resource Development Strategy for South Africa (HRDSSA II)

The NSDS III does not stand in isolation, and forms part of the broader context of the Human Resource Development Strategy of South Africa (HRDSSA) (Department of Education, 2009). The HRDSSA is in its second revision, and NSDS III and HRDSSA II will operate concurrently for the next five years. The implications of HRDSSA II are that the following commitments have been made (Department of Education, 2009, p. 10):

- To urgently overcome the shortages in the supply of people with the priority skills needed for the successful implementation of current strategies to achieve accelerated economic growth.
- To ensure that the public sector has the capability to meet the strategic priorities of the South African developmental state.
- To ensure improved universal access to quality basic education and schooling (up to Grade 12) that is purposefully focused on: (a) achieving a dramatic improvement in the education outcomes for the poor; (b) equipping learners with optimal capacity for good citizenship; and (c) the pursuit of post-school vocational education and training for employment.
- To urgently implement skills development programmes that are purposefully aimed at equipping recipients/citizens with requisite skills to overcome related scourges of poverty and unemployment.
- To ensure that young people have access to education and training that enhances opportunities and increases their chances of success in further vocational training and sustainable employment.
- To improve the technological and innovation capability and outcomes within the public and private sectors to enhance our competitiveness in the global economy and to meet our human development priorities.
- To ensure that the public sector has the capability to meet the strategic priorities of the South African developmental state.
- To establish effective and efficient planning capabilities in the relevant departments and entities for the successful implementation of the HRDSSA II.

These commitments have been made and will need to be executed through the plans of the sector education and training authorities (SETAs) and the National Skills Fund (NSF).

South Africa is experiencing a dire shortage of skills. This shortage manifests in the artisan sector, but is also exacerbated in the knowledge-based sectors of the economy. In NSDS III, the need for a continual upgrade of skills and competencies is highlighted. There is a call to upgrade the intermediate skills pool, with a specific focus on artisans. It can, however, be argued that, with a focus on the knowledge-based economy, this call for a skills upgrade will also affect the skills and competencies of ICT project managers. In order to upgrade skills, there should be concerted efforts between the SETAs and employers to increase workplace experiential learning. For this reason, the SETAs have discretionary funding available (Department of Labour, n.d.).

For this experiential learning to take place, cooperative arrangements need to be in place between the educational institutions, businesses and SETAs. Industry will be called upon to provide the necessary and relevantly trained and experienced staff to address this specific need for trainers. Furthermore, employers would have to play a role in developing the curriculum that would be used for this training (Department of Education, 2009).

Learning in the workplace should form an integral part of the total learning process, and, for this reason, vocational programmes should be developed. Such vocational programmes should be executed through effective partnerships between educational institutions, SETAs and employers. The role that employers should play is to ensure that what gets taught in the training institutions has relevance in the work environment (Department of Education, 2009).

Although HRDSSA II focuses specifically on artisans, it also addresses occupational training, leading to the premise that jobs should be grouped into occupations according to the job family principle.

The NSDS III critiques the current enrolment and participation rate of universities in particular. The argument is that these institutions enjoy higher participation rates than other educational institutions, but they fail to produce sufficient appropriately skilled people in the disciplines required by the economy.

From HRDSSA II, the following can be concluded:

Occupational focus of development

- There is a growing focus on the development of skills in the context of the occupational realm and working towards a career path approach.

- The role that SETAs are to play is highlighted at the highest level of government's strategic planning.
- Funding for initiatives could come from the SETAs.
- The traditional view of education and training will change to have better cooperation between SETAs, employers and training institutions.
- Employers can be called upon to supply skilled and trained personnel to facilitate training and development.

3.2.2 NSDS III Occupational Development Framework

Issued in 2010, NSDS III refers to inequalities, which it aims to rectify, and to ensuring equal access to opportunities. It calls for fundamental transformation and wants to ensure increased access to training and skills development opportunities for previously disadvantaged individuals. Thus, it aims to fundamentally transform inequities linked to class, race, gender, age and disability in our society. The strategy also has a future focus, because it seeks to address the skills shortages and mismatches in South Africa. Hence, in order to remain competitive in the world market, productivity of the South African workforce must also increase.

NSDS III states that its aims to integrate higher and further education, as well as skills development, into a single department. This single department is known as the Department of Higher Education and Training (DHET). In addition to just establishing a single department, the strategy envisions relationships and partnerships between the following:

- Employers
- Public education institutions (further education and training colleges, universities, universities of technology)
- Private training providers
- SETAs

As stated in Chapter 2, the data analysis pattern that emerged from analysing NSDS III was used to determine the relevance of the information contained in it, as and how it pertains to the topic under review.

The analysis of NSDS III has shown that it addresses and pertains to the following:

3.2.2.1 An overarching skills development strategy

As an overarching strategic guide for skills development, guidance and direction can be sought in NSDS III for sectoral skills planning, as well as the resurrection of the

SETAs. It is also the guiding document in terms of utilisation and allocation of the NSF. It provides a framework and sets out the linkages with and responsibilities of other education and training stakeholders.

From a broader perspective, NSDS III stands in relation to New Growth Path (NGP), the Industrial Policy Action Plan (IPAP), the HRDSSA (Department of Education, 2009) and, in particular, sector development plans. In its broader context, NSDS III focuses on significant increases in qualifications and skills to support priorities and initiatives of South African economic growth.

Preceded by documents such as NSDS I and NSDS II, the many lessons learnt since their inception were incorporated into NSDS III. Although these lessons constituted important building blocks, the economy remains constrained by a severe lack of skills. From this constrained situation can be deduced that the skills development system has not yet achieved what was expected.

The driving forces behind the strategy entail improving the effectiveness and efficiency of the skills development system. Having identified these driving forces, the strategy also proposes an explicit commitment. This commitment entails the linking of skills development to career paths, career development and promoting sustainable employment and in-work progression.

The following extract from NSDS III (Department of Higher Education and Training, 2011, pp. 8-9) encapsulates the essence of the intention of the document

> *The NSDS-III has the following pillars:*
>
> - *Sector strategies (aligned to government and industry development strategies), programmes and projects developed with and supported by sector stakeholders. The DHET will play a leading role in forging a closer working relationship and collective identification of skills development priorities, among all the key institutional players in our education and training system.*
> - *Relevant sector-based programmes addressing the needs of unemployed people and first-time entrants to the labour market will be developed and piloted by SETAs, with roll-out being planned, managed and funded, where appropriate, in partnership with the NSF. SETA funds will primarily be used to fund the skills development needs of employers and workers in their sectors.*

However, the utilisation of SETA discretionary funds must be guided by the goals of NSDS III.

- *Professional, vocational, technical and academic learning (PIVOTAL) programmes. These are programmes that provide a full occupationally directed qualification. Such courses will normally begin in a college or university and would include supervised practical learning in a workplace as part of their requirements. The courses – especially for workers – could in some cases start in the workplace and then move to a college or university. The courses would culminate in an occupational qualification. PIVOTAL courses will normally be offered by arrangement between a SETA, an educational institution, an employer and a learner. Fundamental to the successful implementation of PIVOTAL programmes will be a model of cooperation between a SETA, a higher education or further education and training institution and an employer. This will help ensure responsive curricula and courses.*
- *Programmes that contribute towards the revitalisation of vocational education and training including the competence of lecturers and trainers to provide work-relevant education and training, and promote occupationally directed research and innovation.*
- *Incentives for training and skills development capacity in the cooperative, non-governmental organisation (NGO) and trade union sectors, including community and worker education initiatives, which contribute to the effective training of the youth and adults.*
- *Partnerships between public and private training providers, between providers and SETAs and between SETAs, which address cross-sectoral and inter-sectoral needs.*
- *An increased focus on skills for rural development to support government's prioritisation of rural development.*
- *Sector strategies (aligned to government and industry development strategies), programmes and projects developed with and supported by sector stakeholders. The DHET will play a leading role in forging a closer working relationship and collective identification of skills development priorities, among all the key institutional players in our education and training system.*

> *The strategy is informed and guided by other overarching government programmes, especially the HRDSSA, the requirements of the NGP, the IPAP, the outcomes of government's Medium-term Strategic Framework (MTSF), the Rural Development Strategy, as well as NSDS III, among other priorities of government. It seeks a closer synergy between the world of work and our formal education system.*

The most striking point from this extract, as was shown in the data analysis, was the acronym PIVOTAL. As if intentionally, this was chosen to designate the central theme in the document (Department of Higher Education and Training, 2011).

3.2.2.2 PIVOTAL

PIVOTAL is an acronym for:

- Professional
- Vocational
- Technical
- Academic learning programmes

It has the intention to provide full occupationally directed qualifications (Department of Higher Education and Training, 2011, p. 9).

It can be deduced that training programmes can start with college or university education, but, in contrast to the current functioning of such training, the education and skills development should be extended to the workplace where supervised practical learning can take place.

Practical learning would have to augment the gain of academic knowledge. Conversely, training could start in the workplace, and then move to an educational institution. The objective with the PIVOTAL approach is for education, training and skills acquisition to be aligned with occupational requirements, and it could culminate in an occupational qualification (Department of Higher Education and Training, 2011) (Department of Higher Education and Training, 2011).

Under the thinking of PIVOTAL programmes, coursework and training will entail a partnership between:

- SETAs
- Educational institutions
- Employers
- Learners

Thus, PIVOTAL programmes will require a paradigm shift in terms of cooperation between a SETA, a higher education or further education and training institution and an employer.

The implications of PIVOTAL programmes are thus as follows:

- SETAs will have to shape up and be proactively involved in the design and monitoring of curriculum content.
- Educational institutions cannot, as in the past, determine the content of training curricula in isolation.
- Employers could be required to contribute to curriculum content, and form an extension of the educational system.
- Employers would be required to structure positions for growth, wherein the requirements of PIVOTAL programmes would entail that on-the-job training would now form part of the acquisition of an academic qualification.
- Employers might be required to restructure job titles and redefine roles and functions to get positions aligned with:
  - the Organising Framework for Occupations; and
  - the Occupational Qualifications Framework (Department of Higher Education and Training, 2011).

3.2.2.3 Goals

The goals of the NSDS III are stated below (Department of Higher Education and Training, 2011, pp. 11-23):

1. Establishing a credible institutional mechanism for skills planning.
2. Increasing access to occupationally directed programmes.
3. Promoting growth of a public further education and training (FET) college system that is responsive to sector, local, regional and national skills needs and priorities.
4. Addressing low levels of language and numeracy skills to provide access to additional training.
5. Encouraging better use of workplace-based skills development.
6. Supporting small enterprises, non-profit organisations, cooperatives and worker-led training initiatives.

7. Increasing public sector capacity for improved service delivery and supporting the building of a developmental state.
8. Building career and vocational guidance.
9. Encouraging and supporting worker-led, NGO and community training initiatives.

Special attention is drawn to the penultimate goal listed above. At the national skills development level, it is evident that there is a need to organise jobs and positions into a framework of occupations.

3.2.2.4 Conclusions on the NSDS III

From NSDS III, the following conclusions can be drawn: There is a relationship between the drive to develop skills and establish occupations, and the curriculum in which the learning aspects of such occupations should be defined. The relevance of this relationship is that current curricula for training and development should focus more on the actual occupation for which the training has relevance. It also means that an academic qualification alone would not be sufficient for an incumbent to make a productive contribution to the occupation. Particular occupational curricula will need to be developed, and tertiary and FET institutions will need to adapt their teaching.

3.2.3 SAQA and NQF

There is a relationship between skills and training. In terms of the curriculum, the content should be aligned with the requirements of the South African Qualifications Authority (SAQA) and the National Qualifications Framework (NQF). Curricula and qualifications should therefore be based on the outcomes required for a particular occupation, while training efforts should be aligned with occupational criteria, not just academic criteria. Thus, all training endeavours should provide occupational outcomes that can be accredited in terms of unit standards as defined in the NQF.

3.2.4 Occupational qualifications

According to Freeman (Freeman, 2011), NSDS III has the implication that employers should recognise the National Certificate (Vocational) and N courses as important base qualifications through which young people can obtain marketable vocational skills and work experience.

3.2.5 SETAs

From the discussion in the sections above, it is evident that the SETAs have been resurrected, and that new roles, responsibilities and functions have been endowed upon them (Department of Higher Education and Training, 2011).

There is a huge focus on the involvement of the dysfunctional SETAs. The aim of the strategy document is to resurrect these institutions. Their reinvented roles will then be to govern and oversee training in a particular sector (Department of Higher Education and Training, 2011).

Currently, the identified SETA for project management is the Services SETA (The Skills Portal, 2010). Whether this is the correct one remains an open question, as it is difficult to define a single SETA to house project management and ICT project management in particular. This is because projects run in and across all major occupations and sectors. This, however, compounds the problem of having project management defined as an occupation in its own right, with projects branching out across industries and areas of specialisation, such as ICT.

3.2.6 Professional bodies

In contrast to the clearly defined roles and functions of the SETAs, professional bodies receive little attention. Following the failure of the SETAs, professional bodies, filling the vacuum left by the SETAs, are acting to govern the professionalism of a given profession or occupation. Government therefore appears to want to take charge of something that is being well regulated by recognised professions.

3.2.7 Training institutions

Through the relationship that the strategy document (NSDS III) establishes in terms of training institutions, there is a big shift in focus towards higher education (through the DHET and its Directorate for Further Education and Training). This shift in focus implies that the current status quo of universities might be jeopardised as their main focus is on academic learning, as opposed to the envisioned vocational learning.

The envisioned relationship between the SETAs, the DHET (and its Directorate for Further Education and Training) and employers also receives attention. By establishing a relationship between these parties, employers should become actively involved in the training and development of employees. This emphasises aspects such as on-the-job training that is aligned with the requirements of the SETAs, and training where incumbents can gain NQF credits towards a formal qualification. Thus,

employers should become more active in terms of curriculum development and the methods of training and development (Freeman, 2011).

NSDS III also faces the challenge of having the skills level of educators upgraded, especially those involved with training in industry-based training institutions. This calls for an improvement of the pedagogical, vocational and technical skills of college lecturers and ensuring that they are exposed to the latest developments, both in colleges and in industry. DHET will work with other higher education bodies to develop a strategy for improving academic staff qualifications and teaching competence across all universities, universities of technology and colleges (Freeman, 2011).

3.2.8 Establishment of occupations/occupational structuration

HRDSSA III calls for, or at least refers to professional groupings of jobs, which can collectively be called an occupation[3]. In instances where professional registrations are attached to occupations, the strategy refers to them as professions. This has the implication that groupings of positions in an organisation might have to be restructured in alignment with the OFO, as mentioned in the strategy (Freeman, 2011).

NSDS III expresses a key desire to improve "the effectiveness and efficiency of the skills development system". This would be accomplished by linking skills development to career paths and development, and promoting sustainable employment, as well as in-work progression (Freeman, 2011).

3.2.9 On-the-job training programmes

Learning should be extended to the workplace. As such, there is a requirement for an integration of programme elements that establish an effective partnership between education and training systems and employers that would ensure that skills have real labour market relevance and that young people gain an early appreciation of and exposure to the world of work. Thus, it calls for workplace learning to be part of all vocational programmes (Freeman, 2011).

[3] Refer to the discussion and concept of occupation vs a vocation and the difference between the two concepts. HRDSSA III refers to a vocation in PIVOTAL, and to an occupation in the text, with disregard to the difference in meaning.

3.2.10 Trade unions

Involvement of the trade unions is mentioned in the HRDSSA. The strategy envisions the definition of a role for the trade unions and their participation in the skills development and training processes as well (Department of Education, 2009).

With particular reference to the study topic, this strengthens the research statement. In the absence of a defined occupational group for project managers, there can be no adherence to the objectives of NSDS III. It is, however, sad that more references were made to the roles of the SETAs and the trade unions than to professional bodies. With reference to the framework construction, government, from an overarching perspective, should establish a governance framework. Within the confines of this governance framework, industry and academic institutions should be involved.

3.2.11 National Occupational Framework (NOPF), the Occupational Qualifications Framework (OQF) and the Organising Framework for Occupations (OFO)

In the discussion above, it is clear that the acronym PIVOTAL is in essence the central theme and thrust of NSDS III. Upon a more thorough analysis of PIVOTAL, it was found that its elements have a direct or implied reference to the NOPF. This framework has subcomponents identified as the Organising Framework for Occupations (OFO) and the Occupational Qualifications Framework (OQF) (Vorwerk, 2007).

The NOPF, as an element of NSDS III, with its components, was issued by the Department of Labour (Vorwerk, 2007).

In alignment with the research design and data analysis method (the relevant relational map of the key words), it is commendable that there is no mention of national occupational standards in the NOPF and its presentations. Furthermore, no reference was made to on-the-job training, as was done in NSDS III.

There is a continued focus on the roles and functions of the SETAs, as well as those of the DHET through the focus that is placed on higher education, as well as further education and training. It is in this overarching document that occupations and vocations are first mentioned. Reference is again made to the fact that the term occupation has a different interpretation to the term vocation.

In the PIVOTAL acronym, there is large emphasis on trades. However, with reference to this study, the relevance is only on the professional part of the PIVOTAL acronym.

Emphasis is also placed on an overarching governance framework, as it is either implied through the key word, or directly stated as such.

Skills development, through the use of the SAQA standards, as well as unit standards, also features prominently.

Furthermore, there is a focus on the development of curricula to support skills development, both in the formal educational system and in the workplace. The implication is that employers should become more actively involved with the educational providers to determine the learning content. Curriculum content should be aligned to the progress that an individual can make along a defined career path. This implies that employers should give more formal attention to the development of such career paths. It also implies that at the attainment of each level along a career path, such positional outcomes should be defined and related to a particular development curriculum.

Other than skills, competence, complexity and experience are also mentioned. These concepts (the way in and through which knowledge is applied) are of greater importance than just the acquisition of knowledge, and should be the objective to achieve.

What follows in the sections below is a detailed discussion of the components of the NOPF, as they are compounded from the OQF and the OFO.

3.2.11.1 OQF

The OQF aims to facilitate alignment between the development and implementation of learning programmes that are aligned with occupations and relevant qualifications that pertain to such occupations. Thus, it entails a curriculum content alignment with the outcomes as expected from an incumbent in a certain position. Reference is made to alignment in terms of consistency and the coherence of learning programmes that are linked to occupations and occupational qualifications (Vorwerk, 2007).

As it pertains to the study, the likelihood of developing an “artisanship” for project managers in general and ICT project managers in particular would be interesting. At first glance, this sounds rudimentary, but relative to other well-established occupations and professions, such as accounting and legal occupations, one finds accounting clerks doing “articles” and attorneys completing a clerkship.

The OQF's governance focus comes from the fact that this new framework is intended to form the foundation of all further policy development on qualifications, curricula and assessment for programmes regulated by the Skills Development Act, such as learnerships, apprenticeships and skills programmes. The intention to establish a governance framework is further strengthened in the objectives set for the OQF, which (through the OFO) will provide a more direct mechanism to link learnerships, skills programmes, apprenticeships and, where appropriate, internships to occupations.

The OQF level outcomes should align with the relevant SAQA qualification levels. Outcome levels are determined by the skills level of the occupation as defined in the OFO.

With the objective of designing occupation-based qualifications, the Department of Labour chose to employ the OFO. Through this occupational classification system, the development of occupational qualifications will be managed and controlled. Control will be established through the use of an occupational classification system. (Vorwerk, 2007)

3.2.11.2 Proposed occupational qualifications

Within the framework of the OFO, with the objective of designing occupation-directed qualifications, the credit values for qualifications would be determined by "the range, content, duration, inclusivity of work experience, and the complexity of the learning processes" (Vorwerk, 2007, p. 14).

We thus see an explicit attempt to align learning to the OFO and the descriptors for such occupations in terms of the exit outcomes, which will culminate in a qualification.

The OQF and presentations refer to modes of learning that would carry a relative weighted average in terms of the total envisioned outcome of the qualification. Reference is also made to high-skill occupations, where 40% of the weighting can be focused on the attainment of a skill level, especially those skills attained in the workplace.

Specialisation in the attainment of skills in an occupation can be recognised through the issuing of certificates. These specialisation certificates would augment the base organisational qualification, where the specific skills were acquired in a specific context of the occupation, but are not generic to the occupation as a whole. The use

of the skills certificates are elaborated on in terms of the following example) (Vorwerk, 2007, p. 15):

> *Another use of skill certificates is to recognise particular specialisations in an occupation. In some occupations, a particular piece of equipment or a particular procedure may be required in a specific context, but is not relevant to the occupation as a whole, e.g. balancing of helicopter blades for the Reinforced Plastics and Composite Trades Worker* (OFO: 399906).
>
> *The skills in this qualification can be used to make a variety of products: boats, sports and leisure equipment, chemical vessels and aeronautical components including helicopter blades. Only the latter will require this specialisation and this means that such a specific skill set does not have to be included in the occupational qualification. But for those artisans who manufacture helicopter blades, a highly specialised and economically important task, this skill needs to be developed and certified*.

Another use of the skills certificates could be where behavioural competencies are acquired in carrying out a particular job. This refers specifically to the current qualification system that does not address the acquisition of supervisory and leadership skills. The notion and intent of the OFO is thus to treat such competencies as specialised in the occupation. Individuals could thus augment their base occupational qualification through the attainment of such specialisation certificates (Vorwerk, 2007).

The implication is thus that the practitioner is still actively involved with the tasks of the occupation, but other activities are also required for directing, leading and guiding the activities of others (Vorwerk, 2007).

It can then be argued that a single behavioural skills certificate could be implemented across a number of occupations, where the incumbents perform similar supervisory duties (Vorwerk, 2007).

This is in contrast to the current approach of SAQA, which has the view that a generic supervisory qualification can be achieved, and then specialisation courses added (Vorwerk, 2007).

The closest that the OFQ comes to referencing a job family is to make reference to job clusters. Job clusters would be entrenched through the curriculum and qualifications framework. With reference to trades and skills development, reference is made to a National Occupational Pathway Framework (NOPF). It would be through the use of this NOPF that curriculum content development would take place.

Within the context of the NOPF, occupations are clustered together on the OFO to reduce the duplication of qualifications. There is also a drive to ensure that occupational qualifications are aligned and regularly revised to meet the needs of the labour market.

The reason for the clustering of occupations is that the avenue is opened up to ensure articulation between similar occupations, as well as to ensure progression from one level of an occupation to the next for related occupations.

A further use of the clustering of occupations would be to act as the translator between the OFO and SAQA's 12 learning fields. Occupational clusters or groups on the OFO would be the determinant of an occupation, and not a particular single occupation. Through this clustering, a simplified system is developed for the management and control of qualifications and curriculum development processes.

As quite often referenced in the OQF, the next section will discuss the OFO.

3.2.12 The Organising Framework for Occupations (OFO)

As was seen in the discussion above, the NOPF consists of two components: the OQF and the OFO. This section will explain what the OFO entails. Attention will be given to the development and origins of the OFO, as well as the concepts used in defining the OFO: skill and the kind of work performed. It is important to discuss these concepts, as they also relate to the concept of a job family.

The OFO is a concept that manifests in various presentations, but most concretely in an Excel spreadsheet, which organises occupations in terms of a structure with specific codes designated to specific occupations (Department of Higher Education and Training, 2012).

The OFO is a codified occupational classification system, which is used by the DHET to identify, monitor and report on the skills demand and supply in South Africa (Department of Higher Education and Training, 2012).

In constructing the OFO, a bottom-up approach was followed. As such, it entails the following:

- Jobs were analysed, and similarities in terms of tasks and skills identified.
- Jobs were categorised in terms of similarity regarding occupations.
- Occupations were classified and grouped into occupational groups, based on increasing levels of generality.

For skills development planning and the implementation of enhancement programmes, the OFO adds value in that it:

- provides a common language when talking about occupations;
- captures jobs in the form of occupations; and
- groups occupations into successively broader categories and hierarchical levels based on similarity of tasks, skills and knowledge.

3.2.12.1 Developing and updating the OFO

The development of the OFO in its current format started in 2004, when the Department of Labour (DoL), with the support of the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), decided to better link the supply and demand of skills in the economy through the use of occupations as the common denominator for analysis. At that stage, South African Standard Classification of Occupations (SASCO) and the United Nations International Standard Classification of Occupations (ISCO-88) were in existence, and proved to be powerful tools. However, these measures did not provide the detail that South Africa required for good skills development planning. As an earlier source of occupational classification, ISCO-88 sparked the debate as to what constitutes an occupation, both locally and internationally. Over time, international agreement emerged that there should be a definition of occupational groupings, rather than just single occupations. The International Labour Organisation (ILO) consolidated these views into what is known as the International Standard Classification of Occupations (ISCO). To contextualise ISCO for South African application, Statistics South Africa (StatsSA) adopted and modified it to be known as the South African Standard Classification of Occupations. On the international front, in the Australasian context, similar adaptations of the ISCO framework were done during 2005, culminating in a more representative framework known as the Australian and New Zealand Standard Classification of Occupations (ANZSCO) (Department of Higher Education and Training, 2012).

ANZSCO 2005 went beyond ISCO-88 by adding a more thorough reflection of the occupational environment, as well as adding descriptors for occupations. Where ANZSCO left off, the DoL picked up with the definition of the OFO. As such, the OFO

incorporated more occupations and occupational categories. During 2009, DHET took over the responsibility for maintaining the OFO (Department of Higher Education and Training, 2012).

There was divergence in the national development of a classification systems for occupations, as StatsSA used SASCO, which is based on an updated ISCO-88 system, while DHET used the adapted ANZSCO system. With the annual review and updating of the OFO in 2010, it was decided that the OFO should also better reflect the structure of ISCO-88. The reasons for this decision, as cited, included the following (Department of Higher Education and Training, 2012, p. 5):

- The Department of Higher Education and Training uses the OFO for skills planning. Version 9 of the OFO was based on ANZSCO, which was an adaptation of ISCO-88. StatsSA used SASCO, which was based on ISCO-88, as its classification system. The newer version of ISCO, version 8, offered a more comprehensive framework structure. DHET has thus decided to align the OFO to the ISCO-88 structure in an attempt to create a standardised framework, which would also align to the international framework.
- ISCO-88 took a number of developments in the economies of countries all over the world into consideration, such as the developments brought about in the ICT sector, to reflect the important changes that have taken place in the world of work.
- The relation between ISCO-88 and the United Nations International Standard Industrial Classification (ISIC) of all economic activities.

South Africa now has an occupational classification system that serves both StatsSA and the DoL. It is now easier to compare labour market and skills information with international data (Department of Higher Education and Training, 2012).

3.2.12.2 Framework and concepts of the OFO 2011 and 2012

In the design and development of the OFO 2011 and 2012, consideration was given to two main concepts: kind of work performed and skill. An understanding of these concepts is important when working with the OFO, as it influenced the classification units and variables (Department of Higher Education and Training, 2012).

Classification units can be stated as jobs (reflected as occupations on the OFO), while the classification variables are the kind of work done as reflected in the tasks and duties. The classification criteria for determining major, sub-major and minor categories of occupations in the OFO are derived from the ISCO-88 definitions. Such definitions must be adhered to when identifying new occupational titles. These

definitions entail the following (Department of Higher Education and Training, 2012, p. 6):

> *A job is a set of tasks and duties carried out or meant to be carried out, by one person for a particular employer, including self-employment.*
>
> *An occupation is a set of jobs whose main tasks and duties are characterised by a high degree of similarity (skill specialisation).*[4]

Jobs in the workplace could thus either be related to occupations or specialisations on the OFO. The association depends on the level of uniqueness of the output of the job on the workplace.

3.2.12.3 Skill

As stated in the introduction of this section, one of the founding concepts in the OFO is that of skill. In terms of the OFO (Department of Higher Education and Training, 2012, p. 6), the following definition of skill is offered:

> *….the ability to carry out the tasks and duties of a given job.*

Moreover, the OFO delimitates it further as having the dimensions of skill level and specialisation. Arranging these occupations into groups is an important delimitation. Thus, the unit group level of the OFO encompasses the two dimensions of skills.

Skill level

Within the context of the OFO (Department of Higher Education and Training, 2012, p. 6), skill level is defined as:

> *A function of the complexity and range of tasks and duties to be performed in an occupation.*

Further to just the definition of skill level, the OFO indicates how skill level should be measured in the context of a work situation. It states that (Department of Higher Education and Training, 2012, pp. 6,7):

> *Skill level is measured operationally by considering one or more of:*

[4] Note: The output of occupations clustered under the fourth level of the OFO (unit group) is described in terms of tasks and a descriptor. Occupations are thus related to the tasks defined at the unit group and an occupation descriptor describes what the application of the variety of tasks ultimately produces or delivers in the world of work. An occupation descriptor always either indicates the unique service the occupation renders or the unique product the occupation produces in executing some or all of the related tasks in a specific context.

- *the nature of the work performed (i.e. the complexity and range of work) in an occupation in relation to the characteristic tasks and duties defined;*
- *the level of formal education defined in terms of the International Standard Classification of Education (ISCED-97) required for competent performance of the tasks and duties involved; and*
- *the amount of informal on-the-job training and/or previous experience in a related occupation required for competent performance of these tasks and duties*.

Skill specialisation

In terms of enhancing the use of the skills concept, the OFO considers skills specialisation in terms of four conceptual criteria (Department of Higher Education and Training, 2012, p. 7):

- the field of knowledge required;
- the tools and machinery used;
- the materials worked on or with; and
- the kinds of goods and services produced.

The reader needs to be alerted to the following caveat in the OFO:

In accordance with the ISCE, formal education is only one of the measures used in the determination of skill level (indicative in nature). This is due to different educational levels in different countries, which can construe ambiguity in occupational designations. For this reason, job content (tasks and duties) is given preference in the determination of occupational classes (United Nations Educational, Scientific and Cultural Organisation, 2011).

The relevance of the use of job content rather than qualification level is most prominently found in the major groups 6 and 7. Thus, occupations that involve the performance of broadly the same sets of tasks and duties are always classified in the same category, even in cases where national skill level requirements measured in terms of formal education are different.

3.2.12.4 The structure of the OFO

An analysis of the structure of the OFO reveals the following taxonomy of occupational classifications:

> *The major grouping is done at a one-digit level, with the sub-denomination of occupations denoted by a two-digit figure. The minor classification is denoted by a three-digit figure. The lowest level used in the OFO denotes unit groupings and is represented by a four-digit numeral. There is a deviation in the South African occupational classification system from the ISCO system as there are eight rather than ten major groupings. This is due to the combination in Group 0 of the two major groupings of ISCO i.e. 08 Major Group 6: Skilled agricultural, forestry, fishery workers, and Major Group 7: Craft and related trades workers. The main grouping for armed forces was incorporated as a minor grouping with its subsequent seven minor groupings* (Department of Higher Education and Training, 2012, pp. 7,8).

Major groups in the OFO are primarily determined on the basis of four skills levels. However, there is a deviation in terms of Major Group 1, the grouping for managers, where the concept of skills level is primarily applied at the second (sub-major) level. Other than this, all major groups relate to one skill level only. The exception with the managerial occupations resides in the fact that skills levels 3 and 4 are included at the sub-major group level of the classification (Department of Higher Education and Training, 2012).

Thus, having developed an understanding of the classification structure of the OFO, and where and how it was derived from the ISCO standard, it is clear that the OFO offers eight major groupings, as depicted in Table 3-1 below (Department of Higher Education and Training, 2012, p. 8):

Table 3-1: OFO major denominations

Major group	Denomination descriptor
1.	Managers
2.	Professionals
3.	Technicians and associate professionals
4.	Clerical support workers
5.	Service and sales workers
6.	Skilled agricultural, forestry, fishery, craft and related trades workers

Major group	Denomination descriptor
7.	Plant and machine operators and assemblers
8.	Elementary occupations

Thus, to find the relevance of the OFO for the objective of this study, it is important to understand where and how to find occupations relating to the subject, i.e. ICT project managers.

Within the eight major groupings and classifications of occupations, there are sub-major groupings, with their respective minor groupings and subsequent unit groupings. The determinant for the classification is primarily the level and the specialisation in skills required. To thus find an occupation, the six levels will have to be reviewed.

The OFO goes further to provide occupational descriptors for each occupational grouping up to Level 6. A list of the associated tasks is also provided for every occupational grouping (up to Level 4). Graphically, this system of classification can be depicted as shown in Figure 3-2 below.

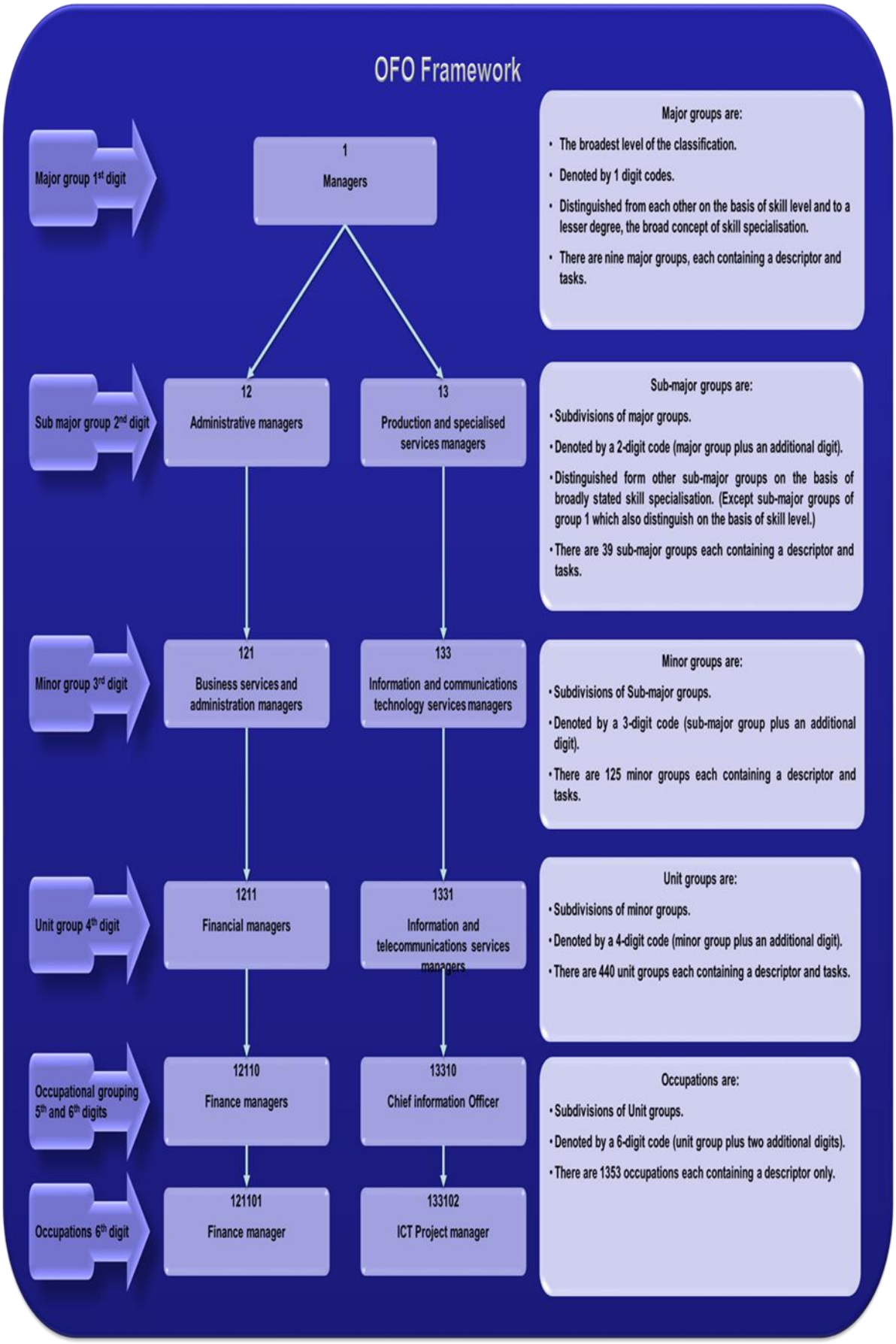


Figure 3-2: Graphic depiction of the OFO classification system as applied to ICT project managers (Department of Higher Education and Training, 2012)

3.2.12.5 Green occupations

Other than the depiction above, the 2012 revision of the OFO added occupations and trades that can be regarded as green occupations. The implication of the addition of the green occupations is twofold:

- The political will is needed to move towards a green economy
- The associated creation of such green jobs would entail new and different skills sets

In the introductory paragraphs to this section, it was stated that there is ambiguity in reporting for statistical, educational and labour market needs, thus giving rise to the structured framework of occupations. The addition of the green occupations in the OFO 2012 version would go further to allow SETAs to better reflect skills demands in support of a green economy and sector skills plan updates. The following excerpt from the OFO 2012 serves as the definition of such occupations (Department of Higher Education and Training, 2012, p. 13).

> *Green occupations are those that have as their direct purpose the nationally identified priorities and initiatives of reducing negative environmental impacts and contributing sustainably to environmentally, economically and socially sensitive enterprises and economies. This includes occupations that directly contribute to the maintenance of processes related to national initiatives to:*
>
> - *develop and adopt renewable sources of energy;*
> - *reduce consumption of energy, fossil fuels and raw materials;*
> - *enhance energy and resource efficiency;*
> - *reduce greenhouse gas emissions;*
> - *decrease waste and pollution;*
> - *recycle materials; and*
> - *prevent the loss of biodiversity and restore ecosystems.*
>
> *As a result of the research, 93 occupations were identified as "green", of which 14 were not reflected on the OFO 2011. Green occupations can be recognised by the _ symbol on the OFO* (Department of Higher Education and Training, 2012).

The addition of the green occupations and the final structure for the OFO 2012 (Department of Higher Education and Training, 2012) is shown in Table 3-2.

Table 3-2 Final structure of the 2012 OFO

Major groups	Sub-major groups	Minor groups	Unit groups	Occupations	Green occupations	Trades	ISCO skill level
Managers	4	11	32	135	3	0	3+4
Professionals	6	27	92	363	48	0	4
Technical and associated professionals	5	20	84	267	31	1	3
Clerical support workers	4	8	29	68	0	0	2
Service and sales workers	4	14	46	109	0	1	2
Skilled agricultural, forestry, fishery, craft and related trades workers	7	20	84	243	7	98	2
Plant and machine operators and assemblers	3	14	40	134	0	5	2
Elementary occupations	6	11	33	98	4	0	1
Total occupations	39	125	440	1 417	93	105	

3.2.12.6 Relevance of the OFO to the study subject

Having developed an understanding of the origin, development and classification structure of the OFO, it is relevant now to interrogate this framework and structure to see whether it provides for the occupation of ICT project managers. For this reason, an electronic copy of the OFO in Excel format was obtained from the website of the Department of Higher Education and Training (2012). In accordance with the rest of the study, the functionality of Excel was utilised to filter key words, and the framework was analysed. The search was conducted utilising the key word of project manager contained in the occupational titles in the relevant columns. The outcome of the search is given in the series of screenshots of the OFO given in Figure 3-3 to Figure 3-8 below.

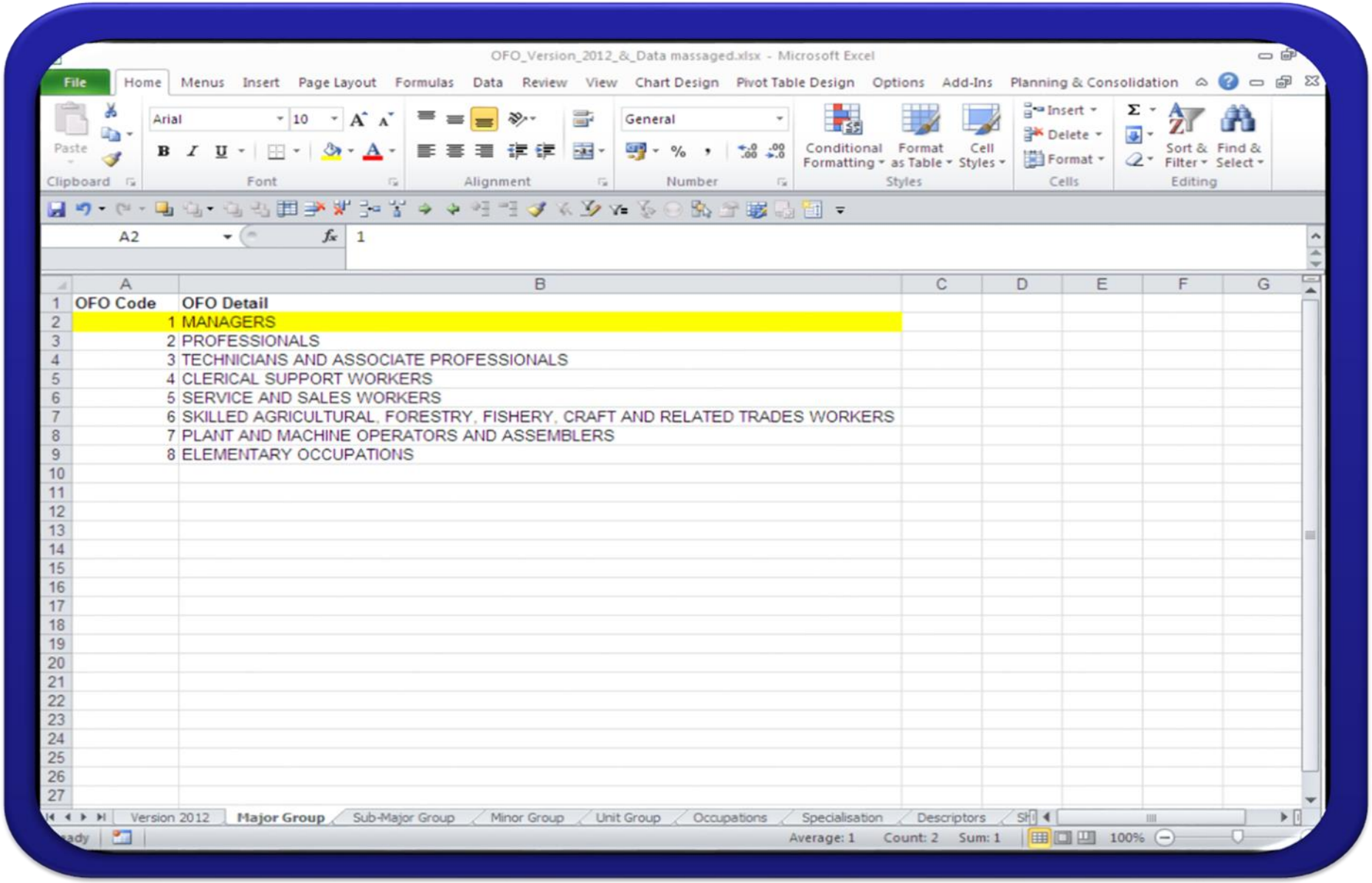


Figure 3-3: OFO major grouping for determining the classification of ICT project managers

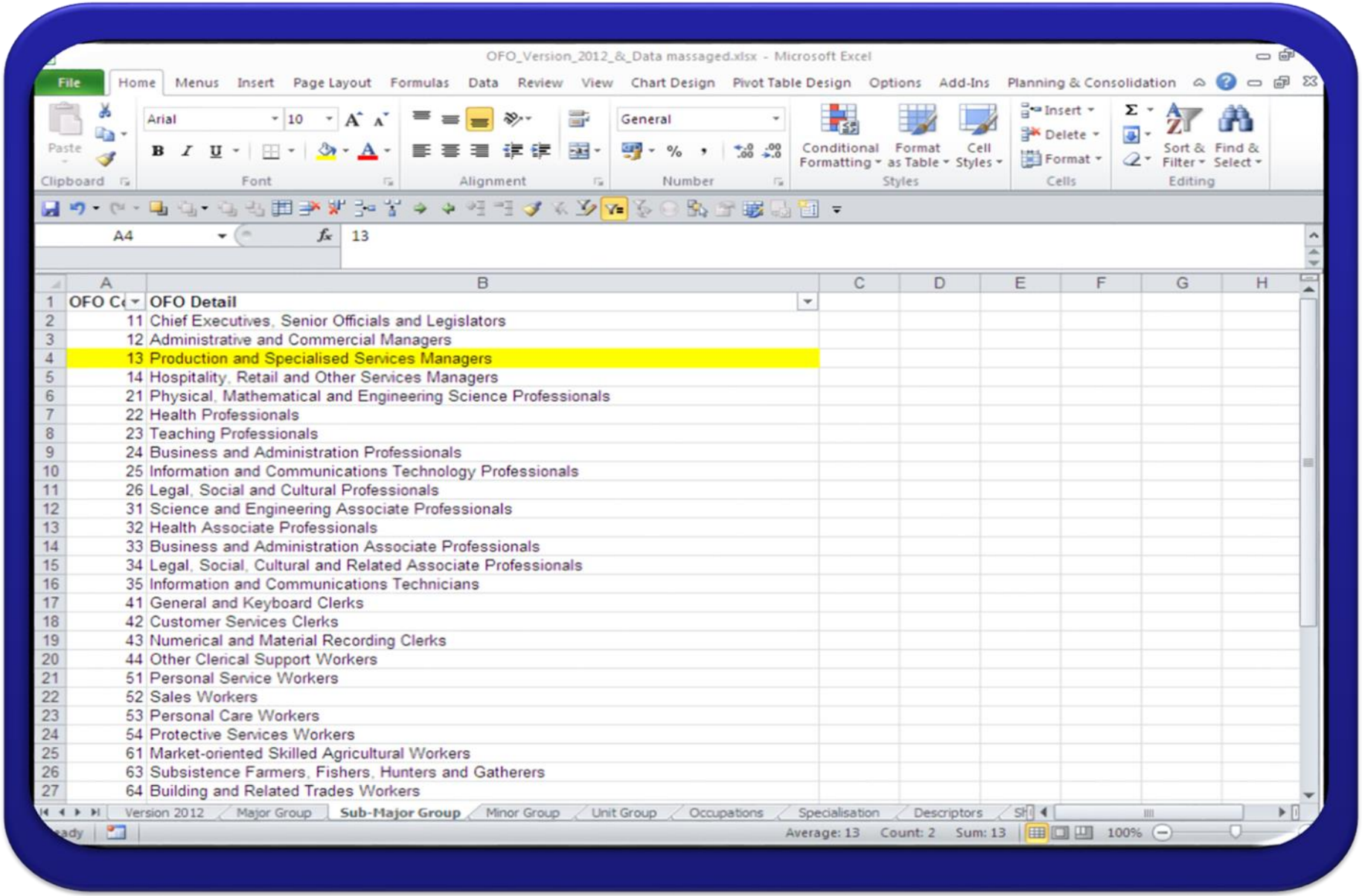


Figure 3-4: OFO sub-major grouping for determining the classification of ICT project managers

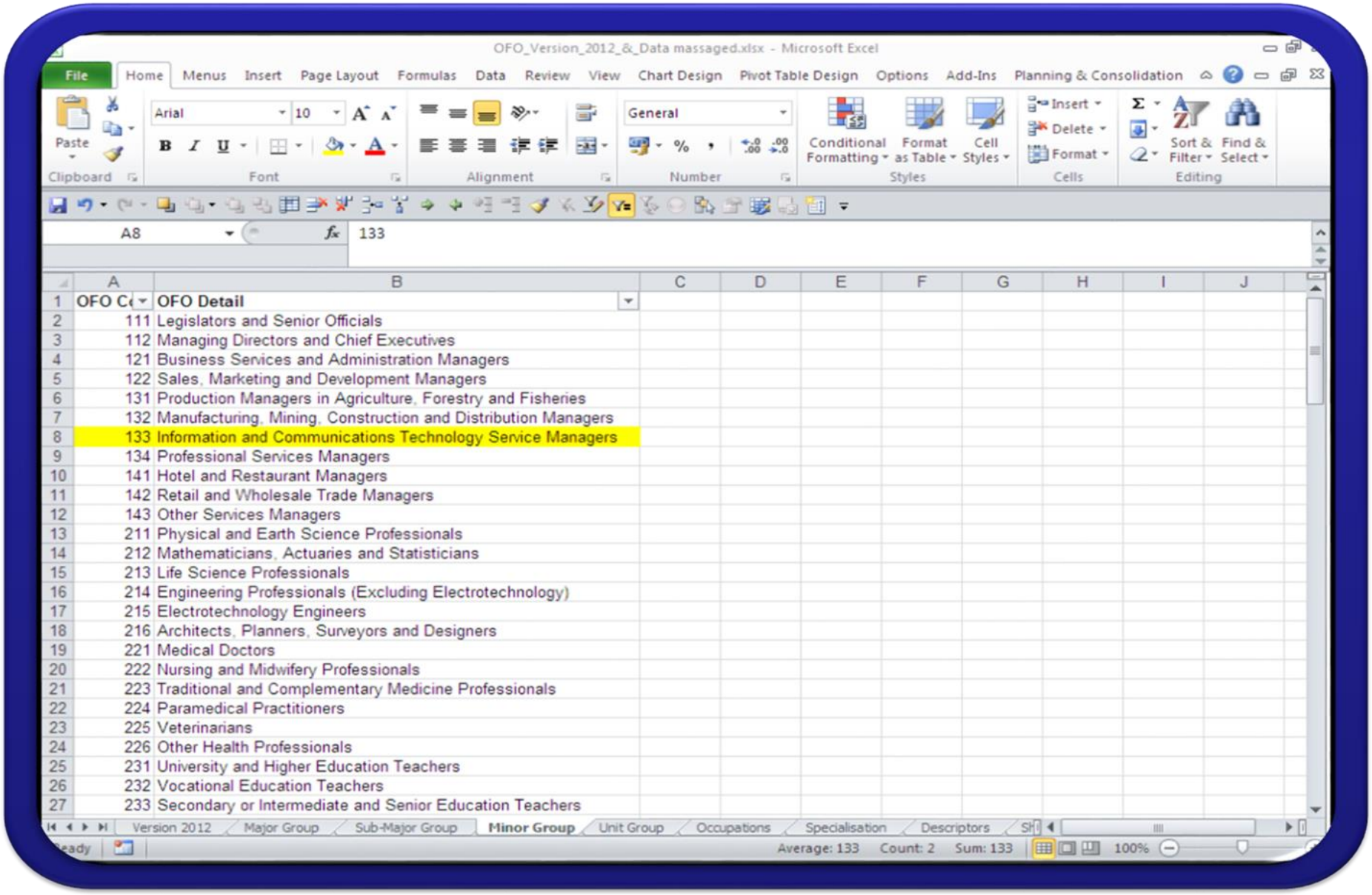


Figure 3-5: OFO minor grouping for determining the classification of ICT project managers

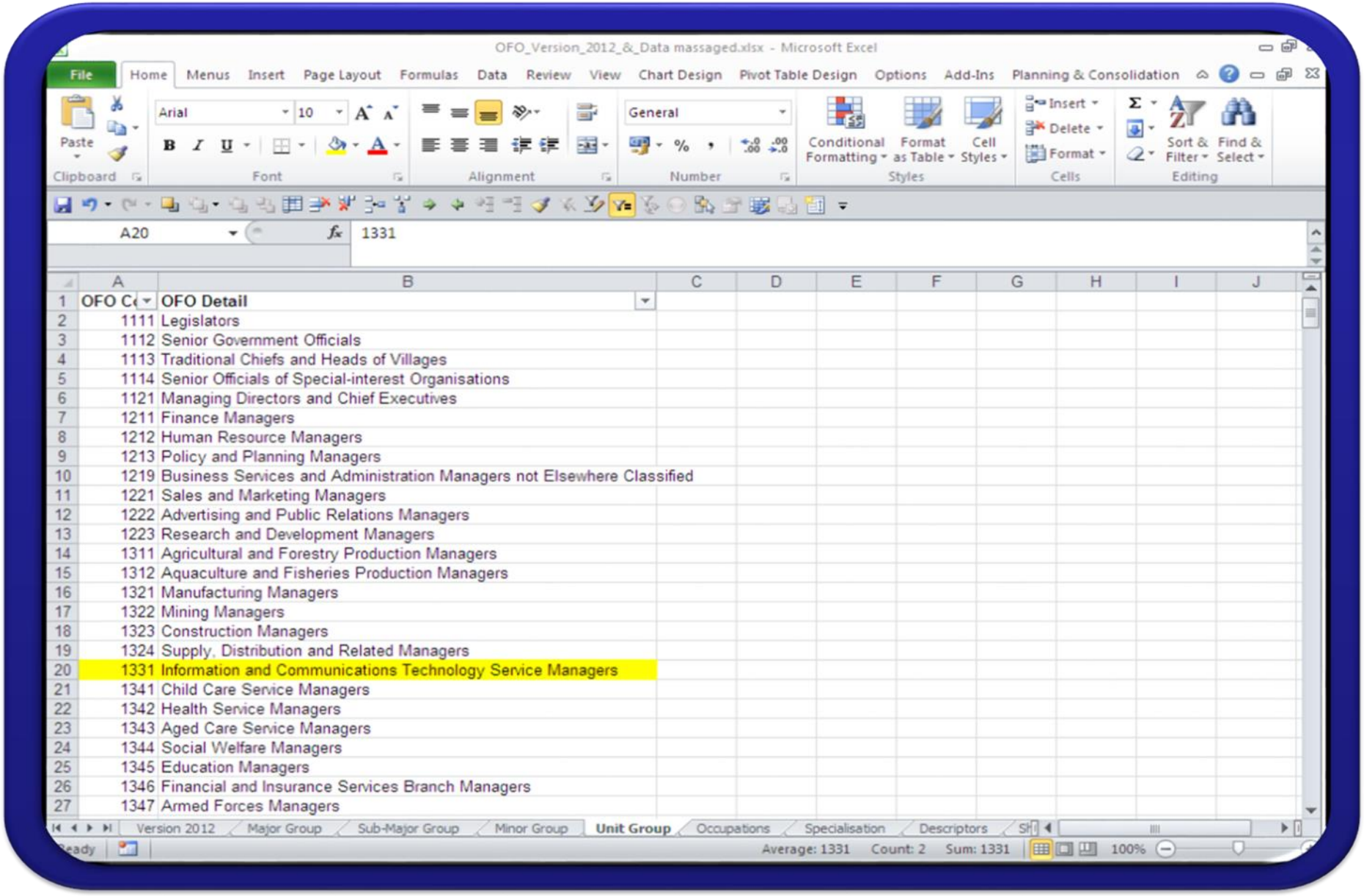


Figure 3-6: OFO unit grouping for determining the classification of ICT project managers

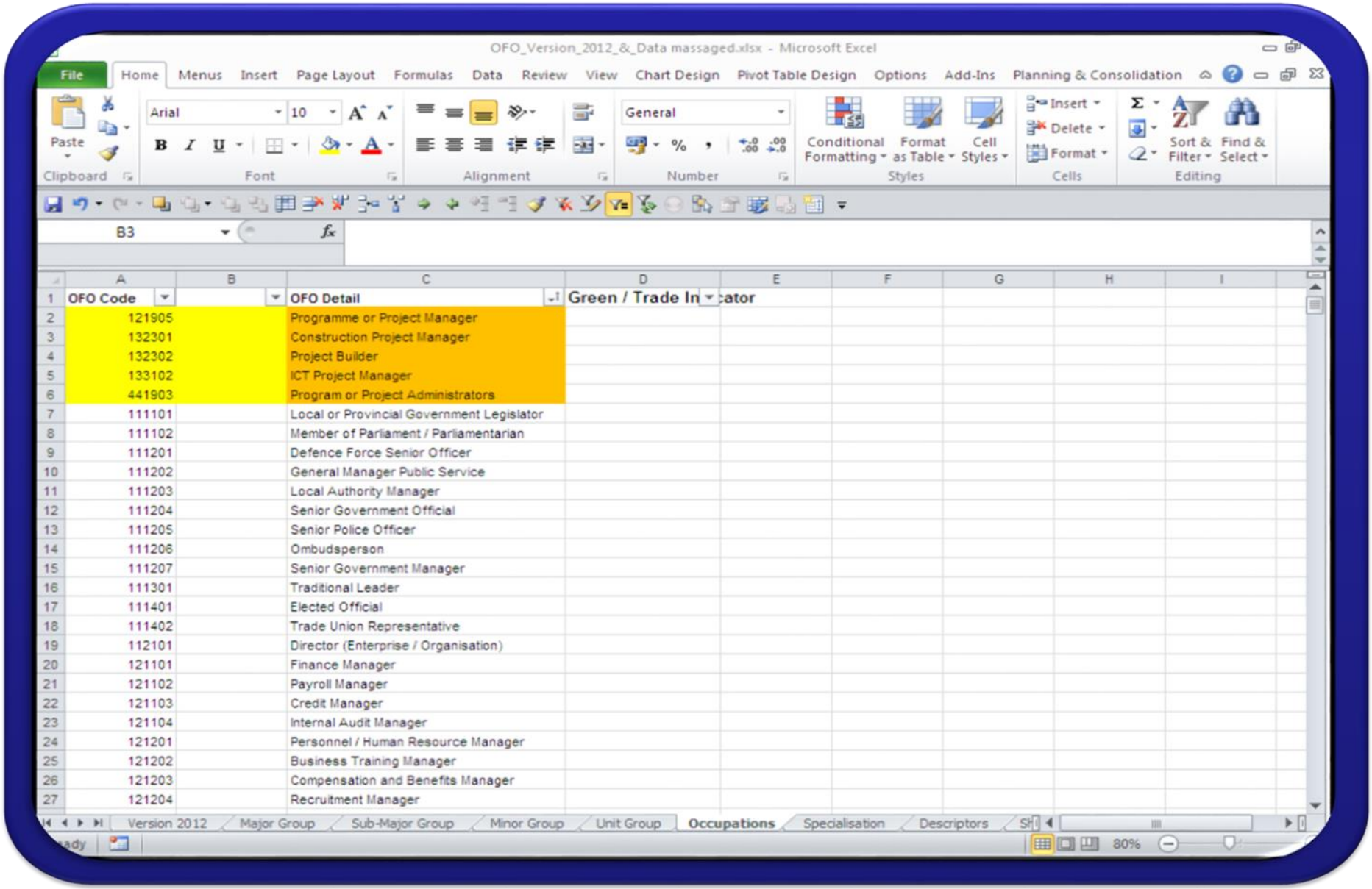


Figure 3-7: OFO occupations grouping for determining the classification of ICT project managers

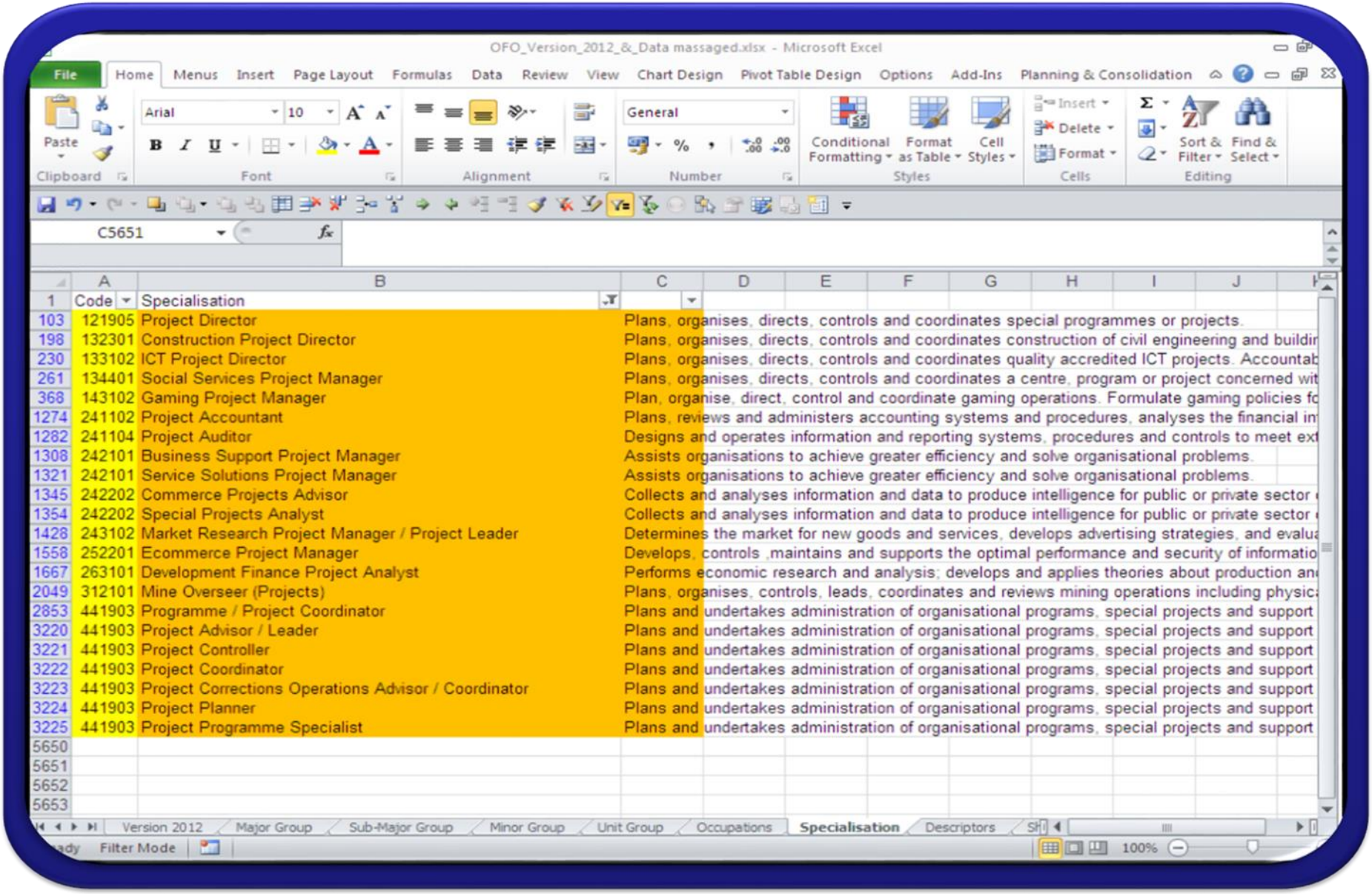


Figure 3-8: OFO specialisation for determining the classification of ICT project managers

The series shows the process of locating ICT project managers in the OFO, starting with the major grouping of managers, followed by the sub-major grouping of where the occupation is denoted by the 13 code. At the minor grouping level, the relevant coding would be 133 for ICT service managers. The unit level grouping shows code 1331, where the category is named ICT service managers. At the level of occupations, the key word search revealed an interesting situation regarding the overall occupation of project management. Here, the occupation of programme and implied portfolio management appears for the first time in the use of the terms project or programme manager in the denominations of the job titles. A split is also seen in the occupational grouping with the mention for the first time of programme or project administrator, albeit under a different code that starts with a 4, which places it in the main category of clerical and support workers. This phenomenon is interesting and will be further utilised in the definition of the actual job family for ICT project managers, as it can be argued that there may be two or perhaps three job families pertaining to the execution of projects: those of portfolio management, programme management and project management. In terms of occupational differentiation, it can be argued that each job family would construe its own administrative and support occupations and careers as well.

3.2.12.7 Conclusions regarding OQF and OFO

From the discussion of the OFO, it is evident that, in concert with the NSDS III, the SETAs will have to improve and play a more important role. There is, however, a strong contrast on the relevance given to the SETAs as opposed to the relevant professional project management bodies in South Africa.

Hypothetically, a learnership could be instituted for project management occupations. This is in accordance with the PIVOTAL acronym's reference to professional occupations, as well as the workplace-based learning that takes place in other occupations such as the accounting and the legal professions.

It can be clearly seen that organisations should conform to the OFO classification system, as they would have to conform to the reporting classification for occupations.

At the task level of detail of the OFO, it is evident that the OFO would have implications on curriculum development, and educational and training institutions, as it can influence the design of the curriculum content.

The implications of professionalising the occupation of ICT project managers are related to establishing formal career paths and skills development in concert with the skills attainment and competence of incumbents.

The idea of a base qualification relates to the acquisition of a relevant undergraduate degree in ICT. However, a skills certificate could be issued on the basis of programmes and courses presented by various professional bodies. For example, a PRINCE2® course could add to the job specialisation and the incumbent could be awarded a skills certificate.

3.2.13 Legal framework for training: SAQA and the NQF

3.2.13.1 SAQA

The following excerpt from the website of Higher Education South Africa (HESA), puts SAQA in perspective;

> *The role of SAQA is to advise the Minister of Higher Education and Training. The authority is required to perform its tasks after consultation and in cooperation with all bodies and institutions responsible for education, training and the certification of standards, which will be affected by the National Qualifications Framework (NQF). It must also comply with the various rights and powers of bodies in terms of the Constitution and Acts of Parliament. The office of SAQA is responsible for implementing the policies and decisions of SAQA* (Higher Education and Training South Africa, 2011).

From the above, it is clear that SAQA is the authority that manages South African qualifications in accordance with the NQF. The following section will briefly discuss how the NQF will affect the aim and objectives of this study.

3.2.13.2 National Qualifications Framework

In order to understand where the NQF fits into the overall framework of education and training in the South African context, the website of the NQF was consulted, where the following aim is stated (National Qualifications Framework, 2012):

> *The NQF aims to:*
>
> - *create a single, integrated national framework for learning achievements;*

- *facilitate access to, and mobility and progression within education, training and career paths;*
- *enhance the quality of education and training; and*
- *accelerate the redress of past unfair discrimination in education, training and employment opportunities*.

Other than understanding the aim of the NQF, it is necessary to understand its purpose as well (National Qualifications Framework, 2012):

It is a framework and means for transforming education and training in South African context. In particular, it is designed to:

- combine education and training into a single framework, and bring together separate education and training systems into a single, national system;
- make it easier for learners to enter the education and training system and to move and progress within it;
- improve the quality of education and training in South Africa;
- open up learning and work opportunities for those who were treated unfairly in the past because of their race or gender; and
- enable learners to develop to their full potential and thereby support the social and economic development of the country as a whole (National Qualifications Framework, 2012).

From the stated aim, it is clear that there is a focus on training and education. Of particular interest is the emphasis on the career path. This focus places the career path in the context of the discussion of this study: to identify the training requirements for incumbents in the occupation of ICT project management.

From the reference in the PIVOTAL acronym, it is clear that there is a drive – at the strategic level – to categorise and manage professions and occupations through the SETAs. The data analysis shows the merits of a discussion on the specific role of the NQF in the development of a job family for ICT project managers.

3.2.13.3 Structure of the NQF

The NQF construes a framework within which standards can be established and qualifications registered. Such registration takes place in consultation with educational providers and training stakeholders.

The NQF finds it roots in legislation and is established in terms of the South African Qualifications Authority Act (Act No. 58 of 1995) (Government Printer, 2012). This act provides for the development and implementation of a National Qualifications Framework.

This structure of the NQF, as depicted in the ten-level accreditation framework, is summarised in Table 3-3 below (South African Qualifications Authority (SAQA), 2012b):

Table 3-3: NQF ten-level structure

Level	Designation
1.	Grade 9
2.	Grade 10 and National (Vocational) certificates Level 2
3.	Grade 11 and National (Vocational) certificates Level 3
4.	National Senior Certificate and National (Vocational) Certificate Level 4
5.	Higher certificates and Advanced National (Vocational) certificates
6.	Diploma and advanced certificates
7.	Bachelor's degree and advanced diplomas
8.	Master's degree, postgraduate diploma and professional qualifications
9.	Master's degrees
10.	Doctoral degrees

Other than the high-level designation and categorisation of qualifications, the NQF allows individual qualification and unit descriptions and standards against which qualifications and components of qualifications can be measured and registered.

There are also sub-frameworks contained within the NQF, which can be identified as follows:

- General and further education and training
- Higher education
- Trades and occupations (South African Qualifications Authority (SAQA), 2012a)

3.2.13.4 Qualifications and unit level descriptors of the NQF pertaining to project management

In accordance with the chapter's data analysis, and the discussion in the paragraphs above, it was deemed necessary to analyse the qualifications and unit standards that are relevant to the development of ICT project managers at the training and educational level.

This section will focus on the qualifications in the NQF and the relevant unit standards that are contained in those qualifications. This was done to determine the relevant curriculum content as it is currently offered, and to map it to the actual requirements of positions as generally prescribed in the literature for ICT project organisational structures.

The unit standards were obtained from the SAQA website and downloaded into an Excel spreadsheet. The initial download was done in accordance with the website's search functionality where all standards that contained project as a key word were obtained. From this, a more detailed search was done in terms of unit standards and qualifications that were more specific to project management. A data book was built with specific sheets for the following:

- Project management unit standards
- Project management unit standards detail
- Qualifications and units standards
- Project management qualifications

It was found that there are 98 unit standards that are relevant to six project management qualifications. It was also found that the highest NQF level of project management qualifications was at NQF Level 5, thus only at the higher certificates and advanced national diploma level. This was quite surprising, as according to the OFO, project management was deemed to be at the managerial level, yet the qualifications offered only seemed to equip incumbents at a supervisory level.

In terms of the unit standards and the outcomes that can be expected from someone holding a project management qualification, the outcomes seem to focus on a level deemed too low if compared to the OFO categorisation.

The following can, however, be deduced from this data book and the subsequent analysis:

Project management training in South Africa is done in accordance with unit standards that were developed, taking account of what happens in the rest of the world.

The SAQA and NQF qualifications are only at the level of national and higher diplomas, and there is no registered bachelor's degree qualification for project managers.

Growth and maturity in the career of a project manager, after the initial qualification has been obtained, will have to be managed in terms of a career path. Taking the PIVOTAL principle into account, employers will have to play a bigger role in the development of project management competencies. This competence development should take place through job expansion, enrichment and rotation, by allowing the individual to increasingly become involved in more complex projects through a succession of positions and career progression.

3.3 Conclusion

The PIVOTAL principle has particular relevance to the study topic, and strengthens the research statement: In the absence of a defined occupational group and professional development home for project managers in organisations, their development will be inferior.

If there is to be alignment with and adherence to NSDS III, employers, educational institutions and the SETAs are required to form a triumvirate relationship.

According to the online Oxford Dictionary (Oxford Dictionaries, 2012), a vocation is referred to as a calling in professions such as nursing, education and religion. Reference should rather be made to occupations. Having said this, the consulted strategies do not place occupations within a broader context such as a job family.

It was found that the OFO makes reference to ICT project managers as a managerial occupation. However, there was no further elaboration in terms of support staff that would be required on such ICT projects, hence the OFO does not describe the totality of occupations that would be involved in ICT project execution and hence the job family concept would be a better description.

NSDS III calls for a higher degree of work differentiation in that it calls for the definition of occupations and occupational pathways by linking them to the OFO.

Through the use of the term job clusters, the OFO hints at the concept of a job family. However, reference to job clusters is at the level of occupations, while the job family concept contains occupations in a higher context. To some extent, the use of the word “occupation” in the OFO makes use of circular reasoning, as it defines occupations in terms of itself, and not in terms of a higher context.

With reference to the framework construction, government should establish a governance framework for project management. Within this governance framework, industry and academic institutions should be involved.

It is recommended that if industry, educational institutions, and employees of SETAs and professional bodies are serious about the development of skills and competence, a good understanding should be developed of the relationships that would form, and they would be required to execute the strategy. It is therefore recommended that this relationship be formed in accordance with the graphic representation of Figure 3-9, which would construe the first tier of planning and alignment for the professional development of ICT project managers.

This first tier would then also, in accordance with the aim and objective of the study to build a stratified framework, form the first component of the framework.

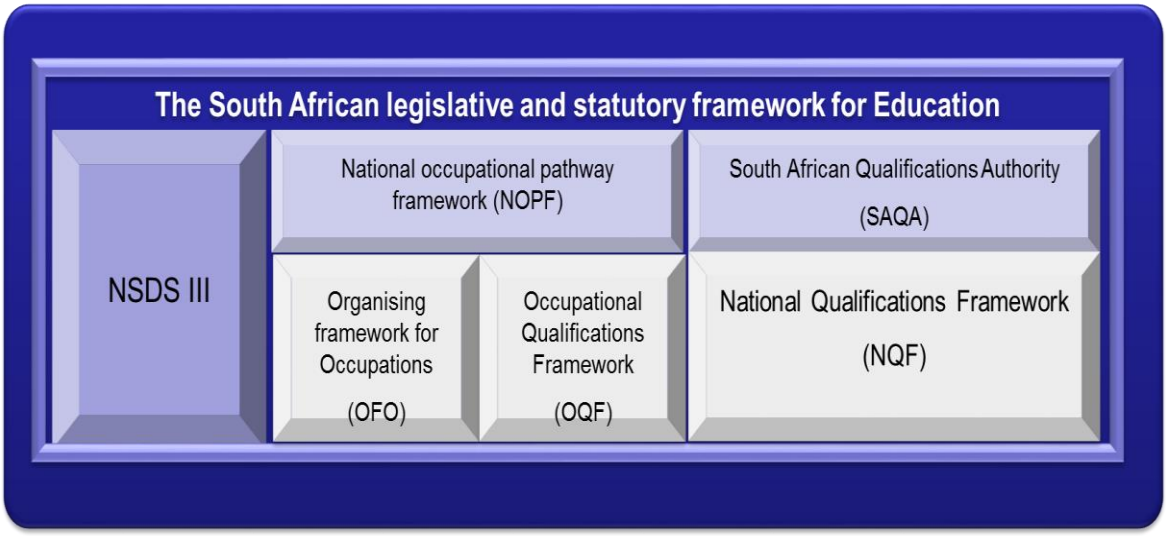
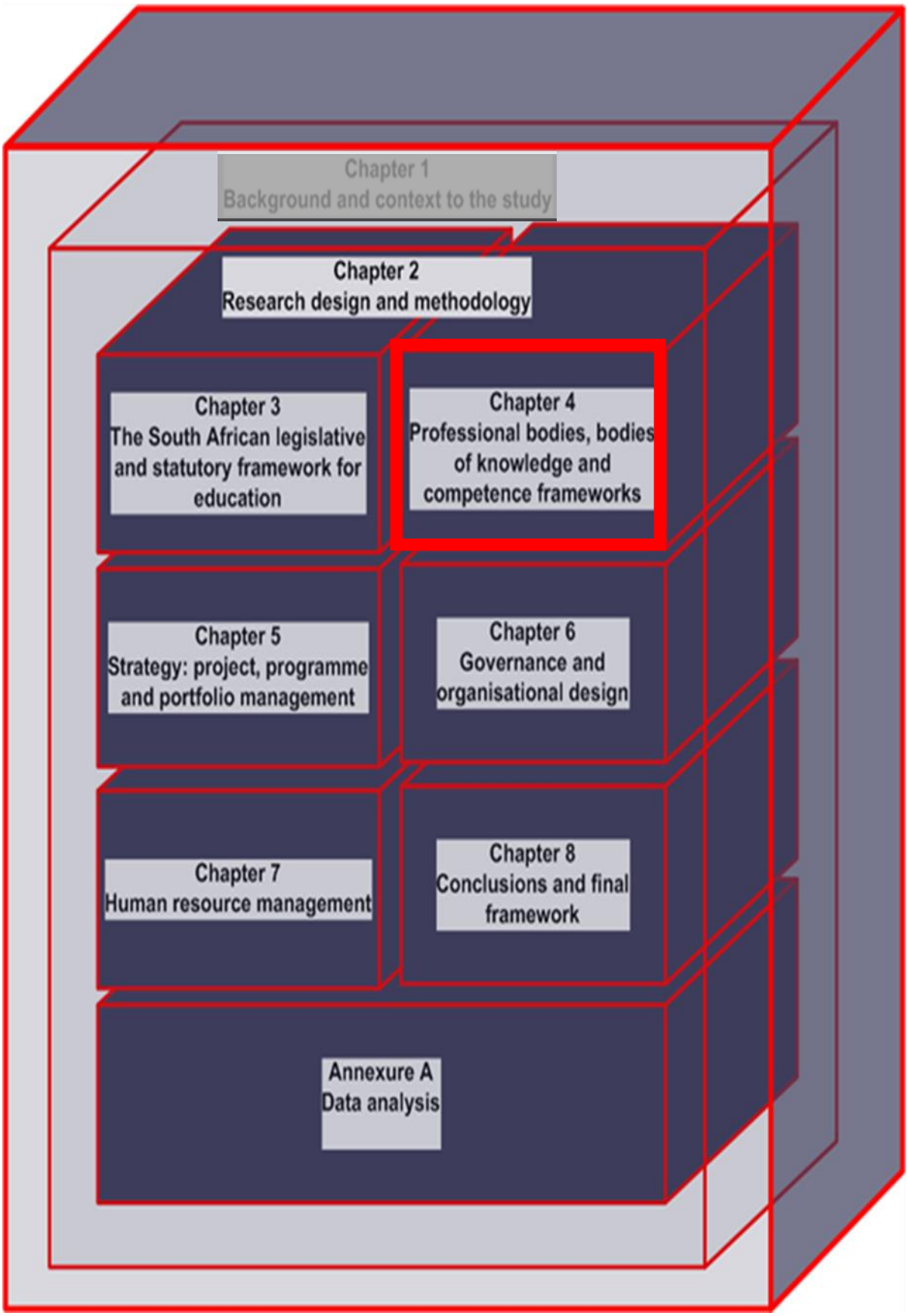


Figure 3-9: The first level of the stratified framework

Chapter 4. Professional bodies, bodies of knowledge and competence frameworks



4.1 Introduction

In the previous chapter, the context for the development of ICT project managers was explored from the perspective of the delimitation of portfolio, programme and project management. In this chapter, the focus is turned to the development of professional bodies in the domain of project management. Attention is given to the origin of the professional bodies, their publications and the subsequent development that these professional bodies have brought about in the domain of project management.

In Chapter 1, Figure 1-1 was presented to depict the author's understanding of the development of project management since the Industrial Revolution. With this understanding as point of departure, a further specific understanding of the development of project management needs to be developed, particularly regarding the origins and publications of the various professional bodies, as found in the contemporary project management domain.

Given the perspective that projects initially developed from the general and production streams, Dr Anthony Yeong (Yeong, 2012) gives the following insights regarding the development of the discipline on his web page dedicated to study resources for MBA and master's degrees. The Project Managers.net website (Yeong, 2012) refers to the formation of the IPMA, but does not list the publications of the IPMA, nor does it mention the Global Alliance for Project Performance Standards (GAPPS) competence framework. Given these shortfalls, however, the site provides a good picture of the general development of the domain, which will suffice for the objectives of this chapter.

According to Yeong (2012), the word "project" has its roots in the Latin word "projectum", which conveys the meaning "to throw something forwards". This word, in turn, was a compilation of the words "pro" and "Jacere". From this can be deduced that a modern-day interpretation could be that "project" also conveys the meaning of "something that comes before anything else is done".

A closer look at the development of the discipline takes us far back in history, through several fields, such as construction, engineering and warfare.

The major milestones in the development of the discipline are shown in the table below. The primary sources of this information are Project Managers.net (2012) and

Haughey (2013). These sources were augmented for the South African context as indicated below. The table was updated with additional information obtained from supplementary sources as indicated where relevant.

Table 4-1: Summary of the history of project management as adapted

Time/date	Milestones in project management
Pre-history	Project construction of Egyptian Pyramids.
Ancient history	Project construction of Great Wall of China.
1856–1915	Frederick Taylor, known as the father of scientific management, developed the concept of breaking detailed work down into elementary parts. This evolved into the work breakdown structure (WBS). Taylor also invented the concept of resource allocation.
1861–1919	Taylor's associate, Henry Gantt, introduced the Gantt Chart (bar chart), a visual aid for project scheduling and planning.
1942–1946	The Manhattan Project used sophisticated project planning, scheduling and tracking methods to develop the first atomic bomb.
1950s	The programme evaluation and review technique (PERT chart), a result of the Polaris Missile Programme critical path method (CPM), was developed by Du Pont, while Remington Rand developed the UNIVAC concept of a single point of responsibility.
	During the 1950s, many techniques for project management were introduced that changed the use of the term "project". Gradually, the term was adopted to mean a plan to do something.
1960s	The Apollo Space Project became a model for matrix organisation. The concept of earned value was adopted by the United States Air Force (USAF), as was the concept of project life cycle.
	The concept of configuration management was adopted by the National Aeronautics and Space Administration (NASA).
1965	The IPMA was born in Europe. It started as a discussion group for project managers involved in international projects. Currently, it has more than 20 000 members all over the world.
1969	The PMI was born in the USA. More chapters have been formed globally and it is now the largest project management organisation in the world. It has over 75 000 members to date.
1970s	Multidisciplines in project management were developed, for example, software project management and IT project management).
1970	The Swiss Federal Administration started its own development of a project management method for ICT projects, known as the HERMES method (Switzerland's Federal Administration, 2014).

Time/date	Milestones in project management
1972	On 2 May 1972, 78 people paid their £1 subscription to become the first members of the Association for Project Management (APM). The APM is now the largest professional body of its kind in Europe, with over 19 700 individual and 500 corporate members.
1975	The first version of HERMES was recognised as a standard outside Switzerland's Federal Administration (2014).
1980s	The PMI awarded the first Project Management Professionals (PMP) certification in 1984.
1982	The PMI South Africa Chapter was launched in South Africa (Project Management Institute, 2014).
1989	The Association for Project Management South Africa (APMSA) was formed as the IPMA's representative association in South Africa (Association for Project Management South Africa, 2009b).
1990s	The concept of project-based project management software like Microsoft Project was adopted by project practitioners.
1992	The original *APMBOK* was published in 1992 (Association for Project Management, 2014a).
1996	The first edition of the *PMBOK® Guide* was published.
1997	ISO 10006 was originally published in 1997 (Gasik., n.d.).
	Project Management South Africa (formerly known as PMISA) was formed in 1997 (Project Management South Africa, 2012).
1998	The second edition of the *PRINCE2® Manual* was published.
1999	The IPMA published the first internationally harmonised *ICB® Version 2.0* (International Project Management Association, 2013a).
	The initial GAPPS meetings took place.
2000s	The Project Management Maturity Model, enterprise-wide project management and global project management standard were developed. Project management certifications were recognised in industries, and web-based project management software and tools, as well as project portfolio management and programme management were developed.
	The South African Council for Project and Construction Management Professions (SACPCMP) was established as a juristic person established by Section 2 of the Project and Construction Management Act (Act 48 of 2000) (South African Council for Project and Construction Management Professions, n.d.).
2000	The second edition of the *PMBOK® Guide* was published (Project Management Institute, 2008, 2010).
2002	The third edition of the *PRINCE2® Manual* was published.

Time/date	Milestones in project management
	A Global Steering Committee meeting of the GAPPS was held in London in August 2002.
2003	ISO 10006 Quality Management Systems – Guidelines for Quality Management in Projects was developed (PQM-online, 2003).
2004	The third edition of the *PMBOK® Guide* was published.
2005	The fourth edition of the *PRINCE2® Manual* was published.
2006	IPMA released a revised ICB® Version 3.0, consisting of 46 competence elements. The APMSA ZAF NCB3 and ZAF NCRG3 South African competence baseline was issued by APMSA.
	The first GAPPS Working Report was published (Global Alliance for Project Performance Standards, 2013).
2008	The fourth edition of the *PMBOK® Guide* was published (Project Management Institute, 2008, 2010).
2008–2010	The former OGC published *Gateway Review Process, General PM Development, Guides to Project Management, Career Planning Guides, Program Management Guides, Standards* and *PRINCE2® materials* (Office of Government Commerce, 2010).
2009	The fifth edition of the *PRINCE2® Manual* was published.
2010	The GAPPS Program Manager Standard was launched.
2011	The draft ISO 21500, *Guidance on Project Management,* was issued.
2012	ISO 21500 *Guidance on Project Management* was published (International Standards Organisation, 2012).
	The ISO Technical Committee on Program and Portfolio Management Standard was established, as well as ISO Technical Committee on Project, Program and Portfolio Governance.
	The sixth edition of the *APMBOK* was published (Association for Project Management, 2012b).

Given the understanding gained from the historical development of project management, attention is drawn to the data analysis according to the Excel spreadsheet. It could be seen how and where the various project management professional bodies influenced the development of an ICT project management job family. The analysis pattern for this chapter is given in Annexure A.

From the data analysis, one can see that there is a strong relationship between the professional bodies, their publications (known as bodies of knowledge), methodologies, the concept of an occupation and the consequent training and

development of skills. From this relationship, the aim of this chapter can be formulated.

This chapter aims to discuss the aspects of ICT project management in terms of the groupings of the main and internationally recognised professional project management bodies and their publications. It will provide a perspective on the standards and bodies of knowledge of the relevant professional bodies that have had an influence on ICT project managers' career development and progression.

Special attention will be given to the career and occupational aspects that are inferred when an organisation refers to project management in general, but with a differentiation of the roles, responsibilities and functions of project, programme and portfolio managers. Attention will also be given to the aspect of secondary roles and responsibilities in terms of project execution teams.

The scope of the discussion will entail the following:

- Introducing the concept of locus, focus and function
- Defining and discussing the various national and international professional bodies
- Defining and discussing the various publications from these professional bodies and how they affect the development of ICT project managers
- Defining and discussing the various methodologies that are available for project execution
- Qualifications and certifications offered at the various levels of competence and proficiency

The discussion will focus on the attainment of the objective of the study, which is to determine the roles and functions as they pertain to the job family concept implied in the delimitation of the concepts of portfolio, programme and project management.

4.2 The concept of locus, focus and function

The concept of locus, focus and function will now be introduced. In the context of locus, focus and function, the locus denotes where the functions will be located and, as such, can be equated to the organisational design structure. This concept of locus, focus and function is shown in Figure 4-1 below.

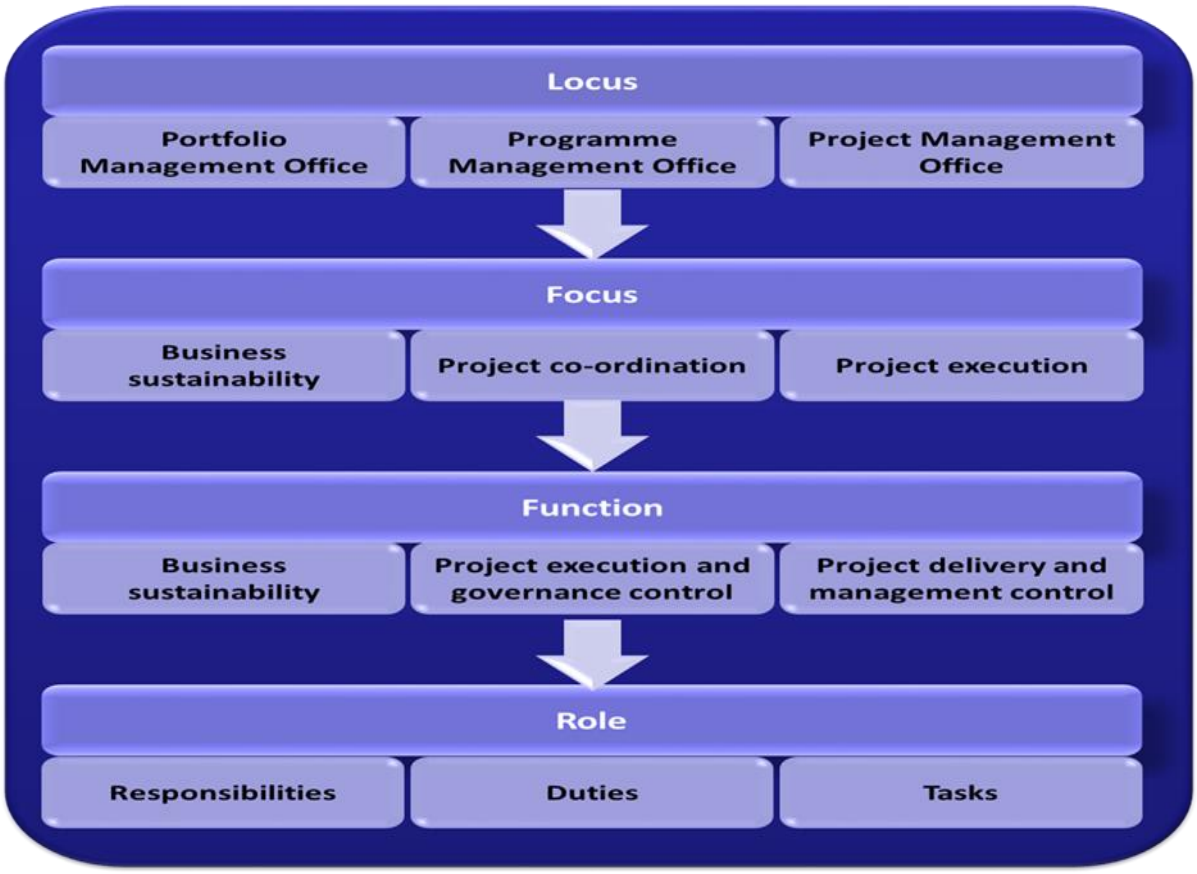


Figure 4-1: Context of locus, focus and function

As shown in Figure 4-1, there seems to be a logical sequence in the relationship between locus, focus and function. The researcher considers roles as the next level of abstraction in this sequential relationship. The roles and functions of personnel in positions of project execution need to be determined in the design of the projectised organisation (see Chapter 6). The design of the projectised organisation leads to the establishment of the project execution of functional offices, which will lead to the definition of the functions of such offices. Once the functions in the organisation have been defined, the roles of people can be determined. It is these roles, fulfilled by people in the context of locus, focus and function, that are central to the further development of the framework (roles are actually also in the middle of the job family definition process).

4.3 Professional bodies

From the historical analysis, it is evident that professional project management bodies have existed since the mid-1960s. The first formally structured organisation was the International Project Management Association (IPMA).

4.3.1 International professional bodies, associations and institutions

As stated earlier, there are two mainstream approaches to project management: the US and the European approaches. The European approach is embodied in the oldest project management association, the IPMA, while the American perspective is embodied in the PMI approach.

4.3.1.1 The International Project Management Association (IPMA)

The IPMA is the world's oldest project management organisation. It can trace its roots to 1964 when a European aircraft project manager, Pierre Koch of France, invited Dick Vullinghs from The Netherlands and Roland Gutsch from Germany to discuss the benefits of the critical path method (CPM) as a management approach (International Project Management Association (IPMA), 2013a).

It was on this occasion that the first use of the word "internet" was coined when Prof Arnold Kaufmann suggested an international network – internet.

Subsequent developments by this group of individuals led to the establishment of the IPMA as an independent organisation and officially located in Switzerland.

During the course of 1967, the Czechoslovak Project Management Science Group was invited to join the first "all-state" Conference on the Methods of Network Analysis in Prague. From then onwards, and with growing sponsorship of the International Computer Centre in Rome, managed by Prof Claude Berge, the first International World Congress took place in Vienna. Since then, INTERNET was the official name of the association, and the first professional association for project management was launched. The name subsequently changed two or three times until the current name of International Project Management Association (IPMA) was established (International Project Management Association (IPMA), 2013a).

4.3.1.1.1 Certification programmes/qualifications

The IPMA focuses on professionals in the project management's certification of competence, with the IPMA four-level certification programme being a world leader and professionally demanding.

By the end of 2011, there were more than 150 000 IPMA certifications worldwide, with over 53 000 of them being advanced, competence-based, professionally assessed certifications in the IPMA's four-level certification (4LC) system.

The 4LC system allows for the following certifications:

- IPMA Level A® (Certified Projects Director)
- IPMA Level B® (Certified Senior Project Manager)
- IPMA Level C® (Certified Project Manager)
- IPMA Level D® (Certified Project Management Associate)

The value of these certifications originates in the global demand from executives, strategic leaders, managers and stakeholders for individuals with demonstrated project, programme and portfolio management competence (International Project Management Association (IPMA), 2013a).

What is noteworthy is that the IPMA Level D certification is at a comparative level to the exam-oriented, knowledge-based certifications of other major project management associations (International Project Management Association (IPMA), 2013a).

It is thus evident that the project management certification is at the individual level of project managers, due to the fact that project management competence and certification have become key driving forces for individuals. It is also clear that there is a differentiation in the skills and competence levels of:

- project team members or participants;
- project managers;
- programme managers; and
- portfolio managers.

Other than just the certification of those individuals who are directly involved in project execution, the IPMA also offers certification of competence for consultants, thus emphasising and recognising the importance of competent consultants in the project management domain. Project management consultants contribute to positioning and strengthening the ability of organisations to initiate, plan, execute and evaluate projects, programmes and portfolios, hence the IPMA's focus on certifying their competence. This certification of consultants' competence provides global recognition of the important role that project management consultants fulfil. Certification takes place at two levels:

- IPMA PMC: IPMA Certified Project Management Consultant
- IPMA PPMC: IPMA Certified Programme and Portfolio Management Consultant

It needs to be reiterated that the competence certification focuses on project management and is not a general competence certification of business or other related consulting work (International Project Management Association (IPMA), 2013a).

In addition to certification at an individual level, the IPMA framework allows for the certification of organisations. For this purpose, an instrument known as IPMA Delta is utilised. IPMA Delta helps an organisation to evaluate its organisational project and programme maturity and performance. IPMA Delta is an organisational project maturity assessment and certification, identifying actions needed to achieve better business results. Through the use of this instrument, organisations are now empowered to be certified as the entire organisation (O) – including individuals (I) and projects (P), thus indicating the organisational project management competence (International Project Management Association (IPMA), 2013a).

The model used for IPMA Delta assessments consists of three modules based on leading project management standards: IPMA Competence Baseline**,** IPMA Project Excellence Model and ISO 21500.

The system of certification gets its credibility through compliance with ISO 17024 (*Conformity assessment – General requirements for bodies operating certification of persons)* with a few modifications that are appropriate to the area of project management (International Project Management Association (IPMA), 2013a).

The overall certification processes include several steps: application, self-assessment, reference check, exam, case study report, role-play workshop, interview, final evaluation and decision. Competences are evaluated by assessors who are certified in programme and portfolio management, project management consultancy or project management, and who have been trained in the relevant techniques. Recertification is required after five years and is based on evidence of the continuing involvement in project management and project management consulting, as well as competence development (International Project Management Association (IPMA), 2013a).

4.3.1.1.2 Management structures

The IPMA and its members are organised as independent association organisations with autonomous control over their local affairs. They all manage their own certification boards.

These certification boards and systems operate in their respective countries and certify project managers, as well as project management consultants, under the 4LC system.

These certification schemes:

- define the competences to be assessed in the framework known as Addition to IPMA Competence Baseline for PM Consultants; and
- conform to a common regulatory framework described in the IPMA's Regulations and Guidelines for Project Management Occupations (International Project Management Association (IPMA), 2013a).

4.3.1.1.3 Publications

The primary IPMA publication comprises the ICB® Version 3.0 (International Project Management Association (IPMA), 2013a), which sets out the framework for certification. With this document as the foundation, various countries' associations have developed their own augmentative frameworks and publications, such as the following:

- PM Baseline from Projekt Management Austria
- NCB – USA National Competence Baseline V2 – American Society for the Advancement of Project Management
- The South African Project Management Competence Baseline NCB3 2006 – APMSA
- Addition to IPMA Competence Baseline for PM Consultants (ICBC)
- IPMA Project Excellence Model (International Project Management Association (IPMA), 2013a)

4.3.1.2 Project Management Institute (PMI)

The need for a project management organisation in the USA can be traced back to the advent of the mainframe computer. In 1967, a representative of the McDonnell Automation Co (MCAUTO), Ned Engman, was visiting Philadelphia. The purpose of this visit was to inspect the laboratories of SmithKline & French (SK&F) in connection with a MCAUTO proprietary computer program that SK&F had bought for its in-house use. Engman met with the representatives of SK&F, Jim Snyder and Susan Gallagher. The software in question was MCAUTO's management control system,

the predecessor of its management scheduling and control system (Project Management Institute (PMI), 2011).

Engman had a keen interest in computers and networks, and his sales conversations were often directed to the need for tapping into the wealth of information in the project management domain that was still untapped in software at that time (Project Management Institute (PMI), 2011).

Snyder had a keen interest in network planning and, under the guidance of Dr Gordon Davis, during coursework for studies, got involved with the PERT and CPM techniques. These techniques were introduced at SK&F, and Snyder and Gallagher conducted training. They soon became frustrated with the fact that the training could not be "calibrated" against norms and standards, such as in the recognised professions of accounting and engineering (Project Management Institute (PMI), 2011).

During a follow-up meeting between Engman, Snyder and Gallagher, the idea of an organisation dedicated to the concept of managing projects was born. In January 1968, Engman took the initiative of inviting potential members to form a "CPM society". The initial meeting of this "CPM society" was held on 15 and 16 February 1968 in New Orleans, Louisiana. Engman, Davis and Snyder, as well as Eric Jenett and John King, attended (Project Management Institute (PMI), 2011).

The minutes of this meeting show that they agreed to form an organisation to be known as the American Project Management Institute. This institute would have the following objectives (Project Management Institute (PMI), 2011):

- Foster a recognition of the need for professionalism in project management
- Provide a forum for the free exchange of project management problems, solutions and applications
- Coordinate industrial and educational research efforts with the objective of directing research efforts towards industrial problem areas
- Develop and disseminate common terminology and techniques in an effort to improve communications between users of project management systems
- Provide an interface between users and suppliers of both hardware and software systems

- Provide guidelines for instruction and education leading to project management implementation and encourage career opportunities in the field of project management (Project Management Institute (PMI), 2011)

Snyder prepared an application for the registration of an organisation with the name of the Project Management Institute during May 1969. The signatories were Snyder, Engman, Jenett, Michael Homyak and Gallagher.

During a two-day congress at the Department of Continuing Education of the Georgia Institute of Technology, the establishment of the Project Management Institute was announced to a group of approximately 80 people on 9 October 1969. Of the delegates, 24 “founders” joined the new institute right away. Membership fees amounted to $20 (Project Management Institute (PMI), 2011).

4.3.1.2.1 Certification programmes/qualifications

The PMI offers certification programmes for project practitioners of all levels of education and skills. Currently, seven credentials for the broader project community are offered:

- Certified Associate in Project Management (CAPM)®
- Project Management Professional (PMP®
- Program Management Professional (PgMP)®
- New – PMI Agile Certified Practitioner (PMI-ACP) SM
- PMI Risk Management Professional (PMI-RMP)®
- PMI Scheduling Professional (PMI-SP)®
- OPM3® Professional Certification

According to PMI’s website, it has more than 650 000 members and credential holders in more than 185 countries (Project Management Institute (PMI), 2011).

4.3.1.2.2 Management structures

The PMI is governed by a 15-member board of volunteer directors. Each year, PMI members elect five directors for three-year terms. Three directors elected by others on the board serve one-year terms as officers. Day-to-day PMI operations are guided by the executive management group and professional staff at the Global Operations Centre in Newtown Square, Pennsylvania.

Further to the central controlling entity, the PMI uses chapters in various geographical locations. These chapters are part of the larger mother organisation and have little autonomy in the regions in which they operate in (Project Management Institute (PMI), 2011).

4.3.1.2.3 Publications

PMI standards are developed through a volunteer consensus process that includes committee meetings. It is also part of American National Standards Institute (ANSI) compliance.

The PMI offers a wide range of publications and standards that are generated through a process of public feedback. During the development phase of such standards, working sessions are held periodically at the PMI's North America and Europe, Middle East and Africa (EMEA) global congresses, which are facilitated by the various committee members. These sessions produce draft publications that are circulated to the committee, PMI members and project, programme and portfolio professionals worldwide. During a period of 30 days, these drafts are exposed to scrutiny and comment, after which they are edited for publication.

The publications that are currently available entail the following (Project Management Institute (PMI), 2012):

Table 4-2: List of PMI publications

PMI publications	
1.	*A guide to the project management body of knowledge (PMBOK® Guide)* – fourth edition
2.	*Organizational Project Management Maturity Model (OPM3®)* – second edition
3.	*Organizational Project Management Maturity Model (OPM3®)* – second edition
4.	*The Standard for Program Management* – second edition
5.	*The Standard for Portfolio Management* – second edition
6.	*Practice standards and frameworks*
7.	*Practice standard for project risk management*
8.	*Practice standard for earned value management* – second edition

PMI publications	
9.	*Practice standard for project configuration management*
10.	*Practice standard for work breakdown structures* – second edition (reaffirmed)
11.	*Practice standard for scheduling* – second edition
12.	*Practice standard for project estimating*
13.	*Project Manager Competency Development Framework* – second edition
14.	*Construction extension to the PMBOK® Guide* – third edition
15.	*Government extension to the PMBOK® Guide* – third edition

4.3.1.2.4 Global Alliance for Project Performance Standards (GAPPS)

Through GAPPS, a unique alliance of government, private industry, professional associations and training/academic institutes are working together to develop globally applicable project management competency-based standards, frameworks and mappings. The GAPPS standards and frameworks are intended to facilitate mutual recognition and transferability of project management qualifications.

GAPPS aims to provide the global project management community with freely available information for use by businesses, academic institutions, professional associations, and government standards and qualifications bodies globally.

During the mid-1990s, usually at international conferences, groups of people interested in the development of global project management standards began meeting formally and informally (Global Alliance for Project Performance Standards, 2013)

4.3.1.2.5 Certification programmes/qualifications

GAPPS in itself does not offer certifications or qualifications, but provides the framework against which competence outcomes can be judged with a specific focus on job outcomes.

4.3.1.2.6 Management structures

Through the signing of memoranda of understanding (MOUs) to guide cooperation among interested parties, the initiative progressed to the hosting of a Global Steering Committee meeting in London in August 2002. This meeting was attended by

representatives of signatories to the MOUs in addition to industry representatives. It was hosted by the Services SETA of South Africa. The initiative initially functioned under the name Global Performance-based Standards for Project Management Personnel (Global Alliance for Project Performance Standards, 2014b).

Under the guidance of the Global Steering Committee, a decision was made to fund the initiative through contributions by each supporting organisation (standards/qualifications organisations, professional associations, educational institutions and corporations). Such supporting organisations would become financial subscribers to cover research, the preparation of material, maintenance of the global standards website, and administrative support. In addition, the Global Steering Committee decided that the initial focus should be on the development of performance-based competency standards for project managers. It was agreed that the initiative would be promoted through working sessions attended by representatives of subscribing organisations. Currently, GAPPS is managed and governed through an elected board of directors (Global Alliance for Project Performance Standards, 2014b)

4.3.1.2.7 Publications

GAPPS Project Manager Standard

The first publication of GAPPS (2014b) focused on the competence framework of the project management role. The objective was for it to be applicable across a broad range of project types and it addressed a varying selection of technical products.

The *GAPPS Project Manager Standard* (Global Alliance for Project Performance Standards, 2014a) is written in the format of a performance-based competency standard. This is a particular form of standard that aims to address two key questions:

- What is usually done in this occupation, profession, or role by competent performers?
- What standard of performance is usually considered acceptable to infer competence?

GAPPS Programme Manager Standard

With programme management becoming the norm for organisations to adopt as a management approach, governments, individuals and both public and private sector

organisations have become interested in frameworks and standards that describe levels of acceptable workplace performance for programme personnel. As such, GAPPS (2011) developed a set of performance-based competency standards for programme managers as part of a wider framework for the role of programme manager.

The GAPPS (2011) Programme Manager Framework consists of:

- a detailed approach to differentiating three levels of programme manager, based on programme management complexity;
- eight units of performance-based competency standards for the role of programme manager;
- a description of six types of programme manager based on which of the eight units apply; and
- supporting material to aid in the application of the standards.

This framework is intended to be used to assess threshold competency – demonstration of the ability to do something at a standard considered acceptable in the workplace. It is applicable to programme managers in all fields of endeavour, including, but not limited to architecture, automotive, biotechnology, construction, defence and aerospace, design, education, engineering, financial services, government, government contracting, information systems, not-for-profit operations, pharmaceuticals, software and telecommunications (Global Alliance for Project Performance Standards, 2011).

Having gained an understanding of the organisations that purport to be acting in the international arena of project management, the most notable bodies and associations that play a role in their countries on a national level will be highlighted.

4.3.2 National professional bodies

Following the discussion of the development of project management internationally in the previous section, the role-players that have a significant influence in their countries on a national level will now be discussed.

4.3.2.1 Office of Government Commerce (OGC)

The former OGC (Office of Government Commerce (OGC), 2013) and its functions have moved into the Cabinet Office (2013). While still known by the name OGC, a wealth of publications have been issued in the domain of project management and in

the specific application area of ICT projects. Although localised in the United Kingdom (UK), these publications have found their way into the international arena. The most notable of these are the ITIL® suite of documents and the PRINCE2® methodology[5] (AXELOS, 2012).

4.3.2.1.1 Certification programmes/qualifications

In collaboration with the UK-based project management professional body, the Association of Project Management (APM), the OGC has developed the PRINCE2® methodology. Having stated that PRINCE2® is a methodology brings with it its own dilemma. Its consideration as a methodology warrants discussion in another section. However, in contrast to other methodologies, the OCG offered a qualification in the use of this methodology as well. Such qualifications take the form of the following (Office of Government Commerce (OGC), 2013):

- PRINCE2® Associate
- PRINCE2® Practitioner

4.3.2.1.2 Management structures

The OGC was part of a government structure and department and was managed through an organ of state. There is, however, a link with the UK-based APM where it entails project management professionalism (Office of Government Commerce (OGC), 2013).

4.3.2.1.3 Publications

As stated above, the OGC has contributed to the knowledge base of project management through a myriad of publications. Most notable is the ITIL® suite of documents and all the augmentative publications concerning PRINCE2®. What follows is a list of supplementary and augmentative publications that came to light under the auspices of the OGC:

Table 4-3: List of OGC project management-related publications

OGC publications

[5] The research spanned a period of approximately five years. At the beginning of the research, the OGC was still in existence and had a separate website from which information was sourced. Later research found that Axelos had taken over the maintenance of the former OGC website, hence where earlier sources are used, reference will be to the OGC, while later sources will reference Axelos.

Reviews and gateways to OGC best practice – *Gateway to success*	
	OGC best practice – gateway to OGC Gateway™ Process Review 0: strategic assessment
	OGC Gateway™ Process Review 1: business justification
	OGC Gateway™ Process Review 2: delivery strategy
	OGC Gateway™ Process Review 3: investment decision
	OGC Gateway™ Process Review 4: readiness for service
	OGC Gateway™ Process Review 5: operations review and benefits realisation
	The OGC Gateway™ Review Process: running an effective review
	The OGC Gateway™ Review Process: designed to make you successful
	The OGC Gateway™ Process: a manager's checklist

General project management development
Common causes of project failure OGC best practice
OCG The Centre of Excellence Pocketbook.pdf

Guides
Achieving excellence in construction procurement guide initiative into action
Achieving excellence in construction procurement guide project organisation roles and responsibilities
Achieving excellence in construction procurement guide project procurement lifecycle the integrated process
Achieving excellence in construction procurement guide risk and value management
Achieving excellence in construction procurement guide the integrated project teamworking and partnering
Achieving excellence in construction procurement guide procurement and contract strategies
Achieving excellence in construction procurement guide whole-life costing and cost management
Achieving excellence in construction procurement guide improving performance project evaluation and benchmarking
Achieving excellence in construction procurement guide design quality
Achieving excellence in construction procurement guide health and safety
Achieving excellence in construction procurement sustainability
Achieving excellence in construction projects – pocketbook
The government procurement code of good practice for customers and suppliers
A guide for public sector procurers of construction – making competition work for you
Disclosure of budgets in the course of procurement – when is it appropriate?
Supplier financial appraisal guidance
Construction procurement guide to best "fair payment" practices
Ownership of intellectual property rights (IPR) in public procurement – guidance note
FOI (civil procurement) policy and guidance Version 2.0
Framework agreements OGC guidance on framework agreements in the procurement regulations
OGC/HMTjoint guidance on using the procedure Competitive Dialogue 2008

Guides
Improving procurement pre-qualification tool
Supplier management supplier debriefing
Supply chain management in public sector procurement: A guide, June 2006
The centre of excellence – a pocket guide
Good practice contract management framework
OGC/HMTjoint guidance on using the procedure Competitive Dialogue 2008
Programme and project management (PPM) specialism achieving professionalism
OGC Gateway™ review – how to become a reviewer: enhancing your own delivery skills
The OGC Gateway™ review process designed to make you successful
Programme and project management specialism public sector PPM practitioners and experts
Successful delivery skills framework – assessment guide

OGC career planning
Programme and project management (PPM) specialism achieving professionalism
Senior responsible industry executive supporting successful delivery
Senior responsible owner
Achieving excellence in construction procurement guide project organisation roles and responsibilities
Successful delivery skills

Programme management
Managing successful programs (MSP)
P3O® online repository portfolio, programme and project offices: P3O Appendix D portal content, Version 1.0
Portfolio, programme and project offices (P3O) guide
Programmes and project delivery joint statement of intent

Standards
Common minimum standards for the procurement of built environments in the public sector
Note: These documents have been downloaded and collected over a period of time from the former OGC website. It is now available from https://www.axelos.com/best-practice-solutions

4.3.2.2 Association for Project Management (APM)

Since its foundation in 1972, the Association for Project Management (APM) in the UK has been pioneering the development of project, programme and portfolio management. This organisation sprouted from the roots of the then known organisation of INTERNET (the later IPMA) and was established as INTERNET UK. Today, APM represents 19 000 professionals, and has become a key influence in the project management arena (Association for Project Management (APM), n.d.).

4.3.2.2.1 Certification programmes/qualifications

The qualifications and certifications offered by APM (Association for Project Management (APM), 2013) are based on what is called the five dimensions of professionalism, which form the pillars for career development and growth. These dimensions entail the following (Association for Project Management (APM), 2013):

- Breadth

The breadth of knowledge is underpinned in the *APMBOK*, as it defines the necessary and required knowledge to manage many varying kinds of projects. It is based and underpinned on and by many project management standards and methods and is aligned with the national occupational standards for project management (Association for Project Management (APM), 2013).

- Depth

Depth of knowledge and experience is provided through the APM competence framework, which is a derivative of the broader IPMA ICB3 4LC competence framework. Through the use of this framework, various levels of experience and knowledge can be mapped for career progression, in acquisition of follow-on and augmenting skills (Association for Project Management (APM), 2013).

- Achievement

Through the issuing of qualifications and certifications, individuals can be granted the required professional recognition to advance their careers and the profession (Association for Project Management (APM), 2013).

- Commitment

Project management skills can be honed through the use of continual professional development. This is accomplished through the use of a targeted development plan (Association for Project Management (APM), 2013).

- Accountability

Members of the organisation are held liable for professional conduct through subscription to the code of conduct of the organisation (Association for Project Management (APM), 2013).

The qualifications and certifications offered by APM in conjunction with its five dimensions of professionalism are given in Table 4-4 (Association for Project Management (APM), 2012a).

Table 4-4: Qualifications and certifications offered by the APM

Qualification	Description
Introductory Certificate to Project Management	APM Introductory Certificate (SCQF Level 6): for a fundamental awareness of project management terminology.
APMP	APMP (IPMA Level D, SCQF Level 7): for people with some project management experience. There is a specifically designed route to APMP for current PRINCE2® practitioners.
APMP for PRINCE2®	A bridging course for PRINCE2® practitioners that want to branch out into broader project management.
Practitioner	Practitioner Qualification (IPMA Level C): a practical assessment of project management skills.
Certificated Project Manager	Equivalent to the IPMA Level B certification
Risk Certificate	APM Project Risk Management Certificates: APM offers Level 1 and Level 2 certificates for project and programme managers involved in project risk assessment in any way
APM Registered Project Professional	Certificated Project Manager (IPMA Level B)
Higher Apprenticeship	An entry level qualification instituted to give young professional entry into the project management careers

What is noteworthy of the APM qualifications is that there is total alignment with the academic framework of qualifications in the UK. Thus, APM courses carry an equivalent value to the South African SAQA and NQF (Association for Project Management (APM), 2012a).

The APM is currently in the process of reviewing its qualifications and course content to get better alignment with the sixth edition of the *APMBOK* (Association for Project Management (APM), 2012a).

4.3.2.2.2 Management structures

As an association, it is registered as a charity and a company limited by guarantee. Governance is exerted through a board of trustees elected by and from the APM membership with the option to add up to three non-members to the board. This board meets regularly and concerns itself with strategy formulation, setting of policy and providing guidance to the organisation (Association for Project Management (APM), 2012a).

The APM states the following regarding its membership, tenure and stature in the European arena of project management:

> *The association is a registered charity with around 19 500 individual and 500 corporate members, making it the largest professional body of its kind in Europe. As part of its strategy to raise awareness and standards in the profession, it is currently in the process of applying for a Royal Charter* (Association for Project Management (APM), 2012a).

4.3.2.2.3 Publications

The APM has localised the IPMA ICB3 4LC and adopted it to its own circumstances, and has published this document as the APM competence framework. This framework forms an integral part in its five dimensions of professionalism, as it provides the guidance for development of competence (Association for Project Management (APM), 2006).

Other than just localising the competence framework, the APM is one of only three professional bodies that have issued bodies of knowledge, the others being the PMI with its *PMBOK® Guide* and the Project Management Association of Japan (PMAJ) with its *P2M Manual*. Listed in Table 4-5 are the official publications issued by the APM in the UK.

Table 4-5: Official publications of the APM (Association for Project Management (APM), 2012a)

	APM publications
1.	*APMBOK*, 6th edition
2.	*APMBOK*, 5th edition
3.	*APM competence framework*
4.	*Starting out in project management*, 2nd edition
5.	*The Scheduling Maturity Model*
6.	*Prioritising project risks*
7.	*Interfacing risk and earned value management*
8.	*Co-directing change: a guide to the governance of multi-owned projects*
9.	*Introduction to project planning*
10.	*Introduction to programme management*
11.	*Models to improve the management of projects*
12.	*Project management pathways*
13.	*The lens collective: a guide to seeing different perspectives in project management*
14.	*Earned value management: APM guidelines*
15.	*Introduction to project control*
16.	*Project risk analysis and management guide*, 2nd edition
17.	*Contract strategy for successful project management*
18.	*Directing change: a guide to governance*, 2nd edition
19.	*Standard terms for the appointment of a project manager*
20.	*Sponsoring change*
21.	*The earned value management compass*

4.3.2.3 Association for Project Management South Africa (APMSA)

According to APMSA, this local organisation:

> *…is a non-profit, section 21 company whose mission is to promote professional project management in South Africa. APMSA's membership compromises individual project managers and organisations throughout southern Africa. APMSA is the national association affiliated to the International Project Management Association, IPMA* (Association for Project Management South Africa (APMSA), 2009a).

4.3.2.3.1 Certification programmes/qualifications

APMSA offers a localised version of the internationally recognised and accredited IPMA ICB3 4LC competence certification. This certification takes place in accordance with the APMSA-published APMSA National Competence Baseline APMSA NCB3 Version 3 (Association for Project Management South Africa (APMSA), 2006).

Certification of competence in South Africa in accordance with the IPMA-aligned ICB3 and the localised NCB3 can only take place through APMSA-Sert. This organisation is a separate legal entity. In accordance with the requirements of ISO/IEC 17024, there needs to be a separation of interest between the certification authority and the organisation offering the certification. This separation is due to compliance requirements of transparency in certifications. This makes APMSA-Sert the only organisation in South Africa that can give IPMA® certifications (Association for Project Management South Africa (APMSA), 2006).

4.3.2.3.2 Management structures

APMSA belongs to the broader family of the IPMA and is structured as an association. Management is accomplished through an elected board of directors and the legal entity is that of a section 21 not-for-profit organisation.

4.3.2.3.3 Publications

The APMSA publications are shown in Table 4-6.

Table 4-6: APMSA publications

	APMSA publications
1.	*APMSA National Competence Baseline (APMSA NCB3 version 3)*

4.3.2.4 PMI South Africa Chapter

The PMI has had an influence in the South African environment since 1982 when the PMI South Africa Chapter was chartered. It was the first chapter to be established outside the USA (PMI South Africa Chapters, 2013).

Since 2002, there has been a mutual acceptance agreement between the PMI's South Africa Chapter and Project Management South Africa (PMSA). During 2007, however, there was a realisation that the strategic direction dictated by the US-based

PMI organisation was not feasible in the South African context. The PMI wanted its chapter to become more active, which led to a new agreement being forged. This agreement entailed that the PMI South Africa Chapter and the PMSA would be run as separate organisations, complementing each other in the delivery of value to the project management community at large.

The PMI South Africa Chapter would specifically look after the PMI members, chapter members, all certification credential holders, and the PMI-registered education providers. In cases where the PMI South Africa Chapter and the PMSA would work together on initiatives, it would be agreed on in an amendment to the joint venture agreement (PMI South Africa Chapters, 2013).

The joint venture allows PMI South Africa Chapter and PMSA members to attend each other's meetings as joint members, and allows the PMI South Africa Chapter to leverage off the PMSA's branch network for membership meetings outside Gauteng. However, the PMI South Africa Chapter may schedule meetings where there is interest for additional membership requirements (PMI South Africa Chapters, 2013).

4.3.2.4.1 Certification programmes/qualifications

The PMI South Africa Chapter, through its ties with the PMI USA, offers the same credentials, certifications and qualifications as that of the PMI (PMI South Africa Chapters, 2013).

4.3.2.4.2 Management structures

Managed as an extension of the US-based PMI, there is little autonomy in localisation of the organisation. Day-to-day management is accomplished through a board of directors, which acts in accordance with certain portfolios with dedicated roles and functions (PMI South Africa Chapters, 2013).

4.3.2.4.3 Publications

The PMI South Africa Chapter offers the same publications as the PMI.

4.3.2.5 Project Management South Africa (PMSA)

As can be seen from the above, there is collaboration between the PMI South Africa Chapter and PMSA. However, despite this collaboration, these two organisations are autonomous.

The PMSA states the following regarding the purpose of its existence:

> *PMSA (formerly known as the Project Management Institute of South Africa) was formed in 1997 as a national association to represent project management professionals across all sectors in South Africa. Since 1997, PMSA membership has grown to almost 1 000 members, are drawn from a diverse cross-section of industries and ethnic groups* (Project Management South Africa, 1997).
>
> *The PMI South Africa Chapter was established in South Africa in 1982. Due to the above imperatives for the formation of an autonomous local body, it nurtured the formation of the PMSA in 1997 and committed to an ongoing and close working relationship between the two organisations. The PMSA also has a cooperative agreement in place with the PMI`s USA-based global office* (Project Management South Africa, 1997).

4.3.2.5.1 Certification programmes/qualifications

The PMSA acknowledges that various qualifications and certifications are offered by a myriad of institutions, but it does not offer any of these programmes in its own right.

According to its website, as a professional body since 1997, it has been involved in the following key projects (Project Management South Africa, 2012):

- Formation of a project management standards generating body (SGB)
- Contribution to and communication of the local project management standards and national qualifications
- Contribution to the development of the Construction Professions Act
- Major representation on the Project Management Chamber in the Services SETA
- Discussions on the establishment of an education and training quality assurance (ETQA) body for project management under the Services SETA

4.3.2.5.2 Management structures

The PMSA is a not-for-profit professional association governed by a board of directors, managed and administered by a national office and directed by a national executive committee. The board and national executive committee members are elected volunteers. The national executive committee is headed by a president who serves a two-year term. It further comprises vice-presidents in the portfolios of

Projects, Finances, Membership, Branches, Special Interest Groups, Marketing and PR, Technical and Education, and Professional Liaison (Project Management South Africa, 2012).

4.3.2.5.3 Publications

The PMSA has no standards or guides published under its own authority, only a bi-monthly management magazine (Project Management South Africa, 2012).

4.3.2.5.4 Conclusions

From this overview of the international and national landscape of project management organisations, and their publications and certification programmes, one can conclude the following:

- There are at most three players that can truly claim to be international: PMI, IPMA and GAPPS.
- There is a differentiating factor in the location of these bodies, which permeates the world view of such an organisation in terms of the nature of its qualifications, certifications and publications. Organisations based in the USA focus a lot on technical content, as opposed to countries that are part of the Commonwealth and European countries, which are focused on competence and not just knowledge.

Contrary to popular belief, there is more to project management than is commonly perceived. Through clever marketing, the PMI is purported to be “the project management organisation”, basing its claim on its *PMBOK® Guide*, which claims that it has ANSI status. If this belief is sustained, the world will become poor in terms of the development of the occupation. Development by the OGC, the APM, the PMAJ, and the IPMA is on a far more mature level of thinking than the US-based PMI. Most professional bodies distinguish between the levels of portfolio management, programme management, project management and project practitioner in their qualifications and certifications. Most professional bodies also distinguish between these levels in their publications. In the following section, the most prevalent publications will receive attention.

4.3.3 International publications and bodies of knowledge

In this section of the discussion, attention will be focused on the publications of the various professional bodies. The discussion will be focused on determining whether these publications will help to define roles and functions as required in the definition

of the job family. The first discussion will be on project management bodies of knowledge, followed in section 4.3.4 by a discussion of the competence frameworks.

4.3.3.1 PMBOK® Guide

It is clear that *A guide to the project management body of knowledge (PMBOK® Guide)* is the most prevalent publication of the PMI. The *PMBOK® Guide* is currently in its fourth edition and under review. It covers nine knowledge areas to project management in its present form, and, in accordance with ISO 21500, the revision will add a tenth knowledge area.

These knowledge areas entail the following:

- Project integration management, which includes the processes and activities needed to identify, define, combine, unify and coordinate the various processes and project management activities within the project management process groups
- Project scope management, which includes the processes required to ensure that the project includes all the work required, and only the work required, to complete the project successfully
- Project time management, which includes the processes required to ensure the timely completion of the project
- Project cost management, which includes the processes involved in estimating, budgeting and controlling costs so that the project is completed within the approved budget
- Project quality management, which includes the processes and activities of the performing organisation that determine quality policies, objectives and responsibilities so that the project will satisfy the needs for which it was undertaken
- Project human resource management, which includes the processes that organise and manage the project team
- Project communications management, which includes the processes required to ensure the timely and appropriate generation, collection, dissemination, storage, retrieval and ultimate disposition of project information
- Project risk management, which includes the processes concerned with conducting risk management planning, identification, analyses, responses, and monitoring and control on a project
- Project procurement management, which includes the processes to purchase or acquire the products, services or results needed from outside the project team to perform the work. (Project Management Institute, 2008)

In Figure 4-2, a summary of the *PMBOK® Guide 5th edition,* where the tenth knowledge area has been added, is shown. The summary was sourced from the website of Tutorialspoint (2014).

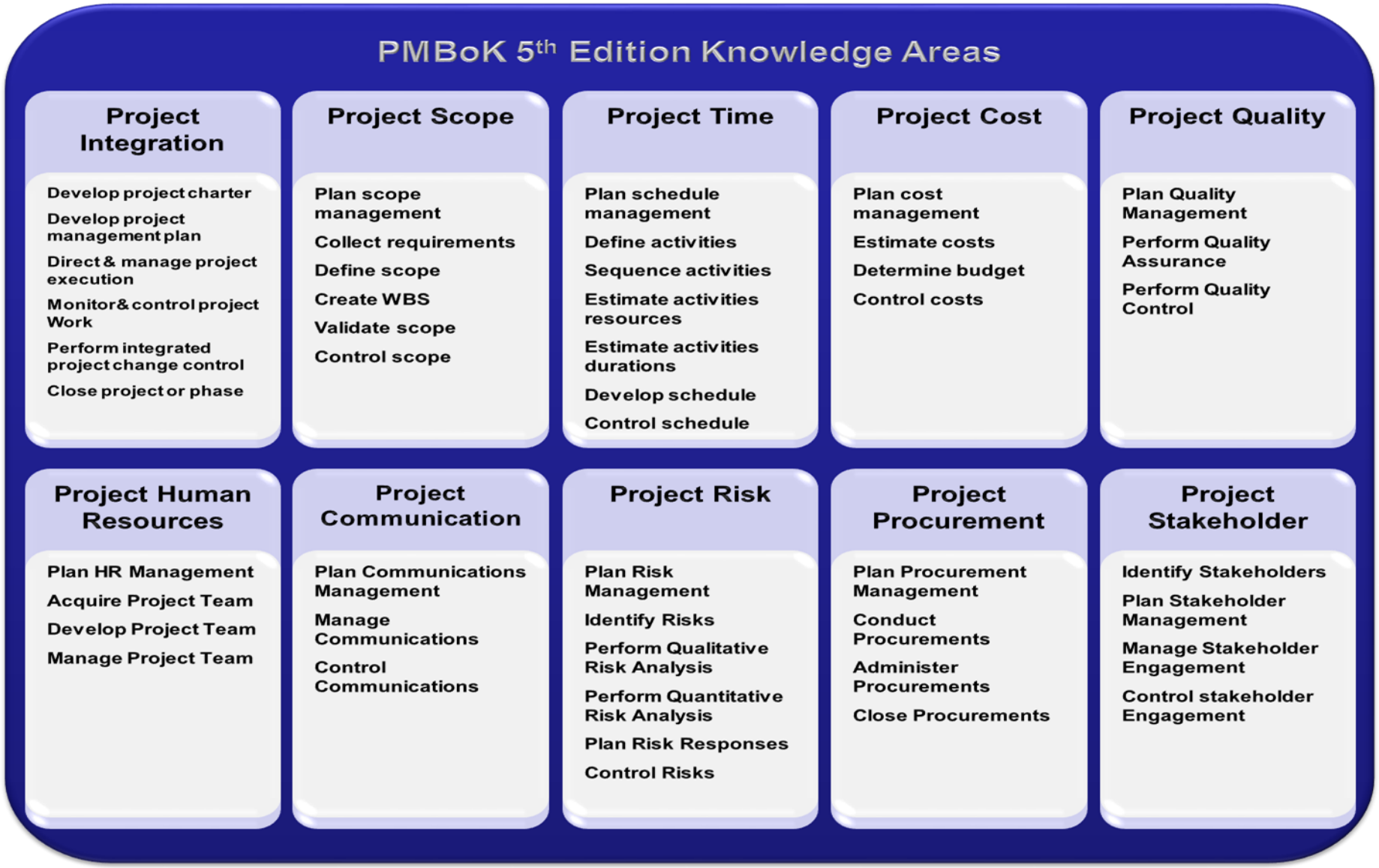


Figure 4-2: Summary of the PMI's project management body of knowledge areas (Tutorialspoint, 2014)

Other than just defining the knowledge areas that would be required for the successful execution of a project, *PMBOK® Guide* also defines processes and process groups where these knowledge areas are grouped in terms of their application. Broadly, *PMBOK® Guide* defines five process groups, which can be depicted as shown in Figure 4-3 below (Project Management Institute, 2008):

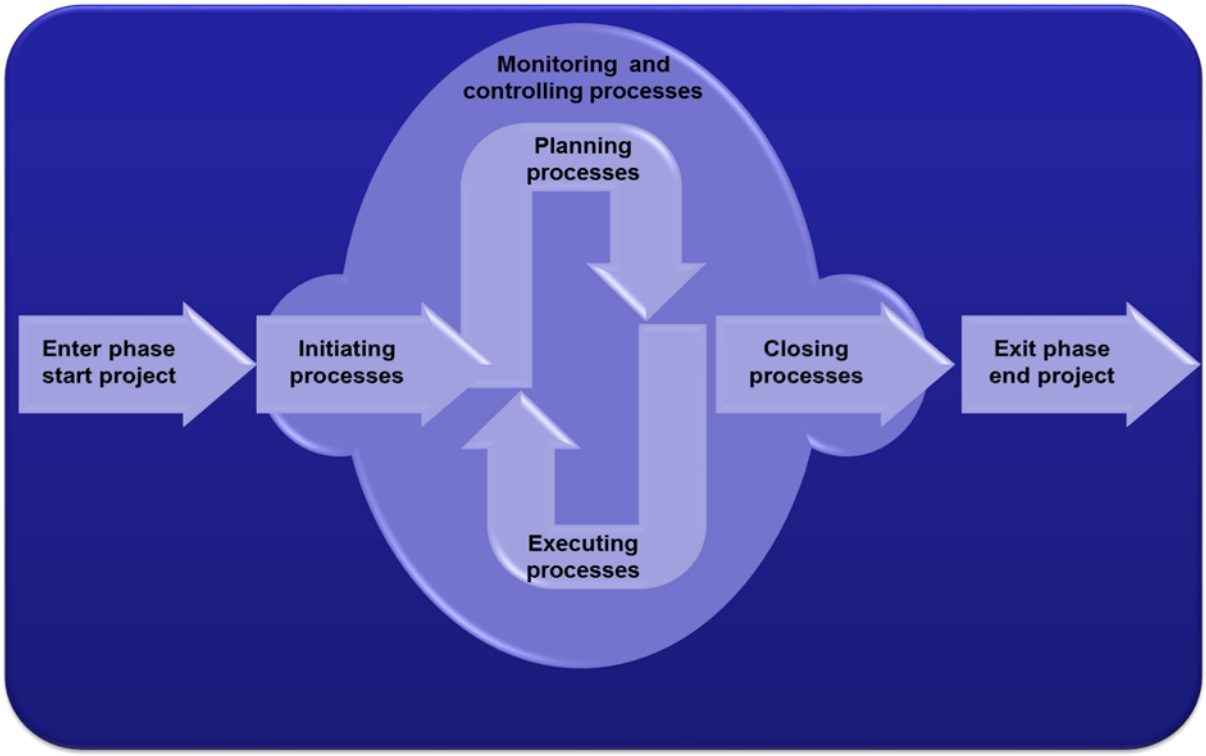


Figure 4-3: Project management process groups

When the need for a new project arises, the initiation process group is employed, and acts to define the start of a new project. These processes are, however, not limited to the starting phase of a project, but can also be employed for the start of a new phase in the project life span, as defined by the project life cycle management approach. The main objective and outcome of this process group is to obtain authorisation to start the project or phase (Project Management Institute, 2008).

In Figure 4-3, it is clear that the next group of processes that would be employed entails the planning process group. This process group is employed to establish the entire scope of the effort, define and refine the objectives, and develop the course of action required to attain those objectives (Project Management Institute, 2008).

Following the planning of the project, the executing processes are employed to effect completion of the work as defined in the project management plan.

From a general management perspective, the management functions are defined as

planning, organising, leading and controlling. In this relationship, the plan establishes what needs to be done, as well as the parameters within which the plan needs to be executed. This then gives rise to the fact that the control function of management is closely related to the planning function, as one plans to control and controls against one's plan. In the same sense, the monitoring and controlling processes are required to track, review and regulate the progress and performance of the project, identify any areas in which changes to the plan are required, and initiate the responding changes (Project Management Institute, 2008).

As the project reaches its conclusion, a separate set of processes is employed to affect project closure. As such, the closing processes are performed to finalise all activities across the project management process groups to formally close the project or phase. It is important to note that the project management process groups repeat themselves during each phase in the project life cycle (Project Management Institute, 2008) .

Expanding on Figure 4-3 and the discussion above, one sees the relationship of these process groups to each other as depicted in Figure 4-4. This depiction shows an overall summary of the basic flow and interactions among process groups and specific stakeholders.

A process group includes the constituent project management processes that are linked by the respective inputs and outputs, where the result or outcome of one process becomes the input to another.

Attention needs to be drawn to the fact that the process groups share similar project life cycle phases, but that they should not be interpreted as such. During the execution of complex projects, all the process groups would normally be repeated for each phase or subproject (Project Management Institute (PMI), 2008, 2010).

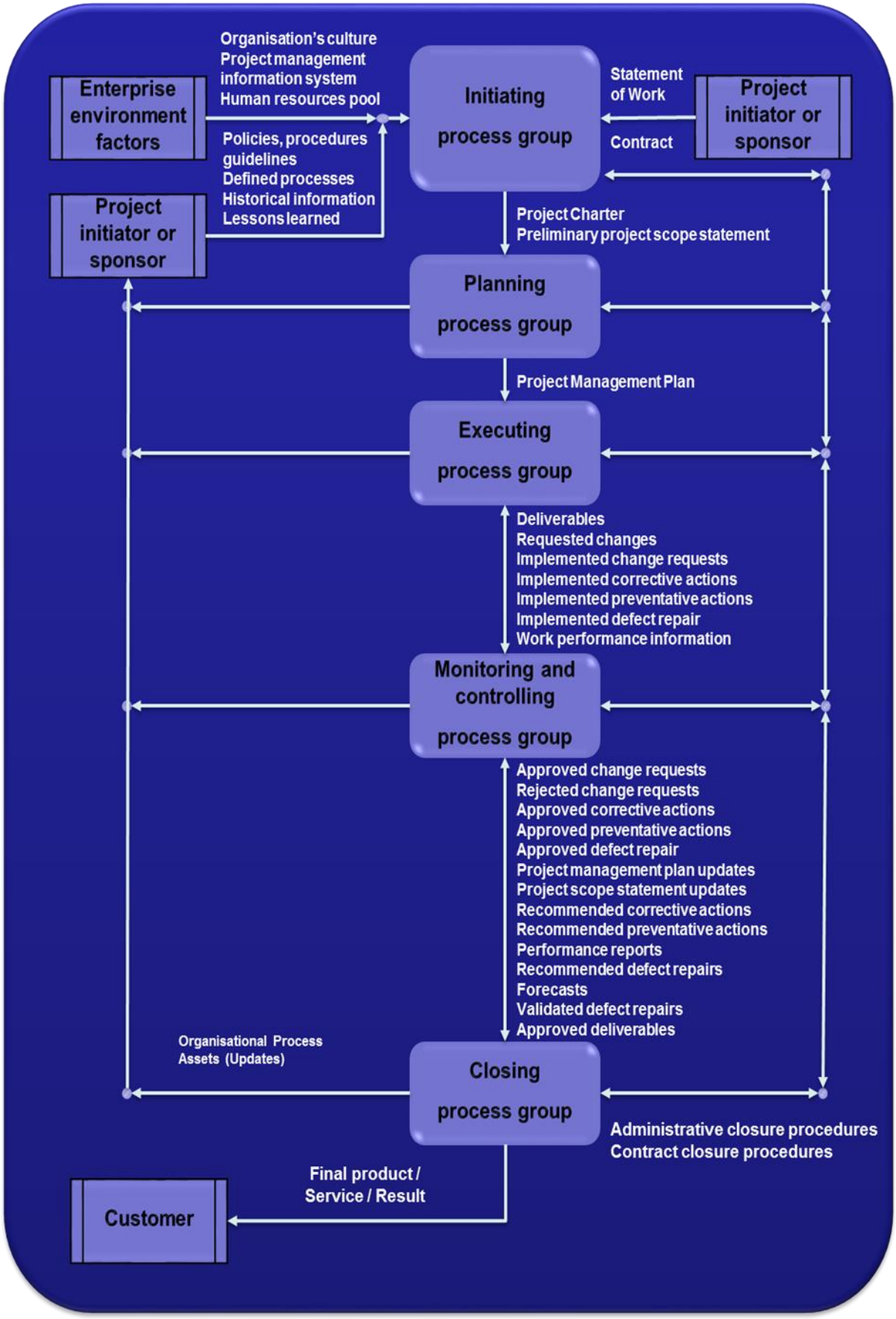


Figure 4-4: Overall summary of the basic flow and interactions among process groups and specific stakeholders

In conclusion, Figure 4-5 depicts the mapping of the 42 project management processes into the five project management process groups and the nine project management knowledge areas. The project management processes are shown in the process group in which most of the activity takes place (Project Management Institute, 2008).

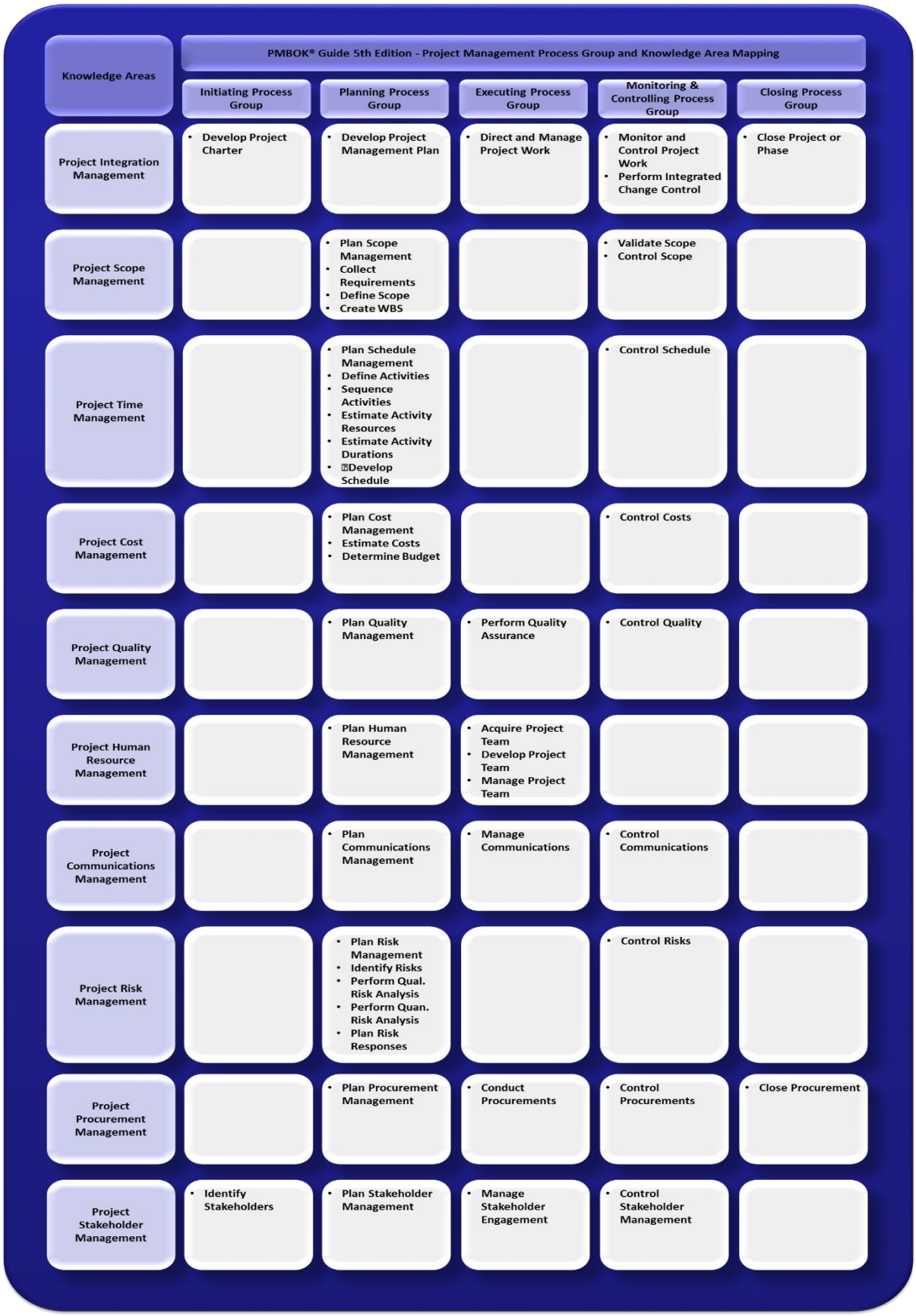


Figure 4-5: Mapping of the 42 project management processes into the five project management process groups and the ten project management knowledge areas (Project Management Institute, 2008)

It is clear from the defined knowledge areas of the *PMBOK® Guide* that knowledge and competencies of multiple disciplines are required. The definition of the process groups also implies that various skills, roles and functions are required in the execution of the project during its life span. This leads to the following conclusions:

- As the size and complexity of projects increases, roles and functions in terms of functional areas of the knowledge areas will also increase.
- With a better focus on the functional areas, and with the project as the overarching context, specific functional roles can be distilled from the specifics of the task and jobs that these roles should fulfil on the project.

4.3.3.2 APMBOK

APMBOK represents the topics on which practitioners and experts who are considered project management professionals should be knowledgeable and competent (Association for Project Mangement, 2006).

It is interesting to note that this publication takes a broader perspective to project execution as it incorporates not only inward-focused project management topics, such as planning, control tools and techniques, but also those broader topics essential to the effective management of projects.

The discussion of the topics is conducted at a high level and encompasses those that are generic to project management. The intent is principally to give an overall “scoping” guide to the topics that professionals in project management consider to be essential for a suitable understanding of the discipline. In instances where detailed information is required, *APMBOK* utilises references to detailed texts for specific content, such as can be found in academic texts and the academic domain.

The topics are generic to project management. The way they are described is also generic, with the intent that each topic is potentially applicable in all project management situations. Flowing from this, topics have been grouped into seven sections as depicted in Table 4-7 (Association for Project Management (APM), 2006).

Table 4-7: Categorisation of the *APMBOK* knowledge topics

Section	Focus area
1.	General and introductory items
2.	The project's strategic framework, including its basic objectives
3.	Control issues that should be employed
4.	The definition of the project's technical characteristics
5.	The commercial features of its proposed implementation
6.	The organisational structure that should fit the above
7.	Issues to do with managing the people that will work on the project

There is a close relationship between these topics, and many of them are interrelated and interdependent. However, for the purpose of significance, they are demarcated as separate entities. Graphically, this demarcation can be presented as shown in Figure 4-6 (Association for Project Management (APM), 2006).

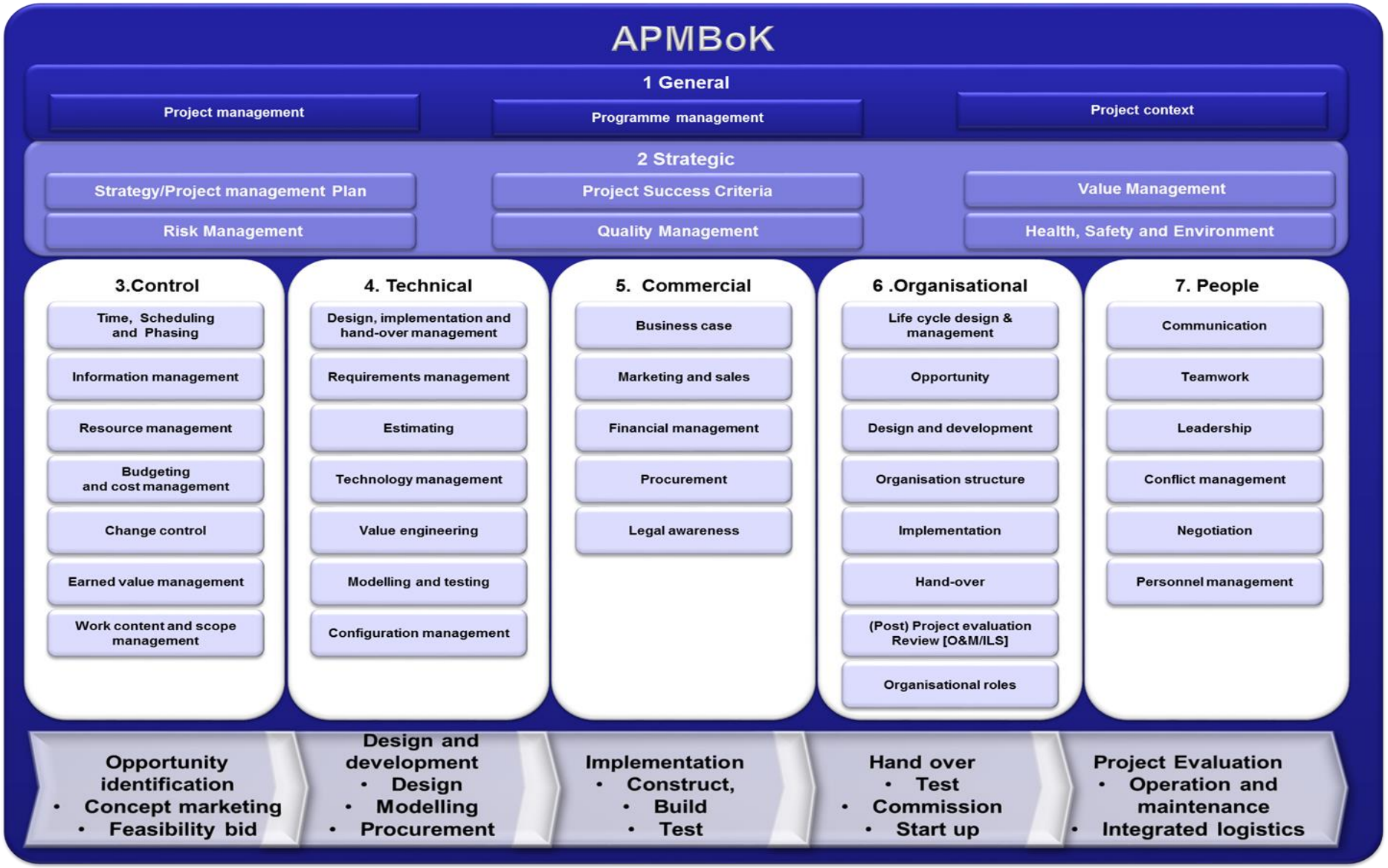


Figure 4-6: *APMBOK* knowledge topics

4.3.3.3 P2M

JPMA published a whole framework for the training of its project managers, known as *P2M*. This framework can also be viewed as its body of knowledge and is shown in Figure 4-7 (Ohara, 2003).

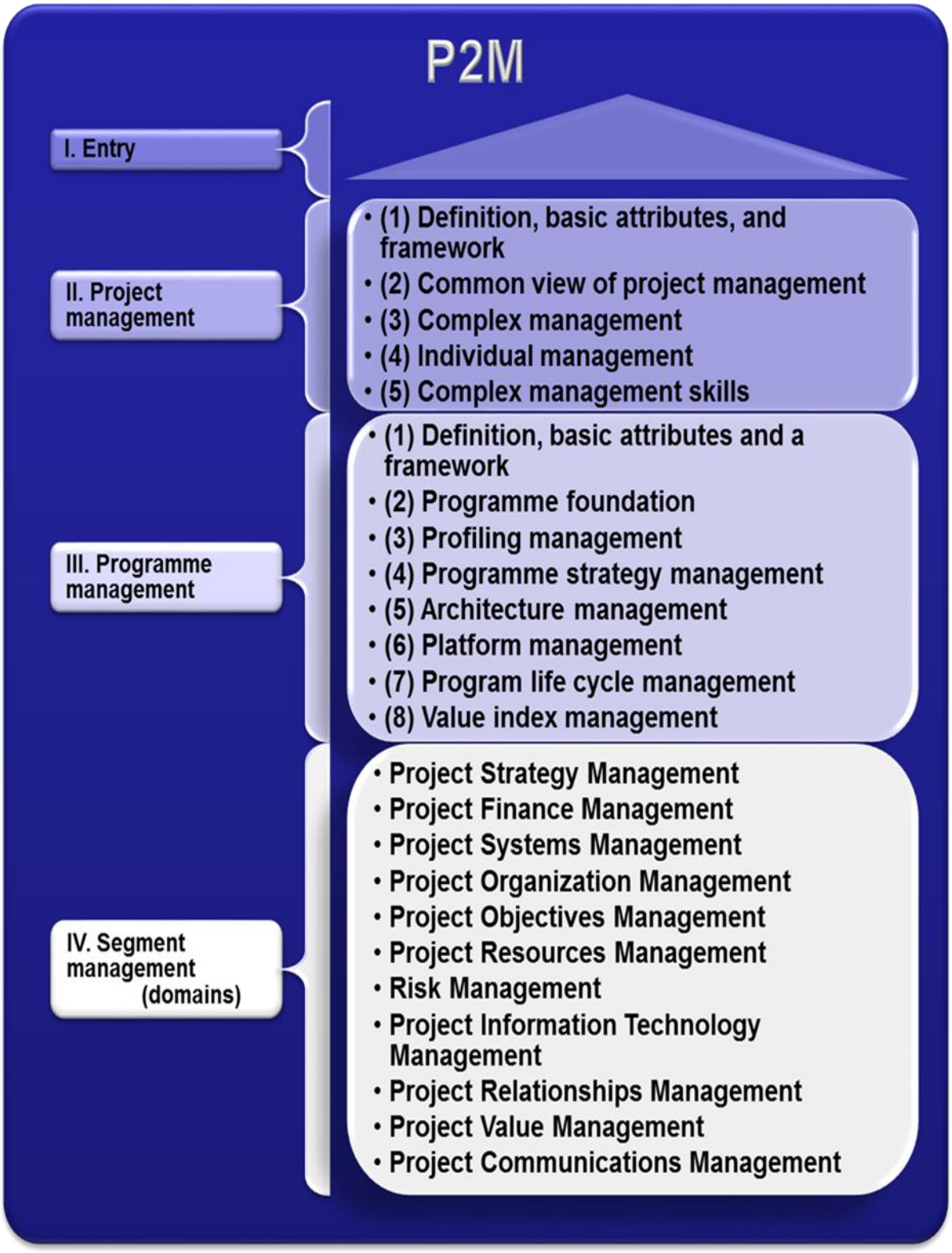


Figure 4-7: Structure of the Japanese *P2M* approach and body of knowledge

P2M, the Japanese version of the systems thinking model for project management, aims to create a strategic framework for improving corporate value during the execution of projects (Ohara, 2003).

Through the framework, the whole organisation is focused on the creation of value with the emphasis on reconstructing a new business model. This new business model aims to accomplish the following (Ohara, 2003):

- Creating value
- Expanding project areas
- Incorporating Japan's accumulated wisdom
- Certifying project managers as professionals, as well as the qualifications to ensure that such professionals form part of a mission-achieving type organisation in connection with the creation of frameworks
- Making knowledge and ability hybrid
- Adopting a project model approach: scheme, system and services
- Upgrading the integration of individual management of *PMBOK® Guide* to the original
- Programme management
- Editing the context (background and a common view) of *PMBOK® Guide* for project management
- Expanding individual management
- Managing each of the following items:
    - strategy
    - finance
    - systems
    - resources
    - relevance
    - value

In order to accomplish this new business model, the project manager would require skill and competence in the areas depicted in Table 4-8 (Ohara, 2003).

Table 4-8: Common *P2M* competencies and skills (Ohara, 2003)

Common management skills	Project management skills
Management principles	Segment management skills
Organisation theories	Project strategy management
Management cycle	Project finance management
Leadership	Project systems management
Use of resources	Project organisation management
	Project objectives management
	Project resources management
	Risk management
	Project IT management
	Project relationship management
	Project value management
	Project communication management

In accordance with the holistic view of the *P2M* approach, the execution of projects can also be seen as a system of projects, hence its publication also refers to this, as depicted in Table 4-9.

Table 4-9: *P2M* project and programme basic views and attributes (Ohara, 2003)

Definition	Project management	Programme management
	Evaluation based on specific missions	**Evaluation based on entire missions**
Basic attributes	Individuality/terminability/ uncertainty	Ambiguity/expandability/ complexity/uncertainty
Common view	Systems approach	Programme mission
	Project life cycle	Programme value
	Project platform (“BA”)	Programme community
	Project stakeholder	Programme architecture
	Use of management skills	Programme integration management skills

From the introduction to the discussion of the *P2M* framework, as depicted in Figure 4-7, one can see that there are some similarities between *PMBOK® Guide*, *APMBOK* and *P2M*. The similarities are that, at the individual level, there is reference to

individual areas/domains of knowledge, where *PMBOK® Guide* now has 10 knowledge areas, *APMBOK* has seven main knowledge domains and *P2M* has 11 knowledge frameworks. Furthermore, it is clear that there is reference to processes grouped together in all three of these publications. The *P2M* process view can be represented as indicated in Table 4-10 (Ohara, 2003).

Table 4-10: Domain depiction of the *P2M* framework

Domain description		
Project strategy management		
Framework that clarifies a relationship between corporate (including public institutions and non-profit organisations) strategies and projects, and introduces project activities effectively to the creation of corporate value.		
Purposes	**Operational procedures**	**Results**
Having projects create maximised corporate value	Making use of evaluation system of strategic projects Real option Balanced scorecard Project portfolio	Project companies
Effective project investment	Maintenance of the foundation system of projects	Learning companies
Elimination of business risk	Construction of partnership	Construction of a win-win relationship
		Improvement of project competitiveness
		Improvement of speed, cost reduction, quality improvement, customer satisfaction
Project finance management		
Project management method that aims to build a framework of fundraising necessary for the execution of projects.		
Creation of a framework for efficient fundraising for projects	Creation and selection of basic concepts	Evaluation of profitability and evaluation of finance eligibility
Containment of risk in projects (limited retroactivity of debt repayment)	Selection and specification of elements	Creation of the framework of stable risk management that supports projects (integrated realisation of a risk management system as a framework and for fundraising)

Domain description		
Ensuring profitability and enforceability	Creation of a feasible framework and an optimal framework	
Creating a framework for fund procurement, while forming a framework of projects	Allotment of optimal risk	
Alleviation of a burden and dispersion of risk	Evaluation of profitability and evaluation of finance eligibility	
Project systems management		
One may come across ambiguous and unexpected matters at the time of performing project activities. This is one of the thinking methods that avoids such problems as much as possible.		
Rearrangement of complex problems existing in projects	Systems management	Project plans that can be accomplished
Fulfilment of required specifications	Systems engineering	Arranged and balanced project concepts
Prevention of the occurrence of problems	Soft systems approach	Improvement of the quality of project management
Improvement of the value of plans and results	For instance, system thinking, problem solution methods and modelling methods	Improvement of results and productivity
Improvement of project profits		Customer satisfaction
Information management		
How to make the most of ICT in fulfilling projects		
Improving efficiency and increasing the sophistication of project operations	Decision of project management methods	Improvement of accuracy of project management
Quick and reliable decision-making	Decision of project management operations to which information systems are applied	Improvement of communication among project members
Project cost reduction	Information shared within projects and	Accumulation and effective use of shared information

Domain description		
	communication methods	
Promotion of information shared by stakeholders of projects		
Relationship management		
A series of operational process that determines a relationship among stakeholders involved in a project, maintains the project in a good condition and leads it to a success.		
Customer satisfaction	Designing of relationships	Clarification of the role and responsibility of each party concerned (stipulation in proposals, agreements and other documents)
Satisfaction of stakeholders	Maintenance of relationships: - Proposal - Agreement - Adjustment of relationships	Solving problems during the fulfilment of projects
Fulfilment of projects	Reconstruction of relationships	Development into the proposal of next cases and new cases
Maintenance of and progress in corporate activities		
Value management		
Value circulation process that accumulates knowledge, experience and the like arising from typical corporate or project activities as a value source and gives feedback to projects		
Quantification of value	Recognition and evaluation of value	Clarification of value
Maximisation of value	Knowledge management	Creation of new business
Reproduction of value	Technology transfer	Maintenance of business
Maintenance of value	Maintenance	Complex effect
Creation of value	Kaizen	

Domain description		
	TQM	
	Contract of surety ship	
	Collection of investment	
	Environment	
	Creation of service business	
Project organisation management		
Method for operating project organisations for quickly and flexibly responding to circumstantial changes in a strict environment surrounding projects		
Construction of the foundation of project organisations	Understanding of the environment of project organisations	Improvement of the productivity of projects
Improvement of productivity of project organisations	Designing of project organisation	Improvement of the maturity of organisations
Decision of decision-making rules	Construction of project teams	Satisfaction of project teams
Improvement of communication efficiency	Securing human resources	
Achievement of customer satisfaction	Operation of project organisations	
	Evaluation of project organisations	
Project target management		
Function that supplies a route map so that project managers and team members can imagine processes from then to the completion under the constraints of contract terms and resources and fulfil projects in a well-balanced manner.		
Analysis of life cycles	Life cycle plan	Successful completion of projects

Domain description		
Visualisation of targets	Scope management	Customer satisfaction
Definition of the scope of services	Cost management	Accomplishment of targets
Establishment of a baseline for measuring and controlling progress	Time management	Effective use of resources
Forecasting results	Quality management	Contribution to corporate administration
Optimal execution	Progress control	Creation of new projects
Effective information transmission	Control over reporting and changes	
Control over changes	Control over delivery	
Formalisation of know-how		
Project resource management		
Management that clarifies the six (material, fundamental, human, intellectual, information, financial) resources required for projects and properly secures them.		
Resource plan	Specification of resources	Securing resources (required quality, necessary time, securing within budget)
Achievement of the required specifications	Preparation of plans	Improvement of results and productivity of projects
Basic plan for budget control	Confirmation of results	Customer satisfaction
Setting and ensuring delivery dates	Measures for improvement	
Improving the profits of projects	Accumulation of resources	
Risk management		
Most of the projects contain uncertainty and risk and this method controls and responds to such risk to a certain extent.		
Understanding uncertainty and risk (degree of danger) and drawing up countermeasures	Basic plan	Evasion of an excess over estimates

Domain description		
Giving a challenge to uncertainty and risk and decision on acceptance	Specification of risk	Evasion of risk and securing safety
Minimisation of the cost of loss	Preparation of measures (plans) against risk	Completion of projects within budgets
Securing accountability (responsibility for results)	Execution of countermeasures	Completion of projects within delivery dates and construction periods
	Evaluation of the circumstances in which risk management is executed (revaluation, monitoring and decision of countermeasures throughout a project period)	Customer satisfaction
		Improvement of project profits
		Expansion of business
Communication management		
Basic matters of communication and a method of getting involved on the basis of one's business experience, focusing on cross-cultural communication closely related to project management.		
Accurate communication among parties concerned	Capability to deal with different cultures	Control over forecasting
Understanding of the actual condition for solving problems	Role of local staff	Establishing a confidential relationship among stakeholders
Making it easy for heterogeneous persons to participate in projects	Understanding one's own culture and different cultures	Establishing a communication style proper for such projects
	Making full use of IT	

In the section that follows, the next major international project management publication, ISO 21500 Standard, will be discussed.

4.3.3.4 ISO/IS 21500: Guidance on Project Management

The *ISO 21500 Standard* will be discussed as a review of "Comparison of ISO 21500 Draft Version and *PMBOK® Guide* 4th Edition" (Gasik., n.d.). The draft version of the standard is available on the website of the International Standards Organization (ISO) (International Standards Organisation (ISO), 2012).

As with all the ISO standards, this standard provides generic guidance on the concepts and processes of project management that have an impact on the achievement of projects (International Standards Organisation (ISO), 2012).

The standard describes the key concepts specific to projects, which will in turn provide the context within which projects are executed. Reference is also made to how these project management concepts relate to each other.

History of ISO 21500

Prior to the development of the specific project management standard, ISO produced *ISO 10006 Quality Management Systems – Guidelines for Quality Management in Projects*, which dealt with the subject discussed in section 4.3.3.5 below. ISO, as the world's leading standardisation organisation, must have its own project management standard. It can be seen that even ISO member countries have been working diligently to produce their own standards. An example of this would be "BS 6079-1:2010 Project management. Principles and guidelines for the management of projects". In the discussion so far, it has become evident that the project management industry worldwide has taken the lead in defining its own standards, and countries like Japan, Australia and Germany have developed their own project management standards (International Standards Organisation (ISO), 2012).

Professional bodies have also published their own materials with the development of the IPMA competence framework, as well as the *PMBOK® Guide*, which was adopted as an ANSI standard for project management in 1999 (International Standards Organisation (ISO), 2012).

Evidence that there is a need for a single global project management standard is also found in other initiatives and efforts, such as the following:

- The Global Project Management Forum (an initiative of David Pells)
- The Global Working Groups (an initiative of Lynn Crawford)
- The Operational Level Coordination Initiative (OLCI)
- The Global Alliance for Project Performance Standards

Through the publication of *ISO 21500 Standard* in 2012, this ISO initiative creates another hope for one such standard (International Standards Organisation (ISO), 2012).

The initiative for the composition of the ISO standard started in 2006 when the British Standard Institute, a member organisation of ISO, registered such a need.

ISO subsequently agreed and created work item ISO/PC 236 to prepare the ISO 21500 Standard on Project Management. Altogether, 31 countries got involved with this work and started observing it (International Standards Organisation (ISO), 2012).

The definition of the basic concepts of the ISO standard renders two issues that need to be examined before starting the discussion on the context and content of the standard. These entail the definition of a project and the types of projects in which ISO 21500 is interested.

Project definition

According to *ISO 21500 Standard,* a project is defined as follows (International Standards Organisation (ISO), 2012):

> *A unique set of processes consisting of coordinated and controlled activities with start and finish dates, undertaken to achieve an objective*.

The issue with this definition is that there is an absence of reference to products. Furthermore, the word “unique” is retained in relation to the set of project processes, which in fact causes the problem that it is uncertain as to whether the “set” of processes is unique or whether each project needs unique processes. This ambiguity is relevant in terms of routine and commercialised projects, where it would be difficult to assign an adjective of “unique” to the set of project processes. Thus, the same problem as with the *PMBOK® Guide*’s definition is experienced (International Standards Organisation (ISO), 2012).

Project types

It seems as if the standard only refers to investment-type projects, and thus gives less reference to other types of projects, namely commercial projects.

With attention drawn to these issues, one can now evaluate the standard in terms of its content and structure (International Standards Organisation (ISO), 2012).

Project management processes and process groups

In essence, the ISO standard defines five process groups as depicted in Table 4-11 (International Standards Organisation (ISO), 2012).

Table 4-11: ISO process groups

	ISO 21500
1.	Initiating
2.	Planning
3.	Implementing
4.	Controlling
5.	Closing

These process groups follow the same naming convention as the traditional life of project span models and can cause some confusion. While employing these process groups, reference is made to ten knowledge subjects, as depicted Table 4-12 (International Standards Organisation (ISO), 2012).

Table 4-12: ISO knowledge subjects

	ISO 21500 subjects
1.	Integration
2.	Stakeholder
3.	Scope
4.	Resource
5.	Time
6.	Cost
7.	Risk
8.	Quality
9.	Procurement
10.	Communication

There are ten defined knowledge subjects, which can be defined at a second layer of detail as presented in Table 4-13 (International Standards Organisation, 2012).

Table 4-13: ISO knowledge subjects detail

ISO knowledge subjects detail	
Integration	
	4.3.1 Develop project charter
	4.3.2 Develop project plans
	4.3.3 Direct project work
	4.3.4 Control project work
	4.3.5 Control changes
	4.3.6 Close project phase or project
	4.3.7 Collect lessons learned
Stakeholder	
	4.3.8 Identify stakeholders
	4.3.9 Manage stakeholders
Scope	
	4.3.10 Define scope
	4.3.11 Create work breakdown structure
	4.3.12 Define activities
	4.3.13 Control scope
Resource	
	4.3.14 Establish project team
	4.3.15 Estimate resources
	4.3.16 Define project organisation
	4.3.17 Develop project team
	4.3.18 Control resources
	4.3.19 Manage project team
Time	
	4.3.20 Sequence activities
	4.3.21 Estimate activity durations
	4.3.22 Develop schedule
	4.3.23 Control schedule

ISO Knowledge subjects detail	
Integration	
Cost	
	4.3.24 Estimate costs
	4.3.25 Develop budget
	4.3.26 Control costs
Risk	
	4.3.27 Identify risks
	4.3.28 Assess risks
	4.3.29 Treat risks
	4.3.30 Control risks
Quality	
	4.3.31 Plan quality
	4.3.32 Perform quality assurance
	4.3.33 Perform quality control
Procurement	
	4.3.34 Plan procurement
	4.3.35 Select suppliers
	4.3.36 Administer contracts
Communication	
	4.3.37 Plan communications
	4.3.38 Distribute information
	4.3.40 Manage communication

At first glance, it would seem as if the ISO standard and the *PMBOK® Guide* have a lot in common. However, a closer look reveals the following:

> *There is one new subject in ISO 21500: Stakeholders, which is a part of the project communication management area in the* PMBOK® Guide (International Standards Organisation (ISO), 2012).

There are 39 processes in ISO 21500 and 42 processes in *PMBOK® Guide*. Thirty-two ISO 21500 processes have their direct equivalents in *PMBOK® Guide* (for one of them its place in the sequence of processes has been changed). Four processes have been moved between subjects (*PMBOK® Guide* knowledge areas). Four pairs

of *PMBOK® Guide* processes have been merged into four single processes in ISO 21500. Two *PMBOK® Guide* processes have not been placed in ISO 21500 (International Standards Organisation (ISO), 2012).

The following four new processes have been introduced to ISO 21500:

4.3.8 Collect lessons learned
4.3.17 Define project organisation
4.3.19 Control resources
4.3.40 Manage communication

Through the issue of this project management standard, there is an effort to draw the fragmented and diverse world of project management closer together (International Standards Organisation (ISO), 2012; International Standards Organisation (ISO), 2003).

4.3.3.5 ISO 10006 – Quality in project management

Originally published in 1997 and updated in 2003, ISO 10006 has not gained the same popularity as the 9000 series, or the world-leading project management standards, for example the *PMBOK® Guide* or PRINCE2®.

ISO 10006 provides guidance on quality management in projects, as it outlines quality management principles and practices. Through the implementation of these quality management practices and principles, quality of the end product can be achieved (International Standards Organisation (ISO), 2003).

As a supplement to the guidance given in *ISO 9004 guidance document managing for the sustained success of an organisation,* which is a quality management approach, one can recognise that there are two aspects to quality in project delivery: quality of the processes and quality of the product. The emphasis of ISO 10006 is thus that there should be congruence between the project's quality management framework and that of the permanent organisation, as well as a quality focus on the processes and the product (International Standards Organisation (ISO), 2003).

The guidance that is provided in ISO 10006 can be consolidated into the following eight quality management principles (International Standards Organisation (ISO), 2003):

- Customer focus
- Leadership

- Involvement of people
- Process approach
- System approach to management
- Continual improvement
- Factual approach to decision-making
- Mutually beneficial supplier relationships

So far, quality as a subject has appeared in most of the bodies of knowledge, thus it is not surprising that there would be a specific ISO standard on the quality management of projects. It is interesting that the specific ISO standard dealing with quality management in projects should address behavioural aspects such as leadership and the involvement of people, as quality management could have been dealt with in a clinical and cold technical manner (International Standards Organisation (ISO), 2003).

4.3.4 Competency standards in project management

In the section that follows, we will diverge from just the technical and clinical delimitation of knowledge, and focus on the application of such knowledge in completing a project. Such application of knowledge is known as competence. In the world of project management, there are at least three frameworks that define what would be effective and efficient behaviour during the management of a project.

4.3.4.1 Competence in project management

The basis for the competency of a project manager will be interpreted through the primary career (the primary career will be the occupation of an incumbent before entry was gained to project management). It is thus imperative to define which primary careers are suitable for transformation into project management careers. These feeder careers must therefore instil in the individual those competencies that a project manager will need to develop.

According to the definition of competence from the GAPPS Framework for project management (Global Alliance for Project Performance Standards, 2011):

> *Competent comes from the Latin root "*competere", *which means "to be suitable.*
>
> *In today's workplace, the term "competent" is generally used to describe someone who is sufficiently skilled to perform a specified task*

> *or to fill a defined position – a competent physician, a competent salesperson, a competent plumber. Increasingly, organisations are interested in assessing the competency of individuals in order to guide employment and development decisions.*

In addition to the above, a dictionary definition of competence reveals the following:

> *A cluster of related abilities, commitments, knowledge and skills that enable a person (or an organisation) to act effectively in a job or situation* (BusinessDictionary.com, 2013).

A further elaboration on the definition shows that competence encompasses:

- sufficiency of knowledge;
- skills; and
- attributes.

This enables someone to act in a wide variety of situations. Because each level of responsibility has its own requirements, competence can occur in any period of a person's life or at any stage of his or her career (BusinessDictionary.com, 2013).

Competency entails the following:

> *A competency is a measurable characteristic of a person that is related to success at work. It may be a behavioural skill, a technical skill, an attribute (such as intelligence) or an attitude (such as optimism). Competencies are observable and measurable characteristics of a person that include using knowledge and demonstrating skills, behaviours and abilities that contribute to improved performance* (Acumen International, 2009).

The use of competence, when grouped into a framework or model, is thus a list of behaviours that define a role, business, team or organisation. The importance and use of such a framework is to differentiate average performers from superior performers and assist any organisation in identifying and developing talent (Acumen International, 2009).

4.3.4.2 Understanding competence

IPMA (International Project Management Association (IPMA), 2013b) states that for organisations that can master it, project and programme management competence is

a strategic advantage. The feeling towards competence rather than knowledge is stated as follows:

> *Those who attempt projects or programmes with only knowledge, and not competence, are walking a dangerous high-wire without a net. This is just one reason why so many others are embracing IPMA's performance competence approach to our discipline* (International Project Management Association (IPMA), 2013a).

IPMA (International Project Management Association (IPMA), 2013b) reiterates what was found in the opening chapters, that there is an increasing link between the strategic initiatives of an organisation and its projects. For this reason, it is evident that there is a demand for improved results from project, programme and portfolio managers.

IPMA (International Project Management Association (IPMA), 2013b) points out that there are crucial differences between knowledge, skill and competence, and that these words cannot be used interchangeably. For this reason, the following examples are cited:

- You board a flight piloted by two Air Academy graduates who have never taken off or landed a plane.
- Your defence lawyer or solicitor has just passed the bar, knows all the case law, but has never practised before a jury.
- Your heart surgeon intern memorised the manual, passed the exam, but has never used a scalpel.
- Your most important strategic, complex project is managed by a good person who has passed an exam, but has never managed a project of any size end to end.

In terms of the discussion of GAPPS and IPMA, it is clear that competence entails much more than knowledge. It can be measured, and most of all it can be tied to certain attributes of a person.

The next section discusses the various competence frameworks found in the project management domain. The main frameworks are GAPPS, IPMA and the Australian Institute of Project Management (AIPM) Competence Framework.

4.3.4.3 Basic structure and content for measuring standards

Compounded from the GAPPS (Global Alliance for Project Performance Standards, 2007), IPMA (International Project Management Association (IPMA), 2006a) and AIPM frameworks (Australian Institute of Project Management (AIPM), 2008a), it can be seen that the structure of a measuring standard needs to contain the following elements:

- Units of competency

  A unit if competency describes a broad area of professional or occupational performance that is meaningful to practitioners and which is demonstrated in the workplace. Units may represent particular work roles, work functions, processes or outcomes (Australian Institute of Project Management (AIPM), 2008a).

- Elements of competency

  The elements of competency refer to the scope of work covered in each unit of competence. The elements are therefore the building blocks of each unit. A single unit will usually consist of three to five elements (Australian Institute of Project Management (AIPM), 2008a).

- Performance criteria

  Performance criteria relates to a set standard of performance that is required for each element. Performance criteria specify the type and/or level of performance that would constitute adequate demonstration of competence. They describe what a competent practitioner would do, expressed in terms of observable results and/or actions in the workplace from which competent performance would be inferred (Australian Institute of Project Management (AIPM), 2008a).

- Range statements

  Range statements add definition to the performance criteria by elaborating on critical or significant aspects of the criteria and enabling applications in different contexts. Where the range statements contain lists, the lists are generally illustrative and not exhaustive (Australian Institute of Project Management (AIPM), 2008a).

For the organisation to be able to use a competence standard, it is necessary to define and identify the abovementioned items in terms of the roles and functions of the personnel on the project team. The secondary aim is to influence the choice of

project team members based on their competency in a specific area and the need for development pertaining to exposure to higher levels of complexity in both the projects and the management processes.

4.3.4.4 GAPPS performance-based competency standards

Through its alliances and the consortium, GAPPS brings together governments, private industry, professional associations and training/academic institutes that aim to work together to develop globally applicable project management competency-based standards, frameworks and mappings. The GAPPS standards and frameworks are intended to facilitate mutual recognition and transferability of project management qualifications.

The approach taken by GAPPS (Global Alliance for Project Performance Standards, 2013) is an outcomes-based competence approach and is given in Table 4-14 below.

Unit no	Unit title	Unit description
PM 01	Manage stakeholder relationships	This unit defines the elements required to manage stakeholder relationships during a project. It includes the performance criteria required to demonstrate competence in ensuring the timely and appropriate involvement of key individuals, organisations and groups throughout the project.
PM 02	Manage development of the plan for the project	This unit defines the elements required to develop the plan for the project. It includes the performance criteria required to demonstrate competence in determining how to realise the project in an efficient and effective manner.
PM 03	Manage project progress	This unit defines the elements required to manage project progress. It includes the performance criteria required to demonstrate competence in ensuring that the project is moving constructively towards the delivery of the product or the project and in support of the agreed project outcomes.
PM 04	Manage product acceptance	This unit defines the elements required to ensure that the product, service or result of the project will be accepted by the relevant stakeholders. It includes the performance criteria required to demonstrate competence in ensuring that the product or the project is defined, agreed upon, communicated and accepted.
PM 05	Manage project transitions	This unit defines the elements required to manage project transitions. It includes the performance criteria required to demonstrate competence in getting the project underway, in moving from one project phase to the next, and in closing the project down at its conclusion.
PM 06	Evaluate and improve project performance	This unit defines the elements required to evaluate and improve project performance. It includes the performance criteria required to demonstrate competence in ensuring that opportunities for improvement are applied in this project and made available for future projects.

Table 4-14: GAPPS competence elements

The researcher concludes, from the above discussion, that the project manager and the ICT project manager, in particular, would require competence and skills in the following areas:

- The ability to manage stakeholder relationships
- The ability to manage and develop plans of action
- The ability to manage project progress
- The ability to manage product acceptance
- The ability to manage project transitions
- The ability to manage, evaluate and improve project performance
- Entrepreneurial skills
- Propensity for planning and control
- Analytical thinking
- Creative problem-solving
- Being a starter/instigator
- Having a propensity towards being a completer/finisher
- Having an inclination to work with figures/mathematical inclination/accounting knowledge
- Being a good manager of time
- Having an inclination towards quality
- Having a good understanding of what constitutes risk
- Having an inclination towards working with people
- Having a good understanding of legal aspects and commercial and contractual law
- Having good interpersonal skills

Performance-based competency standards, also called occupational competency standards, are widely used throughout the world and have been developed in the context of government-endorsed standards and qualifications frameworks in Australia (Department of Education, Science and Training), New Zealand (New Zealand Qualifications Authority), South Africa (South African Qualifications Authority) and the United Kingdom (Qualifications and Curriculum Authority). Although these approaches are focused primarily on performance-based competency assessment, some approaches include aspects of attribute-based competency assessment (Global Alliance for Project Performance Standards, 2013).

Performance-based competency standards typically address at least the following questions:

- What is usually done in this occupation, profession or role by competent performers?
- What standard of performance is usually considered acceptable to infer competence?

In the GAPPS (2007) standards, these questions are answered by defining the following:

- Units of competency
- Elements of competency
- Performance criteria
- Range statements

A discussion of competence frameworks follows. It encompasses the scope of the competence frameworks of GAPPS, IPMA, AIPM and APM.

4.3.4.4.1 GAPPS – project managers' competency standard

As was seen in section 4.3.4 and in the introduction to this discussion, performance-based competence frameworks define competence in terms of the following:

Units of competency

- A unit of competency defines a broad area of professional or occupational performance that is meaningful to practitioners and which is demonstrated by individuals in the workplace (Global Alliance for Project Performance Standards, 2013). The GAPPS Level 1 framework includes five units of competency, while GAPPS Level 2 includes six.

Elements of competency

- Elements of competency describe the key components of work performance within a unit. They describe what is done by individuals in the workplace, but do not prescribe how the work is done. For example, project managers must "define risks and risk responses for the project", but they can do it themselves or delegate the work to others. In addition, there are many different tools and techniques that they could use. Each unit within the GAPPS framework has three to six elements (Global Alliance for Project Performance Standards, 2013).

Performance criteria

- Performance criteria set out the type and/or level of performance required to demonstrate competence. They describe observable results and/or actions in the workplace from which competent performance can be inferred. In the GAPPS framework, performance criteria can be satisfied in many different ways; there are no mandatory approaches, tools or methodologies (Global Alliance for Project Performance Standards, 2013).

Range statements

- Range statements help to ensure consistent interpretation of the elements and the performance criteria by expanding on critical or significant aspects to enable consistent application in different contexts. Where the range statements contain lists, the lists are generally illustrative and not exhaustive (Global Alliance for Project Performance Standards, 2013).

The GAPPS framework attempts to define threshold performance, i.e. the definition of the minimum requirements that would be acceptable in the workplace. The framework does not give an indication of superior performance.

The result of defining a minimum level of performance is that a candidate must satisfy all the performance criteria in the applicable units to be viewed as competent. What should be considered when using the standard is that the performance criteria does not represent an appropriation of the time that needs to be spent on the various elements. Rather, it represents different levels of detail.

The GAPPS (n.d.) framework also recognises that, although project managers are expected to deliver homogeneous results, some projects are harder to manage than others. Thus, they recognise that the context of the project can infer complexity, and that the complexity of a project would infer higher levels of competence required.

Six units are covered by the GAPPS Project Manager Standard (Global Alliance for Project Performance Standards, 2013):

- PM01 Manage Stakeholder Relationships
- PM02 Manage Development of the Plan for the Project
- PM03 Manage Project Progress
- PM04 Manage Product Acceptance
- PM05 Manage Project Transitions
- PM06 Evaluate and Improve Project Performance

These six units are further delimitated into 48 elements as presented in Table 4-15:

Table 4-15: GAPPS elements of project management competence

GAPPS elements of competence	
1. Manage stakeholder relationships	1.1 Ensure that stakeholder interests are identified and addressed
	1.2 Promote effective individual and team performance
	1.3 Manage stakeholder communications
	1.4 Facilitate external stakeholder participation
2. Manage development of the plan for the project	2.1 Define the work of the project
	2.2 Ensure the plan for the project reflects the relevant legal requirements
	2.3 Document risks and risk responses for the project
	2.4 Confirm project success criteria
	2.5 Develop and integrate project baselines
3. Manage project progress	3.1 Monitor, evaluate and control project performance
	3.2 Monitor risks to the project
	3.3 Reflect on practice
4. Manage product acceptance	4.1 Ensure that the product of the project is defined
	4.2 Ensure that changes to the product of the project are monitored and controlled
	4.3 Secure acceptance of the product of the project
5. Manage project transitions	5.1 Manage project start-up
	5.2 Manage transition between project phases
	5.3 Manage project closure
6. Evaluate and improve project performance	6.1 Develop a plan for project evaluation
	6.2 Evaluate the project in accordance with plan
	6.3 Capture and apply learning

The use of a framework, such as GAPPS, is helpful in many ways. It can be used to derive standards for performance measurement for project managers in a particular organisation, assess competence of the project management workforce and evaluate the content of training curricula.

The main difference from just being a body of knowledge, as discussed in the earlier part of the chapter, is that it gives a frame of reference against which performance and outcomes can be evaluated. With the focus on the outcomes of roles and positions, the elements of competence are measured and evaluated.

4.3.4.4.2 GAPPS programme management standard

With more organisations adopting a project management approach, so has the programme management function come to the fore. For this reason, GAPPS has also developed a programme management competence framework. According to this framework, a programme manager has to exhibit competency in the following eight elements (Global Alliance for Project Performance Standards, 2011):

- Provide leadership for the programme
- Facilitate stakeholder engagement
- Craft the programme
- Orchestrate the attainment of benefits
- Sustain programme progress
- Manage organisational change
- Direct the management of contracts
- Engage in collaborative alliances

As with its project management competence framework, this framework is a performance-based competency framework. It also entails the presence of the following:

- Units of competence
- Elements of competence
- Performance criteria
- Explanatory statements

An overview of the units, elements and performance criteria is presented in Table 4-16 (Global Alliance for Project Performance Standards, 2011).

Table 4-16: GAPPS programme management competence framework

PgM0x	Unit title	Unit descriptor		List of elements
PgM01	Provide leadership for the programme	This unit defines the elements required to provide leadership for the programme. It includes the performance criteria required to demonstrate competence in motivating and inspiring individuals and organisations to work constructively towards the attainment of programme benefits.	1.1	Promote the programme vision.
			1.2	Build an environment of confidence and trust within the programme.
			1.3	Embed socially responsible practice into the programme.
			1.4	Develop the potential of constituent project managers and programme-level staff.
			1.5	Support a learning environment.
PgM02	Facilitate stakeholder engagement	This unit defines the elements required to facilitate stakeholder engagement in the programme. It includes the performance criteria required to demonstrate competence in working with stakeholders to achieve the desired programme benefits.	2.1	Communicate effectively with stakeholders.
			2.2	Cultivate stakeholder commitment.
PgM03	Craft the programme	This unit defines the elements required to craft the programme. It includes the performance criteria required to demonstrate competence in establishing both what the programme will accomplish and how it will do so.	3.1	Envision the desired future state.
			3.2	Shape and sustain the programme execution approach.
			3.3	Shape and sustain the programme's business case.
			3.4	Shape and sustain programme governance.
PgM04	Orchestrate the attainment of benefits	This unit defines the elements required to orchestrate the attainment of benefits. It includes the performance criteria required to demonstrate competence in ensuring that benefits are realised when and as expected.	4.1	Identify benefits and trade-offs.
			4.2	Shape and sustain the benefits- delivery approach.
			4.3	Evaluate the attainment of expected benefits.
PgM05	Sustain programme progress	This unit defines the elements required to sustain programme progress. It includes the performance criteria required to demonstrate competence in ensuring that the programme is moving toward the accomplishment of its vision and the attainment of its expected benefits.	5.1	Secure programme funding.
			5.2	Resource the programme.
			5.3	Measure, evaluate and coordinate programme progress.
			5.4	Ensure that the relevant legal and regulatory requirements are addressed.
			5.5	Anticipate and respond to changes.
			5.6	Manage programme risks.

PgM0x	Unit title	Unit descriptor		List of elements
PgM06	Manage organisational change	This unit defines the elements required to manage organisational change. It includes the performance criteria required to demonstrate competence in supporting effective structural and behavioural changes required as part of the programme.	6.1	Shape and sustain the organisational change management approach.
			6.2	Advocate for change with stakeholders.
			6.3	Evaluate the effectiveness of the organisational change.
PgM07	Direct the management of contracts	This unit defines the elements required to direct the management of contracts. It includes the performance criteria required to demonstrate competence in obtaining value from products and services acquired from external sources.	7.1	Shape and sustain the contract management approach.
			7.2	Oversee and verify contract performance.
PgM08	Engage in collaborative alliances	This unit defines the elements required to engage in collaborative alliances. It includes the performance criteria required to demonstrate competence in forging alliances with other organisations to facilitate the achievement of programme benefits.	8.1	Cultivate collaborative alliances.
			8.2	Devise and elaborate collaborative agreements.
			8.3	Support the evolution of collaborative agreements.

In competence frameworks, there is a departure from a pure knowledge- and exam-based assessment to the production of specific outcomes with defined measurables. The GAPPS frameworks for project and programme managers were briefly introduced in the paragraphs above. The next section will focus on another international competence framework: the IPMA.

4.3.4.5 IPMA - ICB3 4LC

The IPMA (International Project Management Association (IPMA), 2013a) states that today, more than ever, pressure is exerted on project teams to deliver the required results in accordance with what was planned initially. Not only is project performance scrutinised, but so is the performance of programmes and portfolios.

The IPMA (International Project Management Association (IPMA), 2013a) is adamant in its statement that, while many factors contribute to initiative and organisation success, few have as great an impact as the competence of the leaders.

> *It is no surprise that many others are suddenly also trying to demonstrate the competence difference* (International Project Management Association (IPMA), 2013b).

4.3.4.5.1 What is competence according to the IPMA?

From the discussion of the GAPPS competence frameworks above, it is clear that the GAPPS perspective is focused on occupational or performance-based competencies. In contrast to this, the IPMA (International Project Management Association (IPMA), 2006a, p. 3) subscribes to the definition of ISO/IEC 17024:2012:

> *Competence indicates sufficiency of knowledge and skills that enable someone to act in a wide variety of situations.*

From the IPMA definition, as opposed to the GAPPS definition, it is clear that the difference lies in the fact that the IPMA incorporates personality traits and behaviour as an element of competence. Thus, GAPPS focuses on occupational competence, while the IPMA focuses on trait-based competencies that would encompass occupational outcomes as well. When the two competence frameworks are put side by side, the difference is clearer (International Project Management Association (IPMA), 2013b).

The IPMA's certification has strong roots in the international accreditation and certification system based in ISO/IEC 17024. The IPMA Competence Baseline (ICB®) Version 3.0 refines the terms used for certification in project and programme management as follows (International Project Management Association (IPMA), 2006a, p. 3):

- Competence is the demonstrated ability to apply knowledge and/or skills, and where relevant, demonstrated personal attributes.
- The certification scheme contains the specific requirements related to particular categories of people to which the same standards and rules, and the same procedures apply.
- The certification process encompasses all activities by which a certification body establishes that a person fulfils specified competence requirements.
- The assessment is the mechanism that determines a candidate's competence by one or more means, such as written, verbal, practical and observational.
- A qualification demonstrates the personal attributes, education, training and/or

work experience of the individual.

4.3.4.5.2 IPMA four-level certification (4LC)

According to the IPMA framework (International Project Management Association (IPMA), 2006a), competence and competency elements can be grouped as follows:

- **Technical competencies**

  Technical competencies construe the following:

  - The ability to view the project, programme or portfolio as a whole in order to meet interested parties' requirements.
  - The ability to integrate work in a temporary project, programme or portfolio.
  - The ability to produce single project deliverables within the project organisation.
  - The ability to manage the project through all phases of the project, all stages of a programme and all periods of the portfolio considered.

- **Behavioural competencies**

  Behavioural competencies construe the following:

  - Elements that are inherent to the personality of the project manager.
  - Elements that are supplemented by those behavioural elements of the direct reports of the project manager.
  - Behavioural aspects of and elements of competency most commonly used in relation to the whole project and parties involved.
  - Elements that are rooted in the economy, society, culture and history.

- **Contextual competencies**

  Contextual competencies construe the following:

  - The role of the project manager in the permanent organisation.
  - Inter-relationships between project management and the organisation's business administration.

Graphically, these IPMA competence elements (International Project Management Association (IPMA), 2006a) can be depicted as in Figure 4-8 below.

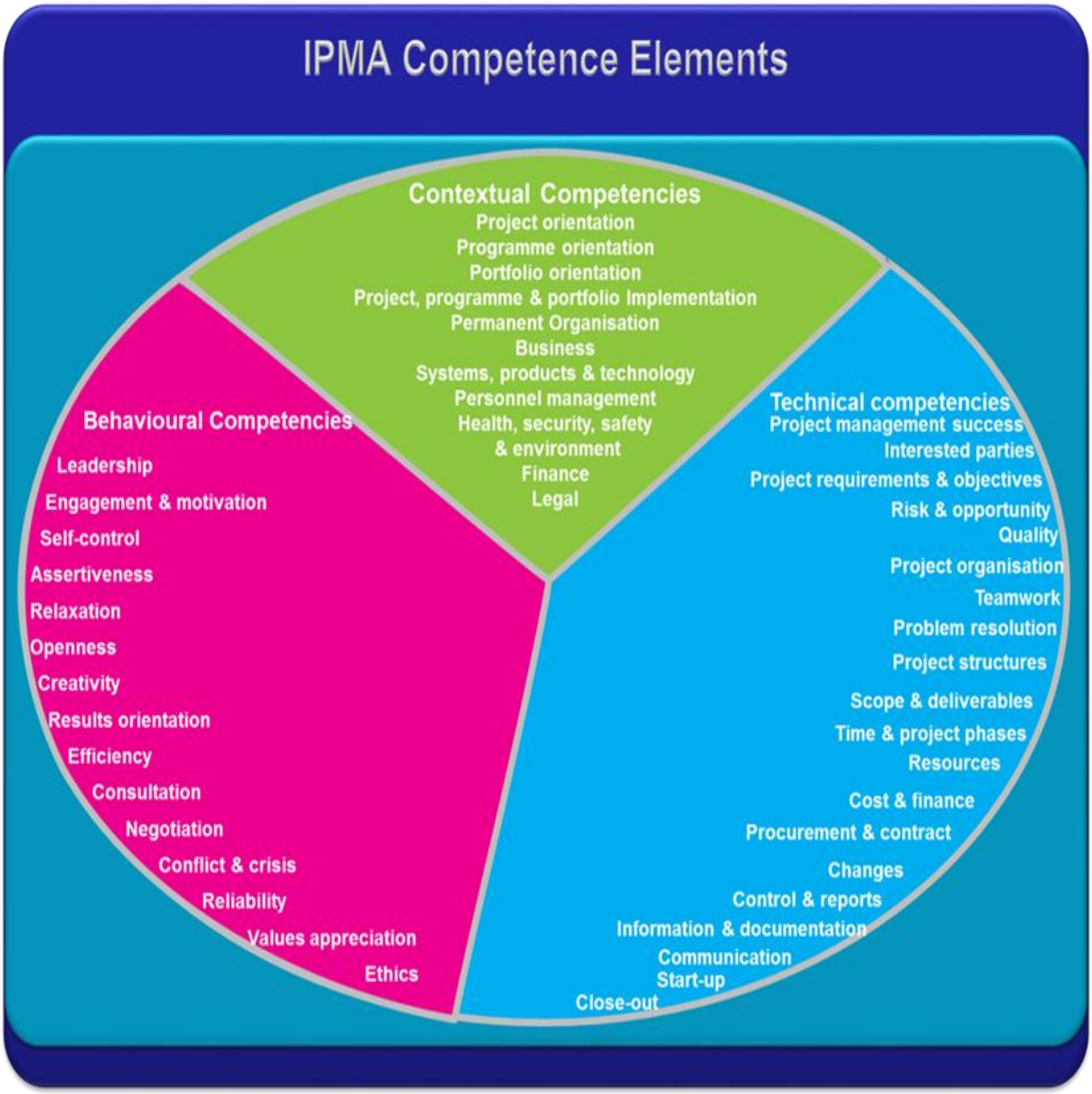


Figure 4-8: IPMA Competence Baseline® Version 3.0

The IPMA four-level certification (International Project Management Association (IPMA), 2006a) programme is designed as an ongoing competence development process. Every step up the four-level competence stair incorporates adequate development in self-knowledge and verified competence. While each IPMA member association may have different names, and some may have additional roles at some levels, they all use the basic role-based certification approach, as shown in Figure 4-9 below.

Figure 4-9: The roles in the 4LC system, with their distinctive capabilities

An elaboration of the roles depicted in Figure 4-9 reveals that there is a progression in the level of complexity that an individual can handle as and how progression is achieved through the levels. As such, each role then has distinctive capabilities, which include the following:

- IPMA Level A: Certified Projects Director, manages complex project portfolios and programmes.
- IPMA Level B: Certified Senior Project Manager, manages complex projects. Minimum of five years' experience.
- IPMA Level C: Certified Project Manager, manages projects of moderate complexity. Minimum of three years' experience.
- IPMA Level D: Certified Project Management Associate, applies project management knowledge when working on projects (International Project Management Association (IPMA), 2006a).

Through this growth path approach, the IPMA and the 4LC (International Project Management Association (IPMA), 2006a) demonstrate a level of rigour that helps to assure knowledge, experience, competence and performance for each role. The certification process ensures that, for the achievement of a Level B or a Level A role, more than mere experience on a non-complex project is gained. For this reason, the IPMA has comprehensive guidelines on complexity (International Project Management Association (IPMA), 2006b). In accordance with the requirements for certification levels A and B, an end-to-end responsibility and authority in projects of a certain minimum size and organisational impact is required. The IPMA states categorically that:

> *Of all the persons leading projects around the world today, many do not have the authority, or manage projects of sufficient complexity, to qualify for our advanced certifications* (International Project Management Association (IPMA), 2006a).

4.3.4.5.3 Certify consultants

The IPMA recognises the important role that is played by project, programme and portfolio management consultants (project management consultants). However, they are not accountable for the project, programme and portfolio products and outcomes. Instead, they advise project managers and organisations. For this reason, they offer certification and professional stature and tenure growth to these professions as well.

To fulfil the certification needs of project management consultants, the IPMA has extended the 4LC system to a two-level certification for project management consultants (International Project Management Association (IPMA), 2013a).

4.3.4.5.4 A global certification

The IPMA's global certification is based on the way it views and defines competence (refer to 4.3.4.5.1). It is from the roots of this anchored definition that the IPMA certifies the following to be competent in executing project management and related work:

- Individuals in project management
- Individuals in project management consulting

Organisations Certification is done in accordance with the 4LC system, and is carried out by individual member organisations worldwide. The certification process involves several steps and culminates in four certifications in accordance with the defined competence levels. These levels entail Level A, Level B, Level C and Level D (International Project Management Association (IPMA), 2006a). These certification levels can be depicted as shown in Table 4-17 .

Table 4-17: IPMA four-level certification system and process

Long title	Short title	Assessment	Certification process					
			Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	
Certified Project Director	IPMA Level A©			References (+ options)	Project directors report (+ options)			5 years
Certified Senior Project Manager	IPMA Level B©	Knowledge and experience	Application, curriculum vitae, self-assessment, project list, report, proposal	References (+ options)	Project report (+ options)	Interview (+ options)	Final evaluation, feedback (+ options)	5 years
Certified Project Manager	IPMA Level C©			References, exam (+ options)	Project report (+ options)			5 years
Certified Project Associate	IPMA Level D©	Knowledge	Application, curriculum vitae, self-assessment (= options)	Exam (+ options)	(+ options)	N/A		5 years

The way in which the IPMA is organised in an associative way gives its member organisations the freedom to adopt their frameworks, and, as such, the language barrier is removed from the certification process. For this reason, the IPMA's certifications have grown worldwide in the past ten years to more than 150 000 project managers in over 50 countries across the globe.

From Table 4-17 it is clear that competence entails knowledge, but that it does not end there. Consequently, passing a written examination does not equate to a person being competent in all the components described in the IPMA's competence framework. The various levels of ability and knowledge required to be deemed competent in accordance with the IPMA's framework is depicted in Figure 4-10.

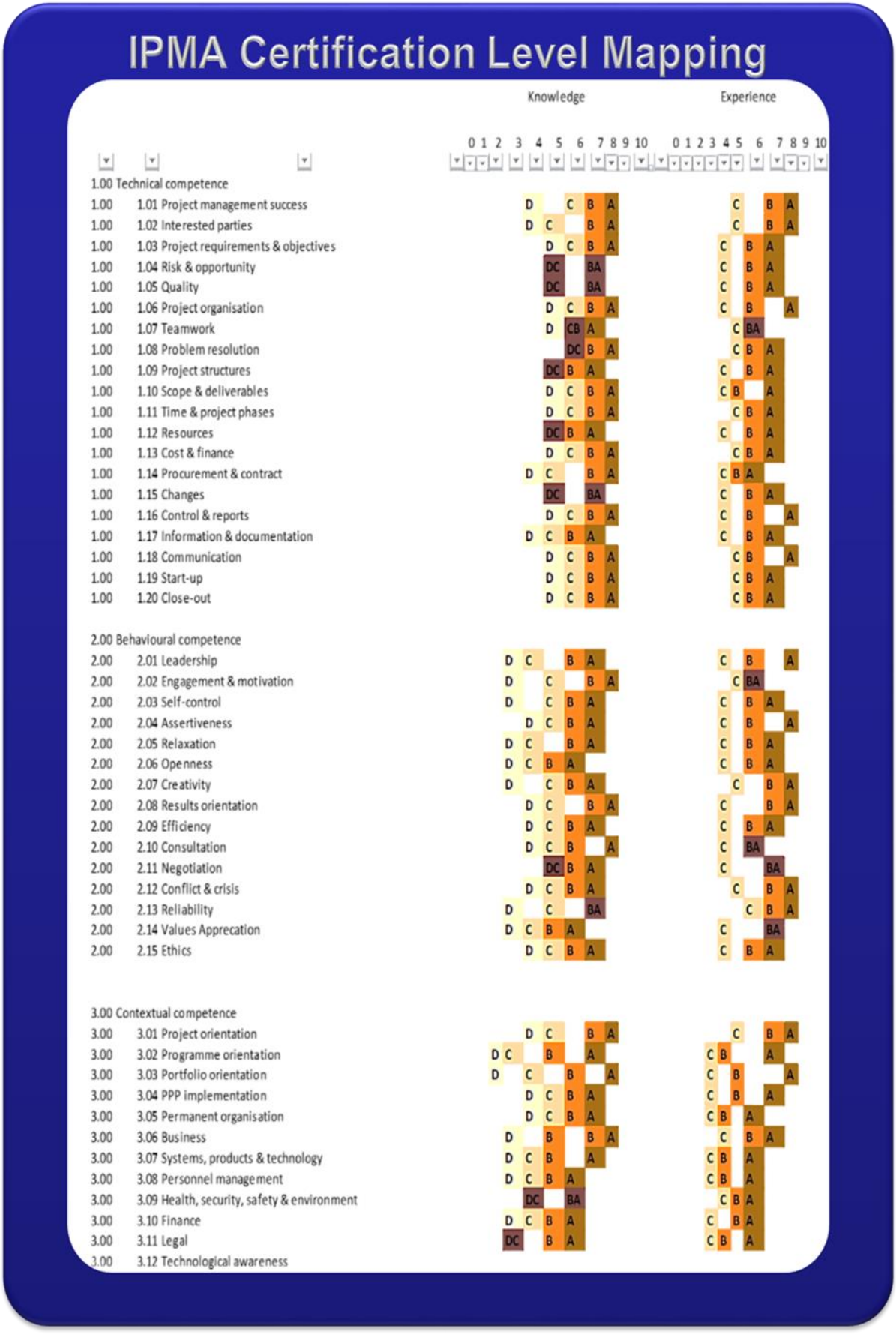


Figure 4-10: IPMA certification level mappings (International Project Management Association (IPMA), 2006a)

4.3.4.6 AIPM competency standards

The AIPM is the primary body for project management in Australia. It states as one of its aims: “to promote and progress the profession of project management in Australia” (Australian Institute of Project Management (AIPM), 2011).

In June 2008, the AIPM issued a set of documents stipulating the units and elements for competence that would be required for the professional development of project managers in that country. These documents are the *AIPM professional competency standards for project management Part A – D* (Australian Institute of Project Management (AIPM), 2011).

The set of four documents entails an introductory document on the measurement and determination of competence for project managers. The following three documents stipulate what competence would comprise at three levels for those who work in a project management context (Australian Institute of Project Management (AIPM), 2011).

The standards are described in terms of the units of project management. Within each unit, the standards detail the elements of competency and associated performance criteria, range indicators, knowledge and skills, and evidence guides.

The standards of the AIPM (Australian Institute of Project Management (AIPM), 2011) have been developed as generic standards with the objective of applicability across a wide range of industries and enterprises. The AIPM states that its standards are applicable across industries/enterprises as they stand or that they may be used as a basis from which each industry or enterprise may contextualise the project management standards.

The standards basically describe the following competence levels and requirements across three levels of participation in a project team:

- Guidelines on how to use the standards (Part A) (Australian Institute of Project Management (AIPM), 2008a)
- Project Team Participant/Practitioner (Part B) (Australian Institute of Project Management (AIPM), 2008b)
- Project Manager (Part C) (Australian Institute of Project Management (AIPM), 2008c)

- Project Director (Part D) (Australian Institute of Project Management (AIPM), 2008d)

Part B (Australian Institute of Project Management (AIPM), 2008b), which deals with early entry and participation levels on project teams, stipulates the minimum requirements that should be adhered to for people working in the context of a project team. This also encompasses those positions in a project organisation that would allow early entry to the occupation of project management. The document states that (Australian Institute of Project Management (AIPM), 2008b, p. 1):

> *Work done at project practitioner level allows early entry into a programme entitled Registered Project Manager (RegPM). This programme enables members to participate in the Continuous Professional Development programme and take up opportunities to develop their knowledge and skills.*
>
> *Work done at this level is under the direction of a project manager, project director or executive project director.*
>
> *An individual working at this level can identify and apply project management skills and knowledge to a wide variety of contexts with depth in some areas.*
>
> *At this level, project practitioners may be members of a project team, but with no direct responsibility for the overall project outcomes. Under direction, they utilise project management tools and methodologies.*
>
> *As a project practitioner, the individual will take responsibility for his or her own outputs in relation to specified quality standards. As a project practitioner, the individual will take limited responsibility for the quantity and quality of the output of junior team members, trainees or cadets.*

The document stipulates that there are nine areas in which an individual would require knowledge, but for the entry levels, there are eight areas. Furthermore, an individual should have competence or experience in four of these areas, of which three are compulsory and one would be an elective for the individual. If presented in a matrix format, the base or entry level of competence for a project team member or those in the early stages of entry into the project management career path is presented in Table 4-18 below.

Table 4-18: AIPM Part B competence matrix: project practitioner

Unit	Description	Compulsory		Knowledge	Experience
		Yes	No		
Unit 1	Apply scope management techniques	X		X	x
Unit 2	Apply time management techniques	X		X	X
Unit 3	Apply cost management techniques		X	X	Once-off
Unit 4	Apply quality management techniques	X		X	X
Unit 5	Apply human resources management techniques		X	X	Once-off
Unit 6	Apply communications management techniques		X	X	Once-off
Unit 7	Apply risk management techniques		X	X	Once-off
Unit 8	Apply contract and procurement techniques		X	X	Once-off
Unit 9	Integration		X		

Part C (Australian Institute of Project Management (AIPM), 2008c), the standard for project managers, describes a deepening level of knowledge and experience. This is evident in the change of the verb in the element and range statements. The focus changes from “participate” to “manage”. One can thus deduce that there is a deepening level of experience, competence and the level of complexity that the individual can handle. The standards document states the following regarding work done at the project manager level (Australian Institute of Project Management (AIPM), 2008c, p. 1):

> *At project manager level, an individual will manage project teams, have responsibility for overall project outcomes, and utilise a range of project management tools and methodologies on a daily basis with a high degree of competence. The project manager level employs the self-directed application of project management knowledge and skills, with substantial depth in project management tools and methodologies where judgement is required in planning and selecting the appropriate equipment, services and techniques for the use of the individual and others.*
>
> *At the project manager level, individuals participate in the development of strategic initiatives, as well as having personal responsibility and autonomy in performing complex technical project management operations. They may participate in project manager teams concerned with planning and evaluation functions for their projects, which may fall under wider programmes or portfolios.*
>
> *Work done at the project manager level is under the direction of a project director, executive project director or senior manager*.

This can be presented as inTable 4-19 below.

Table 4-19: AIPM Part C competence matrix: project manager competencies

Unit	Description	Compulsory		Knowledge	Experience
		Yes	No		
Unit 1	Plan and manage scope	X		X	X
Unit 2	Plan and manage time	X		X	X
Unit 3	Plan and manage costs	X		X	X
Unit 4	Plan and manage quality	X		X	X
Unit 5	Plan and manage human resources	X		X	X
Unit 6	Plan and manage communications	X		X	X
Unit 7	Plan and manage risk	X		X	X
Unit 8	Plan and manage procurement	X		X	X
Unit 9	Plan and manage project integrative processes	X		X	X

In Part D (Australian Institute of Project Management (AIPM), 2008d), the standard for project directors, one can see the further deepening of knowledge and skills as the actions required progress from managing to directing. This deepening in the focus of the work indicates a transformation of the work from a management control perspective to one that is more focused on governance controls.

The standard states the following regarding work done at project director level (Australian Institute of Project Management (AIPM), 2008d, p. 1):

> *Work done by project directors is generally, but not always, performed under the direction of an executive project director or a senior executive. It may also rely on support from a Project Management Office (PMO)*
>
> *At project director level, the individual's primary role is project or programme management. He or she needs to be recognised by colleagues, supervisors and/or clients as having fulfilled this role. In their daily work, project directors rely on, extend and understand high-level project management tools and methodologies. They ensure that the appropriate project management methodology is being applied and provide control over the management of scope, identification and escalation of issues, risks, budgets, etc. Professionals operating at this level are involved in analysis, diagnosis, design, planning, execution and evaluation across a broad range of technical project management areas and/or management functions, including the development of new criteria, applications, knowledge or procedures relating to project management.*

This further deepening of the focus of the work is presented in Table 4-20.

Table 4-20: AIPM Part D: competence matrix: project director competencies

Unit	Description	Compulsory		Knowledge	Experience
		Yes	No		
Unit 1	Direct and control scope	X		X	x
Unit 2	Manage overall project schedule	X		X	X
Unit 3	Direct and manage costs	X		X	X
Unit 4	Direct and manage quality	X		X	X
Unit 5	Direct and lead human resources	X		X	X
Unit 6	Direct and manage communications	X		X	X
Unit 7	Direct and manage risk	X		X	X
Unit 8	Direct and manage procurement	X		X	X
Unit 9	Direct and manage programme/project integration	X		X	X

In conclusion, one can make the following deduction from the AIPM competence framework: There is a progression on a continuum from technical participative knowledge towards governance control of giving guidance and direction along the development of the ability to handle complexity in terms of the project context. This can be depicted as in Figure 4-11 below.

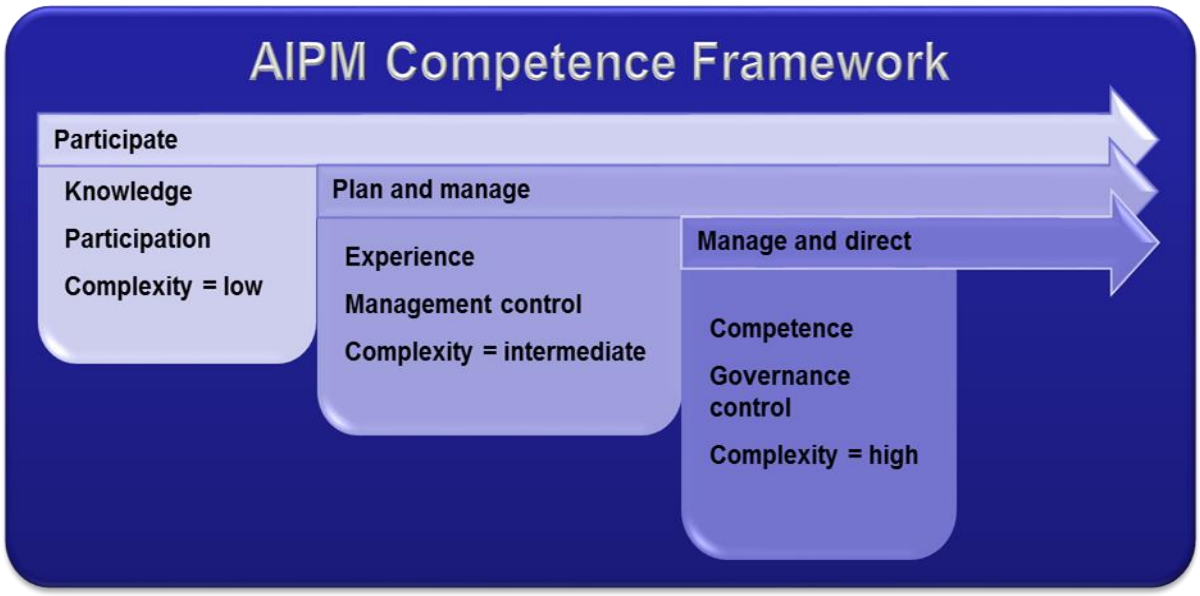


Figure 4-11: Summary of development in the AIPM competence framework

In the section that follows, attention will be given to the competence framework developed by the British Association for Project Management (APM).

4.3.4.7 APM competence framework

The APM issued its competence framework in 2008 (Association for Project Management (APM), 2008). The APM competence framework forms an integral part of the APM's five dimensions of professionalism (refer to 4.3.3.2), providing a guide to individual competences in project management. It is an essential part of the toolkit for all project professionals. This competence framework is a valuable tool for assessing current knowledge and experience, helping to identify training, development and qualification needs. The competence framework, closely related to the IPMA framework, spans three competence domains, totalling 47 competence elements, as explained below:

Domain grouping of elements:

- Technical (30)
- Behavioural (9)
- Contextual (8)

The above elements have five underpinning key concepts, referring to the environment within which a project is undertaken:

- Project management
- Programme management
- Portfolio management
- Project context
- Project office

It is similar to the IPMA's competence certification framework as it has four levels of competence that can be certified.

The APM states that the addition of a competence framework has brought about benefits for the organisation, as well as for the individual. These benefits can be summarised in Table 4-21 and Table 4-22 given below.

Table 4-21: APM organisational benefits

Organisational benefit
The APM competence framework provides a tool to assess individual knowledge and experience against a recognised project management benchmark.
Match the right people for the right job: • Mitigate risk • Maximise efficiency at time of skills shortage
Identify training and development needs
Underpin management and development of the entire project and programme management community.

Table 4-22: APM individual benefits

Individual benefits
The APM competence framework provides a tool to: • assess the individual's knowledge and experience against a recognised project management benchmark; • help identify training and development needs, including the individual's readiness to obtain internationally recognised professional qualifications; and

- identify the specific areas of knowledge and experience that are needed as part of continuing professional development.

In conclusion, the APM perspective on project management can be summarised as follows:

- A body of knowledge with 52 areas categorised into seven areas of application – the breadth dimension of individuals' professional development
- A competence certification framework with 47 competence elements – the depth dimension of individuals' professional development
- Academic training and learning tied to their national qualifications framework – the achievement dimension of individuals' professional development
- A system of registration of professionals in the project management domain with their professional body – the accountability dimension of individuals' professional development
- A system with continuous professional development points – the commitment dimension for individuals' professional development (Hancock, 2009)

In the next section, the focus will be narrowed to what is available in the local context, and a high-level overview will be undertaken of the APMSA's NCB3 4LC.

4.3.4.8 APMSA's NCB3 4LC

The APMSA's NCB3 4LC (Association for Project Management South Africa (APMSA), 2006) has been in existence since 2006, and is administered by APMSA-Sert, an independent organisation in the APMSA Group. APMSA-Sert is responsible for certifications and the issuing of competence certificates (Association for Project Management South Africa (APMSA), 2006).

Based on the international ICB3 (refer to the discussion on the IPMA), which provides the official IPMA definition of the competences expected from project management personnel, the NCB utilises the same four-level certification system. Hence, the APMSA NCB3 also provides definitions of the elements that define project management competence. APMSA is of the opinion that, in the South African context, a project manager must have at least a "medium knowledge" about the technical content of the project and not only a generalised "generic" project management competence. Following from this, the NCB3 added an additional element to the technical competence area.

Nationalisation and localisation of the ICB3 to an NCB3 standard was necessary due to the following:

- differences in languages;
- differences in lexicology of words and understandings; and
- differences in cultures.

However, this localisation was done with the view of adjusting the ICB® to the local understanding and definitions of project management. Localisation also provides facilities for accommodating local cultures in order to develop a unified project management paradigm.

APMSA has developed a clear understanding of the integration of many concepts that are used to describe various aspects of project management (Association for Project Management South Africa (APMSA), 2006).

Flowing from this, the ICB3 evolved into the NCB3, with the following additions (Association for Project Management South Africa (APMSA), 2006):

- Clarification of concepts
- Additional aspects peculiar to the South African circumstances on health and racial matters
- Additional Range 3 Technical Element (project logistics)
- Definition of element standards to give particular focus embedded in each element
- Methodology for assessment consistent with the taxonomy
- Project management process control competences (PC 4LC), and associated certification
- Project management and project controls training curricula suitable for each competence element

What was most noteworthy of the review of the APMSA NCB3 were two components that take the understanding of competence to a further level, and that were not found in the other competence frameworks:

- The APMSA organisational cone
- The Vocational Competence Model

The APMSA organisational cone (Figure 4-12 below) depicts the integration of six concepts that are explained in Table 4-23 below (Association for Project Management South Africa (APMSA), 2006).

Table 4-23: The APMSA organisational cone elements

Bodies of knowledge, irrespective of discipline, represented by the volume of the cone underneath the maroon skin layer
Competence baseline standard, embedded in the bodies of knowledge, represented by the centre pole supporting the cone structure, and feeding structure into the bodies of knowledge
The graded cone segments, representing the levels of competence of the permanent organisation, the Project Office and all the functional processes like technical, procurement and implementation, each as a separate segment and each with a graded competence presentation
The cone skin, representing the project support services with an inherent characteristic of integration into each and every segment, and directly in touch with the bodies of knowledge
Segment thickness, representing organisational and personnel competence determined by the taxonomy of the centre pole
Competence alignment of segments, which means comparable and harmonised interdepartmental and interprocess competences

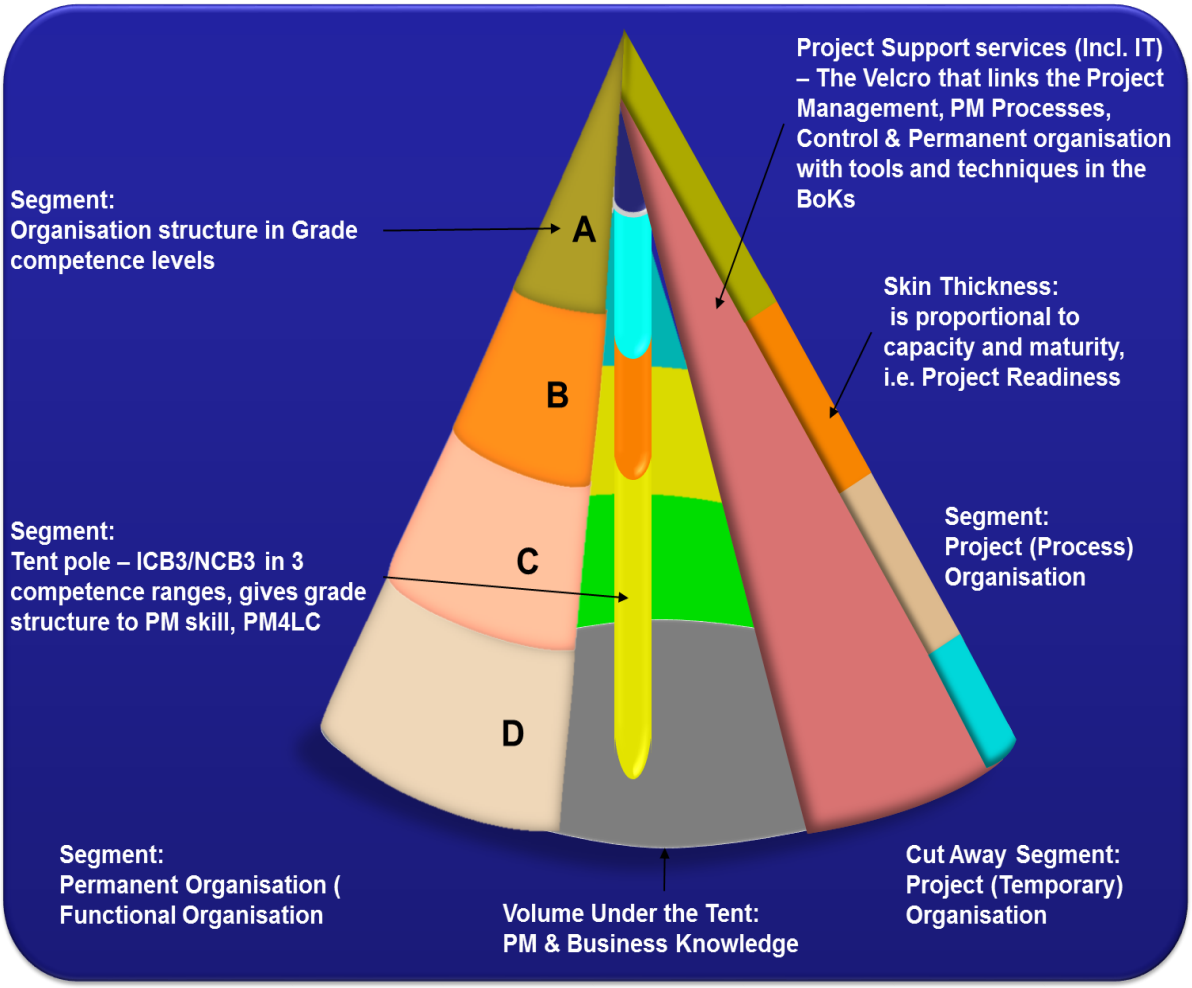


Figure 4-12: The APMSA organisational cone

With the integration of the different elements into a coherent model, it is now possible to represent, discuss and present the model as a means to understand and position all of the management, project management, knowledge and organisational structural issues.

A further aspect that differentiates the APMSA competence baseline from the others entails the discussion of vocational competence, with an accompanying model where competence per specified area can be calculated.

According to the APMSA NCB3, competence is best described by the universal vocational 3-D competence model with three complex dimensions and metrics. According to this model, there are three important aspects that need definition to understand competence (Association for Project Management South Africa (APMSA), 2006):

- Education

- Experience
- Attitude

Competence is the synthesis of these complex dimensions.

The APMSA states the following regarding the model:

- Education

Skills leadership and competence is mainly built through education. As discussed in section 3.2.3, SAQA and the NQF are used as a linear metric for education. According to APMSA's NCB3 4LC, this is an over-simplification, but a generally acceptable and known metric. In order to have a well-functioning model, APMSA suggests that an exponential or logarithmic relationship is required between the different NQF levels, but this calls for much more refinement.

Albeit that there are shortfalls in the education grading system (NQF), the index for education forms the backmost index in the model.

- Experience

The experience aspect of the model is the most complex, as APMSA suggests that serious mathematical calculations should be performed to determine an indicator on an index. It states the following:

> *Experience can only be acquired in the workplace over time. Because of the nature of experience, it is difficult to describe it. Consequently, APMSA-Sert postulates that experience is a scalar with two orthogonal components. One component is scope of experience, meaning all the different things that have been done by the candidate. This metric is a linear list of things done. The second component, depth of experience, is an orthogonal vector on each of the things done, but evaluates on a scale of 0 to 10 for depth of experience on that particular metric of things done* (Association for Project Management South Africa (APMSA), 2006, p. 12).

- Attitude

The third dimension, attitude, is a human personality characterisation. It is a difficult descriptor when no objective means are available to analyse or measure it.

For the application in the model, APMSA-Sert motivates its reasoning with the following assertion:

> *Attitude is driven by two fundamental quantities, namely motivation and the role an individual plays in a team.*
>
> *The Belbin role definitions are accepted as a descriptor on a linear scale, while motivation is unpacked as the drive of achievement and the care for people. The author of APMSA's NCB3 acknowledges that the 3-D model is in need of further development and therefore suggested that it be the topic of further research* (Association for Project Management South Africa (APMSA), 2006, p. 13).

4.3.4.8.1 Competence and the NCB3

In its simplest meaning, competence is the demonstrated ability to be successful in the chosen function. APMSA (2006) explains as follows:

> "The lexicology of competence stems from the original Latin "*competentia*", which carried the meaning "authority to judge" or "the right to speak". Contemporary meanings of the word according to the Collins dictionary describe it as "having the skills, ability or experience". In the context of both the NCB3 and ICB3, it conveys the meaning of knowledge, experience and attitude."

4.3.4.9 Conclusion

The concept of competence and the word *competence* has been widely used in this work, from the discussion of the OFO in Chapter 3 through to the various professional bodies that claim to have a competence framework. It needs to be stated that there is a general misconception regarding the terms *competence* and *competencies* and that more clarification is needed in this regard, but it falls outside the scope of this discussion.

It is evident from the discussion on competence that there are at least four recognised frameworks to determine competence in project management. These frameworks have different perspectives, and competence frameworks can be focused on outcomes or behaviours. A competence framework embodies knowledge, and is deemed to be a broader context than just a body of knowledge. Competence frameworks, such as GAPPS, evaluate competence on at least two levels: project

and programme managers. The AIPM, APM and IPMA give a four-level delimitation that can be equated to levels in various project management occupations.

Team members/project participants and early entry positions:

- Project managers
- Programme managers
- Portfolio managers

For a conclusion and summary of the various bodies of knowledge and competence frameworks, there is no better place to end than with what is offered to us courtesy of Hübner (n.d.), who provides the most conclusive comparison of the acknowledged bodies of knowledge and competence frameworks in the project management domain. Refer to Figure 4-13 and Figure 4-14.

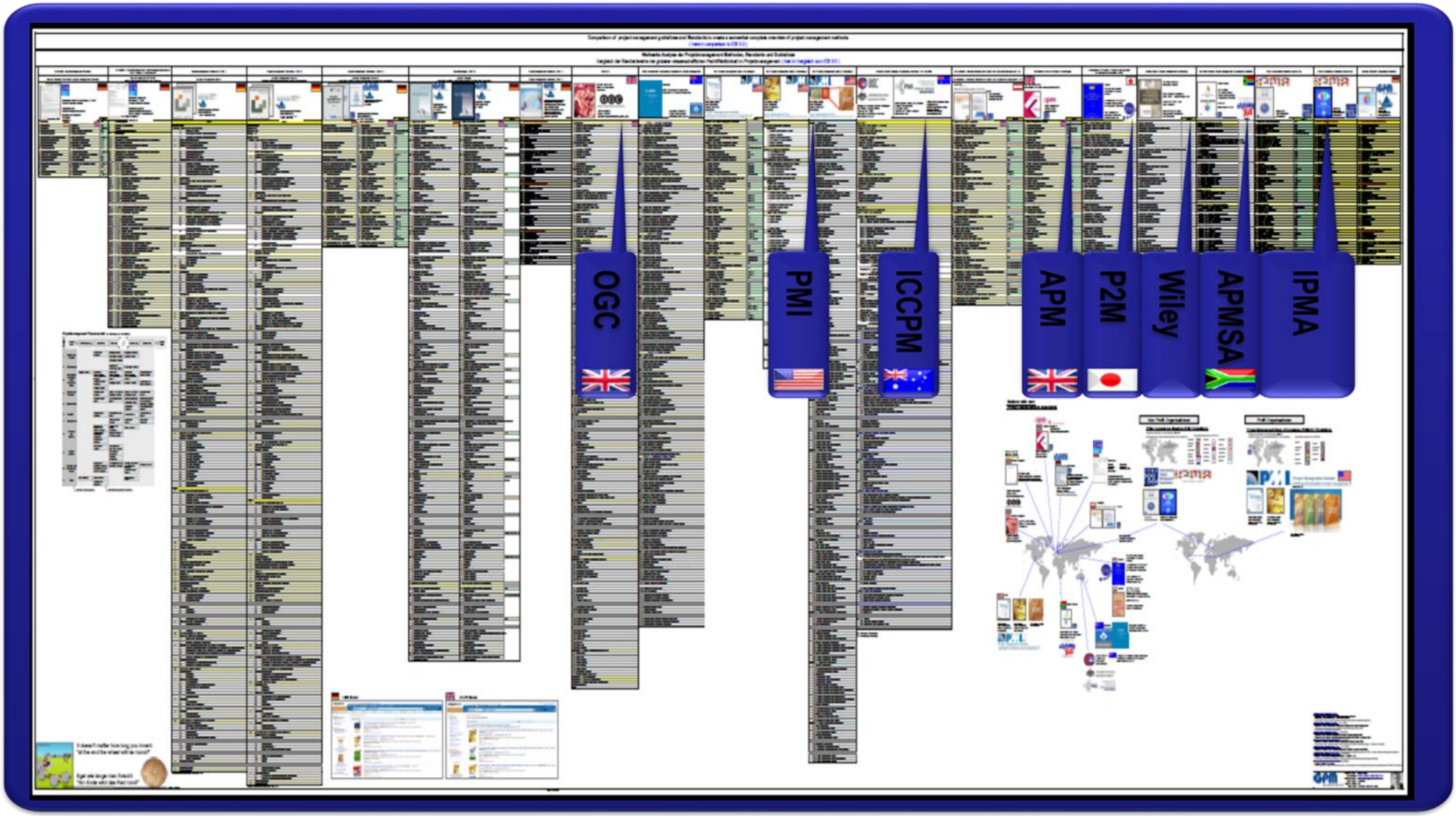


Figure 4-13: Comparison of the most well-known project management bodies of knowledge and competence frameworks (Hubner, nd)

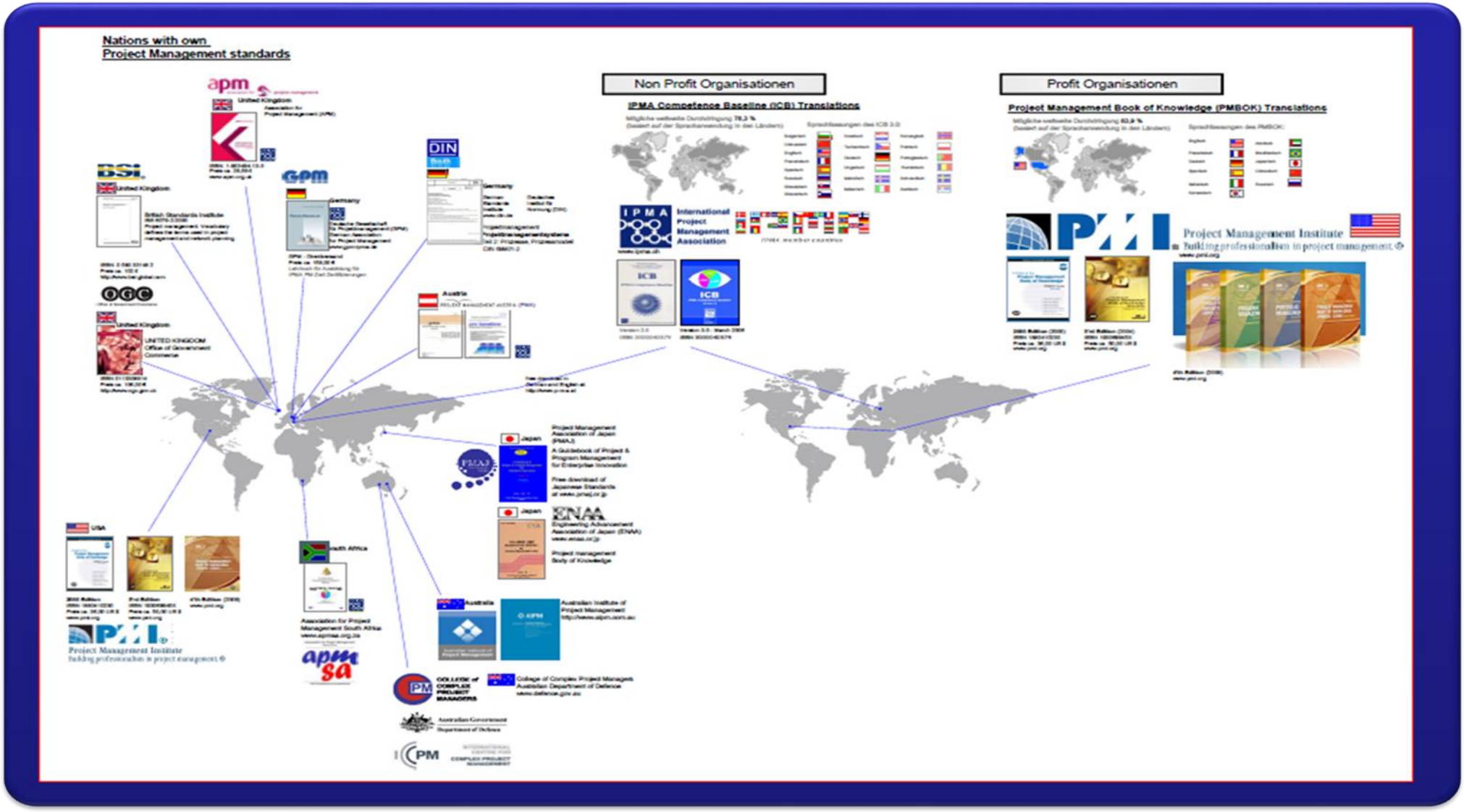


Figure 4-14: Worldwide dispersion of project management bodies of knowledge and competence frameworks

With reference to Figure 4-13, the graphic depicts the most well-known project management bodies of knowledge mapped against the IPMA's ICB standard. It includes *PMBOK® Guide*, *APMBOK*, *P2M* and PRINCE2® methodologies. Although the graphic is not legible, the detailed graphic is available from Hübner's website (Hübner, n.d.). It is included here for the mere illustration that there are various bodies of knowledge, and that no single organisation can claim to have "the best" or the "single-most important" body of knowledge.

Having access to such a comprehensive comparison, it is strange that, during the literature review, the *PMBOK® Guide*'s framework was referenced more often than the other bodies of knowledge.

The researcher posits that *PMBOK® Guide* falls short of measuring competence. The researcher further posits that the frameworks of the British and the Japanese (*APMBOK* and *P2M* respectively) cover a broader spectrum of competence measurement. The researcher further posits that the project management fraternity is immature and ill-informed regarding the ambit of knowledge in its chosen career domain.

Having discussed the numerous bodies of knowledge, their approaches, frameworks and interpretations of the project management context, the next section will explore the various qualifications that are commonly found in the project management domain.

4.3.5 Project management qualifications and certifications

As explained in section 3.2.3, SAQA refers to project management qualifications in terms of defined outcomes in accordance with unit standards. In this section, the professional bodies' qualifications and certifications will be explored.

A search for "project management qualifications" points to one qualification offered, namely the PMI's PMP certification and credential. Most of the sources cite this as an authoritative qualification. From most of the blogs and discussions studied, it is clear that many people were not even aware of anything other than the PMP certification. This reiterates the researcher's view that the project management community is ill informed regarding education and qualification choices to best prepare them for the complexities of a project management career.

There are numerous qualifications available in the project management environment.

To enable an understanding of the value of the qualifications, concepts relating to locus, focus and function in relation to the roles, and subsequently the position in the project execution organisation, need clarification. Figure 4-15 below explains this relationship.

At the various levels of project execution, the focus of what needs to be done at the various levels of project execution (portfolio management) defines the context of the role.

The programme focus ensures a tactical approach to scheduling individual projects and ensures that resource planning is done centrally for allocation on a decentralised basis. The project management focus ensures that projects deliver in accordance with the needs of the organisation to ensure business sustainability. Figure 4-15 depicts an example from the perspective of financial management, and will now be further discussed.

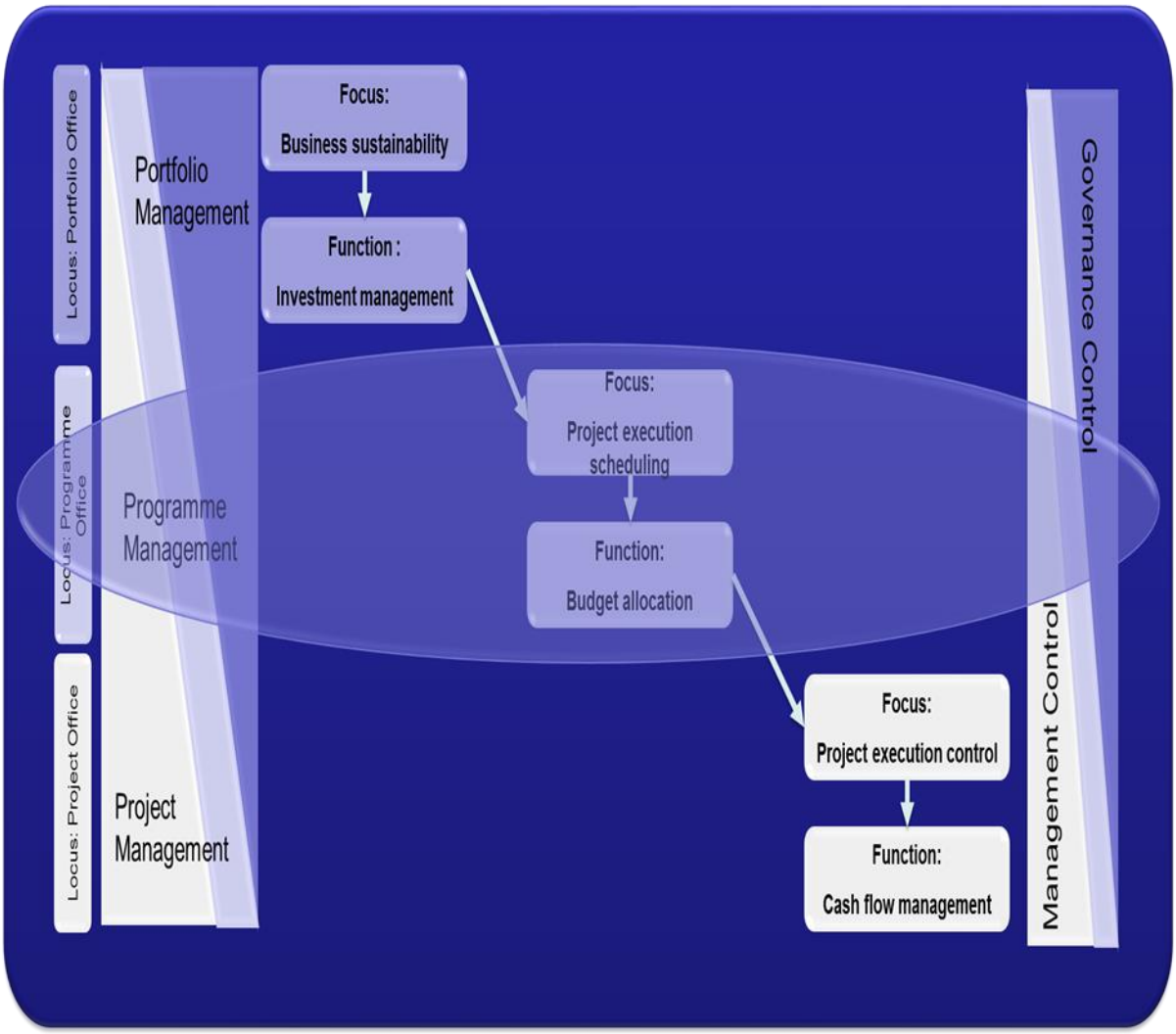


Figure 4-15: Graphic depiction of focus and function relationships

The blue ellipse indicates an overlap between the focus of the previous function and the specific function at the level being considered. Here, the relationships between the function of portfolio management and the focus of programme management become blurred. This situation also holds true for the relationship between the function and focus for project execution. This observation is critical as this is why there can be role ambiguity in project execution organisational structures.

Following from sections 4.3.1 and 4.3.2, an analysis was done of the professional bodies, their training focus and their certifications or qualifications offered. The result of this analysis is presented in Figure 4-16. The professional bodies focus on the following levels:

- Portfolio
- Programme
- Project management
- Entry level of practitioner
- Project support staff

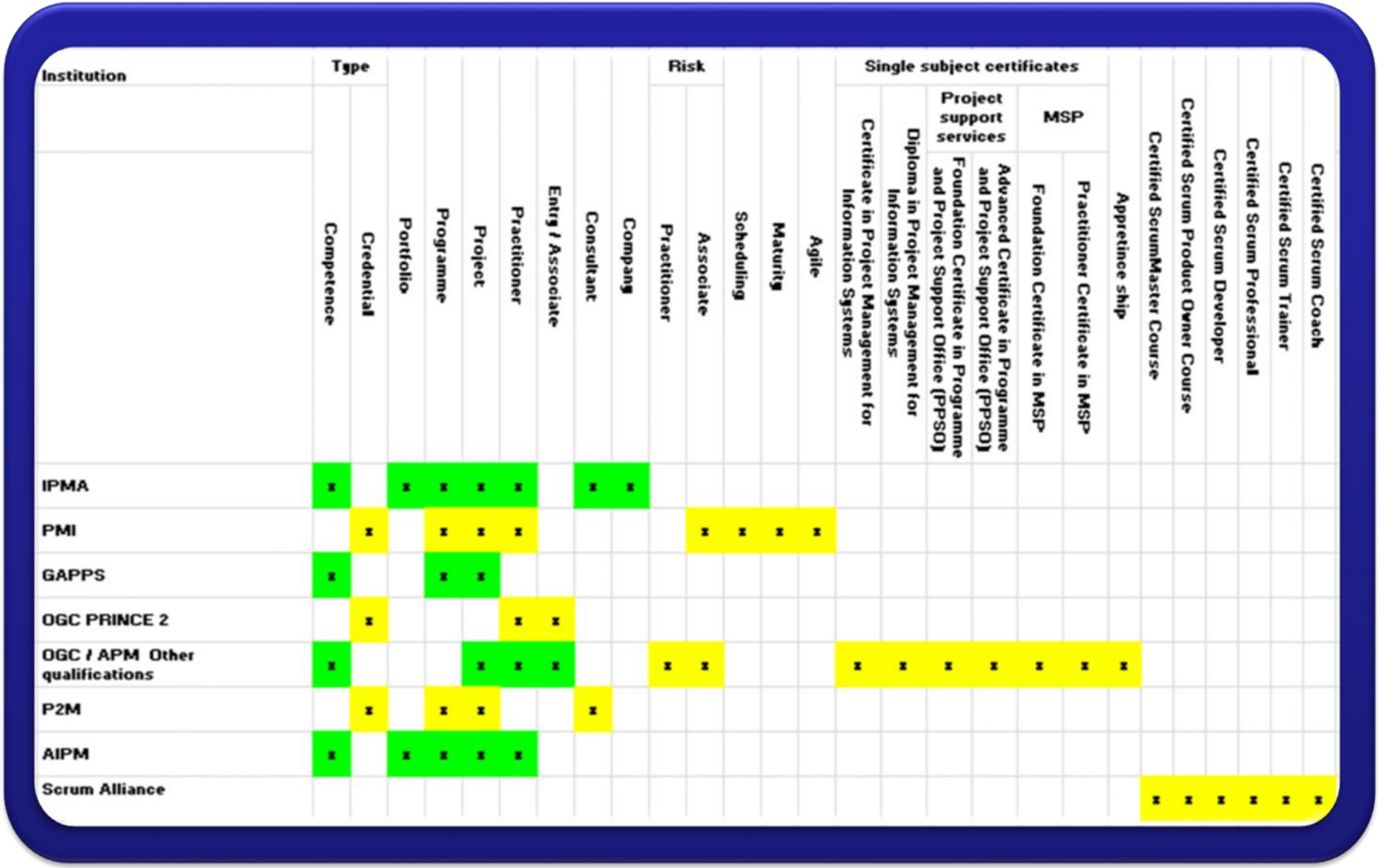


Figure 4-16: Summary of qualifications and certifications offered by the relevant project management professional bodies

From Figure 4-16, the researcher deduces that most of the professional bodies focus their training and development efforts on project, programme and portfolio management skills and competencies.

It was also found during the analysis that organisations such as IPMA offer certification for ancillary roles such as project management consultant, and that maturity received attention from the PMI.

As a whole, complete qualifications, as well as individual complementary and growth certificates, are offered by organisations such as the APM. Furthermore, the APM also has qualifications that focus on project support. Situations where the context of the role is the project, but the job content would be specialist technical content, risk, planning and scheduling are also addressed.

Compared to Figure 4-15, these project support roles and functions will be found in those areas of overlap, where a person with the occupation of project manager works in the location (the locus of the function) of a programme office, without being the programme manager (thus having a job focus and function different from what would be deduced from its locus). The researcher posits that it is necessary to define the job context and subsequently the job content.

From Figure 4-16, it is clear that the various professional bodies offer a wide variety of qualifications, certifications and credentials. Based on these qualifications, certifications and credentials, it is possible for incumbents of positions to qualify in accordance with the roles and functions that they would fulfil in the organisational structure.

It is evident that no one organisation can claim to be “the one” at the top in the world of project management and the profession.

The researcher posits that the alliance between the former OGC’s PRINCE2® methodology and *APMBOK* provides the most complete solution for training and development, as it offers a competence certification, ancillary standalone qualifications and an apprenticeship for project management.

As was stated, the project management fraternity places a high premium on the PMI’s PMP certification. However, when compared to the competence frameworks, such as GAPPS, IPMA APMG and AIPM, the following was found (Global Alliance for Project Performance Standards, 2014b):

Table 4-24: Summary of GAPPS comparison of project management qualifications

GAPPS framework for project managers November 2006 (unit and element level)							
	AIPM 2008 (Australian Project Management Professional body)	NCSPM 2008 (Australian version of SAQA and NQF)	IPMA ICB3 4LC Competence Framework	*P2M* (Japan)	*PMBOK® Guide* 2008 (PMI)	PRINCE2® 2009 (UK Government and APMG)	SAQA NQF Level 5
G2 Percentage	65%	59%	98%	73%	70%	92%	77%
G1 Percentage	69%	62%	99%	81%	79%	93%	80%

At least four of the seven qualifications or certifications offered and compared to the GAPPS framework outclass the PMP certification. Most importantly, the SAQA qualifications at diploma level, as measured against the unit standards, would better qualify an incumbent in terms of competence than the PMP certification. The top ranking by comparison is the IPMA ICB3 4LC certification.

Giammalvo (2010) refers to Gladwell's benchmark of 10 000 hours of work. Following below is an excerpt from the article:

> *There is one additional factor that is worth introducing as part of this research. In Malcolm Gladwell's* Outliers*, he asserts pretty convincingly that it takes 10 000 hours of honest, dedicated effort to become a "top ranked professional" at anything (sports heroes, musicians, such as the Beatles, artists, computer programmers, such as Bill Gates and Bill Joy, and – one would hope – project managers).*
>
> *Consistent with Gladwell's "10 000 hour" baseline, I have drawn a line across the graph below indicating which of the credentials meet or exceed that criteria and which ones do not.*

> *As can be seen, the IPMA C and the AIPM CPPM both just meet Gladwell's 10 000 hour cut off, but perhaps more importantly, PMI's PMP, being the most ubiquitous, just misses meeting this "superior performer".* (Giammalvo, 2010)

The graph (Giammalvo, 2010) that is referred to is given as Figure 4-17.

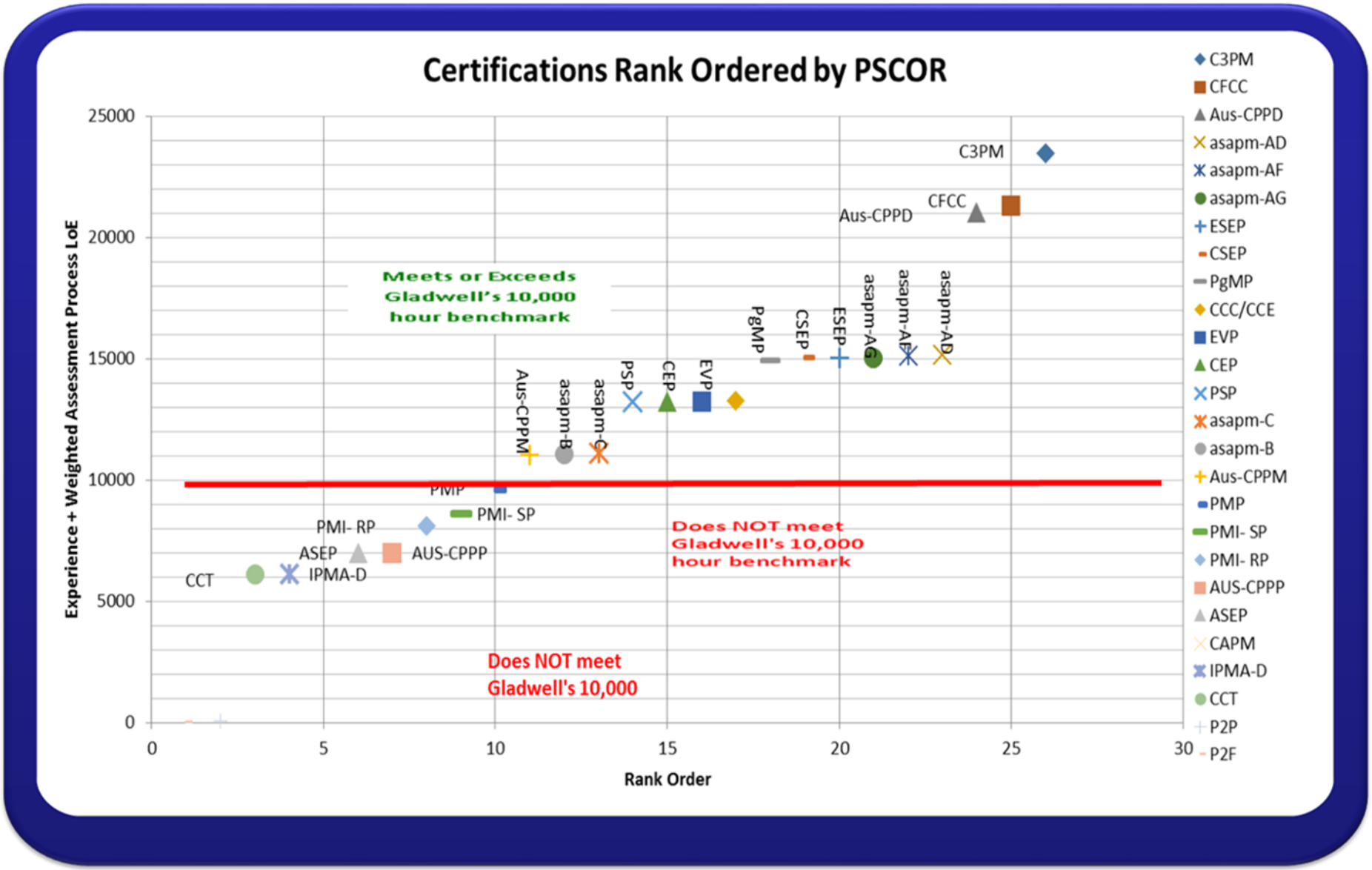


Figure 4-17: Project management credentials compared – a preliminary analysis (Giammalvo, 2010)

4.4 Conclusion

In *Rethinking project management final report of May 2006,* Charles Smith and Mark Winter (Smith & Winter, 2006) state that they gained critical insights during their research. They state as follows:

- Bodies of knowledge are based on unrealistic views of how companies and individuals behave.
- They gained an accurate understanding of the challenges and realities of contemporary project management.
- Professional associations have a limited understanding of the real world. Growing links are being developed between organisation theory and project management literature.
- Project management remains more of a craft than a science.
- It is important to identify the political and cultural contexts, before designing the scope, structure, style, process, and the quality assurance and communications strategies for a project.

Thomas and Mengel (2008, p. 309) have an even harsher opinion of the current state of affairs in terms of project management and the training of project managers. They state as follows regarding the current model of project management training and qualifications:

> *This model indicates that the* PMBOK® Guide *and training based on linear, rational, analytical knowledge only moves practitioners to the competent or proficient performer level. Given that projects in a real-time environment tend to unfold as complex adaptive systems, effective project managers need to be the masters and leaders who can act and react in a timely manner without having to resort to time-consuming analytical applications of context-dependent or -independent techniques. Advanced project managers need to be capable of "staying with the ambivalence and ambiguity of the not-yet-known; recognising that how a situation emerges crucially shapes its meaning, interpretation and social significance". Thus, development of the master project manager requires going beyond the inculcation of standards of best practice, preparing project managers to deal with complexity.*

The world has a very narrow view of project management. It was encountered time and again that websites, discussion forums and even blogs refer to the PMI and its *PMBOK® Guide*. It is shameful that the world has been misled to such an extent that we are to believe that only the PMI possesses knowledge of project management. We have seen that other (better) bodies of knowledge exist, but that the marketing of such bodies of knowledge is limited to national boundaries. We have seen that competence frameworks encompass knowledge, but that they are rarely mentioned. This may be due to a lack of knowledge in the project management fraternity or just that the organisational structure of the PMI, being a profitable organisation, is drowning the rest of the world.

Most of the professional bodies focus on qualifications of the project management role alone, and very little attention is given to project support roles and functions.

Especially the PMI's *PMBOK® Guide* focuses on processes and not on roles and functions, as would be required for the project execution of complex and large projects.

The *ISO Standard* and the *PMBOK® Guide* have the same basic structure, but it is interesting to note that the *PMBOK® Guide* has added a tenth knowledge area after the issuing of the *ISO Standard*.

It can be noted that competence frameworks focus on the level of task execution, with growth in levels of task density and complexity, which can be construed as a measure of career growth for individuals.

The IPMA differentiates between five roles and responsibilities that are found in project execution:

- Project team member
- Project manager
- Programme manager
- Portfolio manager and project management consultant

Methodologies define roles and responsibilities, as well as the life cycle management approach, with different roles and responsibilities in different phases, as well as different competencies.

Qualifications offered distinguish between roles and responsibilities.

This chapter is concluded with this relevant quote from the work of Dr David H. Dombkins, College of Complex Project Managers, AIPM:

> *Project management as a profession is presently debating the suitability of existing vocationally based project management bodies of knowledge, methodologies and tools, and their relevance to complex projects. Other management disciplines, such as systems thinking, have faced similar challenges and provide insights that are useful for project management. Systems thinking parallels project management in many ways, being largely project-based, and having encompassed complexity* (Dombkins, 2007, p. 19).

I, the researcher, came to a further realisation and insight: during the execution of this study, there seems to be a relationship between maturity, the level of complexity that can be handled and the level of competence of the workforce and how it will relate to the architecture of the organisation. I, the researcher, came to the realisation that project organisation design can be narrow, but shallow in terms of defined job roles and titles. This situation would be prevalent where the organisation is at low levels of maturity, without a well-defined locus, focus and function for the various project execution offices. As task density increases, there may be a subsequent increase in the depth of the organisational structure as more subordinate positions are created that can be supervised. Growth in complexity and maturity will require a commensurate growth in competence as well. With the growth in competence, there would be a requirement for the development of more specialist roles within the locus, focus and functions of the various project execution offices. What is then found is that the organisational design will be broad as well as deep. The author came to this realisation due to the current discourse in terms of who (role) and what (function) can be called project managers. The realisation was further strengthened by the central premise of the research, which posits that a job family concept needs to be introduced for ICT project personnel in totality.

It is also evident that training must be aligned to the extent that the project management personnel must be able to work with a large number of non-complex projects at the level of in-depth knowledge, or at the level of a singular complex project at the knowledge level of an expert in one to two areas. This realisation can best be presented in Figure 4-18.

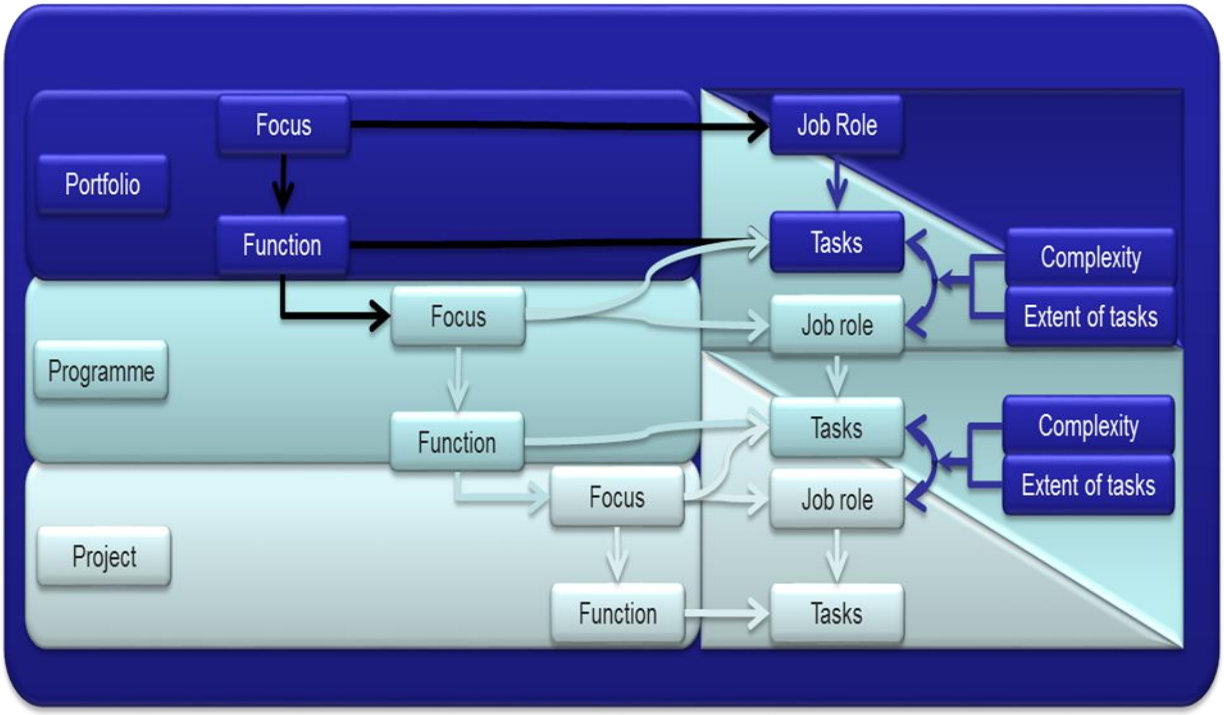


Figure 4-18: Level of in-depth knowledge and specialisation in accordance with roles and task density

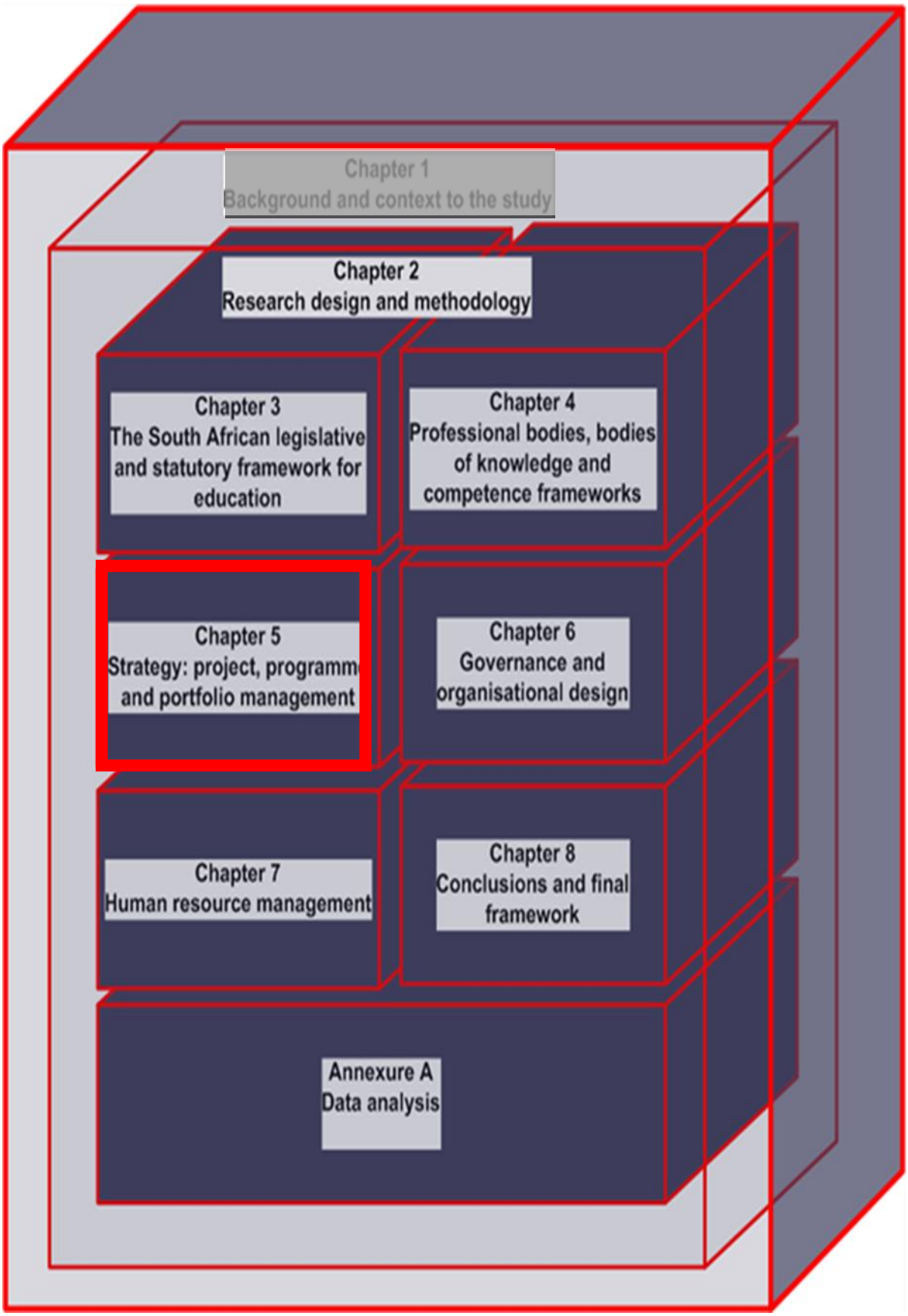
The following recommendations are made:

- Before embarking on developmental training in project management, a study should be conducted as to which body of knowledge should form the basis for the curriculum for training.
- A study should be conducted as to the various qualifications and credentials offered by and through the various professional bodies.
- In alignment with a systems thinking approach, the whole ambit of the projectised organisation needs to be considered when deciding on project management qualifications.

This chapter concludes with the addition of the next layer of the stratified framework, where the aspects that need to be considered from a professional body point of view were added. The next level is shown in Figure 4-19 below:

Figure 4-19: Context of professional bodies added to the stratified framework

Chapter 5. Strategy: project, programme and portfolio management



5.1 Introduction

In the previous chapter, the context for the development of ICT project managers in terms of the most well-known international and national professional bodies and their publications was addressed. Chapter 4 explained that project management training and development takes its cue largely from the various professional bodies, and that their views are divergent. The discussion culminated in the addition of a second level to the stratified framework that the research aims to develop.

This chapter will explain the concepts of portfolio, programme and project management in accordance with the concepts of locus, focus and function. This is done to clarify what is expected of individuals whose jobs are located in an organisation structure, where the purpose of their jobs has a specific focus, and where executing their tasks fulfils a certain function.

With changes in technology and shifting paradigms for production, it is clear that projects are the future. A deeper analysis of what project management entails reveals that there are actually two concepts: managing what the project sets out to accomplish, and the work that needs to be done to accomplish the aim and objectives of the project to the extent that the project can be closed and successfully completed. Both aspects are required for the project to be successful.

This chapter aims to discuss the aspects of ICT project management in terms of the portfolio, programme and project elements of project management in its broadest sense. It will provide perspective on the relevant topics and definitions, as well as what is meant when these terms are used in organisations. Special attention will be given to the career and occupational aspects that are inferred when an organisation refers to portfolio, programme and project management in an ICT context.

The scope of the discussion will entail the following:

- Establishing the links between project and strategy execution
- Establishing a link between strategy execution, project execution and governance
- Defining and discussing the concept of project management and its components
- Defining and discussing the concept of programme management and its components

- Defining and discussing the concept of portfolio management and its components

This is done to clarify the roles and functions as they pertain to the job family concept that are implied in the delimitation of the concepts of portfolio, programme and project management.

The scope excludes coding techniques during the code production phase of the project. Thus, the Agile grouping of techniques, rational unified processes (RUP), systems development life cycle (SDLC) and scrum are excluded, as they do not focus on the management of the project per se.

The models and theories presented in the discussion henceforth serves to give guidance and establish context to the aim of the respective chapter. The serious constraint of space limited too much discussion. Integration will be done at the chapter conclusion level where for instance the effect of the governance structure will be done in terms of roles and functions. In essence the focus of this chapter and the study in general can be viewed as an extended critical review and as such, the presented materials sometimes serves as an introduction to a concept which would affect, but falls outside of the scope of the study and / or chapter in particular. It is included here to show the embeddedness and clarification of project management within the total context of portfolio, programme and project management and the link to strategy, not in particular to form a specific focus area of the study.

5.2 Project governance and strategy

In the literature analysis, a definite relationship was established between project execution and strategy. Research by Morris and Jamieson (2004) and the later effort of Shenhar (2007) made the existence of such a link evident. Further research, particularly by authors such as De Reyck et al. (2005), Light and Stang (2004) and Maylor et al. (2006), elaborated on the strategic links.

Having established this link, another interesting pattern that emerged from the data analysis is the relationship between organisational strategy and the aspect of governance, in particular, project governance. Again, this is done with the objective of uncovering roles and functions that would influence the definition of the ICT project management job family.

The data analysis of the literature sources have uncovered the fact that the APM and the related development work done in the UK through the former OGC have mostly

put a governance structure in place for projects and project management. It is acknowledged that this area is a field of study on its own, and that various authors have written about this subject. However, as the topic of governance construes the creation of context only, a brief synopsis of this field will be given here. Again, the main recognised professional associations and their publications are the mainstay of the analysed data sources.

According to *APMBOK*:

> *The governance of project management concerns those areas of corporate governance that are specifically related to project activities. Effective governance of projects ensures that an organisation's portfolio of projects is aligned to the organisation's objectives, is delivered efficiently and is sustainable* (Association for Project Management (APM), 2006).

PMBOK® Guide's view on project governance entails that provision should be made for a comprehensive, consistent method of controlling the project and ensuring its success. The project governance function should be described in the project management plan and should fit into the larger context of the programme or organisation sponsoring it. Within those constraints, as well as the additional limitations of time and budget, it is up to the project manager to determine the most appropriate method of carrying out the project. Decisions are made regarding who will be involved, what resources are necessary, and the general approach to completing the work. Another important consideration is the phase structure for the project, which provides a formal basis for control. Portfolio managers are responsible for the high-level governance of a collection of projects or programmes (Project Management Institute, 2008).

Maharaj, Heil, and Van Rensburg (2006) mention the 11 principles for the governance of projects in the guideline developed by the APM Governance of Project Management Special Interest Group (GOPM SIG). This guideline is a practical tool for improving the governance of projects (Maharaj, et al., 2006). The governance principles are shown in Table 5-1 below.

Table 5-1: Governance principles of the Governance of Project Management Special Interest Group

Directing change – 11 principles	
1.	The board has overall responsibility for the governance of project management.
2.	The roles, responsibilities and performance criteria for the governance of project management are clearly defined.
3.	Disciplined governance arrangements, supported by appropriate methods and controls, are applied throughout the project life cycle.
4.	A coherent and supportive leadership is demonstrated between the overall business strategy and the project portfolio.
5.	All projects have an approved plan containing authorisation points at which the business case is reviewed and approved. Decisions made at authorisation points are recorded and communicated.
6.	Members of delegated authorisation bodies have sufficient representation, competence, authority and resources to enable them to make appropriate decisions.
7.	The project business case is supported by relevant and realistic information that provides a reliable basis for making authorisation decisions.
8.	The board or its delegated agents decide when independent scrutiny of projects and project management systems are required and implement such scrutiny accordingly.
9.	There are clearly defined criteria for reporting project status and for the escalation of risks and issues to the level required by the organisation.
10.	The organisation fosters a culture of improvement and of frank internal disclosure of project information.
11.	Project stakeholders are engaged at a level that is commensurate with their importance to the organisation and in a manner that fosters trust.

In support of the discussion on governance, and elaborating on the principles of governance, Maharaj et al. (2006) refer to Knutson (2004), who mentions the criteria for project governance, as seen in Table 5-2.

Table 5-2: Criteria for project governance

Project area	Criteria
Portfolio management	Solicitation: A single-request document or business case consisting of predefined data in a predefined format should be created. Consistency will make comparison and equitable choices easier. Selection: A list of objective, measurable selection criteria should be developed. An appeal process should be available when project proponents feel unfairly rejected. Priority: Allocation of resources should depend on the ranking of the project in the priority list. Only the committee can override such a decision. Resource management: When determining effect allocation and estimating duration, the amount of time worked on a project should be considered.
Personnel management	Roles: A unique job description should be developed for project managers. Performance objectives: Performance objectives should be set considering the project roles. An evaluation of these goals should be carried out when performance appraisals are conducted. A training programme dedicated to project management skills should be established.
Authority and escalation	Thresholds of control: Define when a project manager can make business decisions without asking the governance committee's permission. A triple constraint priority order covering time, budget and resource allocation can be set. Escalation: A procedure should be established covering when, to whom and by what mechanism an issue to be escalated should be developed.
Project briefings	Format: Assess how meaningful presented information is and if the project is meeting its targets. Timing: Check whether the project manager is on top of the project status, briefings can be called at very short notice. It is important to provide a reason for the briefings. They should not be called only when the project is in trouble. Content: The metrics on which briefings will be conducted should be defined. However, new questions should be presented to the project team when necessary. Participation: All team members should be encouraged to participate in the briefings.

Governance is also concerned with the life cycle ownership of the project's products. Portfolio management at the highest level of project execution management is thus a function within the larger governance structure. The project manager must ensure that the strategic mission and vision of the project are communicated to the team members so that they are motivated. He or she must relate the strategy to the day-to-day execution and management of the project.

It can be concluded that there are different areas of control as a project proceeds through its life span: there should be strategic alignment between the initiation of the project and the writing of the business case. Without a business case, there cannot be a project (the project cannot give birth to itself, therefore the work should be done from either a programme or a portfolio perspective). The soon-to-be-appointed project manager must be involved in accordance with a participate-accountable-responsible-informed-consulted-sign-off (PARICS) delimitation of responsibilities. Where the governance focus of the project manager comes into play, resources should not be allocated purely to the requirements of the project or to the specific requirements of the project manager, but within a broader perspective so that one does not "rob Peter to pay Paul".

Hence, the governance function should not be located at the portfolio management level, but executed with a guidance and direction focus through the programme management function, and executed at the project level.

Projects can be reviewed either during a governance or a portfolio review. The focus of these reviews differs in purpose and outcome. Governance reviews evaluate the status of the project to establish whether the project still supports the organisational strategy and whether it merits continued investment. During portfolio reviews, the focus is more on tactical project considerations like detailed deliverable progress, issue review, performance measures and resource utilisation.

In a model developed by Stavros et al. (2007), the author mentions that there are three basic elements of governance:

- Regulation
- Execution
- Compliance

The identification of the basic aspects then leads to the definition of a fundamental governance model, which can be stated as follows:

"Good governance is a balance of all three governance elements; it is meaningless to have regulation without execution or execution without compliance. Regulation indicates what needs to be done, execution is actually doing it and compliance is making sure it is done correctly" (Stavros, et al., 2007).

An illustration of this model is given in Figure 5-1 below.

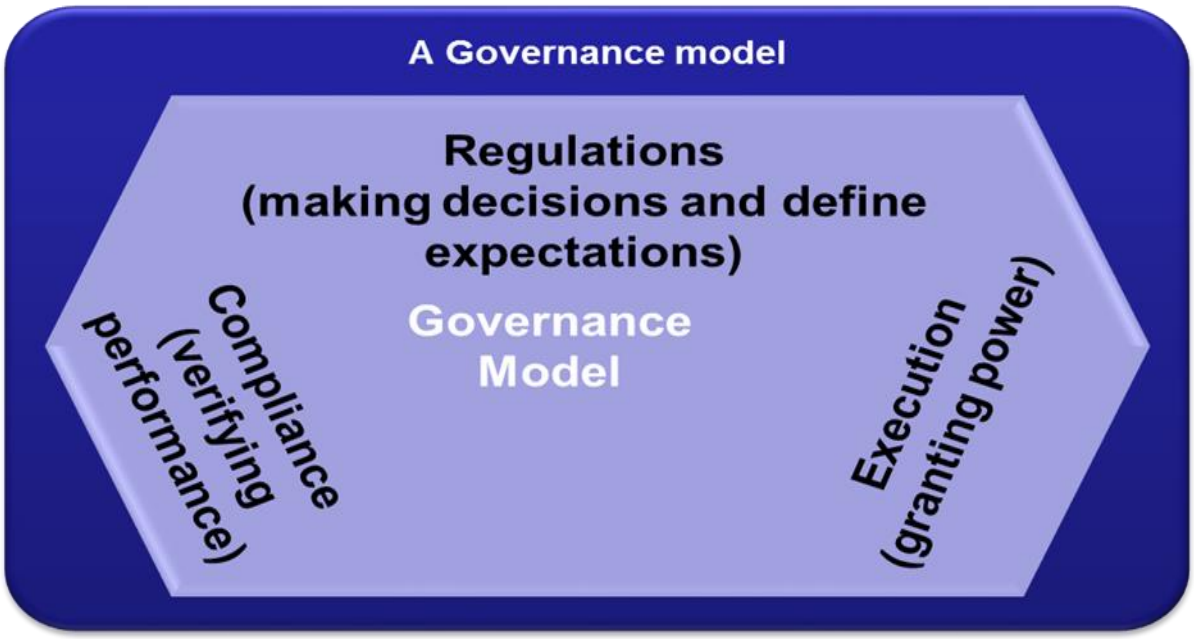


Figure 5-1: The Fundamental Governance Model (Stavros, et al., 2007)

The opinion of Stavros et al. (2007) regarding the model is quoted below:

Regulations *are formal, codified, authoritative rules. They are adopted by a public regulatory agency and are usually interpretations of the statutes passed by a legislative body. Once formalised, the legislative documents and governing standards are consolidated in governing statements, which will cover all the related activities executed. The consolidation of these governing statements forms the basis of the governing rule book. These governing statements are expanded into high-level governing procedures, which form the basis for implementing structures/procedures/guidelines/best practices and further set out the criteria to measure compliance.*

Execution *is the aspect of governance charged with actually fulfilling formal, codified authoritative rules derived from regulations to those specifications provided by compliance. Without execution, the other*

aspects of the governance model are meaningless. During the execution phase, the governing procedures developed as part of the governing rule book will form the basis for the development of the governing process, which will enable the implementation of the governance regulations. As part of this phase, these governing processes will be extended into execution procedures, which, if followed correctly, will result in standardised, well-coordinated and properly optimised projects.

***Compliance** ensures the objective and valid meeting of regulations through observation, measurement or testing. Good governance clearly and effectively separates the responsibility for creating regulations from the enforcement of regulations. Regulations must be enforceable through compliance checking. Therefore, the line between regulations and compliance is not fixed and rigid, but needs to be negotiated with the validation of regulations from the compliance aspect. Procedures can be used to measure compliance and adherence to the regulations and execution processes. Any deviation from the procedures, standards or manuals must be analysed and corrective action taken* (Stavros, et al., 2007).

Klakegg (2008) found that there is still confusion about what “governance” means. The main focus of project governance is on executing projects well (delivering outputs on cost, time and quality, and increasing efficiency in the project management processes), but not on the front-end challenges (Klakegg, et al., 2008).

Miller and Hobbs (2005) state that project governance has only recently become important in the project management community and literature.

Klakegg (2008) and Olsson et al. (2007) establish that the link between the owner and the project is established through the organisation structures and subsequent description of roles and responsibilities, reporting lines and control spans, and internal and external interfaces. Governance represents the owner’s effort to ensure that projects are carried out in accordance with the overall objectives of the organisation. Accountability is seen as an important means of achieving governance. Accountability can be used synonymously with concepts such as answerability, responsibility and liability. Figure 5-2 shows the link between governance, the

governance of projects, portfolio management, programme management, project management and the relationship between governance and accountability (Klakegg, et al., 2008).

Figure 5-2: Governance and accountability

Klakegg et al. (2008) support the definition of the governance of projects as defined in *APMBOK,* and define a governance framework as "an organised structure established as authoritative within the institution, comprising processes and rules established to ensure projects meet their purpose". The main goals for governance, as derived from *APMBOK*, are:

- choosing the right projects (to make sure the right objectives are achieved);
- delivering the chosen projects efficiently (avoiding wasting of resources); and
- making sure the projects (their effects) are sustainable (taking the economy, environment and other aspects into consideration).

According to Klakegg et al. (2008), the governance of projects is limited to choosing the relevant project during front-end planning and the efficient delivery of the project during project execution (see Figure 5-3 below).

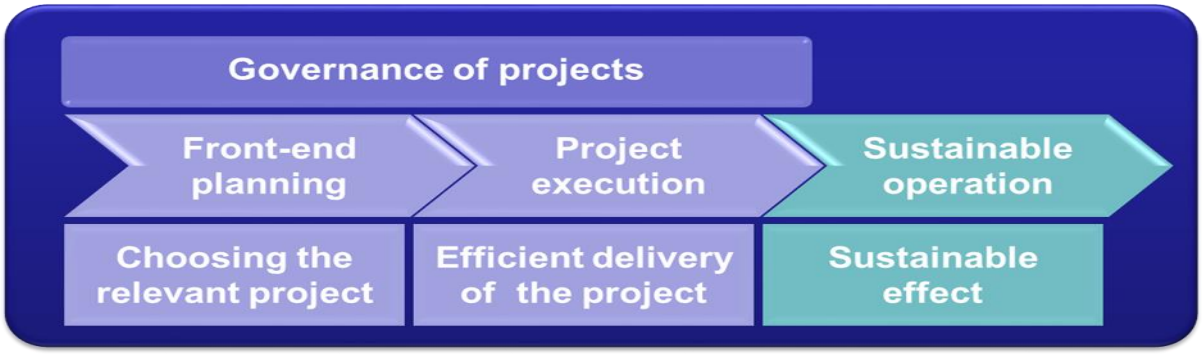


Figure 5-3: Governance of projects (Klakegg, et al., 2008)

According to Pratt (2011), organisational governance establishes the limits of power, rules of conduct and protocols that organisations may use to manage progress towards the achievement of their strategic goals. Project portfolio governance is a set of interrelated organisational processes by which an organisation prioritises, selects and allocates limited internal resources to best accomplish organisational objectives. Portfolio management is one discipline within organisational governance. Portfolio management is both a framework and a management activity. The framework provides the means to translate the organisational strategy into a portfolio of strategic and operational initiatives. The management activity ensures actualisation of those initiatives through the use of organisational resources (Pratt, 2011).

Figure 5-4 illustrates the interrelationship between portfolio governance, the roles of executive, portfolio, programme and project management, and operations management (Pratt, 2011).

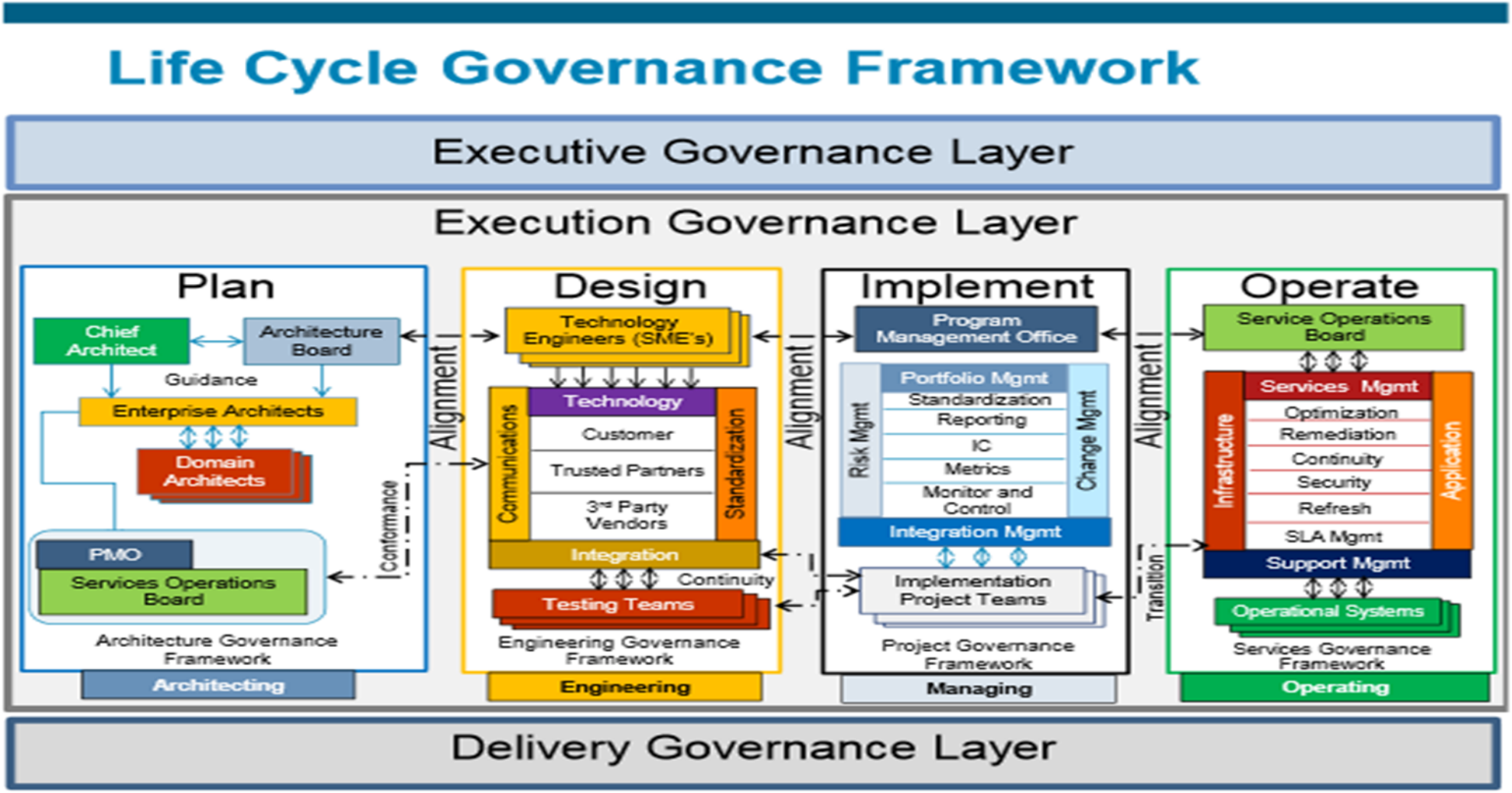


Figure 5-4: Interrelationship between portfolio governance, the roles of executive, portfolio, programme and project management, and operations management

Effective governance of projects and their management ensures that an organisation's project portfolio is aligned to the organisation's objectives, is delivered efficiently and is sustainable. Governance is a set of practices that enables transparent executive decision-making. Project governance establishes the overall direction. It is the approval authority to authorise projects for execution, and provides a comprehensive, consistent method of controlling the project to ensure its success. Project governance also provides a platform for stakeholder input. From a project perspective, project governance involves prioritising, selecting and allocating the limited resources needed to accomplish strategic and organisational objectives (Pratt, 2011).

Portfolio management ensures that the relationships between programmes and projects are identified and that resources (people, funding, etc.) are allocated in accordance with organisational priorities. Programmes focus on achieving the benefits expected from the portfolio as determined by strategic organisational benefits. Projects are largely concerned with achieving specific deliverables that support specific organisational objectives (Pratt, 2011).

5.3 Projects, programmes, portfolios and strategy

Morris and Jamieson (2004) conducted research regarding how corporate strategy moves to project strategy. They state that project and programme management are widely used as a means of implementing corporate strategy. Strategies at the corporate level cascade through portfolios, programmes and projects in a systematic and hierarchical manner to provide cohesion, visibility and an effective means of communication. Within this framework, project strategy is dynamic, as it evolves while the project is being executed. Enterprise-wide business models play an important part in effecting this transformation. Portfolio management plays a key role in programme and project prioritisation, as well as resource allocation. Programme management implies the management of business benefits. On the other hand, project strategy management is recognised as a significant project management practice. Project strategy management ensures that project definition and development are comprehensively considered and that they properly relate to corporate goals and strategies. Project strategy typically covers the entire project life cycle, with review and optimisation occurring at specific points as the strategy

evolves. Value management is used in optimising the strategy, often in combination with risk management.

Furthemore, Morris and Jamieson (2004) are of the opinion that project management is a key business process. They modified a generic business enterprise model developed by McKinsey showing the structure of an organisation in terms of processes (see Figure 5-5). This model identifies what are considered to be the major processes of the value delivery system of the company and the key business processes that enable them (Smit, 2012)[6].

[6] This source is a research report published by The Da Vinci Institute, where the research was conducted under my direct supervision. It is used here with permission.

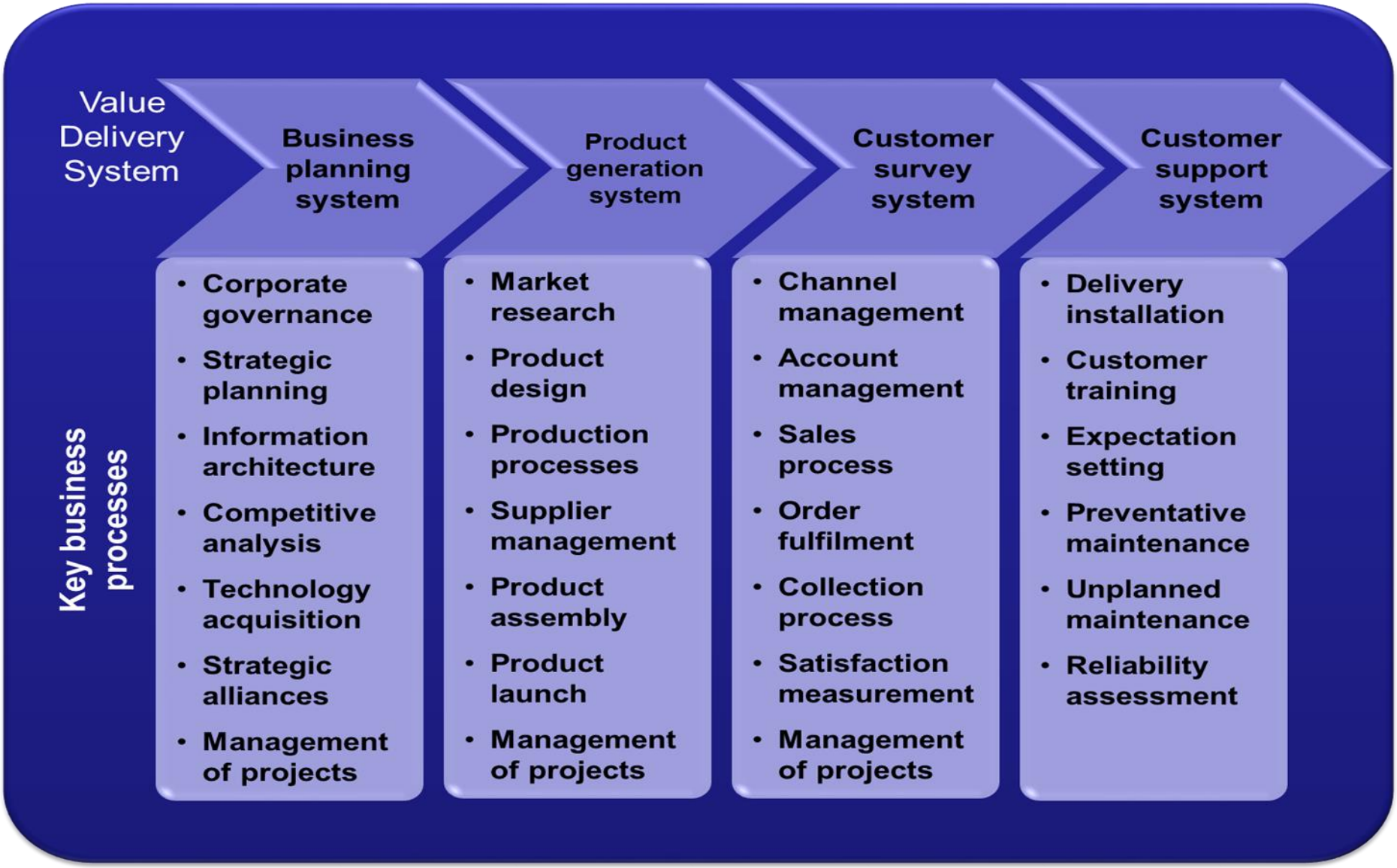


Figure 5-5: Generic business enterprise model of Morris and Jamieson as in Smit, 2012.

According to Morris and Jamieson (2004), few researchers explicitly connect business strategy with project strategy, as project management is merely seen as a form of operational strategy.

In their research findings, Morris and Jamieson (2004) conclude that most of the components of the strategic planning process have strong links to the project management process. They specifically mention the following:

- Internal analysis
- Strategic choice
- Organisational structures
- Control systems

The availability of resources (material, technical, financial and managerial) is a major factor in deciding the organisation's strategy. Project management resources are seen as managerial resources and can strongly influence corporate and business strategy. The main activities that determine the implementation of strategy are organisational structure and relationships, organisational processes and behaviour, and leadership, all of which contain major elements of the project management function. A fundamental responsibility is to manage the resources needed to deliver projects effectively (Smit, 2012).

Morris and Jamieson (2004) refer to a model proposed by Turner in 1999, which illustrates how organisations undertake programmes and projects to achieve their development objectives. Morris and Jamieson adapted this model to include business strategy and portfolios, and indicate that a portfolio may comprise groups of programmes and/or groups of projects as shown in Figure 5-6.

Figure 5-6: Linking corporate and project strategy (Morris & Jamieson, 2004)

With regard to Figure 5-6, the findings of the survey from Morris and Jamieson (2004) cover the following areas:

- Business management and strategy: The use of hierarchies of objectives and strategies underscores the systematic way organisations cascade strategy. Project strategy is developed and maintained by project leadership teams and governance through business case processes and not inclusively through project management processes; accordingly, project strategy is maintained within the context of business strategy.
- Portfolio and programme management: Portfolio management is mainly used as a process for selecting and prioritising the right projects. Programme management includes the management of a portfolio or groups of projects using integrated project teams, managing resources in an integrated manner, and managing benefits and integrated risk.
- Project management and project strategy: Integrated project management and business case processes, using specific strategy inputs from corporate and business levels, are widely deployed to dynamically manage project strategy. Project strategy is developed, implemented and maintained for the life cycle of the project using a highly structured approach. A combination of programme and project plans, as well as other management plans, are most commonly used to manage programmes and projects, parts of which describe how the project is to be undertaken, in other words, the strategy. Reviewing project plans (including project strategy), mostly by peers at project gates, is widely practised.
- Value management: The value of programme/project strategy is optimised in a substantial number of organisations using value management processes integrated with risk management processes.
- Project management competencies: Formally defined project management skills and knowledge competencies that are required to manage programmes or projects and develop programme and project strategy are used widely (Morris and Jamieson, 2004).

Morris and Jamieson (2004) conclude that project management's overall performance would be improved significantly, and project management would have a

higher profile in business management in general, if it were better understood how business strategy can be translated into project strategy.

Given that the Morris and Jamieson's research was conducted in 2004, research findings published by Shenhar (2007), which focus on linking project management to business strategy, report that most projects were still failing then. Failure in terms of projects can be attributed to the following:

- Non-attainment of set goals
- Non-attainment of time and budget goals
- Non-attainment of business objectives

These failures occur in spite of the organisations having a continuous improvement focus on the efficiency of processes and systems (Smit, 2012).

Shenhar (2007) alludes to the fact that the failures might be attributable to a disparate view of projects, and that there is no link between or alignment of projects and strategy. From this research, one can then see that there is a definite call for project managers and project teams to think more strategically and become responsible for business results, as well as just project results.

Shenhar (2007) continues by stating that there are very few formal ways in which project management deals with business strategy, thus necessitating that project management and project planning should be aligned with business objectives and results, since results are all that matter.

There is thus a definite call for the development of a strategic approach to project management. For this reason, "project management strategic alignment" is defined as follows:

> *The alignment of project and business strategy is an internal collaborative state where project activities continually support the achievement of the enterprise strategic goals* (Shenhar, 2007).

Shenhar (2007) is of the opinion that the missing link between the "business strategy" and the "project plan" is "project strategy". This can be graphically depicted as shown in Figure 5-7 below.

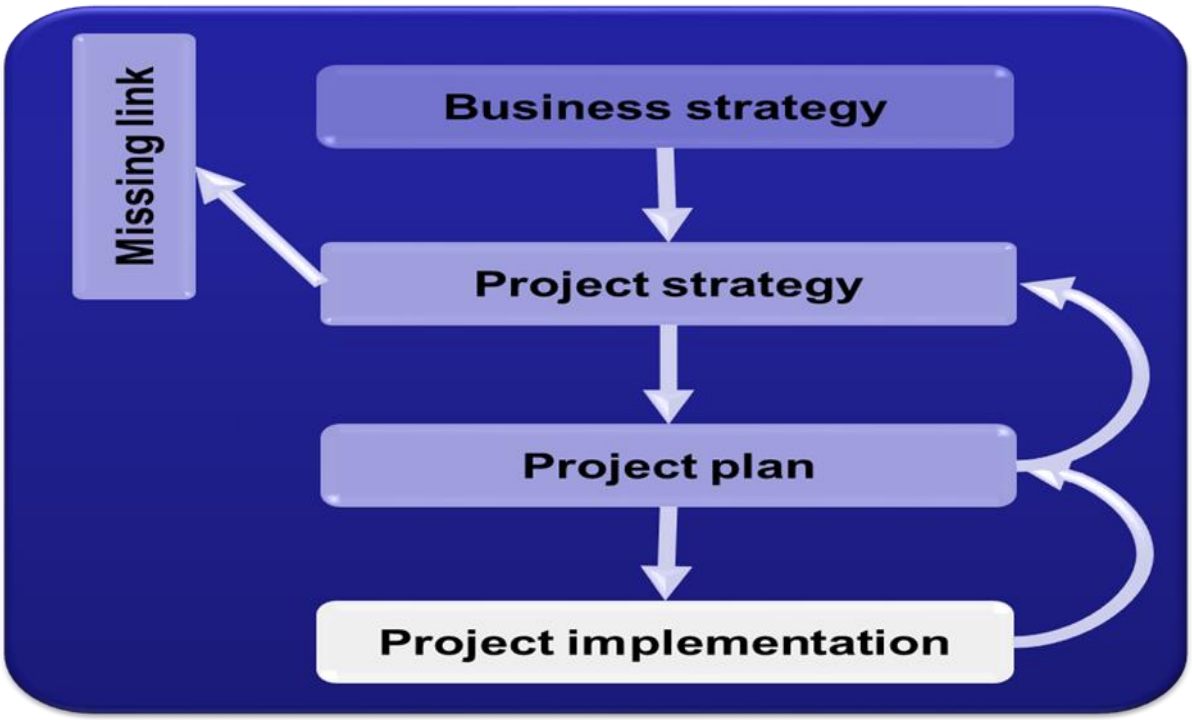


Figure 5-7: Project strategy – the missing link Shenhar (2007)

Further than just the graphic in Figure 5-7, other major findings made by a renowned project management scholar, Shenhar (2007), are included in Table 5-3.

Table 5-3: Major findings from the research of Shenhar (2007)

Findings from Shenhar's research	
1.	Most projects are not managed in a strategic way as the focus is mainly on achieving their time, budget and requirements goals.
2.	Strategic alignment of project management can be achieved by using a hierarchical framework that includes at least the following components: strategy, spirit, organisation, processes, tools and metrics.
3.	Strategic alignment is a two-way process, where the business strategy impacts on the project planning and activities; the project work and experience may have an upward impact on the enterprise strategy.
4.	Each project may have its own specific project strategy. Project strategy is the perspective, position and plans needed to achieve the highest competitive advantage and the best results of the project's outcome.
5.	To align the team's activity and motivation with the strategy, each project should build its own spirit (collective attitudes, emotions and norms of behaviour that are focused on a common vision, which relate to the project's expected achievements).
6.	Project success is a multidimensional strategic concept. To measure a project's success, one needs to look beyond the "triple constraint" of meeting time, cost and requirement goals.
7.	Different business strategies require different project strategies (e.g. cost advantage, customer focus, product advantage and time advantage).
8.	Beyond strategy, strategic alignment must deal with processes, the organisation, and the people sides of projects. Focusing on the tools of planning, and monitoring and controlling is not sufficient. Effective alignment requires the coordination of all parties and total support from top management.
9.	The driver that makes strategy work on a project is its strategic focus. Strategic focus involves the guidelines and the behaviour that will achieve the best competitive advantage and/or value from the project.
10.	Strategic alignment may be seen as the integration of three dimensions: strategic focus, operational efficiency and team leadership.
11.	The most successful projects have a few things in common. Beyond strategic alignment, they enjoy total support from top management, rely as much as possible on existing solutions and external knowledge, and their teams are highly motivated and excited (high spirit).

In accordance with their findings and the objective to achieve this strategic alignment, Shenhar proposes Strategic Project Leadership® (SPL) as a new approach to project management. Through this approach, a connection can be established between project management and business results (Shenhar, 2011).

The traditional view of project management starts with a definition of the specific scope of work. This scope is then translated into processes, where detailed plans are created to build the project budget and schedule. In contrast to this, the SPL® planning framework starts at a higher level and includes five major components:

1. Strategy
2. Spirit
3. Organisation
4. Processes
5. Tools

The SPL® elements are hierarchical, and must be addressed sequentially from the highest (1) to the lowest (5) during project initiation, planning, execution, monitoring and controlling, and closing (Shenhar, 2011). The last two parts (processes and tools) represent the traditional approach, which should not be ignored when managing projects the strategic way. In Table 5-4, a comparison of the traditional approach and the SPL® approach is shown.

Table 5-4: From project management to SPL® (Shenhar, 2011)

	Project management	SPL®
Basic paradigm	Projects are a collection of activities that need to be executed within time, budget, and requirements.	Projects are strategic organisational processes that are initiated to achieve business goals.
Focus	Efficiency	Effectiveness and efficiency
Perspective	Operational	Strategic, operational, human
Manager's role	Getting the job done on time, within budget, according to specifications	Getting the business results Winning in the marketplace
Project management style	One size fits all	Adaptive approach
Project definition	Project scope (scope of work) What needs to be done?	Product, competitive advantage, strategy, scope
Planning	Activity, schedule, budget	End results, success dimensions, activities
Project reviews	Progress, status, milestones, budget	Customer needs, strategy, success dimensions, status
Human side	Teams, conflict resolution	Leadership, vision, spirit, meaning, motivation

The concept of SPL® also defines seven principles to assist organisations in implementing the strategic approach to the leadership of a project. These principles are summarised in Table 5-5 below (Shenhar, 2011).

Table 5-5: The seven principles of SPL® (Shenhar, 2011)

	The seven principles of strategic leadership
1.	Leadership: Turn project managers into leaders. Make them responsible for business results.
2.	Strategic portfolio project management: Group projects based on their strategic impact and policy for project selection.
3.	Project strategy: Define the competitive advantage of the product and articulate a detailed project strategy to win in the marketplace.
4.	Project spirit: Articulate an inspiring project vision, and develop an appropriate project spirit that will support the strategy and create energy, excitement and commitment.
5.	Adaptation: Assess the environment and the task. Clarify the project and select the right project management style to fit the project type.
6.	Integration: Create an integrated hierarchical plan. Start with strategy and include spirit, organisation, process and tools.
7.	Learning: Create a project learning organisation. Every monitoring and controlling activity should include lessons learnt. Summarise the project in a lessons-learnt event and report.

The relevance of the research of Shenhar (2011), other than proposing a new approach, is that it confirms the necessity of a programme management function (that functions in the middle management domain of a business) that is tasked to translate strategy into tactics and operationalisation (projects).

Hence, the conclusion is that the focus of the Programme Management Office (PgMO) is on reciprocity and duality, as it exercises management control over its own processes, as well as governance control over the constituent projects within the framework of a life cycle model or management paradigm.

According to Dinsmore and Cooke-Davies (2006), the classic view is that project management starts when the project is authorised and funds are provided, and that it ends once the tasks outlined are completed and the project is handed over to whoever is responsible for the next ongoing stage, such as operations. Lately, however, there is a growing trend toward broadening the scope of traditional project management (Dinsmore & Cooke-Davies, 2006).

This broadening of the scope takes place in two directions: upstream and downstream. Thus, projects are extended upstream, starting with collation with the

mission and the vision, and ending further downstream to include total asset life cycle management. This is a growing world view.

For this reason, the JPMA developed the *P2M* model, which adds a “mission model” to the front end of projects and a “service model” to the back end. In this view, projects start during the thinking stage, when feasibility is still under consideration, and are only completed when the business results or benefits, as initially proposed, are in fact achieved (Ohara, 2003).

According to Dinsmore and Cooke-Davies (2006), there is a second expansion to encompass multiple project settings and related organisational issues, which fall under the umbrella of enterprise-wide project management. This trend started gaining momentum in the 1990s and continues to grow as companies come to grips with the challenges of responding to market demands by systematically managing multiple projects through improved portfolio management and project support groups, such as project management offices. Broadening the view of project management diffuses its implications throughout the enterprise and brings to light major issues not traditionally dealt with under the banner of project management.

Consequently, prosperity in organisations further hinges on the successful application of a simple formula: the right combination of the right projects done right. This implies that prosperity not only depends on good strategy, but also on implementing that strategy effectively. Success thus depends on effective management across the enterprise, involving an array of unique, timely and finite initiatives called projects.

The right projects are designed to meet specific needs like cost reduction, new product launches, capital expansion, marketing campaigns and quality enhancement. To be effective, these right projects have to be done right. They must meet objectives within specific guidelines of quality, time and cost. These right projects done right are major components in achieving success in organisations. Yet, these right projects done right must be applied in the right combination.

Thus, a balance is required to ensure that overkill is not applied to marketing projects, for example, without making sure that the product launch will come through as envisioned. Another example can be that spending money on improving the quality or lowering the cost of existing products only makes sense if adequate attention is paid to the new products that will replace the present ones in the

marketplace. So, it takes all three project rights (the right projects, the right combination and the right implementation) to attain solid success. The challenge of achieving the right combination of projects lies firmly with top management. Doing the right projects involves line management, project sponsors and other stakeholders. Doing projects right is of primary concern to the project management community and individual project teams. Each "right" concerns different criteria for success and focuses on factors critical to delivering that success (see Dinsmore and Cooke-Davies, 2006).

Table 5-6: Focus on the three rights (Dinsmore & Cooke-Davies, 2006)

Right	Responsible parties	Criteria for success	Critical success factors
The right combination	Senior management	Strategy implemented Productivity improved Right projects done Projects done right	Portfolio management Continual improvement Comprehensive and reliable metrics
The right projects	Project governance, executive sponsor, "client", owner and operator	All benefits realised Stakeholders satisfied	Clear and attainable goals Stakeholder commitment Benefits processes Project strategy
Done right	Project manager and team	Time, cost, quality, scope, technical performance and safety	Clear and attainable goals Capable and effective team Adequate resources Clear technical requirements Effective planning and control Risk management

One can thus conclude that the future of organisations relies heavily on how well a multitude of new initiatives or projects are carried out across the enterprise. For that to happen, two groups must join hands in an effort to put future business strategy

flawlessly into place. How well enterprise-wide project management is carried out depends on how well the two groups understand each other and work together. The first group, devoted to strategy, direction and design, accounts for two legs of the three-legged stool: picking the right projects and selecting the right combination of projects. These actions set the stage for the second group's transformation of the strategies and decisions into tangible results by doing projects right. The two groups are made up of people with different motivations, backgrounds and viewpoints. The first group's focus is to define the future and develop a winning business strategy, while the second group's focus is on getting things done. Each looks at the world through very different eyes (Dinsmore & Cooke-Davies, 2006).

In accordance with the above, it is often found that there is reliance on the establishment of an appropriate organisational structure and design. This will receive attention in Chapter 6. It can be observed that, in general, organisations focus on the development of people in terms of skills through training interventions, but they neglect designing the structures required to accommodate project execution. Commensurate with an increase in knowledge, should be an increase in organisational systems. It can also be noted that there is a relationship between individuals, teams and the organisational space created for them to execute tasks proficiently.

In executing projects, initiatives are undertaken from two perspectives: owner organisations (the owners of the new asset) and service organisations (creators of the new asset). Owner organisations undertake projects to expand their own enterprise capacity to achieve their organisational goals. Situations exist where service organisations execute projects on behalf of the owner organisation due to the owner organisation not having the capacity, or because the project work falls outside its own capabilities. The execution of projects for owner organisations is affected by the business context, which in turn determines the business requirements that projects' objectives fulfil. This is depicted in Figure 5-8 below.

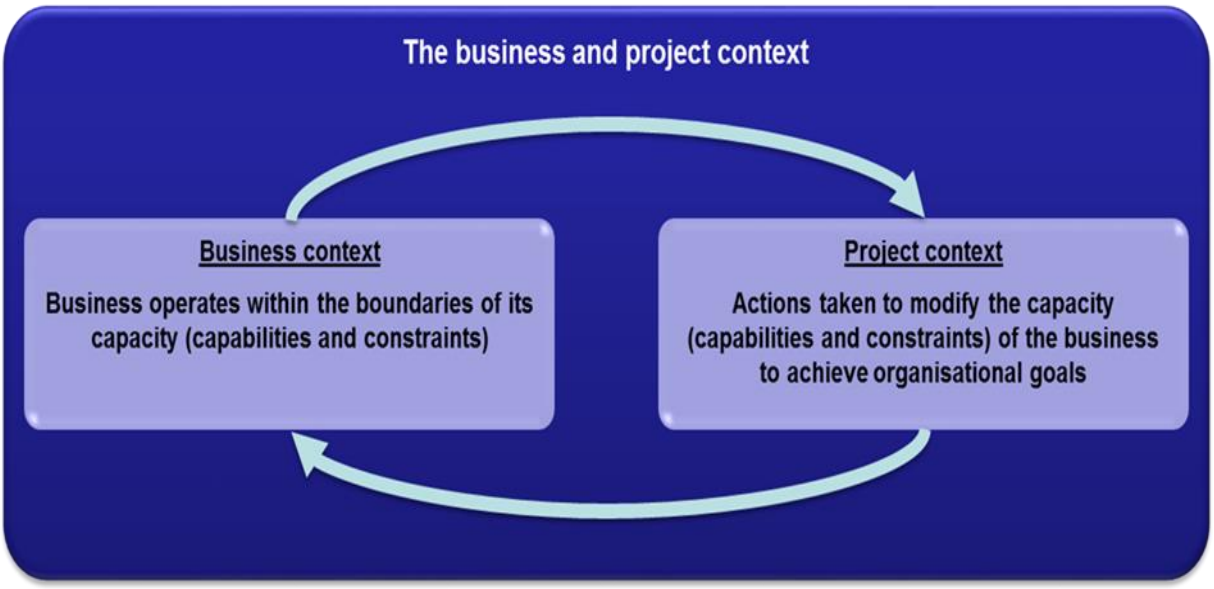


Figure 5-8: Business/projects context

While a project is a short-term action in the continuum of an organisation's existence, it can impact on the organisation's core, with implications extending far beyond the project itself.

The competitive market, with its forces of demand and supply, necessitates organisations to consider the conjuncture of business. This conjuncture necessitates a continual cycle of business improvement. Regardless of whether projects are executed from the perspective of the owner organisation or the service delivery organisation, one sees that successful execution is affected by the same dynamics. Matta and Ashkenas (2003) are of the opinion that large projects fail at an astonishing rate and that the desired end result should be very well understood during the planning phase. Failing this, there is a sizeable risk that important activities could be omitted from the project plan. This implies that the requirements and designs need to be substantially complete, that the complexity is appropriately understood and that working methods are thoroughly identified.

The Organisational Project Management Maturity Model (OPM3) of the PMI (Project Management Institute (PMI), 2003) suggests that in mature project management organisations, project management inhabits an expansive context, which is governed by programme management and/or portfolio management. It is thus proposed that maturity in project management is furthered through an approach that integrates portfolio, programme and project management, all functioning contemporarily and as an integrated unit within the organisation.

5.4 Organisational project management maturity

First, "organisational" increases the domain of project management beyond the delivery of the single project, which is the subject of the *PMBOK® Guide*. Maturity implies that capabilities must be grown over time in order to produce repeatable success in project management (Botha, 2012).[7]

Organisational project management maturity is described in the PMI's OPM3 (Project Management Institute (PMI), 2003) through the existence of best practices. A best practice is an optimal practice or process currently recognised by industry to achieve a stated goal or objective. For project management, this includes the ability to deliver projects predictably, consistently and successfully to implement organisational strategies. Applying best practices increases the probability that the stated objective will be achieved within time, cost, quality and performance. Following are the requirements to be in place before the journey to become mature can be meaningful:

- Performance and metrics:
  - A formal performance system that deals with the classical aspects of cost-time-quality measurement applied to both the product(s) of a project (effectiveness) and to the processes to deliver the product (efficiency). This is the source of the reward system both for individuals and project teams.
  - A policy for training and development integrated with a series of measures that check the effectiveness of project personnel.
  - The establishment and maintenance of a set of measures that demonstrates the level of customer satisfaction (Botha, 2012).
- Commitment to the project management process:
  - A board of directors that is involved in setting project management policies with specified goals.
  - A common framework that is understood and used by all project stakeholders for conceptualising, designing, planning, executing, managing and closing out all project-based work.

[7] This source is a research report where the research was conducted under the researcher's direct supervision. It is used here with permission.

- A common project management culture, with all people involved in projects sharing congruent beliefs, values and behaviours that support effective project working (Botha, 2012).

- Business alignment and prioritisation:
  - A clearly identifiable set of projects that support the organisation's strategic aims.
  - A measure that compares the organisational resources applied to projects that support each major corporate strategy with the importance of the strategy to the organisation (Botha, 2012).
- Success criteria for the continuation or culling of projects:
  - A means of identifying and selecting the projects to be undertaken, which includes elements such as mechanisms for the assessment of the worth/value of projects.
  - A means of identifying and selecting the projects to be undertaken, which includes the identification of the investment (human and financial) it wishes to make available to projects and the balance of the investment it wishes to make across different types of projects.
  - A means of identifying and selecting the projects to be undertaken, which includes evaluating how projects are linked to strategy (at either business unit or corporate level) (Botha, 2012).
- People:
  - A formal competency assessment mechanism that provides the ability to assess the level of competency of people involved in key project roles.
  - A project management community containing all jobs that are necessary for the effective management of the total project portfolio (project sponsors, programme managers, project control officers and project managers).
  - A project management community that provides sufficient competent resources to manage the organisation's total project portfolio (Botha, 2012).
- Allocating people to projects:
  - Acceptance of priorities between projects by the project management community (particularly the sponsors, project managers, line or functional managers and customers) to allow the efficient and effective allocation of resources.

  - Efficient redeployment of resources from projects that have been terminated prematurely to others, consistent with the organisation's strategic priorities (Botha, 2012).
- Organisational fit:
  - A clearly defined project team structure with defined roles and responsibilities.
  - A corporate approach tailored to the needs of the organisation and to the management of projects that acts as a route map for all concerned as to what should be happening (in planning and control terms) at any point of the project's life cycle.
  - A corporate approach to project management that identifies the structure of and interactions between project processes, stakeholder satisfaction processes, innovation and development processes, supply processes and operational processes (Botha, 2012).
- Teamwork:
  - A culture that is based on teamwork and establishes high levels of innovation and creativity in workgroups.
  - Cooperation that is the norm and takes place without the formal intervention of authority.
  - Team members who know the right thing and do it.
  - People in different roles and functions throughout the organisation who collaborate to define and agree on common goals (Botha, 2012).

It is remarkable from the above list that so many aspects refer to the HR component of project execution. A component that is addressed in the variety of bodies of knowledge, however, not at an organisational level, is the development and sustainable development of project managers.

5.4.1 Maturity in project management

On the website of the Sukad Group (Amat, 2012), Mounir Amat published a blog regarding organisational project management maturity. In the discussion, it is purported that a higher level of project management maturity means improved organisational performance over lower levels in the organisation. According to the discussion on the blog, many studies by the University of California-Berkeley, PM Solutions, PMI and others prove this.

It means implementing a proper, comprehensive and effective project management "system" and continuously improving it.

Project management maturity is about implementing (building) the project management system. By "system" is not meant IT/software. It means that the organisational system starts with the strategic aspects (governance, project selection and prioritisation) and includes other elements such as the following:

- Methodology for managing projects and programmes
- Processes
- Competence and performance management
- Leadership and professional development (Amat, 2012)

Then, the question would be: How can one build the project management system, leading to a higher level of project management maturity, with the ultimate purpose of establishing a Project Management Centre of Excellence (PMCoE)? (Amat, 2012).

In order to achieve the objectives stated above, a brief overview is presented of the various project management maturity models that were encountered. Again, the PMI is emphasised, but it is not the only authoritative reference when it comes to project management maturity. A synopsis of the landscape of maturity models is given in Table 5-7 below.

Table 5-7: Synopsis of project management maturity models

Level	Portfolio, Programme and Project Management Maturity Model (P3M3) (Office of Government Commerce 2008)	PRINCE2® Maturity Model (P2MM) (AXELOS, 2013)	Gartner (Mieritz et al., 2007)	PMI (Kerzner, 2001)
0	N/A	N/A	Non-existent; ad hoc	N/A
1	Awareness: recognise project has little structure	Awareness: recognise project has little structure	Initial: reactive	Common language

Level	Portfolio, Programme and Project Management Maturity Model (P3M3) (Office of Government Commerce 2008)	PRINCE2® Maturity Model (P2MM) (AXELOS, 2013)	Gartner (Mieritz et al., 2007)	PMI (Kerzner, 2001)
2	Repeatable: begin standard approaches, no consistency	Inconsistent PRINCE2® utilisation	Developing: emerging discipline	Common process
3	Defined: consistent standards, clear ownership	PRINCE2® is tailored and completely utilised	Defined: initial integration	Integrated processes
4	Managed process: monitor consistency, active interventions	Not addressed	Managed: increasing efficiency	Benchmarking
5	Optimised: focus on optimisation, consider future demands	Not addressed	Optimised: enterprise orientation	Continued improvement

From Table 5-7, it is interesting to note that the current maturity models do not emphasise the development of people, yet it is mentioned in the requirements for maturity.

5.5 Project management

Projects are not executed on their own, for their own sake and in isolation. They are delivered within a framework of corporate governance, portfolio and programme management. This framework is necessary to facilitate the effective management of the work required to meet the strategic objectives of an organisation.

According to Kerzner (1995, p. 2), organisations are adopting a trend of managing the delivery of their business objectives in a manner that adopts either managing by executing projects, or through project management in executing services.

Executing work through project management is becoming more and more prevalent. It is therefore necessary to look at what this phenomenon entails. For this reason, it is necessary to examine the various definitions of project management. This is done to determine the elements that would differentiate a project and project management work from other work.

In accordance with the definitions of projects and project management, one can deduce the following:

- Projects follow a life span, making it a temporary endeavour with time constraints.
- Projects have unique deliverables.
- The deliverable of the project has to be achieved at a required level of efficacy.
- There are risks involved in executing projects.
- Projects need to be executed within a framework of quality management.
- There is a link between organisational strategic management and projects.

5.5.1 Project process groups

According to *PMBOK® Guide* (Project Management Institute, 2008), project process groups are:

- Initiating
- Planning
- Executing
- Monitoring and controlling
- Closing

Given that a life cycle approach is taken, project management should exist in an environment (life cycle) where the management of projects is controlled and governed, to ensure the consistent behaviour of practitioners.

In contrast to a process group, a project phase is a collection of logically related project activities, usually culminating in the completion of a major deliverable. Due to the nature of projects, i.e. the implied uniqueness, the deliverables of each stage are

different, hence the life cycle of each project is unique. In order to cater for the uniqueness, but maintain a level of control over project execution, many organisations have developed a common scalable project life cycle approach (Project Management Institute, 2008).

Within this life cycle approach or framework are commonalities such as the following:

- Methods
- Procedures
- Standard practices

These commonalities detail the specific way in which a project is to be executed within a specific company's culture. The main objective of having a life cycle management approach is therefore that an organisation can employ standardised processes on all projects (Project Management Institute, 2008).

There is, however, a caveat that needs to be mentioned. According to Jainedrakumar (2008), there is a distinction between the project life cycle phases and the project management process groups, as purported by the PMI. This is especially true in the ICT environment, as the traditional model approach of initiation, planning, execution and close-out would be replaced by the life cycle management approaches, such as spiral development and the waterfall approach (Project Management Institute, 2008).

It is noteworthy that if a traditional life cycle management approach is applied to ICT projects, an additional phase or stage is added. This is illustrated below (Jainedrakumar, 2008):

- Analysis
- Design
- Development
- Testing
- Implementation

From the stated caveat, it is important to conclude this section with the realisation from Jainendrakumar (2008) that there should not be confusion between the naming of the life cycle stages and phases and the process groups of *PMBOK® Guide*. The stated process groups can be repetitive in each phase of an ICT project. This is important, as it gives rise to roles and functions that would need to be defined in each consecutive stage of project execution.

In the following section, a larger view of how projects are grouped in a collective programme will be discussed.

The unique and temporary character of a project is universally accepted. The execution of such a project requires exceptional leadership behaviour, which is underpinned by the context of project management. According to *PMBOK® Guide* (Project Management Institute, 2008), project management is the application of knowledge, skills, tools and techniques to the activities that are required to achieve the project requirements.

In its combination of knowledge, skills and tools, the latter statement suggests that individual knowledge and an organisational way of work are not disjointed, but the two concepts are mutually dependent, and a symbiotic relationship exists between them.

5.5.2 Project life cycle models

Projects need to be managed and governed in accordance to an organisation-wide accepted framework or model. Through the use of such a model, there is an opportunity to achieve a structured and controllable software development effort. Several software development models can be used in the execution of ICT projects and software development. However the most well-known models are the following (Rahmany, 2012):

- Spiral Model
- Waterfall Model
- V Model
- Agile Model

The model defines a systematic way of accomplishing an orderly way of working during the project. In terms of software development, testing appears in each of these life cycle models, but with very different meanings and extents. One can thus infer that some models work better for specific types of projects.

Rahmany (2012) posits that these models can work in parallel, e.g. a project might start with the Spiral Model, but during the development process, it becomes clear that the project should update some of its requirements because of the customer's change of design. This means that the Spiral Model interacts with some aspects of the Agile Model (Rahmany, 2012).

The discussion will focus on the differences between the most well-known life cycle models and elaborate on their various strengths and weaknesses.

5.5.2.1 Understanding project life cycles

A further aspect that needs to be mentioned is the differentiation between project management and what is commonly known as the project life cycle. In the project life cycle approach, a project is divided into phases with the occasional subdivision of stages. The phases with their embedded stages are sequential. It usually forms a good framework for evaluating the delivery of products and services as the required outputs of the project.

The literature broadly concurs with the life cycle approach and, while the various bodies of knowledge (Association for Project Management (APM), 2012a; Australian Institute of Project Management (AIPM), 2011; Project Management Institute (PMI), 2011) and methodologies (Method123® Project Management Methodology, 2011; TenStep, 2011; PRINCE2, 2011) may all differ to an extent with regard to terminology, the golden thread of the phases through a life cycle remains consistent.

According to *APMBOK* (2006), projects are executed through four distinct phases of the project life cycle:

- Concept Phase: Confirm the need, opportunity or problem, consider the overall feasibility, identify a preferred solution and develop the business case.
- Definition Phase: Optimise the preferred solution, plan the work to be done and organise the resources to do it.
- Implementation Phase: Implement the work by executing the plan.
- Handover and Closeout Phase: Hand the project over to the customer, finalise all matters and perform final reviews.

This can be graphically represented in Figure 5-9 below.

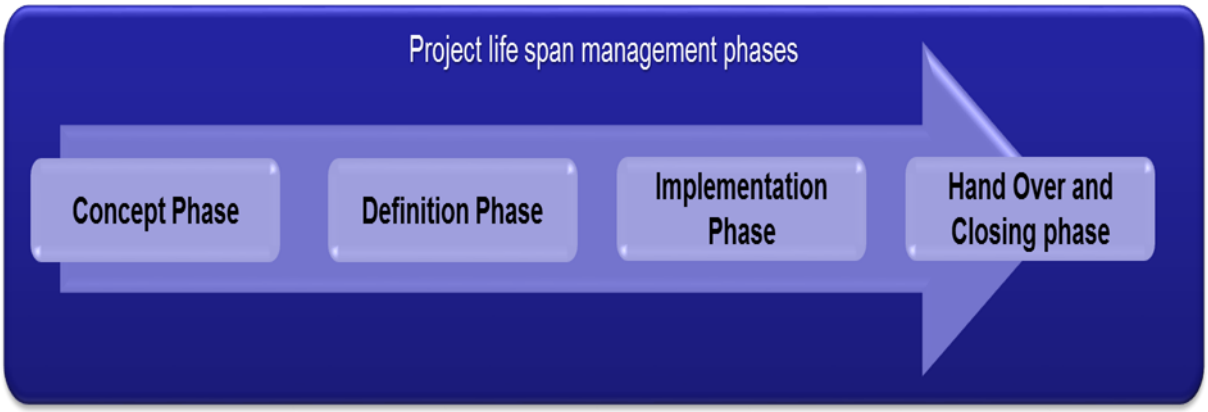


Figure 5-9: Generic project life cycle phases according to the APM

This classic view is also present in *PMBOK® Guide* (2008), which shows four distinct phases in the project life cycle (see Figure 5-10):

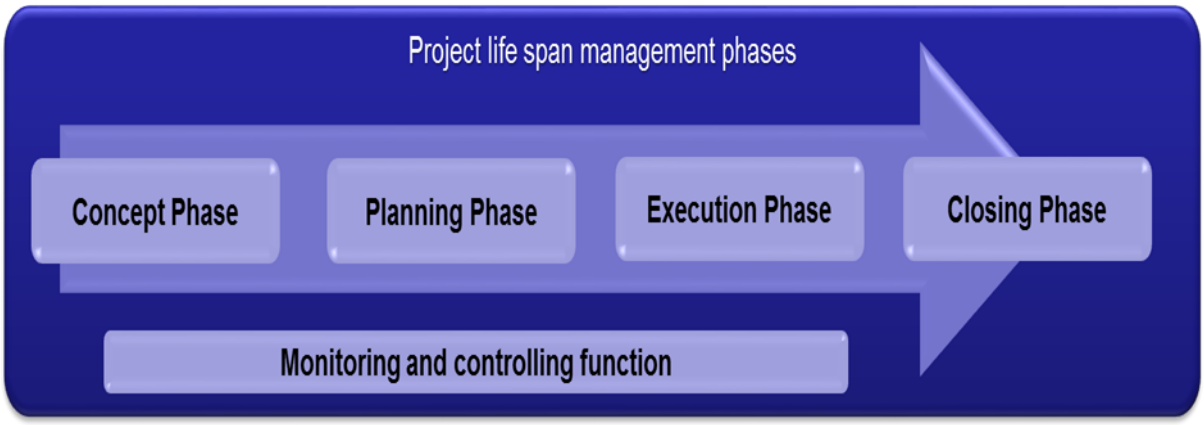


Figure 5-10: Generic project life cycle phases according to the PMI

- Concept/Initiation Phase: Start the project.
- Planning Phase: Plan the work to be done and organise the resources to do it.
- Execution Phase: Implement the work by assigning work to people and lead the team of people involved.
- Closing Phase: Handover and close out the project.

Monitoring and controlling processes exist throughout the project life cycle. Through control, progress is measured and adjustments are made to the plan.

The processes coincide with the life cycle phases, but recur. In order to complete the processes, some inputs are transformed into outputs through the use of tools and techniques, which then become the inputs to the next process or phase. Besides the project management bodies of knowledge models, there are other project life cycles and models to manage them.

On the website of Verillon.com (Verillon, 2011), RK Wysocki states that project management life cycle models can be viewed as belonging to two broad categories. In terms of the categorisation the models are either:

- linear and incremental models (also known as traditional models); or
- iterative and adaptive models (characteristic of the Agile project management approach).

There are five types of models within this categorisation.

The most suitable model needs to be chosen by the project team and the project manager. Bear in mind that the chosen model should be within the boundaries of the governance framework as prescribed by the Programme Management Office (PgMO)[8].

It is natural that each model will have strengths and weaknesses, and in choosing an appropriate model to mitigate risks, the team should consider each model on its merit (Wysocki, 2009).

Furthermore, Chin and Spowage (2012) explain the use of life cycle models during project execution. A short overview of their findings will now be discussed (Chin & Spogawe, 2012).

Linear Project Management Life Cycle Model

A linear model is a model starts with determining the scope, followed by a planning phase, a monitoring process and consecutive phases, through to the closing of the project. It relies heavily on planning during the initiation phases of the project, which set the scene for the execution of the project. Wysocki, as cited in (Chin & Spogawe, 2012), however, pointed out that “knowledge based from one process group cannot be used to revise and improve the deliverables” (Wysocki, 2009). Wysocki infers that, when changes occur, it would have a significant effect on the project’s budget and schedule, and would constitute putting more pressure on the project team. To alleviate the pressure, the project team should try to mitigate the risk linked to the lack of flexibility of this model by ensuring that scoping and planning is as thorough and detailed as possible. This would necessitate upfront preparation of the

[8] Take note that some sources consulted use the acronym PMO to refer to the Programme Management Office (PgMO).

contingency plans. A generous budget tolerance margin can give the project team the much-needed room to manoeuvre (Chin & Spogawe, 2012).

One can thus deduce that there would be a need for more specialised people upfront during the project start up. There would be pressure on the planners in the project support part of the job family due to a large focus on their function upfront.

Incremental Project Management Life Cycle Model

According to Chin and Spowage (2012), an incremental model is similar to the linear models in that it shares many of the steps followed. The difference, however, resides in the project delivery being divided into parts. These are described as follows (Chin & Spogawe, 2012):

- Firstly, part of the project's deliverables are produced and released.
- Additional developments are made and linked to the initial delivery.
- The solution is completed.

This approach calls for each stage to be completed with the review of the solution and resultant testing. The review of the tests are assessed and any required changes are incorporated into the next stage of solution development. At each stage of increment or project execution, changes and amendments of the planned developments actually add value to the process, and are important in ensuring the success of the final solution. The weakness of this approach is linked to the scheduling of the stages of the solution development. Again, Wysocki (2009) commented that a mistake in the scheduling of development (linked, for example, to the dependencies between the developments) can put the whole project schedule at risk. The project team can try and mitigate this weakness through additional effort in terms of planning and scoping, thus attempting to predict possible outcomes and how they will influence each other. In addition, during the solution development, testing should be exhaustive to ensure that all scenarios are considered (Chin & Spogawe, 2012).

Thus, the Incremental Project Management Life Cycle Model restrains resources so that more specialised resources are required within the project team, and more people with contextual knowledge would be required. Furthermore, pressure causes people to need more HR management skills at an interpersonal level.

The second identified group of life cycle approaches consists of iterative life cycle

models and adaptive models. These are characteristics of the Agile project management approach.

Iterative Project Management Life Cycle Model

Chin and Spowage (2012) state that there are slight similarities between the Iterative Project Management Life Cycle Model and the Incremental Project Management Life Cycle Model. Both models rely on partial developments of the solution, their review and further enhancement according to the requirements or review findings. The difference between the two is that in the Iterative Project Management Life Cycle Model, change is necessary to allow progress. The main disadvantage of this model is that the fully developed solution requires partial developments to be implemented. This is often complicated and costly. Furthermore, the client needs to be very involved, specifically at the testing stage, and must also actively participate in the review of each stage. The client may not always be happy to be this involved.

One can deduce that there is a high demand for very good stakeholder and communication management. This would require planning for such a role and function in the project team.

The mitigating action would be to ensure that there are dedicated full-time resources on both sides: a development and testing team on the provider's side, and a project and technical testing team on the client's side. It is important that the resources are secured full time throughout the project, not only periodically.

Adaptive Project Management Life Cycle Model

This model is based on cycles, with each cycle planned and scheduled based on findings from the previous cycle. This is the model that favours the focused approach, and only the viable options are taken into account (solutions considered probable based on each cycle's findings). Furthermore, there is minimal planning involved, as the model is based on frequent change. The disadvantages of this model are that it requires active client involvement and the solution of the project is unknown (Chin & Spogawe, 2012).

The solution to these two downsides would be to ensure that all members of the project team, and especially the client, are aware of the nature of the project (that it is unspecified and that there are a lot of unknown factors). Secondly, the client must understand that this model requires very active involvement on its side and, similar to

the iterative model, a dedicated team must be established by the client (Chin & Spogawe, 2012).

The last model is the Extreme Project Management Life Cycle Model.

Extreme Project Management Life Cycle Model

This model is best suited to situations where there are a lot of uncertainty and changes. It is based on phases and is characteristic to projects where not only the solution, but also the direction is unknown. This model shares similarities with the Iterative Project Management Life Cycle Model, but the main difference is that there are more unknown factors and client involvement is higher. Where the Linear Project Management Life Cycle Model was based on upfront planning and did not allow any deviations, the Extreme Project Management Life Cycle Model is on the other end of the spectrum: there is virtually no upfront planning, as there are too many unknown factors and it gives project teams nearly unlimited flexibility. There are many risks linked to this model, most of them resulting from the high uncertainty of the project direction. The time frame and the budget are unspecified. It is difficult to obtain any additional funding if nothing specific can be shown. The resources and efforts can be committed to pointless research. The fact that it is pointless becomes clear post-factum (Chin & Spogawe, 2012).

Project teams should try to apply a structured approach to each phase: brainstorm and discover as many options as possible, test them and eliminate them if they are not viable or successful. The biggest challenge of an undefined project is to remain focused.

From research conducted by Rahmany (2012), one finds examples of the models described above, with particular relevance to ICT projects.

5.5.2.2 Spiral Model

According to Rahmany (2012), Barry Boehm (1985) was the first to define the Spiral Model in his article “A spiral model of software development and enhancement”. The model, as defined by Boehm, was the first to explain why iterative development matters.

The Spiral Model is an evolutionary version of incremental prototyping. It is mostly used in large projects. For smaller projects, Agile concepts are more appropriate.

This model of development combines the features of the Prototyping Model and the Waterfall Model (Rahmany, 2012).

The incremental nature of the model reflects the fact that the project is not done in (possibly large) pieces, but as a series of smaller developments and deliveries. There is a notion to reduce risk through the development and delivery of small parts of a system early on and getting client feedback and approval. System functionality and reliability requirements will grow over time, from an early version only for development or for users, to a version released to final customers later (Rahmany, 2012).

When using the Spiral Model, testing must be adapted to such development models, and continuous integration and regression testing are necessary. The tests should be reusable test cases for every component and increment, and it should be reused and updated for every additional increment. If this is not the case, the software reliability tends to decrease over time instead of increasing (Rahmany, 2012).

The advantages of the Spiral Model are as follows:

- It is a very flexible model: Development phases can be determined by the project manager, according to the complexity of the project.
- Estimates (budget, schedule, etc.) get more realistic as work progresses, because important issues are discovered earlier in the project.
- It is good for large and mission-critical projects.
- Software is produced early in the software life cycle (Rahmany, 2012).

The disadvantages of the Spiral Model are as follows:

- It does not work well for smaller projects.
- Evaluating the risks involved in the project can escalate the cost and it may be higher than the cost for building the system.
- It is customised for every project.
- Risk analysis requires highly specific expertise (Rahmany, 2012).

In summary, it serves as the best option for businesses with volatile business goals, but where there is a need for a prototype to handle the complexities in the business procedures.

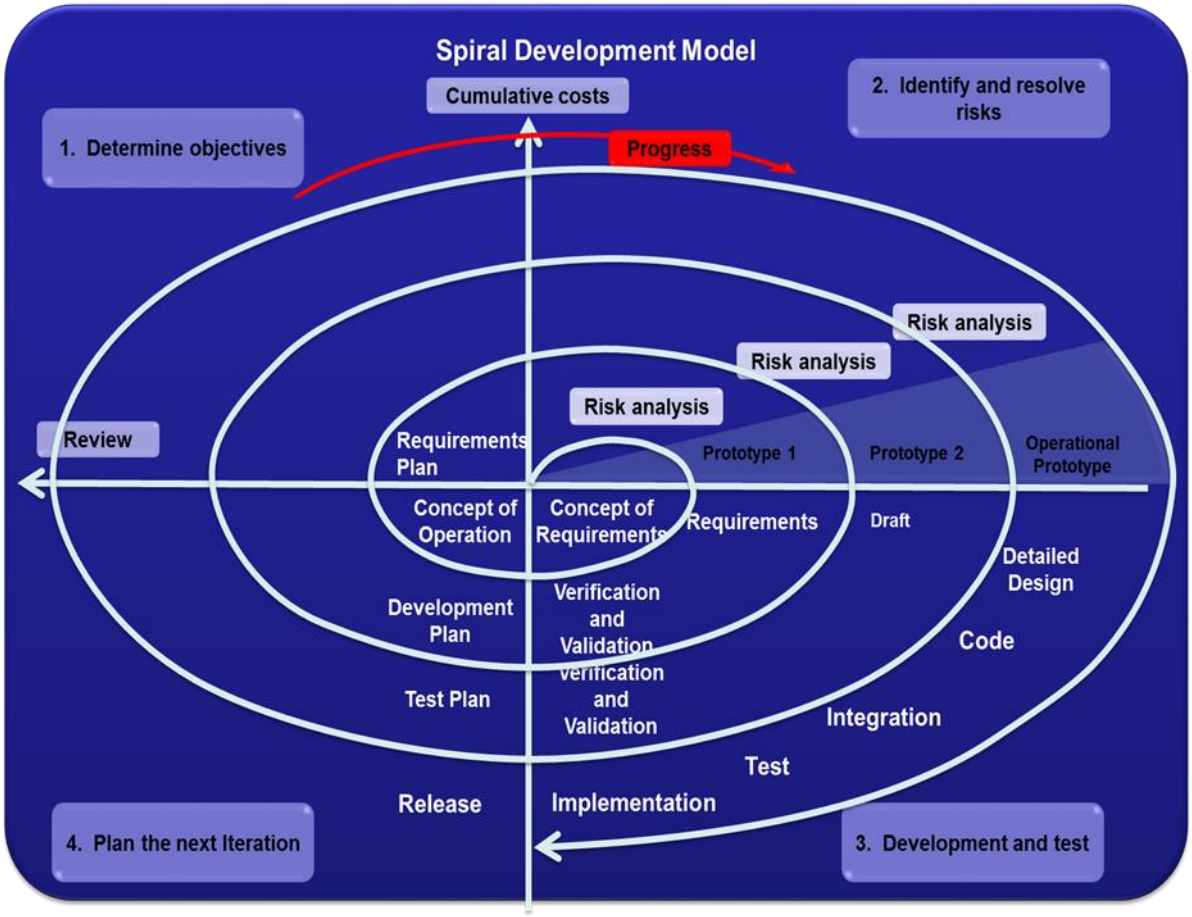


Figure 5-11: Rahmany's Spiral Development Model (Rahmany, 2012)

5.5.2.3 Waterfall Model

The original SDLC model was the Waterfall Model. This model is very simple to understand and well known in the development process (Rahmany, 2012).

The main concept of this model is that only one development level is completed at a time. At the end of each phase, a review takes place to determine if the project is on the right path and whether or not to continue or discard the project (Rahmany, 2012).

The advantages of the Waterfall Model are as follows:

- This method is also well known among software developers, therefore it is easy to use.
- It works well for smaller projects where requirements are well understood.
- It is cost effective. Time spent early in the software production cycle can lead to greater economy at later stages (Rahmany, 2012).

The disadvantages of the Waterfall Model are as follows:

- The crucial disadvantage of this model is that testing is understood as a “one time” action at the end of the project just before the release of the operation. The test is seen as a “final inspection”, an analogy to a manufacturing inspection before handing over the product to the customer.
- There is high risk and uncertainty.
- It is inflexible.
- It is a poor model for complex and object-oriented projects (Rahmany, 2012).

In summary, the Waterfall Model should be used for projects with clearly and deeply understood project requirements, design, technical tools and infrastructures.

The standard phases of the Waterfall Model (Rahmany, 2012) are shown in Figure 5-12 below:

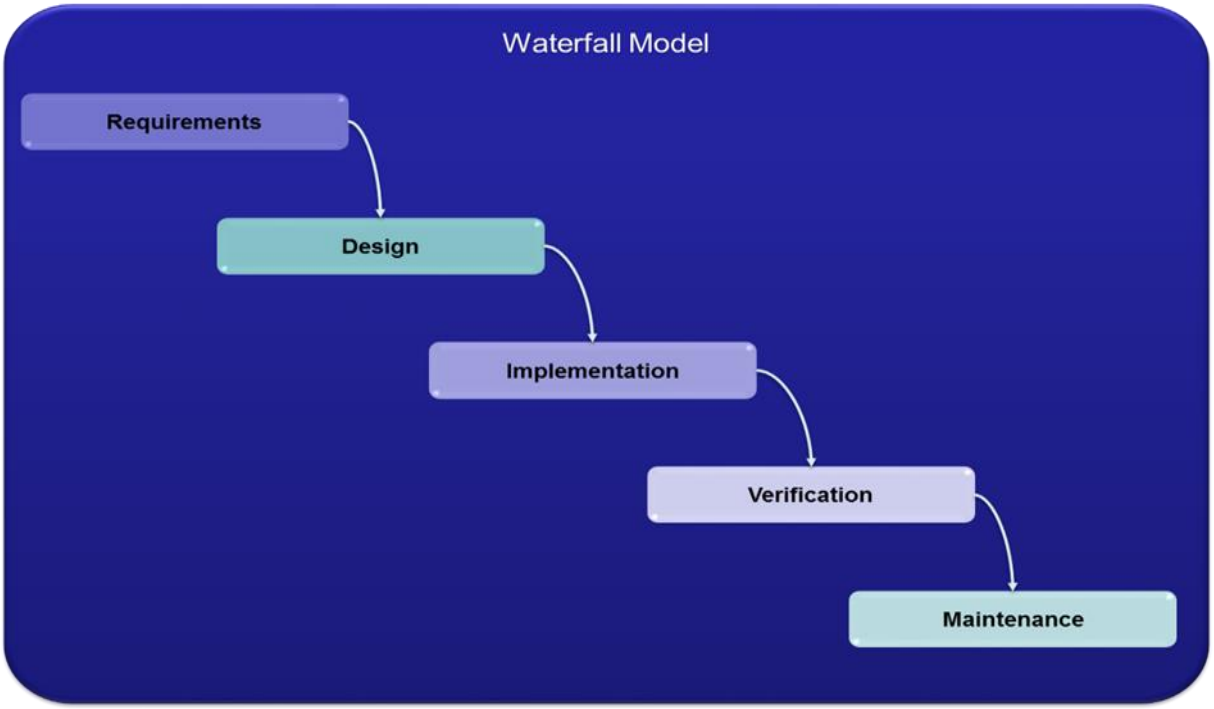


Figure 5-12: Waterfall Model

5.5.2.4 V Model

The third model is the V Model. This is the most familiar model in the development process. The model has the form of a “V”. The main idea of the V Model is that development tasks and testing tasks are corresponding activities of equal importance, symbolised by the two sides of the “V” (Rahmany, 2012).

The development process proceeds from the upper left point of the V towards the right, ending at the upper right point. In the left, downward-sloping branch of the V, development personnel define business requirements, application design parameters and design processes. At the base point of the V, the code is written. In the right, upward-sloping branch of the V, testing and debugging is done. The unit testing is carried out first, followed by bottom-up integration testing. The extreme upper right point of the V represents product release and ongoing support. Like in the Waterfall Model, each phase must be completed before the next phase begins. The V Model is actually a modified version of a Waterfall Model. The V Model ordains that the code testing documentation is written in tandem with the development phases. That means, for instance, that the integration tests should be documented as and when the high-level design is finalised, and the unit tests should be ready as and when the detailed specifications are laid down. In this model, testers should be involved in reviewing development information as soon as possible. Like Waterfall Model testing, process and fixing faults can be done at any stage in the life cycle, but the cost of finding and fixing faults increases dramatically as development progresses. The number and intensity of the test levels may be modified according to the specific needs of the project. For every development stage, there is a corresponding test level (Rahmany, 2012).

The advantages of the V Model are as follows:

- Due to the fact that defects in the V Model are repaired soon after they are detected, it is cheaper to fix them.
- The model has the reputation of having a very good base for the partitioning of testing; all the participants in the development of a system have a responsibility for quality assurance and testing.
- Testing activities like requirements and test design take place well before coding. This saves a lot of time and helps to develop a good understanding of the project at the initial stage.
- The objectives of testing change are specific for each test level (Rahmany, 2012).

The disadvantages of the V Model are as follows:

- It is very rigid and the least flexible model. This means that if one of the requirements changes, the tester needs to update the test documentation as a whole.

- This model is applicable mostly to big companies because it needs a lot of resources.
- The number and intensity of the test levels should be tailored according to the specific needs of the project (Rahmany, 2012).

In summary, in the V Model (Rahmany, 2012), as presented in Figure 5-13, the place of testing in the development process is critical. Fault finding occurs early on in the stages of the development process, which provides a cheaper alternative in terms of rectification.

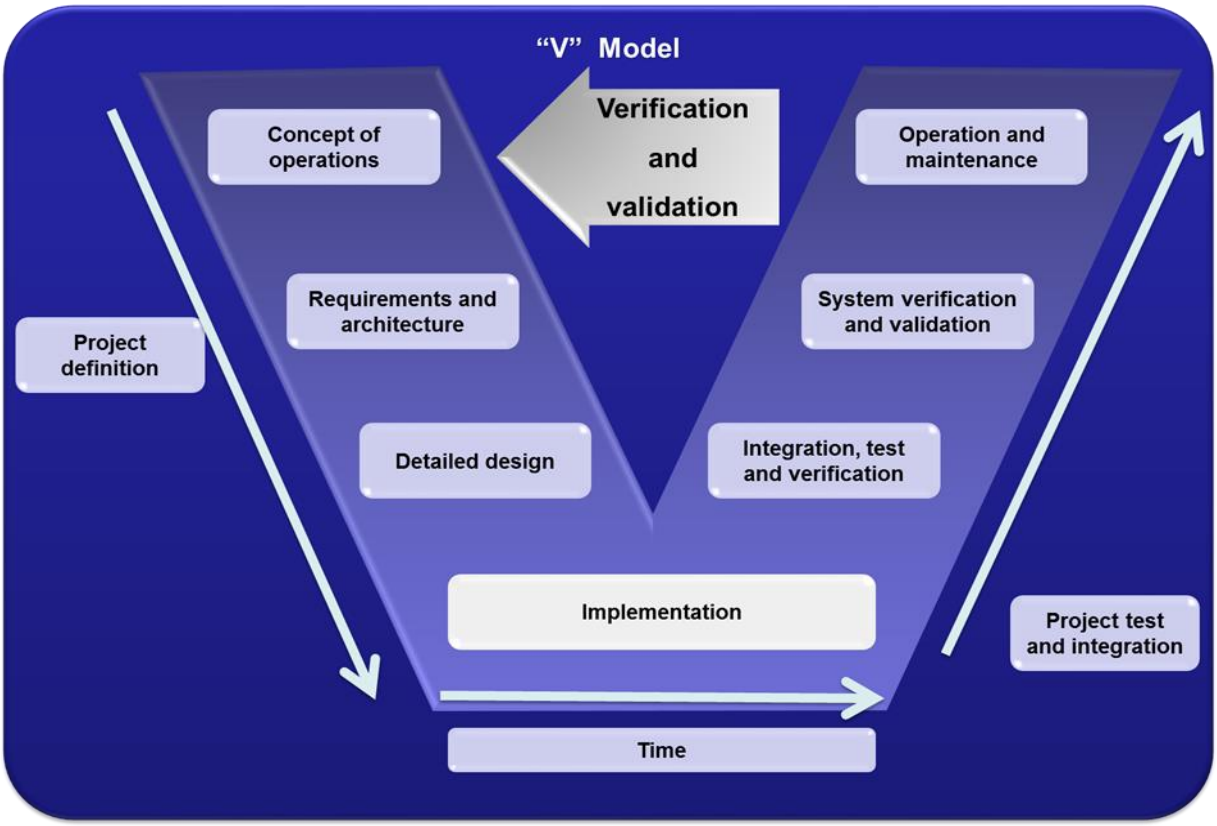


Figure 5-13: V Model

5.5.2.5 Agile models

Agile methodologies[9] arose from the need to develop software applications that could accommodate the fast-paced evolution of the internet. The Agile Model is, in some way, a variant of the Iterative Project Management Life Cycle Model, where deliverables are submitted in stages. The main difference is that Agile models cut delivery time dramatically. Companies that practise Agile methodologies are

[9] Although Agile is referred to here as a methodology, the literature is ambivalent regarding the use of the term methodology. Refer to http//agilescout.com/agile-is-not-a-methodology for further clarification.

delivering software products and enhancements in weeks rather than in months. Moreover, the Agile manifesto covers development concepts aside from the delivery life cycle, such as collaboration, documentation and others (Rahmany, 2012).

Agile software development is a conceptual framework for software engineering that promotes development iterations throughout the life cycle of the project. The name "Agile" implies doing something very quickly. Hence, Agile testing refers to validating the client's requirements as soon as possible, and making it customer friendly. Agile practices are specially tailored to eliminate all kinds of waste manifesting in a product life cycle, but more specifically, improving the quality of the developed product is a major goal interwoven into most of those practices (Rahmany, 2012). Rahmany explains the Agile model as set out in Figure 5-14 below.

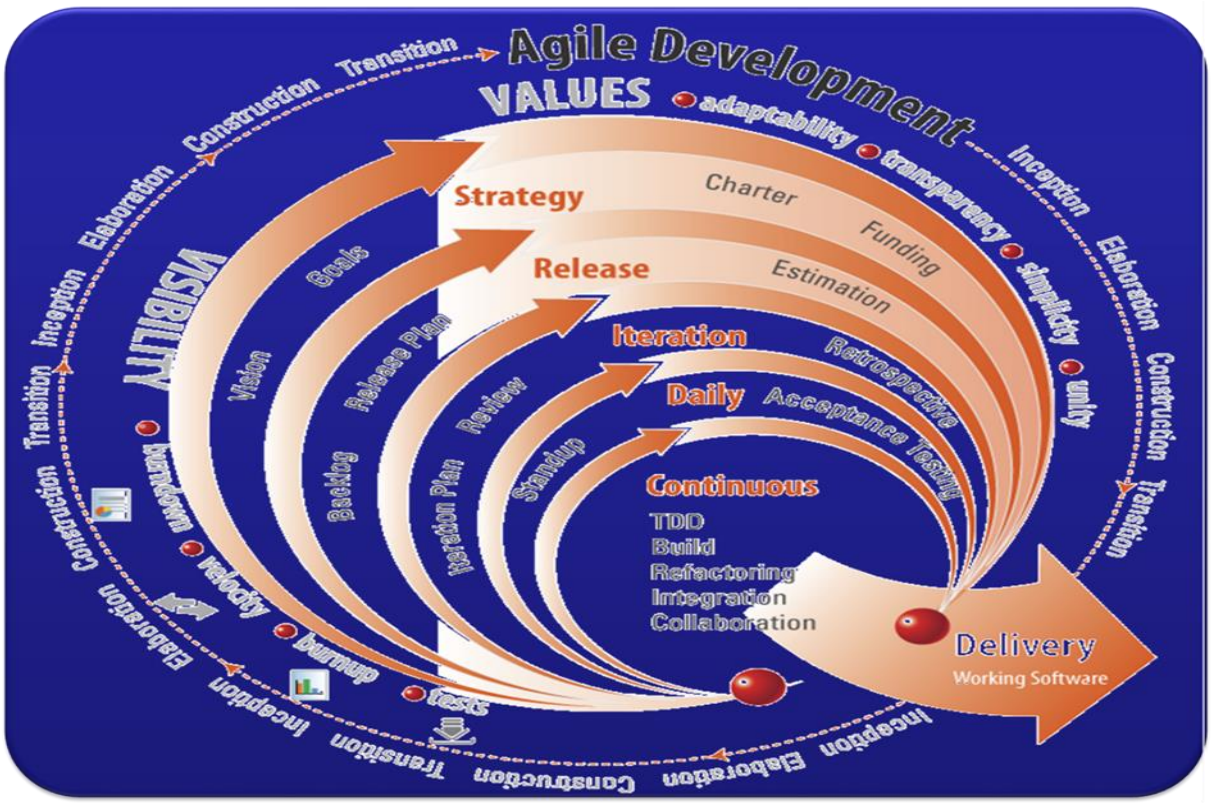


Figure 5-14: Agile delivery model

There are many Agile development methods. Most minimise risk by developing software in short periods of time. Software developed during one unit of time is referred to as an iteration, which may last from one to four weeks. Each iteration is an entire software project, including planning, requirements analysis, design, coding, testing and documentation. In Agile testing, as soon as the build is out, testing is expected to start and any bugs reported quickly.

The Agile Model has some accepted properties, for example:

- Short release cycles: Agile development cannot be called Agile unless it is done in short repetitive iterations.
- Customer involvement: the tester should provide his or her thoughts on the client requirements rather than just being the audience at the other end of the process.
- Responding to change: Agile development is focused on quick responses to change and continuous development.
- Individuals and interactions take preference over processes and tools (Rahmany, 2012).

Agile methodologies have the following advantages:

- They save time and money.
- They are focused more on the application than on documenting things.
- Daily meetings and discussions for projects done according to the Agile Model can help determine the issues well in advance and work on them accordingly.
- It is suitable for requirements changing even in a late stage of development.
- The end result is high-quality software in the least possible time, and a satisfied customer (Rahmany, 2012).

Agile methodologies have the following disadvantages:

- The project can easily be taken off track if the customer representative is not clear about the final outcome that the company wants.
- There is a lack of emphasis on the necessary design and documentation.
- User involvement is often a potential problem, especially in big, complex projects.
- Agile processes are really only applicable to products where reliability is not very critical (Rahmany, 2012).

An example of an Agile development method is explained in Figure 5-15 below, courtesy of Microsoft Solutions Framework (MSF) (Microsoft Technet, 2005). It clearly shows another version of a model that can be employed using Agile principles.

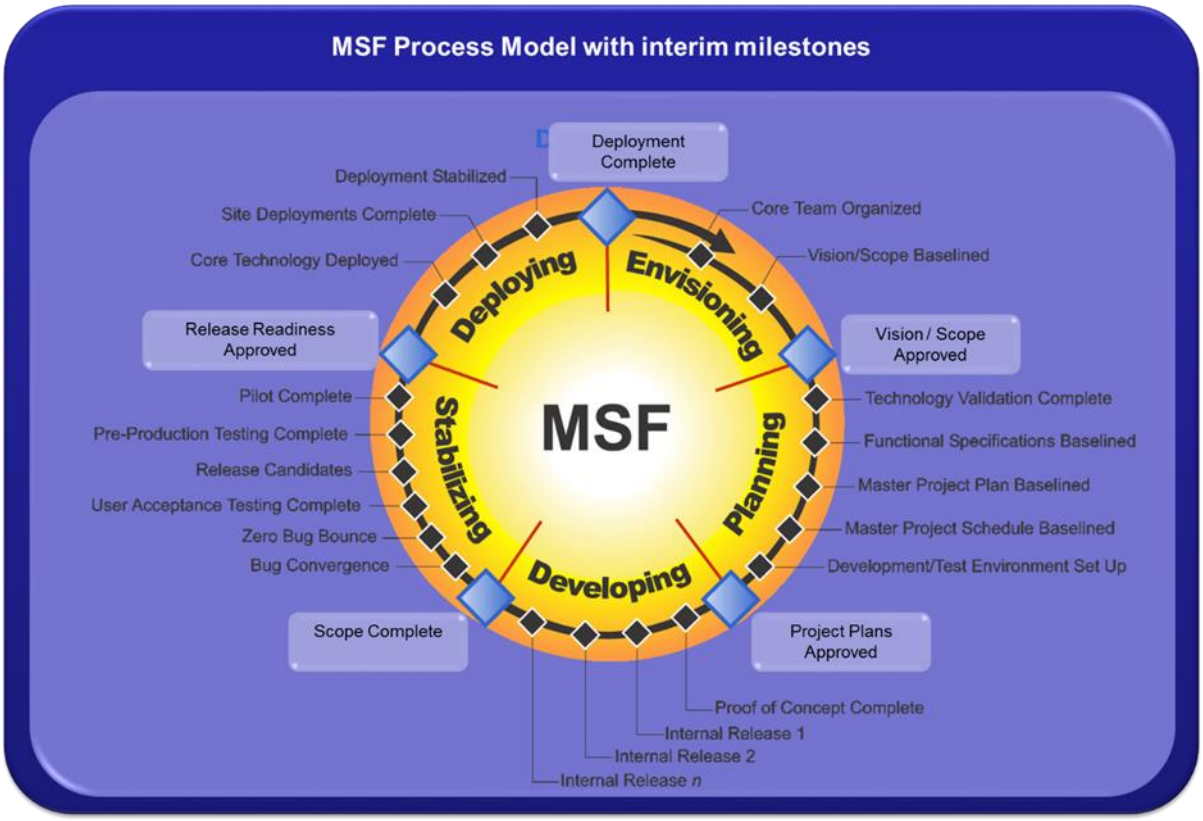


Figure 5-15: MSF process model with interim milestones

5.5.2.6 Project life cycle models – which ones to use

Having developed an understanding of the various approaches to ICT project life cycles, the question arose as to which approach/model is the best. Figure 5-16 was developed to summarise and indicate which approach would be best suited to the needs of the project.

			Watrerfall	Agile
How stable are the requirements?	Clarity and stability of the project requirements.	High	x	
		Low		x
	Frequent changes	High		x
		Low	x	
	Opportunity for you to accommodate new requirements	High		x
		Low	x	
	engaged in a more traditional project development where there is a stiff rule on ensuring complete set of requirements before going on to the next phase	High	x	
		Low		x
Who are the end-users of the system?	Influence on roject	High	x	
		Low		x
	Who are they?	High	x	
		Low		x
	Are they dispersed or controlled group?	High		x
		Low	x	
	How can they influence the project?	High	x	
		Low		x
Is the time line aggressive or conservative?	Deliver partial functionalities early	High		x
		Low	x	
	An opportunity for you to satisfy your stakeholders by delivering key features that are necessary	High		x
		Low	x	
What is the size of the project?	Large enterprise projects generally require large number of project teams to work on clearly defined deliverables.	High	x	
		Low		x
Where are the project teams located?	If you have several project teams located in different geographic locations, co-ordination of work needs to be more detailed and stringent.	High	x	
		Low		x
	Work assignments need to be well-defined to avoid confusion and redundancy of work.	High	x	
		Low		x
	Geographical dispersion	High	x	
		Low		x
What are the critical resources?	Critical resources restricted	High	x	
		Low		x

Figure 5-16: Traditional vs Agile life cycle approaches choice factor matrix

5.5.3 Methodologies and job roles

In the previous section, attention was given to project life cycle management approaches. This section will relate information in the discussion regarding execution methodologies.

Chin and Spowage (2012) have conducted research regarding the various execution methodologies that are employed in project management, as explained in Figure 5-17 below.

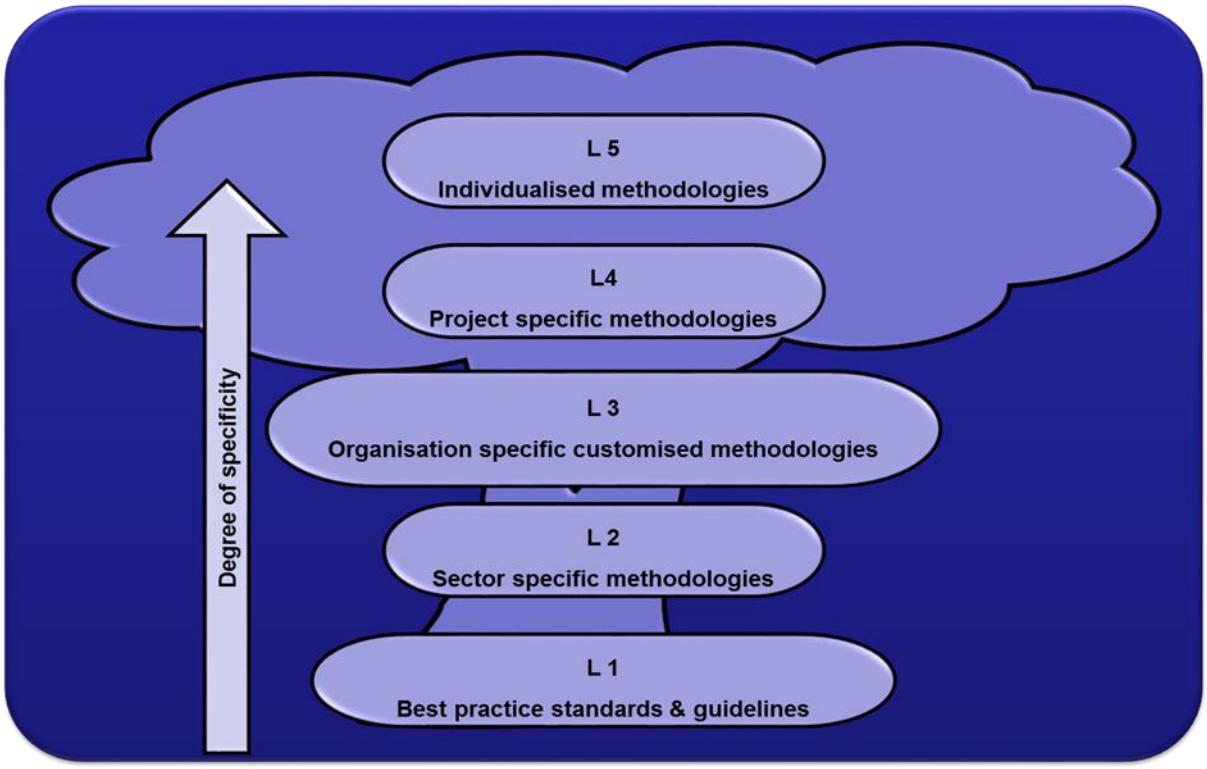


Figure 5-17: Classification of project management methodologies

Chin and Spowage (2012) cite Bredillet (2003) and Garcia (2005), who indicated that there are over half a million published standards globally, termed L1 methodologies. An "analysis of the PMMs [project management methodologies] reviewed … indicated that the most popular best practice used to build the organisation-specific customised methodologies was the PMI's *PMBOK® Guide*, followed by PRINCE2®; while other methodologies were based on *APMBOK* and PROPS [Projects and Organisations – Ericson's developed PM methodology]".

With reference to the research and objective, it can be stated that the importance of the classification of methodologies of Chin and Spowage (2012) reflects the definition of the job family and subsequent roles and responsibilities. However, how different methodologies will influence job roles needs to be considered.

> *Roles refer to a person or group that performs a certain set of activities. Roles are different to titles. Roles refer specifically to the work a person is performing at any given time. Titles refer to the specific designation of each employee that recognises his or her skills, years of experience and place in the organisation chart* (TenStep, 2014a).

For instance, a person could fill the role of a support analyst, but his or her title could be that of program analyst. A person could have the role of project manager, while his or her title might be that of team leader. One could also have a situation where one person could be fulfilling multiple roles, but typically only have one title (TenStep, 2014a).

Various organisations, namely professional bodies, government departments or businesses, have defined project management methodologies. The importance of the discussion of methodologies stems from the fact that most methodologies define roles and responsibilities that would be prevalent during the life span of a project. With reference to the scope of the study and its aim, it is important to ascertain whether the prevalent roles and responsibilities would have an effect on the definition of a project management job family. If these roles and responsibilities are required, surely they should be reflected in the organisational design of the project organisation and even more so in a projectised organisation.

In order to progress with the discussion and the relevance of roles and responsibilities as embodied in methodologies, it is necessary to develop a common understanding of the concept of a methodology. For this purpose, dictionaries are consulted for a definition of the concepts. These definitions are presented in Table 5-8:

Table 5-8: Definitions of methodologies

Source	Definition
Dictionary.com (2014)	A set or system of methods, principles and rules for regulating a given discipline, as in the arts or sciences.
Ask.com (2014)	The analysis of the principles of methods, rules and postulates employed by a discipline. The systematic study of methods that are, can be, or have been applied within a discipline. The study or description of methods. A methodology can be considered to include multiple methods, each as applied to various facets of the whole scope of the methodology.
Merriam-Webster (2014)	A body of methods, rules and postulates employed by a discipline: a particular procedure or set of procedures. The analysis of the principles or procedures of inquiry in a particular field.
The Free Dictionary (2014)	A body of practices, procedures and rules used by those who work in a discipline or engage in an inquiry. A set of working methods: the methodology of genetic studies (a poll marred by faulty methodology). The study or theoretical analysis of such working methods.

The common denominators that can be distilled from the above definitions are as follows:

- a system;
- containing methods, principles and rules;
- can go down to a level of granularity of procedures;
- applicable to a specified area or discipline; and
- can be governed by postulates, paradigms and rules.

Further to the above, the website of Attask.com (2013) contains the following statement regarding what a methodology entails:

> *The word "methodologies" is sometimes confused with other terms like "processes" and "frameworks." However, there are important distinctions between the three* (Attask.com, 2013).

These distinctions are as follows:

- A framework is a state of mind for approaching a project.
- A methodology is a prescriptive form of approaching a project.
- A process is a specific function in which the stages of a methodology are carried out (Attask.com, 2013).

Having gained a better understanding of the commonalities in the different definitions of what a methodology entails, attention is now drawn to the application of this concept in the domain of project management.

With reference to a hierarchical taxonomical structure, one can see that there is general agreement that:

- frameworks precede methodologies; and
- methodologies precede processes.

> *Even with this clarification of terminology, the differences between project management methodologies, processes and frameworks continue to undergo constant discussion* (Attask.com, 2013).

In the following section, attention is turned to the various roles that are mentioned and employed in methodologies that have specific reference to ICT projects.

As with so many things in project management, there seems to be little congruence of information. However, the data search and analysis revealed the following regarding generic project management roles in organisations. The main source of information for the analysis was *The ePMbook* (Wallace, 2007). This was used as the norm to find similar roles embedded in the various methodologies. The methodologies that were analysed are the following:

- Method123® Project Management Methodology (MPMM®)
- TenStep
- PRINCE2®
- HERMES

Lastly, there will be a short discussion on the Agile manifesto (Beck, 2001), as it is commonly found in the ICT project management world and is regularly stated as being a methodology as well.

The most well-recognised methodologies in the project management domain that fulfil the requirements stated above will now be discussed.

5.5.3.1 Components of a project management methodology

Chin and Spowage (2012) have shown that the use of project processes varies across organisations. It was found that the majority of processes integrated into a project management methodology (PMM) are based on *PMBOK® Guide*, but that organisations recognise the importance of being unique in the market. Therefore, it is common practice to customise PMM process groups to suit their organisation's practice.

Chin and Spowage (2012) found that "very few organisations integrated their technology elements into their PPM. It was thus found that there was little integration of technical applications, such as analysis tools, mathematical analysis, simulation, project management software, change control systems and a project tracking database into the methodology and then into an integrated project management information system (PMIS)" (Chin & Spogawe, 2012).

Chin and Spowage (2012) also examined the use of common tools and techniques as found in the various project management methodologies. Presented in

Table 5-9 below are the findings of the most commonly used tools and techniques in the various methodologies.

Table 5-9: Commonly found tools and techniques in project management methodologies

Phase where applicable	Tool or technique
Initiation process	Project proposal
Planning process	Risk plans
	Risk plans
	Work breakdown structures
Execution and controlling process	Change request plans
Closing processes	Lessons learned reports (sparsely used)
	End project reports (sparsely used)

Chin and Spowage (2012), citing Bolles (2002), Charvat (2003), Kroll and Royce (2005), Chemma and Shahid (2005), Microsoft Solutions Framework (2002), Murch (2001) and Turbit (2005), further define the requirements of a good PPM. The identified requirements are cited verbatim in the table below:

Table 5-10: Requirements of a good project management methodology

No	Requirements
1.	It should facilitate the identification and management of risks and opportunities**.**
2.	It should facilitate the clarification of goals and the scope of the project by incorporating the best practices of all project management group processes (Kroll & Royce 2005; MSF 2002), tools, techniques and templates to effectively plan and manage research projects.
3.	It should create a project board to oversee, monitor and assess the research project progression.
4.	It should be scalable and adaptable to project sizes; where it should be specific to the organisation, but customisable to individual projects.
5.	It should leverage on the best practices of the specific environment/ discipline to minimise obstacles and failure rate.
6.	It must be in place to promote organisational learning.
7.	It should be based on organisational, governmental and sector-specific standards and regulations.
8.	It should model the work flow of a typical project.

From the above tables, it can be inferred that as the project goes through its various phases, team members are required with different skills and competencies, who are located in different areas of the organisation with different focus areas of attention. Thus, different team members will fulfil roles and responsibilities within the context of the project execution, while the content of their work would be in a specific area of application. It also implies that there should be a focus area of project governance in the organisation.

Although Chin and Spowage (2012) indicated that there are a myriad of methodologies, the next section will elaborate on four of the commercially available and most well-known methodologies.

5.5.3.2 Method123® Project Management Methodology

Westland (2006) developed the Method123® Project Management Methodology (MPMM®). MPMM® starts by defining the project life cycle as "a series of project phases which are undertaken in either sequential or parallel order" (Westland, 2006). A project phase is defined as "a set of project activities and tasks which usually result in the completion of a project deliverable" (Westland, 2006). As depicted in Figure 5-18, the MPMM® project life cycle consists of four phases.

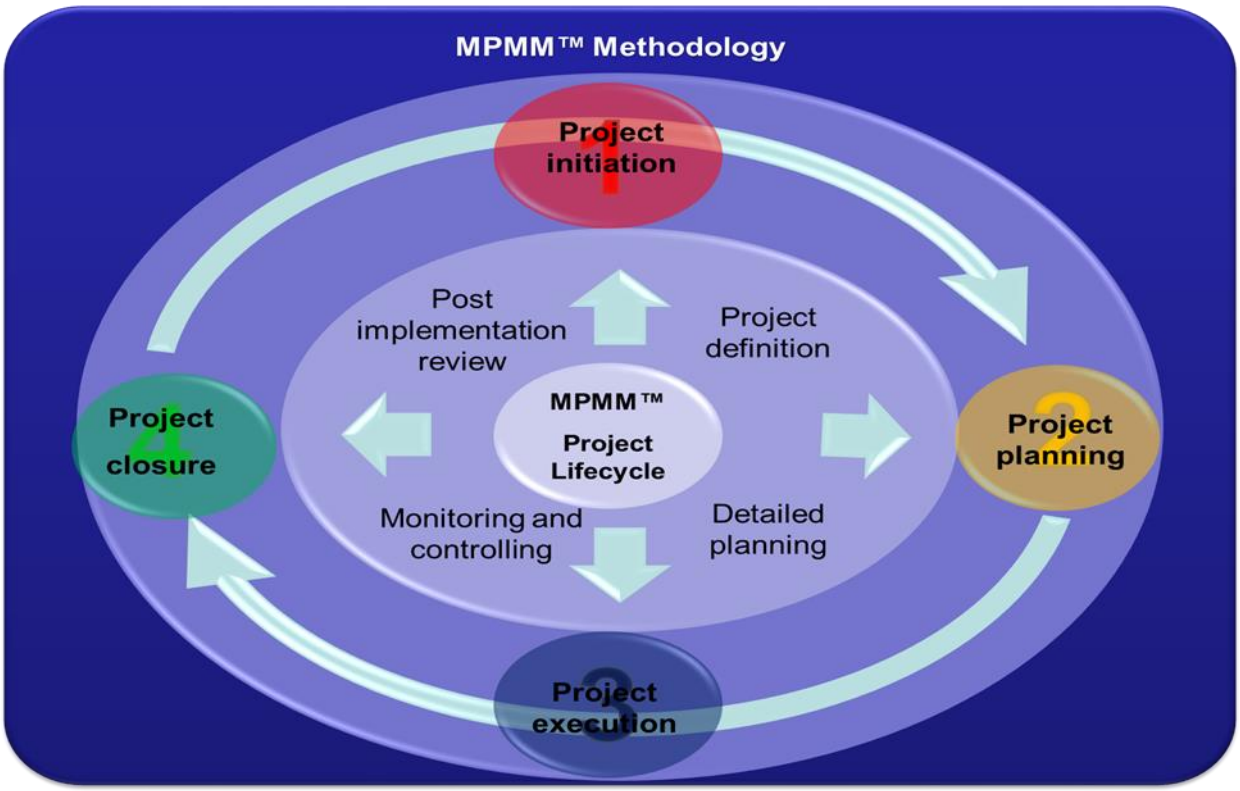


Figure 5-18: Westland's MPMM® (Westland, 2006)

The project roles according to the MPMM® are stated in Table 5-11 below.

Table 5-11: MPMM® roles, responsibilities and functions

MPMM® role/function	Responsibility
Change management roles	Team member
	Project manager
	Project board
Time management roles	Team member
	Project manager
	Project administrator
Cost management roles	Team member
	Project manager
	Project administrator
Acceptance management roles	Team member
	Project manager
	Customer
	Procurement manager
	Project manager
Quality management roles	Quality manager
	Project manager
Issue management roles	Team member
	Project manager
	Project board
Risk management roles	Team member
	Project manager
	Project board
Communication management roles	Team member
	Project manager

From the information in Table 5-11, it is clear that MPMM® broadly follows the layout of *ISO 21500 Standard*, as well as *PMBOK®. Guide*. Notably, what is defined as roles, could just as well be called functions, and that what is stated as a responsibility, could also be called a role.

One then sees that, with the similarity to the two stated documents, the functions (knowledge areas) of these roles are assigned to parties such as the project manager, team members, etc. Descriptions of tasks were also supplied that are fulfilled by the various roles.

5.5.3.3 TenStep

Mochal (TenStep, 2011) developed the TenStep LifeCycle Process™. This process is based on the typical Waterfall Model for IT projects, and is used to build and support the deliverables produced by the project. The TenStep LifeCycle Process™ consists of initiation, planning, execution, monitoring, and control and close-out, as shown in Figure 5-19.

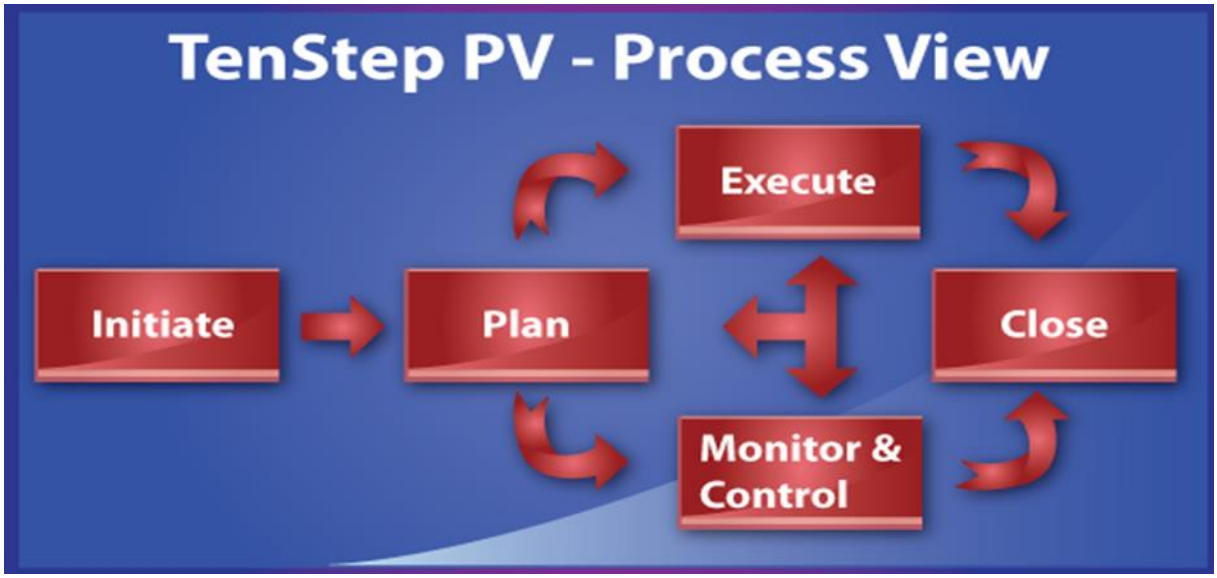


Figure 5-19: TenStep LifeCycle Process™

As with all methodologies, TenStep (2011) suggests the utilisation of a standard set of life cycle processes, techniques and templates, which results in faster start-up times. Good life cycle processes require an upfront investment of time and effort for analysis and planning. Projects are completed sooner if they are properly planned and the requirements to design an efficient solution understood correctly. This results in a reduction in the time, effort and rework required in the construct, test and implement phases.

Mochal (TenStep, 2014a) says that to be effective, support is required from the entire organisation to use a governance focus on standardisation conformance and assurance that the relevant information is being captured.

In the Step 4 of the TenStep methodology, and specifically in “408.0 Project Roles and Responsibilities” (TenStep, 2014b), the architecture of the project team is described. The roles and functions that are prevalent in this methodology are given in Table 5-12 below.

Table 5-12: TenStep roles, responsibilities and functions (TenStep, 2014b)

TenStep role/function	Description/responsibility
Change control board	The change control board is usually made up of a group of decision-makers authorised to accept changes to the project's requirements, budget and time lines. This organisation would be helpful if the project directly impacted on a number of functional areas and the sponsor wanted to share the scope change authority with this broader group. The details of the change control board and the processes they follow are defined in the project management processes.
Client	This is the people (or groups) that are the direct beneficiaries of a project or service. They are the people for whom the project is being undertaken. (Indirect beneficiaries are probably stakeholders.) These might also be called "customers", but if they are internal to the company, TenStep refers to them generically as clients. If they are outside the company, they would be referred to as "customers".
Client project manager	If the project is large enough, the business client may have a primary contact that is designated as a comparable project manager for work on the client's side. The IT project manager would have overall responsibility for the IT solution. However, there may be projects on the client's side that are also needed to support the initiative, and the client's project manager would be responsible for those. The IT project manager and the client's project manager would be peers who work together to build and implement the complete solution.
Database administrator	A database administrator is a specialist that models, designs and creates the databases and tables used by a software solution. This role combines data administrator (logical) and database administrator (physical). For more information on this role, see "408.8 The Role of the Database Administrator".
Developer	The developer is responsible for the actual building of the solution. For more information on this role, see "408.6 The Role of the Developer".
Project team	The project team consists of the full-time and part-time resources assigned to work on the deliverables of the project. This includes the analysts, designers, programmers, etc.

TenStep role/function	Description/responsibility
Designer	The designer is responsible for understanding the business requirements and designing a solution that will meet the business needs. There are many potential solutions that will meet the client's needs. The designer determines the best approach. A designer typically needs to understand how technology can be used to create the optimum solution for a client. The designer determines the overall model and framework for the solution, down to the level of designing screens, reports, programs and other components. Designers also determine the data needs. The work of the designer is then handed over to the programmers and other people who will construct the solution based on the design specifications. For more information on this role, see "408.5 The Role of a Designer".
Project manager	This is the person with authority to manage a project. This includes leading the planning and development of all project deliverables. The project manager is responsible for managing the budget and schedule and all project management procedures (scope management, issues management, risk management, etc.). For more information on this role, see "408.1 The Role of a Project Manager".
Quality manager	On a large project, quality management could take up a large amount of project management time. In this case, it could be worthwhile to appoint a quality manager. For more information on this role, see "408.9 The Role of a Quality Manager".
Stakeholder	These are the specific people or groups who have a stake or an interest in the outcome of the project. Normally stakeholders are from within the company, and could include internal clients, management, employees, administrators, etc. A project may also have external stakeholders, including suppliers, investors, community groups and government organisations.
Subject matter expert	A subject matter expert (SME) has superior (expert) knowledge of a discipline, technology, product, business process or entire business area. For more information on this role, see "408.4 The Role of the SME".
Tester	The tester ensures that the solution meets the business requirements and that it is free of errors and defects. For more information on this role, see "408.7 The Role of the Tester".

TenStep role/function	Description/responsibility
Sponsor (executive sponsor and project sponsor)	This is the person who has ultimate authority over the project. The executive sponsor provides project funding, resolves issues and scope changes, approves major deliverables and provides high-level direction. Sponsors also champion the project within their organisation. Depending on the project and the organisational level of the executive sponsor, he or she may delegate day-to-day tactical management to a project sponsor. If assigned, the project sponsor represents the executive sponsor on a day-to-day basis and makes most of the decisions requiring sponsor approval. If the decision is large enough, the project sponsor will take it to the executive sponsor for resolution. For more information on this role, see “408.3 The Role of the Project Sponsor.”
Steering committee	A steering committee is a group of high-level stakeholders who are responsible for providing guidance on overall strategic direction. They do not take the place of the sponsor, but help to spread the strategic input and buy-in to a larger portion of the organisation. The steering committee is usually made up of organisational peers and is a combination of direct clients and indirect stakeholders. Some members on the steering committee may also sit on the change control board”.
Suppliers/vendors	Suppliers and vendors are third-party companies or specific people who work for third parties. They may be subcontractors who are working under your direction, or they may supply material, equipment, hardware, software or supplies to your project. Depending on their role, they may need to be identified on the organisational chart. For instance, if you are partnering with a supplier to develop your requirements, you probably want them on your organisational chart. On the other hand, if the vendor is supplying a common piece of hardware, you would probably not consider them part of the team.
Users	These are the people who will actually use the deliverables of the project. They may also be heavily involved in project activities such as defining business requirements. In other cases, they may not get involved until the testing process. Sometimes you want to specifically identify the user organisation or the specific users of the solution and assign a formal set of responsibilities to them, like developing use cases or user scenarios based on the needs of the business requirements.

According to Mochal (TenStep, 2014b), the architect of the TenStep methodology, projects of different sizes have different needs according to how people are organised. In a small project, little organisational structure is needed. There might be a primary sponsor, project manager and a project team. However, for large projects, there are more people involved, and it is important that people understand what they are expected to do, and what roles they are expected to fill. This section identifies some of the common (and not so common) project roles that may be required for IT projects (TenStep, 2014b).

One sees that the TenStep LifeCycle Process™ does not follow role assignment in accordance to a specific body of knowledge, and that what the MPMM® would define as a role, the TenStep LifeCycle Process™ would define as a function (see deduction in the discussion in Section 5.5.3.2).

5.5.3.4 PRINCE2®

PRINCE2® (PRINCE2, 2011) is a project management methodology owned and maintained by the former UK Office of Government Commerce (OGC), now the Office of Her Majesty Treasury.

In an introduction to project management and PRINCE2®, Scott Spence (Whatis.com, 2006) states that PRINCE2® is a project management methodology that outlines eight processes, eight components and three techniques to successfully carry out a project. See Figure 5-20 for the PRINCE2® processes (Caulkin & Davies, 2005).

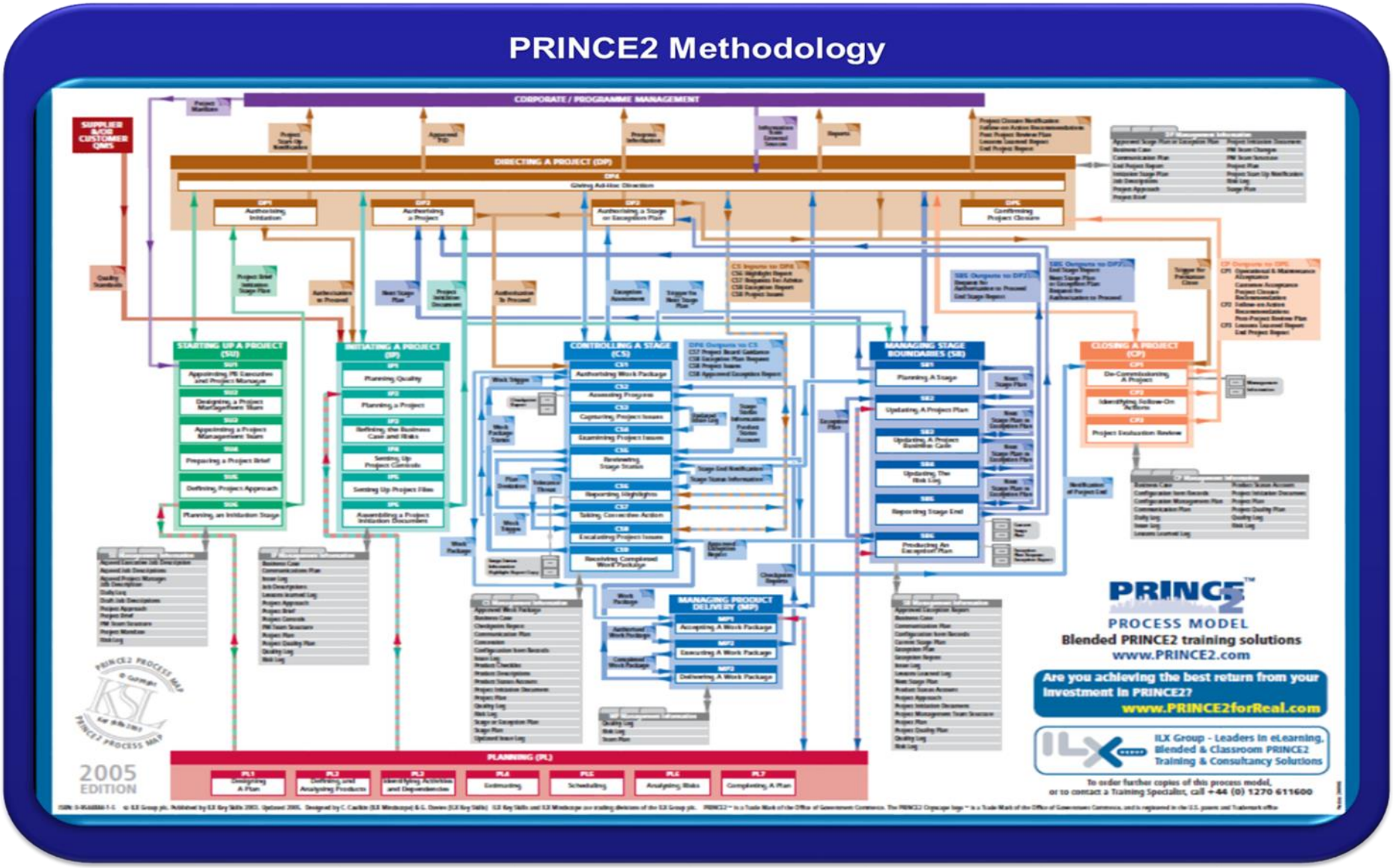


Figure 5-20: PRINCE 2® project management methodology

Each PRINCE2® project will have a project board made up of the customer (or executive), someone representing the user side, and someone representing the supplier or specialist input. In PRINCE2®, these people are called customer, senior user and senior supplier respectively (ILX, 2014).

The project manager reports regularly to the project board, keeping them informed of progress and highlighting any problems he or she can foresee. The project board is responsible for providing the project manager with the necessary decisions for the project to proceed and to overcome any problems (ILX, 2014). The PRINCE2® project roles (Bradley, 2005) are presented in Table 5-13 below:

Table 5-13: PRINCE2® roles, responsibilities and functions

PRINCE2® role/ function	Description/responsibility
Executive	The person who is paying for the project is called the customer or executive. The executive has ultimate responsibility for the success of the project; that it gives return on investment and that the demands of the business, user and supplier are balanced. The executive will appoint people to the roles of senior user, senior supplier and product manager, will chair meetings and conduct briefings throughout the project. The executive will closely monitor ongoing progress and changes to the project plan; and will eventually approve the notification of project closure once satisfied that it is completed within agreed budgetary and scheduling tolerances.
Senior user	The person who is going to use the results or outcome of the project, or who will be impacted on by the outcome of a project, is called the user. The senior user specifies the needs of those who will use the product and monitors to ensure that the solution meets those needs. His or her place on the board is to represent the interests and requirements of the users as a whole. Sometimes this role may be shared to cover different user interests, but splitting the role between too many people risks losing effectiveness. The senior user will ensure that any testing has the appropriate user-focus and representation.
Customer	The person who is paying for the project is called the customer or executive.
Senior supplier	On some projects, the customer and user may be the same person. The person who provides the expertise to do the actual work on the project (designing and building the outcome) is called the supplier or specialist. The senior supplier advises on the technicalities of the project, including method, design and strategy. They are the product specialists who approve the product descriptions and represent those who are designing, developing, operating and maintaining the product. The senior supplier has the authority to utilise any resource needed to achieve the final product. He or she exercises quality control and must ensure that any operating standards are defined and achieved. This person will need to be able to brief other management staff on the technical aspects of the projects.
Project Manager	Organising and controlling a project means that someone is needed who is responsible for organising and controlling the project. This person is the project manager.

PRINCE2® role/ function	Description/responsibility
	The project manager will select people to do the work on the project and will be responsible for making sure that the work is done properly and on time. The project manager draws up the project plans that describe what the project team will actually be doing and when they expect to finish. The project manager works on behalf of the project board to manage the ongoing project to agreed specifications and tolerances. He or she makes sure the final product is as agreed, to the required standard and within time and cost budgets. This person is also responsible for ensuring that the product will lead to the benefits outlined in the business case.
Team manager	The team manager role is often taken by the project manager, but some projects may demand a specific role for a team manager who has specialist knowledge of the product or who works in a more appropriate location than the project manager. The team manager reports to the project manager, but has the responsibility to ensure that the product is delivered in the time and budget specified. This person will directly manage the project team and is responsible for motivating and monitoring their ongoing work.
Project assurance	Providing an independent view of how the project is progressing is the job of project assurance. In PRINCE2®, there are three views of assurance: business, user and specialist. Each view reflects the interests of the three project board members. Assurance is about checking that the project remains viable in terms of costs and benefits (business assurance), checking that the users' requirements are being met (user assurance), and that the project is delivering a suitable solution (specialist or technical assurance). On some projects, the assurance is done by a separate team of people called the project assurance team, but the project assurance can be done by the individual members of the project board themselves. Project board members are not part of the project full time and so place a lot of reliance on the project manager. They may assign project assurance functions to ensure that the project is meeting its aims. Project assurance is in place to give the board members confidence that they are being given accurate reports on the progress of the project and the expected quality of the output. The task of project assurance is given to individuals from the project board, but not to the project manager or any of the core project team.
Project support	A lot of administrative work is needed on most projects: keeping everyone informed, arranging meetings, keeping plans up to date, following up, keeping files, etc. Project managers often do all this work themselves, particularly on smaller projects, but if there are a number of projects going on at the same time, a project support office can be set up to help the project managers with this work. Project support is driven by the needs of the project and the project manager. It can take the form of advice on project management tools, administrative services, including paperwork, or data collection.

The PRINCE2® methodology is very thorough in its definition of project roles. As in the case of MPMM®, one can once again observe that, in comparison to the TenStep LifeCycle Process™, there is ambiguity in what is defined as a role, as opposed to what is defined as a function. This is especially true in the case of project support, project assurance and the customer.

5.5.3.5 HERMES

HERMES, as a methodology, dates back to 1975 (d'Algue, et al., 2014). This methodology was developed by the Swiss government for the execution of ICT projects. As such, it shares similarities with the PRINCE2® methodology.

The official website for this methodology states the following:

> *In the process world of organisations and enterprises, development processes often take a prominent position. Great demands are placed on those responsible for the processes accordingly and for their implementation, not only because of the importance of the solutions to be created here, but also due to the often very complex steps leading to the development* (Switzerland's Federal Administration, 2014).

From the above, it can be deduced that HERMES focuses on the complexity of projects. Commensurate with that, it makes allowance for roles to model on that complexity.

Depicted in Figure 5-21 (Switzerland's Federal Administration, 2014) is the structure of a project through the HERMES method as a system development type of project.

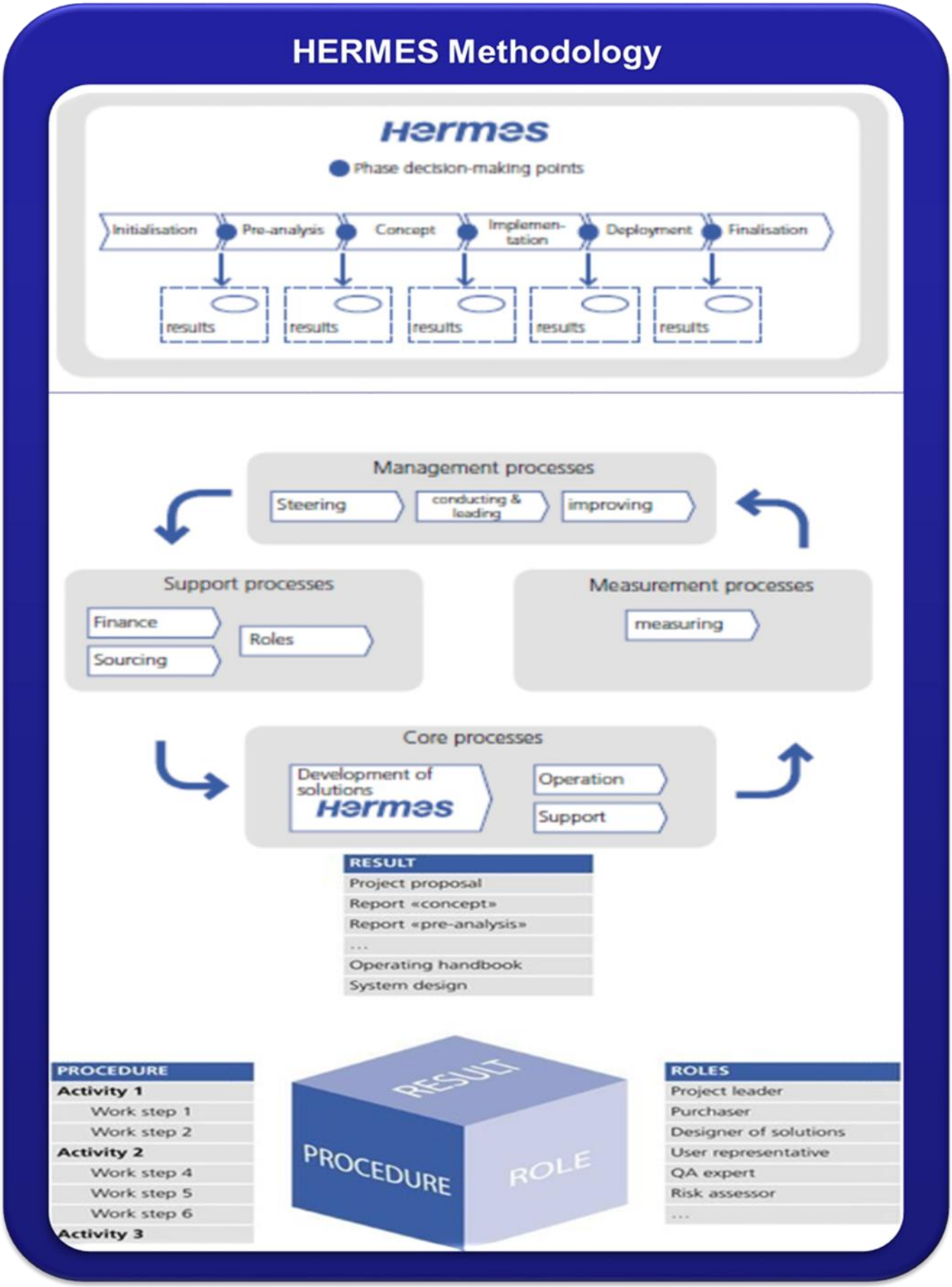


Figure 5-21: HERMES methodology

According to the paradigm of thinking utilised in the HERMES methodology (Switzerland's Federal Administration, 2014), project work is in most cases marked by a complex project environment, which includes the surrounding processes. Depending on the existing process environment in which HERMES is to be integrated and applied as a process method, it can also serve the purpose of defining roles and functions, thus acting as an interface with surrounding processes, for example, sourcing, management and others.

There are five fundamental sub-models in the HERMES methodology, and it is within the definition of these sub-models that one finds the definition of roles, responsibilities and functions (Switzerland's Federal Administration, 2014). These submodels entail the following:

- Project management
- Quality assurance
- Configuration management
- Risk management (new)
- Project marketing (new)

Depicted in Table 5-14 are the roles as defined in the HERMES methodology (Switzerland's Federal Administration, 2014). The table only shows the roles. The descriptions were not available in the information found, as it is part the proprietary knowledge and would have to be bought. The monetary constraints of the scope of the study prevented its purchase.

Table 5-14: HERMES' roles, responsibilities and functions

HERMES' role/function		Description/responsibility
1.	Account manager	
2.	Team	
3.	Business process supervisor	
4.	Information security and data protection manager	
5.	Configuration manager	
6.	Purchaser	
7.	Project board	
8.	Quality manager	
9.	Risk manager	
10.	Training manager	
11.	User representative	
12.	Solution architect	
13.	Operation supervisor	
14.	Developer	
15.	Information security and data protection supervisor	
16.	Configuration supervisor	
17.	Project administrator	
18.	Project manager	
19.	Project manager (contractor)	
20.	Component advisor	
21.	Quality controller	
22.	Quality supervisor	
23.	Risk supervisor	
24.	Training supervisor	
25.	Tester	

5.5.3.6 ePMbook.com

Another source that was referenced for the definition of the roles and functions in a project team, is *The ePMBook* (Wallace, 2007). As in the case of HERMES, the specific role descriptions were not freely available and would have to be purchased.

Table 5-15: Roles as depicted in *The ePMbook* methodology (Wallace, 2007)

***The ePMbook* role/function**		**Description/responsibility**
1.	Project sponsor	
2.	Supporting sponsors	
3.	Project director	
4.	Executive committee	
5.	Steering committee or project board	
6.	Project manager	
7.	Project office manager/staff	
8.	Project accountant	
9.	Team leader	
10.	Organisational change manager/ facilitator	
11.	Communications specialist	
12.	Business process reengineering specialist	
13.	Process owner	
14.	Process specialist	

The ePMbook role/function		Description/responsibility
15.	Process manager	
16.	Process modeller	
17.	Solution architect	
18.	Technical architect	
19.	Organisational design specialist	
20.	Solution designer	
21.	Developer/programmer	
22.	Network and telecommunications specialist	
23.	Marketing specialist	
24.	Training specialist	
25.	Training developer	
26.	Trainer	
27.	Documenter/technical writer	
28.	End user	
29.	Computer operations analyst/staff	
30.	Facilities manager/staff	
31.	Lawyer/legal adviser	

The ePMbook role/function		Description/responsibility
32.	External auditor	
33.	Internal auditor	
34.	External regulator	
35.	Quality manager	
36.	Quality auditor	

5.5.4 Agile manifesto

In the search for a PMM, the researcher invariably stumbled upon Agile methods. According to AgileScout (2013), it is not a methodology at all, because of the following considerations:

- individuals and processes over tools;
- working software over comprehensive documentation;
- customer collaboration over contract negotiation; and
- responding to change over following a plan.

Agile is a framework or frame of mind.

> *An Agile practitioner can use different methodologies within the framework to "do or be" agile. Agile is one of the guiding principles that lay the foundation for building better software* (AgileScout, 2013).

As there is so much confusion regarding what a methodology is and what it is not, a summary of the Agile methods and what they entail (Rose India Technologies, 2012) is supplied in Table 5-16 below.

Table 5-16: Summary of the Agile methods

Method	Description
Crystal methods	In a crystal method, the most attention is paid to team communication, team member skills, people and interaction instead of giving priority to the project processes. Crystal methods can be considered under the Agile category.
	In crystal methods, the project processes are given a low priority. Instead of the processes, this method focuses more on team communication, team member skills, people and interaction. Crystal methods come under the Agile category.
Dynamic Systems Development Model (DSDM)	This is an advanced form of rapid application development (RAD) methodology and can also be considered under the Agile software development methodology in which training, documentation and active user involvement during the project life cycle is given utmost importance.
	This is the successor of RAD methodology. This is also a subset of Agile software development methodology and boasts about the training and document support this methodology has. This method places greater emphasises on the active user involvement during the project life cycle.
Extreme programming (XP)	Extreme programming (XP) is a software development methodology ahead of various Agile software development methodologies, and is quite different from the traditional methodologies. XP is intended to enhance software quality and responsive to changing customer requirements in the entire project cycle, providing a high degree of adaptability. XP is one of the best methodologies that can be used to meet the changing requirements of customers in dynamic projects at any point of the project life cycle.
	Lowering the cost of requirement changes is the main objective of XP. It emphasises fine-scale feedback, continuous process, shared understanding and programmer welfare. In XP, there is no detailed requirement specification or software architecture built.

Method	Description
Feature-driven development (FDD)	Feature-driven development (FDD) as a PMP is based on simple and well-defined processes that understand the needs of the project with short iterative and feature-driven delivery cycles. FDD is mostly used in software development projects that recognise the role of every individual in a project and specify what role should be given to whom.
	This methodology is more focused on simple and well-defined processes, short iterative and feature-driven delivery cycles. All the planning and execution in this type of project take place based on the features.
Lean development (LD)	Lean development (LD) is basically a set of processes used to reduce waste in a project in order to provide the client with the best return on investment. This involves identifying the problems that can be solved individually and, once the individual waste has been identified, it becomes quite easy to run the project efficiently with the least amount of waste. Thus, lean development helps with the proper planning and execution of a project with the highest degree of value.
	LD focuses on developing change-tolerant software. In this method, satisfying the customer comes as the highest priority. The team is motivated to provide the highest value for the money paid by the customer.
Scrum	This is an Agile methodology. The main goal of this methodology is to improve team productivity dramatically by removing every possible burden. Scrum projects are managed by a scrum master.

The discussion of the various roles and functions of the PMMs can be summarised in Figure 5-22.

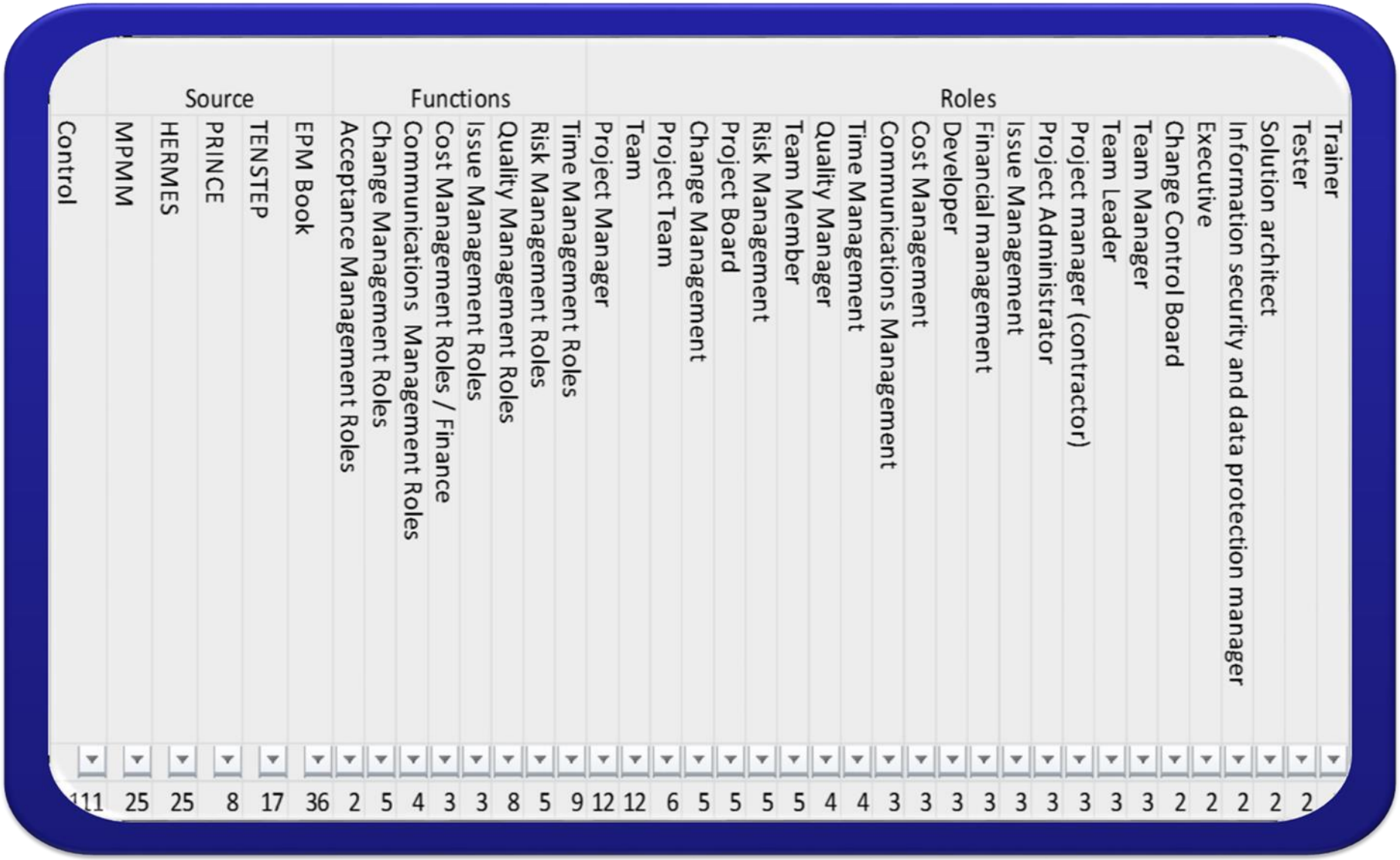


Figure 5-22: Summary of the top ten roles and functions in ICT project management execution methodologies

From Figure 5-22, it is clear that there is strong emphasis on the human aspect of management rather than just the technical aspects, as so many roles refers to the involvement of people (the “team” that is included in the role designation). One can also conclude that due to the methodology’s requirement to be marketable, there would be a finer and better designation of roles as complexity and task density increase in the project. The level of maturity would also affect the level and detail of role definition when using a particular methodology.

Note that in Figure 5-22, the column that denotes functions is in accordance with the conclusion drawn earlier in the discussion, and that the function would then lead to the definition of the role that a team member should play. It should come as no surprise that the foremost role that was defined is that of project manager, followed by “the team”. This is followed by the role that a change manager should play, as well as the role of the project board (governance and oversight function), even though the programme management function and role did not feature as a specifically defined role. It is assumed that the role of oversight and governance, and hence the function of programme management, are entwined into that of the project board.

5.6 Programme management

We have seen from the introduction, as well as in the section on project management, that individual projects can be aligned in terms of tactical objectives or even strategic initiatives. This grouping gives rise to the definition of a programme management perspective. In this section, the programme management perspective will be elaborated on to see whether it would have an effect on the definition of the ICT job family.

The context of project management is established by at least three global authoritative institutions that differentiate between project management, programme management and portfolio management.

In accordance with the delimitation of the established project management organisations’ definitions, one can see that programmes and portfolios are constituted through an amalgamation of projects. In addition to the definitions of project management that were presented earlier, the professional organisations PMI and IPMA present the following on programme management.

PMBOK® Guide:

> *A programme is defined as a group of related projects managed in a coordinated way to obtain benefits and control not available from managing them individually. Programmes may include elements of related work outside the scope of the discrete projects in the programme. A project may or may not be part of a programme, but a programme will always have projects* (Project Management Institute, 2010) (Project Management Institute , 2008)

ICB3 4LC:

> *A programme is set up to achieve a strategic goal. A programme consists of a set of related projects and required organisational changes to reach a strategic goal and to achieve the defined business benefits. Programme management typically involves senior project managers or projects directors* (International Project Management Association (IPMA), 2006a, p. 13).

Central to all the definitions is the notion that programmes consist of amalgamations and aggregations of related projects that, through a combination of effort, at a centralised location, facilitate the decentralised execution of the constituent projects.

It can then be deduced that multiple projects are aligned to achieve a higher objective than that of the singular component project. This amalgamation can render further benefits of optimised or integrated cost amalgamation, schedule integration and consolidation of effort.

Programme managers are thus charged with the coordination of efforts between projects, but do not manage them. Programme management responsibilities include the following:

- Identification, monitoring and control of the interdependencies between projects
- Dealing with the escalated issues among the projects that comprise the programme
- Tracking the contribution of each project and non-project work to the consolidated programme benefits

Due to the integrative nature of programme management processes, there is an implied coordination of individual projects and processes, e.g. the management of

risks and issues needing resolution at a higher level of authority than that of the project.

The interaction between a programme and its components tends to be iterative and cyclical. This cyclical interaction (Project Management Institute, 2008) can best be portrayed as illustrated in Figure 5-23. In this graphic depiction, attention is drawn to the interaction of information flow between programme management and project management.

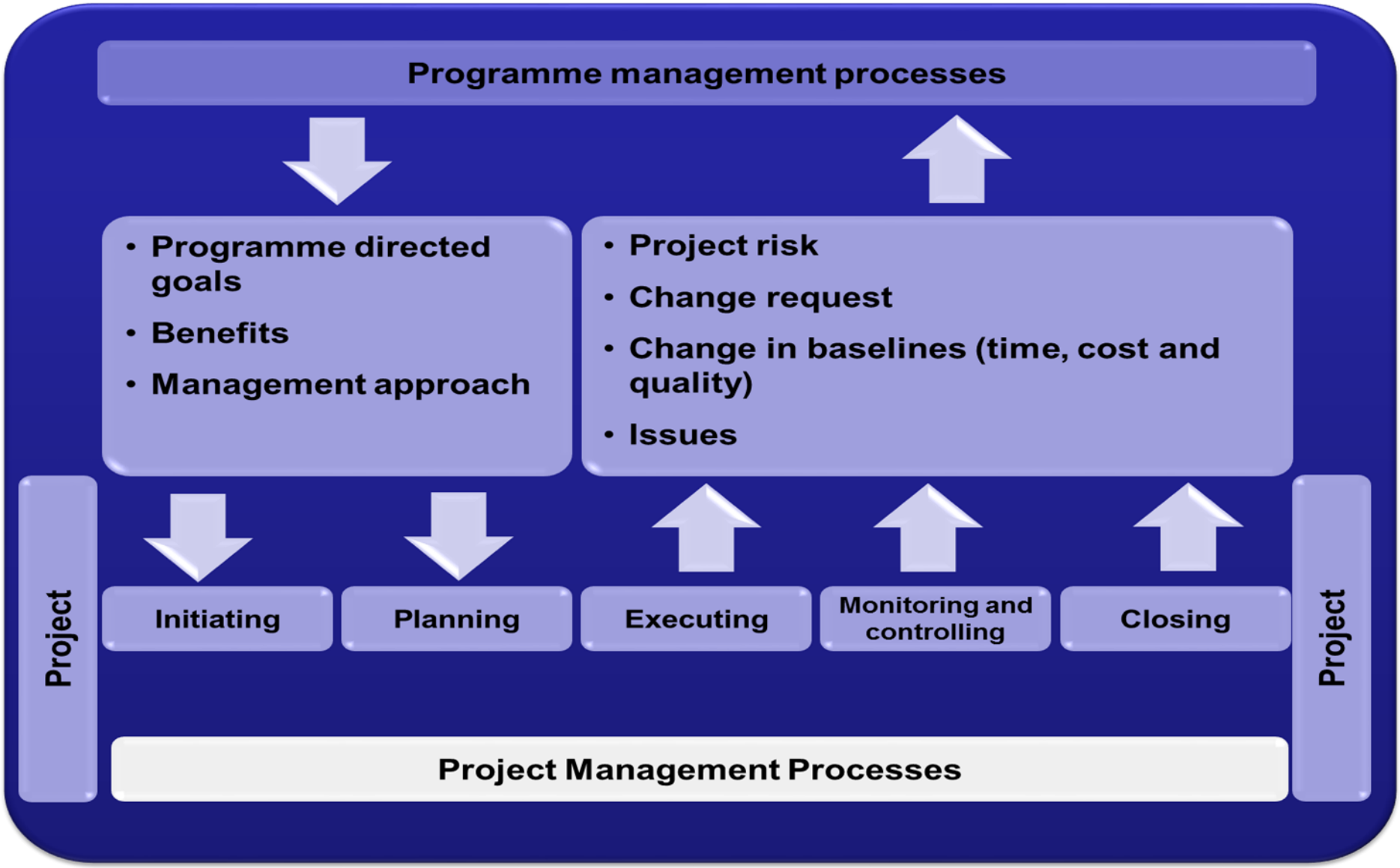


Figure 5-23: Interaction of information flow between programme management and project management (PMI)

From this brief discussion on the aspect of programme management, one can see that there is a definite difference in the focus of programme management as opposed to project management. The relevance of this would entail that, at the level of the job family definition, there would be implied differences in skills and competencies as the focus shifts from an individual project to that of a programme.

However, it is evident that there is a further level of amalgamation of even programme management into a higher level, known as portfolio management. In the section below, the perspective of portfolios and their relevance to the topic at hand is discussed.

5.7 Portfolio management

The PMI, IPMA and APM were consulted for a definition of the portfolio management perspective. Again, the definition of the function is given from which common elements can be extracted and evaluated in accordance with the effect that it would have on differing and different skills and competencies required for the execution of the function.

PMI:

> *A portfolio refers to a collection of projects or programmes and other work that are grouped together to facilitate the effective management of that work to meet strategic business objectives. The projects or programmes of the portfolio may not necessarily be interdependent or directly related. For example, an infrastructure firm that has the strategic objective of "maximising the return on its investments" may put together a portfolio that includes a mix of projects in oil and gas, power, water, roads, rail and airports. From this mix, the firm may choose to manage related projects as one programme. All of the power projects may be grouped together as a power programme. Similarly, all of the water projects may be grouped together as a water programme* (Project Management Institute, 2008, p. 9).

IPMA:

> *A portfolio is a set of projects and/or programmes that are not necessarily related, brought together for the sake of control, coordination and optimisation of the portfolio in its totality. Important issues on a portfolio level are reported by the portfolio manager to the*

> *senior management of the organisation, together with options to resolve the issues. This enables them to reach a decision on what should be done based on factual information* (International Project Management Association (IPMA), 2006a, p. 13).

APM:

> *Portfolio management is the selection and management of all an organisation's projects, programmes and related business-as-usual activities, taking into account resource constraints. A portfolio is a group of projects and programmes carried out under the sponsorship of an organisation. Portfolios can be managed at an organisational, programme or functional level* (Association for Project Management (APM), 2014b, p. 3).

The common denominator in the offered definitions is a focus on governance control, rather than management control. There is thus a definite shift in the function of portfolio management as opposed to programme and project management. As was found in the discussion on programme management, the relevance of this deduction is again that a different set of skills and competencies are required for the person acting in a portfolio management position (Morris & Jamieson, 2004).

From the discussion in this section, it is clear that a governance focus is emerging in the execution of projects by amalgamating and consolidating them. In the next section, the focus is on the component of governance and how it will affect the execution of ICT projects and, ultimately, the definition of the job family.

5.8 Conclusion

The business cannot manage the project mix without the management of individual projects. There is a fine balance between the detailed management of the projects themselves and the portfolio perspective required to inform the business of their impact. To use the analogy of a symphony, each instrument must play its own part of the score correctly in order for the entire orchestra to create beautiful music.

Projects take place within the defined constraints of a project life cycle, which can be shown as phases. Each phase focuses on a specific area of the vision and mission of the organisation. Each of the decisions within a certain phase is located in a different

project management function: in the portfolio management domain, the programme management domain and the project execution domain.

Most projects are not managed in a strategic way as the focus is mainly on achieving their time, budget and requirements goals.

Prosperity in organisations hinges on the successful application of a simple formula: *the right combination of the right projects done right*. Prosperity depends on good strategy and on implementing that strategy effectively. Strategic alignment of project management is the alignment of project and business strategy to support the achievement of the enterprise's strategic goals. Thus, a better understanding of how business strategy can be translated into project strategy would improve the overall performance of project management significantly.

Project managers and project teams should be more strategically orientated and should become responsible for business results, therefore project strategy must be developed, implemented and maintained for the life of the project.

SPL® (Shenhar, 2007) is an approach that can be used to connect project management to business results to achieve a competitive advantage. If business strategy is better understood and translated into project strategy, the overall performance of project management would be improved significantly, and project management would have a higher profile in business management in general.

Project governance, located in the right organisational position, with the right definition of its functions, domain and focus, can assist in the alignment of business and project execution strategy. Locus, focus and function also have relevance to projects and programmes. From this, one can derive the scope of subsequent chapters in the discussion towards the building of a stratified framework for the definition of a job family for project managers.

Thus, the following deductions can be made:

Project life cycle management

- The project life cycle phase structure must provide the formal basis for control.
- The client/sponsor must provide direction and ensure that the required approvals for the project are obtained at each appropriate stage of the project.
- The transition of the project through the various phases by means of a life cycle approach and subsequent methodology requires the project execution team to

possess different skills. Team members come from different locations in the organisation, yet they share the same context for the work (content).

Programmes

- Programmes must focus on achieving the benefits expected from the portfolio as determined by the strategic organisational benefits.
- The programme manager needs to possess other skills than the project manager, as the function is located in a different area of the business. It entails a different focus in terms of the execution of the project.

Portfolio

- Portfolio management must ensure that the relationships between programmes and projects are identified and that resources (people, funding, etc.) are allocated in accordance with the organisation's priorities.
- At the highest level, in the absence of a programme management function, the decision-makers should assume responsibility for the development of project management as a function in the business.

Strategy

- A project strategy must be developed, implemented and maintained for the life cycle of the project to ensure that the project supports the achievement of the enterprise's strategic goals.
- Strategic links bring new/other skills to project managers and require a different organisational design.

Governance

- The project governance function must be described in the project management plan.
- The processes of project governance must be integrated into the project life cycle activities to ensure that projects are properly controlled.
- Effective governance of projects must involve the prioritisation and selection of projects to ensure that it is aligned with the organisation's objectives and that it provides a platform for stakeholder input.
- Project governance must authorise the project for execution, provide overall direction, and control the project to ensure that it is sustainable and delivered successfully.

- The client/sponsor must ensure that project issues are appropriately reviewed.
- Governance reviews must focus on the status of the project to establish if the project still supports the organisational strategy and if it merits continued investment. These reviews would require different skills.
- Project reviews must focus on tactical project considerations like detailed deliverable progress, issue review, performance measures and resource utilisation.
- Governance requires dedicated organisational design, requiring different skills and competencies.
- Various authors have alluded to the organisational design in the execution of projects, programmes and portfolios. They referred to the domains of project execution, and exerting governance over projects.

There is a caveat that should be considered when concluding this discussion. Theoretical models would purport that there is a hierarchical structure in terms of the composition of a portfolio and that all of the necessary institutions are in place (Project Management Office, Programme Management Office, etc). This is not always necessarily true, and there is often no programme management function due to the organisation only having a few large and strategically orientated projects. The fact that there is no hierarchical progression from a project through to a programme through to a portfolio may be the reason why HR practitioners do not focus on career management for project managers.

The short-term nature of projects creates complex temporary work environments. In the researcher's own employment experience and observations, organisations seem to solve this by relying on the competencies of the individuals that comprise the team, rather than focusing on the synergies that can manifest themselves in total team competence.

Kerzner (1995) referred to the fact that projects are becoming more prominent. Due to the short-term nature of individual projects, there is often no regard for planning the project in terms of its executables, and much less in terms of planning the roles, responsibilities and functions that are required of individuals during the execution of the project. There is even less focus on planning the composition of the project team and the subsequent structure according to which it needs to execute the project work.

The conclusions that can be drawn from the discussion of project life cycle management approaches are as follows:

The particular life cycle approach and how a project proceeds through it brings different areas of focus in different phases, and requires different skills and competencies, and different levels of decision-making focus. They are located at different locations/areas (loci) in the business and are executed through different functions in the business. Consequently, the focus of management control is at the execution level, as stated through budget and time goals, and is located at the project execution level. The locus of governance control is vested in the programme and portfolio management functions and has a focus strategy, as stated in the requirements of meeting the business objectives. This gives rise to a requirement for different skills sets of incumbents in positions as determined by the progression of an initiative through the various phases of the project life cycle.

The conclusions that can be drawn from the discussion of methodologies entail the following:

The inclusion of this section provides context to roles and functions arising from specific or organisational specific methodologies. Furthermore, the organisational structure is influenced by the methodology. The methodology also affects the choice and use of the curriculum that forms the basis for training and development within the organisation.

There seems to be a lot of ambiguity regarding roles, functions and responsibilities in the ICT project management domain.

In some instances, roles are derived from a specific function. In other instances, roles define a function. In yet others, a function contains so many roles that the roles are split at a task-density level.

An increase in overall project complexity and task density necessitates the definition of additional roles and functions.

The typical roles and functions required to execute an ICT project can be broadened to encompass other organisational roles such as assurance and support roles.

When the concept of a job family is applied to the structure of a projectised organisation, or the design of a particular complex project execution team structure, roles/responsibilities are defined at one level, while duties are defined at a lower

level. This aligns with some of the methodologies, but inconsistencies were found among the methodologies in terms of role and function definition.

There are generic role descriptions that, through the implementation of a specific methodology, could be incorporated into the project organogram. These roles and functions cover the entire project management spectrum:

- Project management
- Programme management
- Portfolio management
- Project support

Contrary to what would seem obvious, there was very little reference to most of the 10 knowledge areas, as found in *ISO 21500 Standard* and *PMBOK® Guide*. Only MPMM® referred to these knowledge areas, but then in terms of roles that team members would play. It would be more accurate to refer to the "knowledge areas" as functional areas, and then to define the roles from the functions at the given level of complexity and task density. The specific areas entail quality, finance (not cost) and communications. Surprisingly, risk and HR management did not feature. This is especially so, as risk is one of the critical aspects of project management in defining a project.

At the strategic link level, where portfolio management should focus on business sustainability, there was very little reference to portfolio management roles. Instead, these functions and roles seem to be defined in terms of the duties of the project board, steering committee and functional line managers. One can therefore conclude that portfolio management roles seem to be confused with senior general management roles. With regard to the strategic link and project management, and where roles and functions of portfolio management are concerned, the following can be stated: The portfolio perspective in the project management job family would be contextual roles, with a high level of understanding of project, as well as programme management, but with a low level of technical content in terms of project execution

Size, the technical nature of the product and the level of complexity of projects undertaken will ultimately determine the roles and functions as they would be taken up in the organisational structure and design.

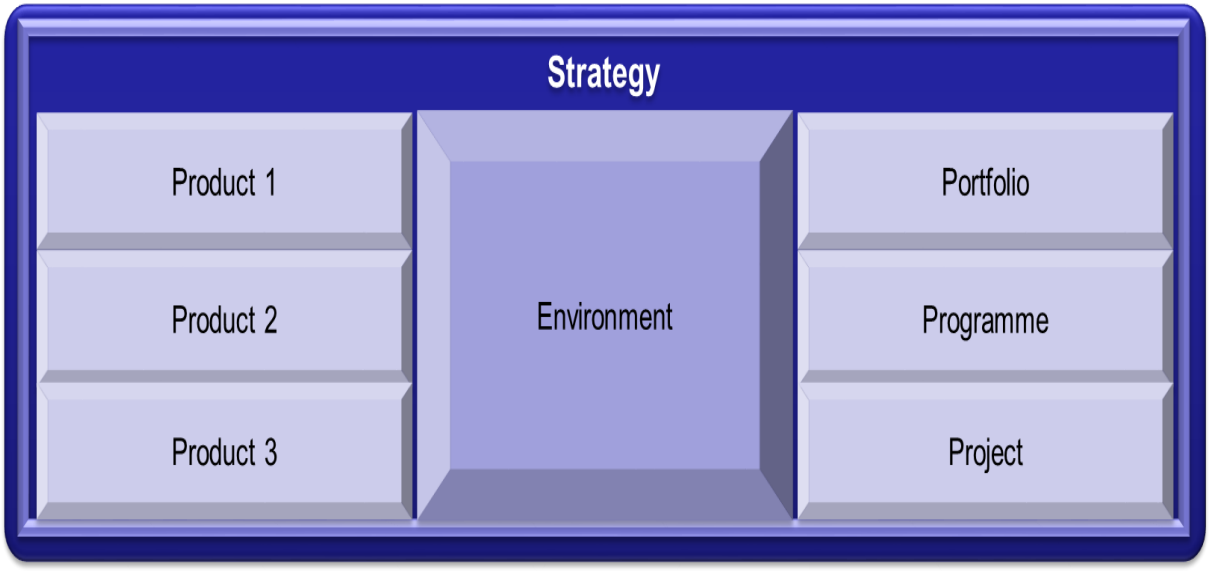
The finding above is surprising, yet to be expected, as most of the studied methodologies entailed a focus on project execution, rather than the management of projects within a business context. It is in the management of the business context that the role of programme manager would be more prevalent. This situation will however receive attention in the following chapter, where the specifics of the design of a projectised organisation will be discussed.

The application of appropriate portfolio, programme and project management knowledge, processes, skills, tools and techniques can have a significant impact on project success. According to the PMI (Project Management Institute, 2008), (Project Management Institute, 2010) portfolio management ensures that relationships between programmes and projects are identified and that resources (people, funding, etc.) are allocated in accordance with the priorities of the organisation. Programmes focus on achieving the benefits expected from the portfolio as determined by strategic organisational benefits. Projects are largely concerned with achieving specific deliverables that support specific organisational objectives. In Table 5-17, a comparative summary is given on the areas of project, programme and portfolio management.

Table 5-17: The PMI's overview of project, programme and portfolio management (Project Management Institute , 2008)

	Projects	Programmes	Portfolios
Scope	Projects have defined objectives. Scope is progressively elaborated throughout the project life cycle.	Programmes have a larger scope and provide more significant benefits.	Portfolios have a business scope that changes with the strategic goals of the organisation.
Change	Project managers expect change and implement processes to keep change managed and controlled.	Programme manager must expect change from both inside and outside the programme and be prepared to manage it.	Portfolio managers continually monitor changes in the broad environment.
Planning	Project managers progressively incorporate high-level information into detailed plans throughout the project life cycle.	Programme managers develop the overall programme plan and create high-level plans to guide detailed planning at the component level.	Portfolio managers create and maintain necessary processes and communication relative to the aggregate portfolio.
Manage-ment	Project managers manage the project team to meet the project objectives.	Programme managers manage the programme staff and the project managers; they provide vision and overall leadership.	Portfolio managers may manage or coordinate portfolio management staff.
Success	Success is managed by product and project quality, timeliness, budget compliance and degree of customer satisfaction.	Success is measured by the degree to which the programme satisfies the needs and benefits for which it was undertaken.	Success is measured in terms of the aggregate performance of portfolio components.
Monitoring	Project managers monitor and control the work of producing the products, services or results that the project was undertaken to produce.	Programme managers monitor the progress of programme components to ensure that the overall goals, budget and benefits of the programme will be met.	Portfolio managers monitor aggregate performance and value indicators.

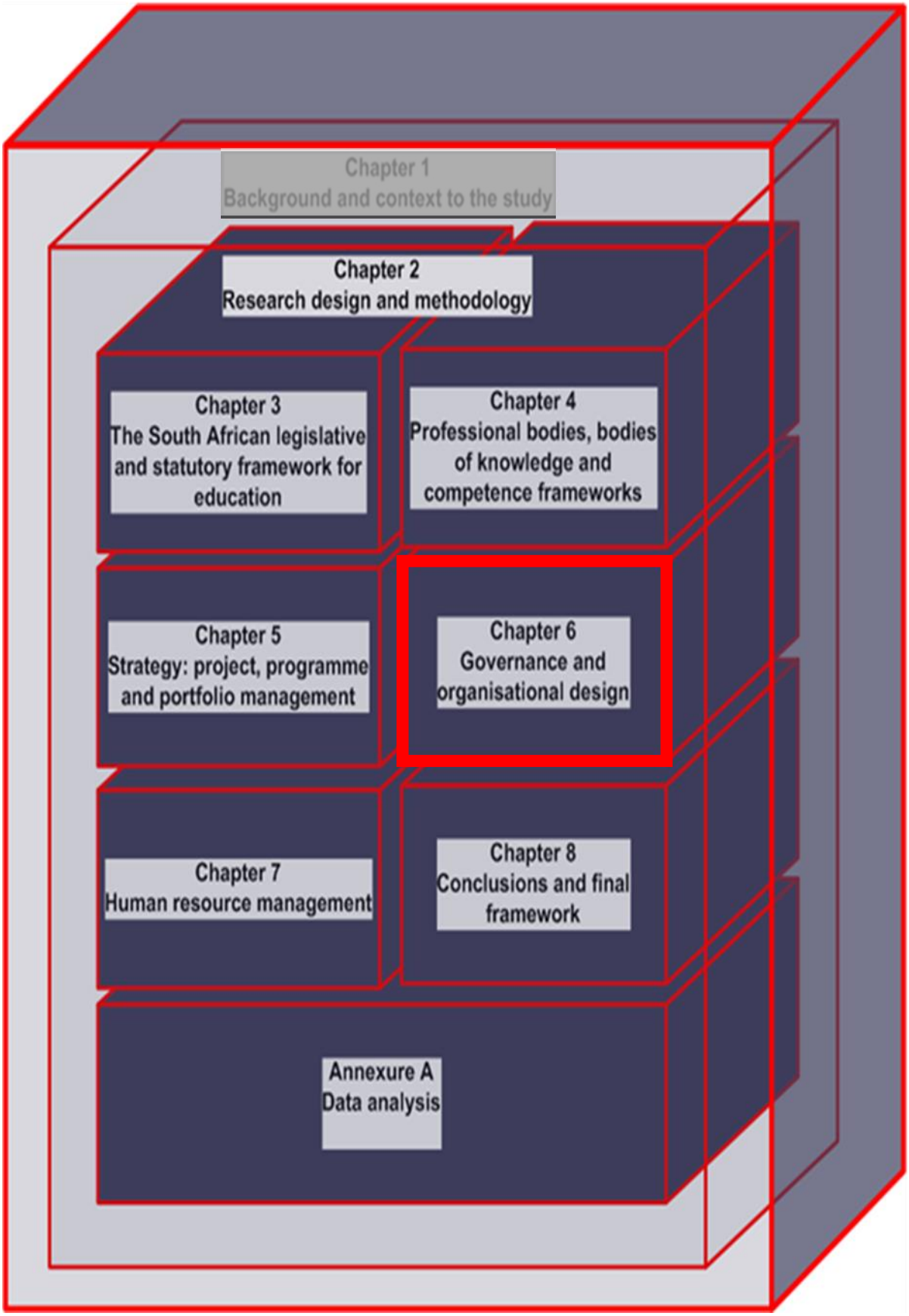
From the discussion in this chapter, it is evident that the developing stratified framework requires consideration of the overall business management context. It is within the context of how the business is managed and the role that projects play in it that the definition of a job family for ICT project managers is elevated to receive the necessary attention. It is thus recommended that a further level of stratification be added to the framework. This stratified addition would contain the elements of the domain of portfolio, programme and project management, with how it is influenced by and influences the strategy of the organisation, and the consequent influences on the governance of projects. The choice of an appropriate life cycle management approach, as well as an appropriate methodology, also requires attention as it would influence the definition of roles and functions within the project team. In the discussion, the main aspects that came to the fore were the issue of locus, focus and function. It can thus be recommended that the next layer be added to the framework,



as depicted in Figure 5-24 below.

Figure 5-24: The third level of the stratified framework

Chapter 6. Governance and organisational design: portfolio, programme and project offices



6.1 Introduction

In accordance with the envisioned aim and objectives of the research, this chapter will add the layer to the stratified framework of what should happen in terms of governance and organisational design to facilitate the establishment of a professional development home for ICT project managers.

The previous chapter concluded with the addition of the next level of the stratified framework – strategy: project, programme and portfolio management – that can exert an influence on the development of the individual ICT project manager. The chapter also contributed a list of distilled functions and roles that are embedded in the methodologies.

According to Manktelow (2014), there is a misconception in the minds of many people when referring to organisation design. In many instances, design is thought to mean the organisational structure. Organisation design encompasses much more than the mere structure of the organisation. Organisation design is a process of aligning an organisation's structure with its mission (Manktelow, 2014). Manktelow declares the following:

> *There is a need to look at the complex relationship between tasks, workflow, responsibility and authority, and making sure these all support the objectives of the business… Good organisational design facilitates communication, productivity and innovation* (Manktelow, 2014).

The researcher posits the following:

It thus creates an environment where people can work effectively.

Following from what Manktelow (2014) states as the misconception, it was found that there is also confusion in terms of how an organogram is defined and the nomenclature used for the graphic depiction of the organisation structure.

Manktelow (2014) cites poor organisational design as the cause of many productivity and organisational issues. The following aspects are stated as direct influences on organisational performance:

- How work is done
- Business processes
- Information sharing

- How people are incentivised

If what Manktelow (2014) states holds true for traditional functional hierarchical organisations where there is stability and continuity, the researcher deduces that the problem would be exacerbated when organisational design is applied to projects and the projectised organisation (Manktelow, 2014).

The researcher posits that organisational design is important, and further poses the question:

Given the importance of organisational design, why is it so often to blame for inefficiency and ineffectiveness?

Manktelow gives the answer to this question, namely that organisation design often evolves rather than being designed to support the organisational vision, mission and strategy. More often than not, there is little or no planning and intervention, hence the organisation design that emerges is likely to be flawed (Manktelow, 2014).

This chapter builds on Chapter 5 in terms of a discussion of the locus, focus and function of project, programme and portfolio management offices from an organisational design perspective.

Subsequent objectives are to:

- determine the common ground and elements between the locus, focus and function of portfolio, programme and project management; and
- determine the various and differing roles located in the various functions and offices in a projectised organisation's design.

The detail of the scope of this chapter was determined through the Excel spreadsheet and the key word analysis as shown in Appendix A. The particular emerging pattern of relationships was quite extensive, but has confirmed the premonition that the mere institution of project management as a function would not suffice to enhance project execution effectiveness in an ICT environment. From the analysis pattern, it was evident that the notion of locus, focus and function is necessary to develop an effective project execution organisation. The locus, focus and function aspects will form the backdrop to the rest of the discussion in this chapter, and serve to develop the scope of the discussion.

From the spreadsheet, it was also determined that the discussion should entail the following:

- Define the common ground and elements between the locus, focus and function of portfolio, programme and project management (this is represented by the most densely populated area of the spreadsheet).
- Define the main functions of a portfolio management office.
- Define the main functions of a programme management office.
- Define the main functions of a project management office.
- Define the roles and functions of the various projectised organisational structures, such as project, programme and portfolio management offices.

6.2 Portfolio, programme and project management

Adamopoulos (2012b) reminds one that the ICT function is there to support and create value for the business. Support and value creation can only be achieved if the chief information officer (CIO) is involved with the management of portfolios, programmes and projects early on in the life span of such initiatives (Adamopoulos, 2012a).

Adamopoulos (2012b) then states that, where it concerns the CIO:

> *Project portfolio management is not just a question of selecting projects in pursuit of every profitable opportunity, and then overseeing the management of them. Rather, it is a question of balancing the selection of projects within the limits of the financing and resources available and, most significantly, within the context of the strategic direction of the organisation as a whole* (Adamopoulos, 2012a).

One can see that organisations increasingly depend on ICT systems to act as enablers, and that the installation of such enablers usually happens in terms of project execution. There is, however, a caveat: the allocation of larger budgets from which to make investments in terms of ICT systems is not the panacea. There should be a total focus on portfolio management to ensure the viable selection and visibility of project performance. This holds true for the CIO, as well as the portfolio manager. However, the conditions of the caveat do not end here. A system alone cannot solve the problem. There should be a wider point of vantage, which entails the following:

> *A good portfolio management approach should help an organisation focus quickly on the most profitable ideas and expedite their time to market. It ought to be a consistent process that creates visibility across the organisation; focusing on what is important and supporting good*

> *decision-making. The approach needs to have prioritisation at its heart, while supporting execution and speed* (Adamopoulos, 2012a).

Further to the opinion of Adamopoulos (2012a), it is stated in a White Paper drafted by Keyed In Solutions (2012) that more companies are realising that projects should no longer be viewed as "one-off" isolated entities, but as a core element that drives the future profitability of the business. In fact, the effectiveness of an organisation's project management process can make or break the bottom line of the business. With this in mind, stakeholders are demanding greater accountability in the way projects are selected, managed and delivered. This is the common imperative for today's high-growth organisation. Whether this is accomplished through project management (PM), a programme management office (PgMO) or project portfolio management (PPM), the goals are the same. The White Paper developed by Keyed In Solutions (2012) then states the following:

> *Although many PM, PMO[10] and PPM practices were initially developed within IT departments, in recent years it has become a mainstream feature in a wide range of industries, offering businesses of all sizes a simple framework for selecting, prioritising and delivering projects and programmes* (Keyed In Solutions, 2012).

The perspective of Adamopoulos (2012a) and Keyed in Solutions (2012) can be summarised in Figure 6-1 below.

[10] Note, the acronym PMO is used by some authors to denote the Programme Management Office (PgMO).

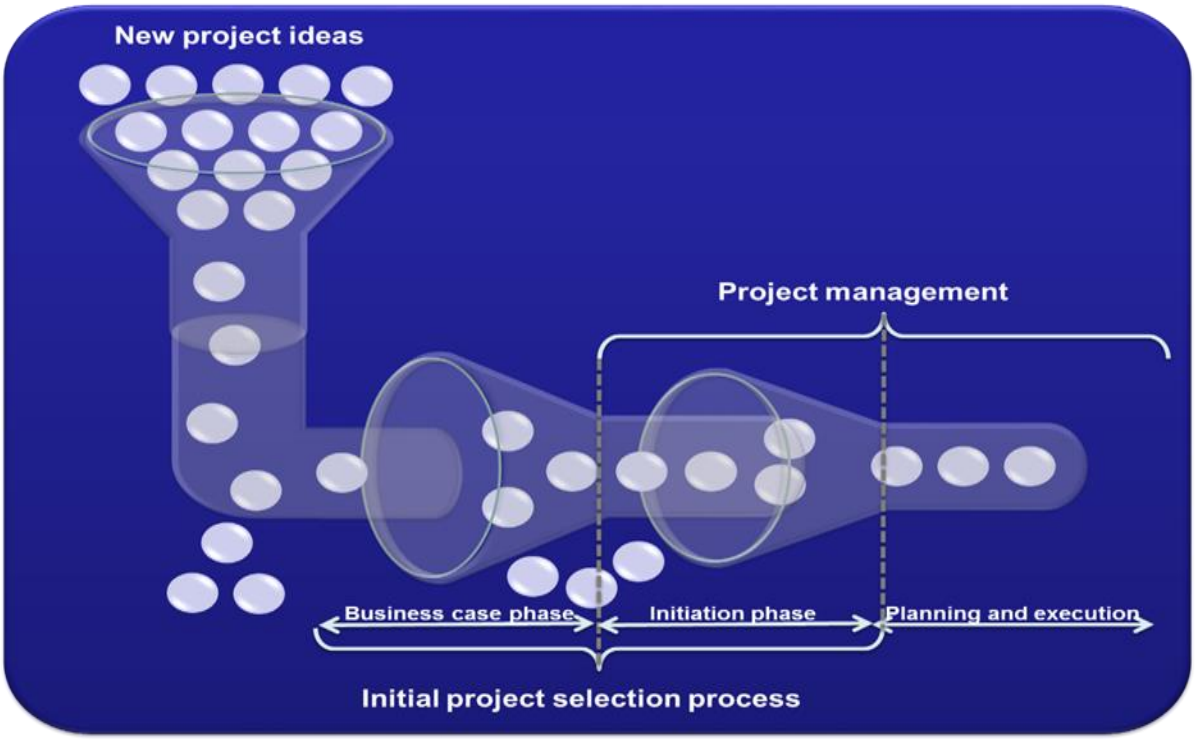


Figure 6-1: Project pipeline and project portfolio management perspective

One can deduce from Figure 6-1that, with the growth and escalation in importance of projects and project management, the structure and design through which execution will be given to projects is going to become increasingly important. The typical questions of what, where and who will become ever more important in the design of the organisation of the future (Sherwin, 2014).

The current trend towards project management as an approach to close the gaps between customers' needs and the quick pace of the changing marketplace has solved only part of the problem, and mere project management is becoming outdated. For this reason, Adamopoulos (2012a) quotes the research of Gartner, which predicted that PPM would go from just managing business projects to managing value and change, as well. Portfolio management, both as a function and as a focus, is becoming increasingly important to the overall landscape of how companies manage change and identify value. In order to realise the value that can come from addressing customers' needs, processes should be defined and followed. However when applied to project, programme and portfolio management, processes are rarely defined and managed. This problem is compounded even more when it is applied to portfolio management. (Adamopoulos, 2012b)

Following from Adamopoulos, one sees that people act on processes through roles. Thus, these roles need to be defined, as well as located somewhere. In the world of

project management, terms such as project office, programme office and programme management office as locations flourish. The situation gets even worse when these terms are abbreviated and one finds references to PO, PMO, EPMO, and PgMO (Adamopoulos, 2012b).

There is thus a need to better understand the functions of the offices where project, programme and portfolio management are executed. This, linked to the defined roles and functions of individuals, will provide a better perspective of the organisational design needed in terms of the temporary project execution office, the slightly more permanent programme management office, and where to locate the function of portfolio management. The discussion will focus on the locus, focus and function of the various designs of offices through which to conduct the management of projects. Special attention will be given to the Programme Management Office, as it:

- is more permanent in the organisational design;
- forms the link between strategic thinking and the planning of the portfolio management function;
- is required for the tactical translation of strategic plans into operational projects; and
- virtually sits between the two other functions, thus having a governance control function in terms of oversight of the constituent projects, as well as management control focus in terms of portfolio management reporting (Eskom, 2007).

Given the above, there are, however, always anomalies, and projects can be found that are not tied to programmes, as shown in Figure 6-2 below.

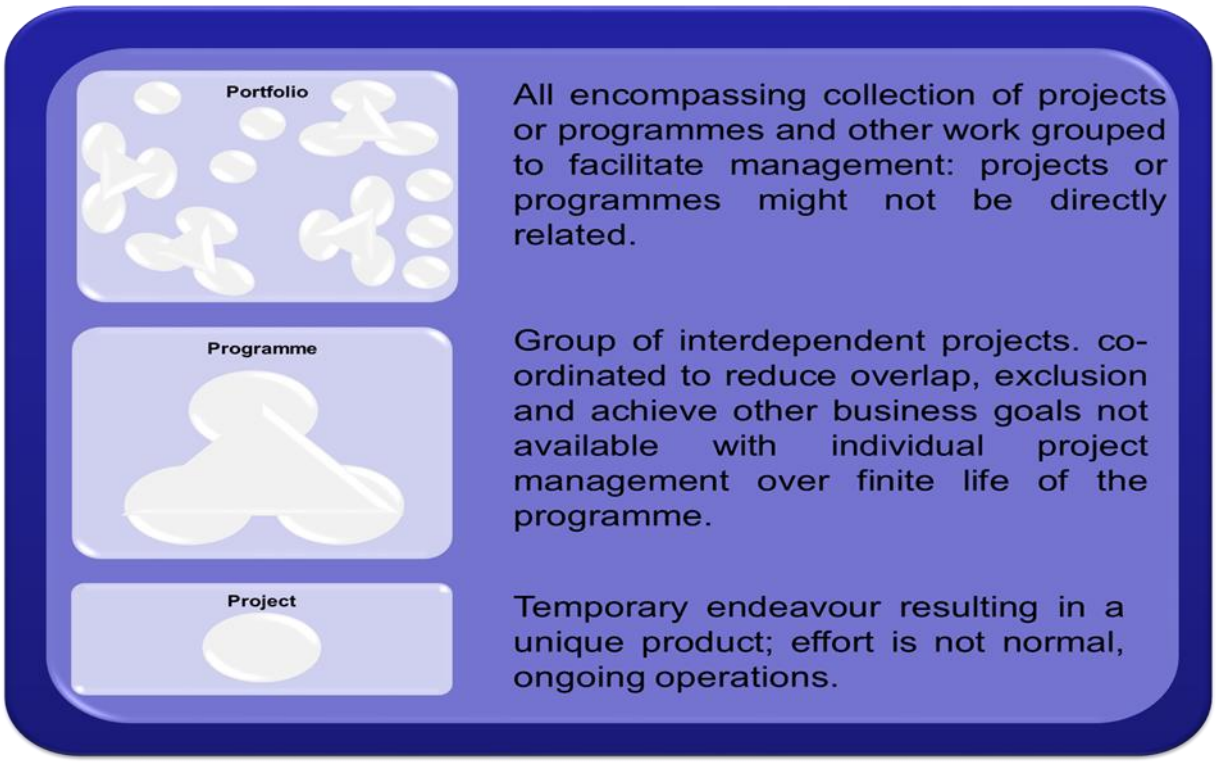


Figure 6-2: The relationship between projects, programmes and portfolios (Keyed In Solutions, 2012)

From Figure 6-2, one sees that projects can exist outside a defined programme, but that programmes are always part of a particular portfolio. To further elaborate on the understanding, let us recap the different definitions of project, programme and portfolio management, according to the PMI:

> *A project is defined as a temporary endeavour undertaken to create a unique product, service or result. Project management is the application of knowledge, skills, tools and techniques to project activities to meet the project requirements* (Project Management Institute, 2008).
>
> *A group of multiple related projects forms a programme. Constituent projects are initiated during the programme's life span, and are managed in a coordinated way. The role and function of the programme manager is to align the efforts of the related projects, and not to get involved in the management thereof. The role of a programme management office is to interact between the portfolio management level where strategy would be devised, then handed over to the programme management function to be interpreted and implemented. On the other hand, the programme office will schedule the execution of individual projects in accordance with the priority assigned from the*

portfolio office and availability of resources, and start the process of formally initiating a project that will ensure strategy attainment through the execution of various projects (Project Management Institute (PMI), 2011).

With the institution of portfolio management, an organisation exhibits its truest intent, direction and progress. The portfolio management function takes charge of the investment decisions and resource allocation, and determines priorities for projects to be executed. Changes in the businesses' strategic direction would be reflected in the re-prioritisation of the portfolio (Project Management Institute (PMI), 2011).

A portfolio is a collection of components (projects, programmes, portfolios and other work) that are grouped together to facilitate the effective management of that work in order to meet strategic business objectives. The projects or programmes of the portfolio may not necessarily be interdependent or directly related, although they share a common resource pool or compete for funding (Project Management Institute (PMI), 2011).

A portfolio always exists within an organisation that has projects in progress. It is comprised of the set of current initiatives, which may or may not be related, interdependent, or even managed as a portfolio. With portfolio management, the organisation is able to align the portfolio to the strategic objectives, approve only components that directly support business objectives, and take into account the risk of the component mix in a portfolio at any time (Project Management Institute (PMI), 2011).

In Table 6-1, the theme of locus, focus and function is reinforced, as it gives clarity to the work done in and through the various functions (Keyed In Solutions, 2012).

Table 6-1: Focus, scope and organisational structure during project execution

	Portfolio management	Programme management	Project management
Focus	Deliverables linked to strategic objectives	Process to create deliverables	Deliverables
Scope	Selects, prioritises and optimises the entire project portfolio	Multi-project and interdependencies	Single project
Communication	Across the business	Among projects	Within a project
Organisation	Project portfolio management team	Programme Management Office	Project team

A better understanding of portfolio, programme and project management can be gained through examining their interactions. It is clear from Table 6-1 that the programme management function is not always present, but that a project cannot exist without the context of a portfolio that gives the strategic direction. As the complexity and volume of projects increase, so the function of programme management becomes prevalent. The portfolio management function has as its focus the execution of the business strategy and aims to achieve business sustainability. Thus, it has to ensure that programmes and projects are selected, prioritised and staffed with respect to their alignment with organisational strategies.

It can be deduced that, with multiple projects being originated in an organisation, the programme management function becomes a necessity. During the execution of this function, there is a focus on achieving the benefits aligned with the portfolio and, subsequently, organisational benefits.

Just as the case where individual projects cannot exist outside the context of a permanent organisation, one sees that the programme management function cannot exist without the content of individual projects.

Depending on the size and complexity of the individual projects, the organisational structures can also become complex and large. This relationship is depicted in Figure 6-3.

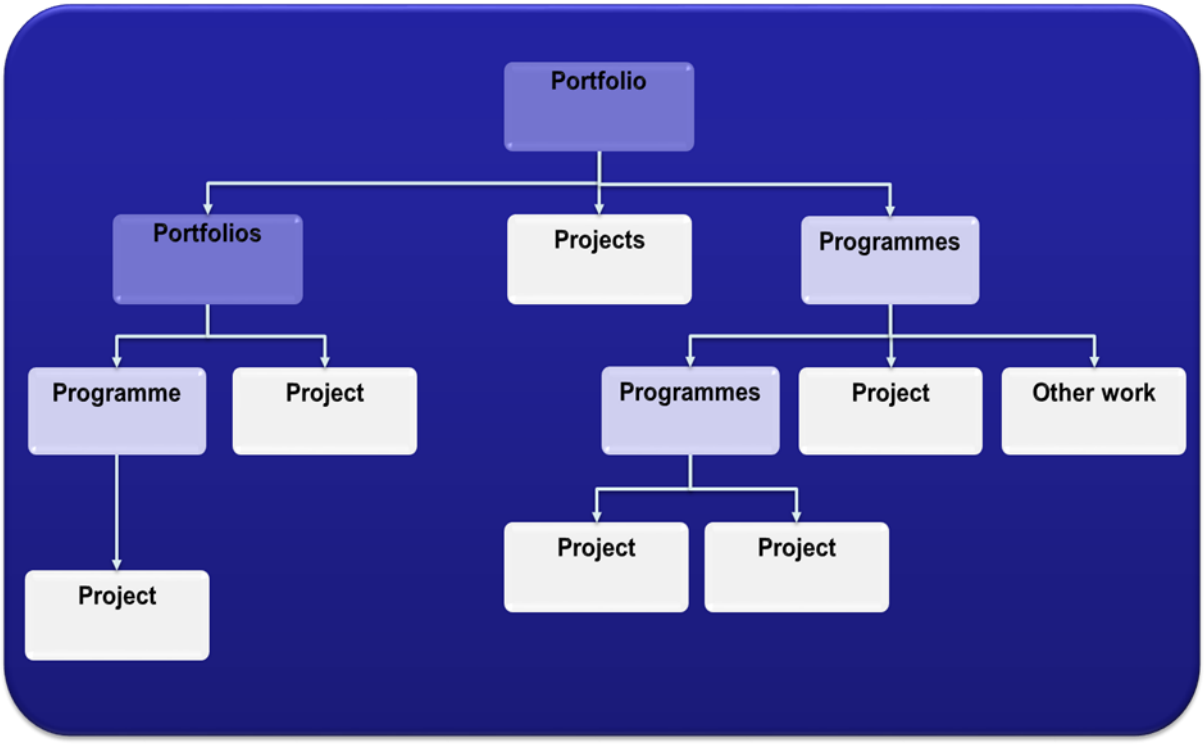


Figure 6-3: The complex relationship between portfolios, programmes, projects and related work

It is clear from Figure 6-3 that there can be various offices located at various levels of the organisation, all focused on implementing, sustaining, supporting or executing projects. Thus, one sees the emergence in organisational structures of offices called by all sorts of names and acronyms. Given the introduction and background up to now, the researcher posits the following:

The world of project management is confused when it comes to the terminology employed to describe the locus, or the names of the offices in which the work of the relevant functions should be accomplished.

Given the introduction and recap regarding the importance of portfolio, programme and project management, the discussion will now focus on the traditional view of organisational design, specifically as it pertains to project management. This is necessary to place the concept of locus, focus and function into perspective.

The question that now arises is what would the correct location (locus) be for the correct functions with their accompanying roles and responsibilities?

6.3 Overview of organisational design

Most publications in the project management domain refer to organisational design to some extent (Global Alliance for Project Performance Standards, 2014a; International Project Management Association (IPMA), 2006a; Project Management Institute (PMI), 2011). The reference is usually in terms of a comparison of traditional hierarchical designs at one end of a continuum contrasted with a matrix-based design at the other end of the continuum. This continuum is depicted in Figure 6-4. Note that this figure is composed of two parts; the top part shows examples of the matrix organisational designs, while the bottom part explains the characteristics of the continuum in terms of hierarchical designs vis-à-vis matrix designs.

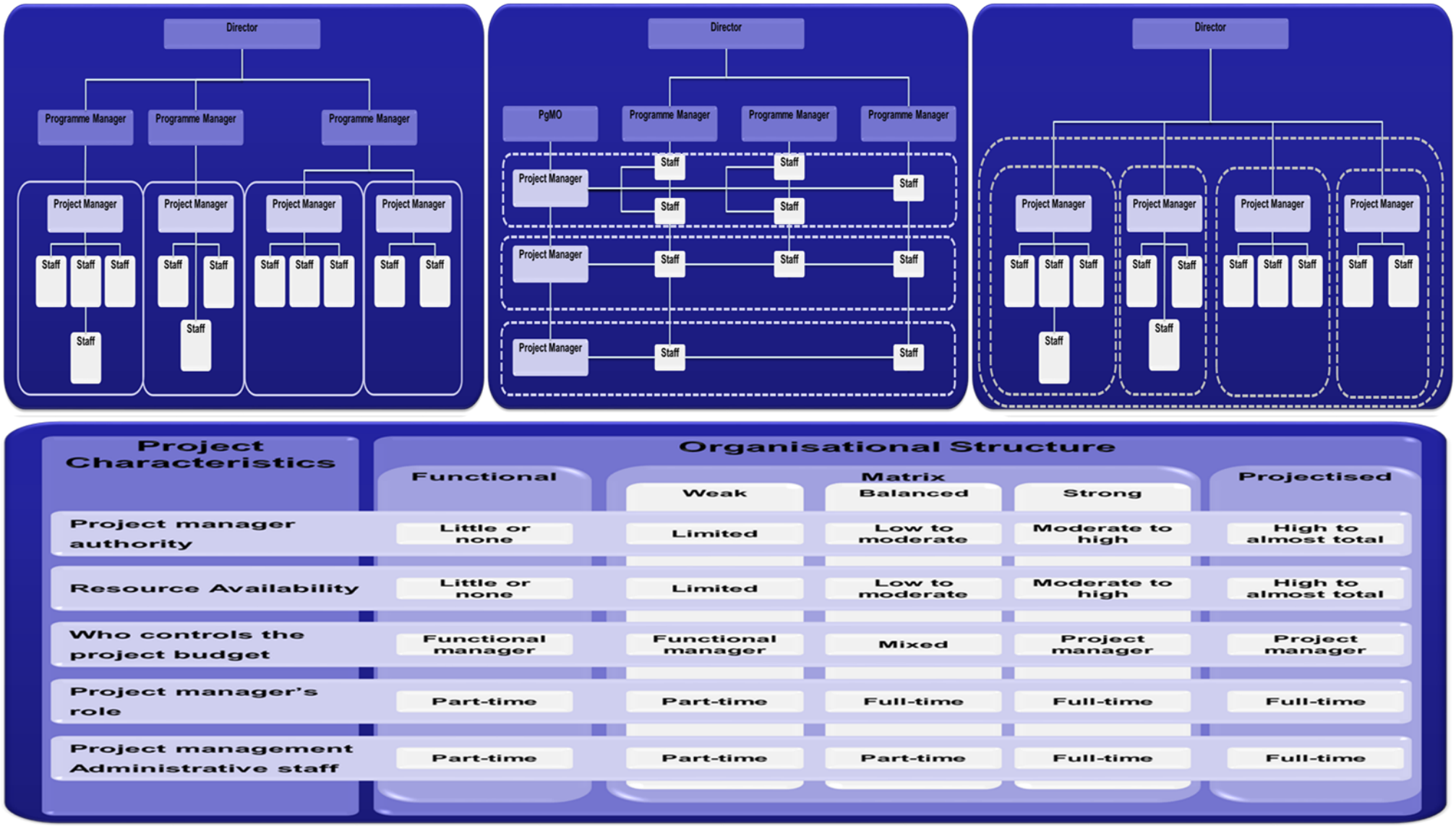


Figure 6-4: Synopsis of the various project organisational structures

Sherwin (2014) gives a comparison of the most common organisational design structures. Sherwin states that one type of structure is not intrinsically better than another. Rather, it is important to make sure that the organisation design is fit for the organisation's purpose and the people in it. A comparison of the various structures is given in Table 6-2 below:

Table 6-2: Comparison of the characteristics of hierarchical vs organic structures

Characteristic	Hierarchical structure	Organic structure
Complexity	High with lots of horizontal separation into functions, departments and divisions.	Usually lower – less differentiation or functional separation.
Formality	High with lots of well-defined lines of control and responsibility.	Lower – no real hierarchy and less formal division of responsibilities.
Participation	Low – employees lower down in the organisation have little involvement with decision-making.	Higher participation – lower level employees have more influence on decision-makers.
Communication	Downward – information starts at the top and trickles down to employees.	Lateral, upward and downward communication – information flows through the organisation with fewer barriers.

When one considers a projectised organisation, new terms such as Project Management Office and Programme Management Office (sometimes causing confusion, especially when acronyms are used) have come to the fore.

> In project management organisational structures, Project Management for Development (PM4D) (pm4dev, 2007) refers to the importance of an organisational structure as follows:
>
> *A project organisation is a structure that facilitates the coordination and implementation of project activities. Its main reason is to create an environment that fosters interactions among the team members with a minimum amount of disruptions, overlaps and conflict. One of the important decisions of project management is the form of organisational structure that will be used for the project* (pm4dev, 2007).

Derived from the uniqueness of each project, the design of an organisational structure should consider the organisational environment, the project characteristics

in which it will operate and the level of authority the project manager is given. A project structure can take on various forms, each having its own advantages and disadvantages.

One of the main objectives of an organisational structure would be to reduce the uncertainty and confusion that typically occurs at the project initiation phase. In a well-defined organisational structure, one finds the definition of relationships between members of the project management team and the external environment. Other than just showing position, the structure defines the authority by means of a graphic illustration called an organisation chart (pm4dev, 2007).

It goes without saying that all of the structures on the continuum (refer to Figure 6-4) have their advantages and disadvantages. However, there are other factors to consider other than just the advantages of one above another. These factors include the level of specialisation and the need for coordination (pm4dev, 2007).

The design of the project structure would be affected by the degree of specialisation in technical areas or development focus. Thus, where there are many areas that would require specialist knowledge, the project structure would grow on a horizontal plane, calling for differences in execution approaches and perhaps even methodologies. This growth in the structure width results in each area of specialisation having its own goals, and even though it maximizes productivity, it creates a burden of coordination and communication for the project manager. A focus on specialisation goals that is too narrow can also cause the team to lose focus of the project's overall goals and may lead to conflict among the component teams.

The need for coordination is driven by the work breakdown structure (WBS) and is required to bring unity and cohesion to the various elements of the project. This would require the project manager to design a structure that ensures the integration of the various components and efforts of the project team. The designated structure must allow integration and collaboration of the various components of the project team's work, and elements and components of the project's deliverables. In the production of deliverables, there would be a division of labour. In the choice and design of the structure, there should thus be a focus on the integration of the work through task dependencies and interdependencies.

Furthermore, factors to consider would be where and how the function of governance over projects would be based and how this function would be staffed.

A synopsis of the elements (pm4dev, 2007) to consider in the design of the projectised organisation is presented in Table 6-3.

Table 6-3: Elements to consider during organisational design

Element	Description
Strategy	The organisation design must support your strategy. If your organisation intends to be innovative, then a hierarchical structure will not work. If, however, your strategy is based on low cost and high volume delivery, then a rigid structure with tight controls may be the best design.
Size	The design must take into account the size of your organisation. A small organisation could be paralysed by too much specialisation. In larger organisations, on the other hand, there may be economies of scale that can be gained by maintaining functionally specialist departments and teams. A large organisation has more complex decision-making needs and some decision-making responsibilities are likely to be devolved or decentralised.
Environment	If the market environment you work in (customers, suppliers, regulators, etc.) is unpredictable or volatile, then the organisation needs to be flexible enough to react to this. Controls – what level of control is right in your business? Some activities need special controls (such as patient services in hospitals, money handling in banks and maintenance in air transport), while others are more efficient when there is a high degree of flexibility.
Incentives	Incentives and rewards must be aligned with the strategy and purpose of the business. When these are misaligned, there is a danger that units within the organisation become self-serving. Using the earlier example of a company that wants to grow by acquiring new customers, the sales team is incentivised on customer retention, and therefore is self-serving rather than aligned with the business purpose.

One can conclude that there is much more to organisation design than just deciding on its structure. The information in Table 6-3 shows just some of the facets of organisation design that need to be considered. It can also be concluded that, with each stage of growth or each change, the organisation design needs to be reassessed and realigned as necessary.

The researcher concludes that organisation design structures can be categorised as being on a continuum. On the one end are the functional and hierarchical structures, while on the other are the more projectised or matrix-based structures. Most of these

structures have their advantages and disadvantages. What is of importance in the research regarding project organisation structures is how they would affect the definition of various roles and functions in the organisation. It has been seen in the discussion thus far that the qualifications offered by the various professional bodies, the various methodologies on offer and the function of project, programme and portfolio management all affect project efficacy. In the organisational structure and design, all these aspects need to come together.

6.4 Project organisational structures

Further to the organisational designs that may be found in the general business context, Sherwin (2014) explains that there are specific designs that relate more to project execution. The importance of the various organisational structures that are found in executing ICT projects is relevant in terms of the roles and functions that can be defined in the context of the project team. In general, there are three generic ways that organisations structure themselves to manage projects:

- Projectised
- Functional
- Matrix

From the above discussion, an interesting realisation dawned. Reference was made to organisational design, and then to the traditional continuum of functional hierarchy and matrix, as well as the more contemporary organic designs. Opposed to this would be references to locations within the structure of a matrix and then, in particular, to functions such as project, programme and portfolio offices. It is this realisation that reiterates the backdrop of locus, focus and function to understand the roles that people who occupy the structure, as well as offices, would play (Sherwin, 2014).

The PM4DEV website states that there are several aspects to consider when designing a project organisational structure. The aspect that is singled out entails the measure of authority and responsibility endowed to the project manager. It is important to realise when designing the project organisation that project organisational design goes further than just the design of the structure within which the team should execute the project, but should also address the permanent organisation. The permanent organisation is involved in the measure that top management applies to design an organisation that fully supports project

management. This calls for a redesign of the permanent organisation, with an emphasis on project execution. This redesign should focus on the new roles that are created. This study is especially interested in the new roles that are created (pm4dev, 2007).

The role of project manager does not relate to the team members, but also to other projects and units in the organisation. Thus, the organisation needs to define the project manager's job description, as well as his or her degree of authority and autonomy.

The physical drawing of relationships in terms of an organisational chart helps define lines of communication, command and control. These aspects should, however, be cleverly thought out for the project internally, as well as for the organisation on its journey towards maturity in terms of project management. It is thus the job of senior management to specify communication channels, as well as methods of conflict resolution between the project and the rest of the organisation.

In organisations, every time a new (large) project is started, it would entail a large team of people working together to develop a new virtual entity, which is capable of delivering on the outcomes of the project. It goes without saying that this process involves establishing a new team, as well as considering the development of the existing team.

We have seen thus far that project organisational structures have traditionally developed from the functional hierarchy. As an entity starts to embark on executing projects, it will try to accomplish this from a hierarchical structure. As the level of project intensity increases, one can see that there is a transition towards a weak matrix structure and, ultimately, towards a strong matrix structure. In a highly mature organisation with the ability to handle complexity, one can see the emergence of a projectised design (pm4dev, 2007). This transition, against the backdrop of Figure 6.1, led to an interesting observation. This observation is shown in Figure 6-5. Attention is drawn to the relationship of locus, focus, function and roles going downwards that constitute a one-to-one relationship. However when testing the relationship going upwards, it was found that a one-to-many relationship may emerge.

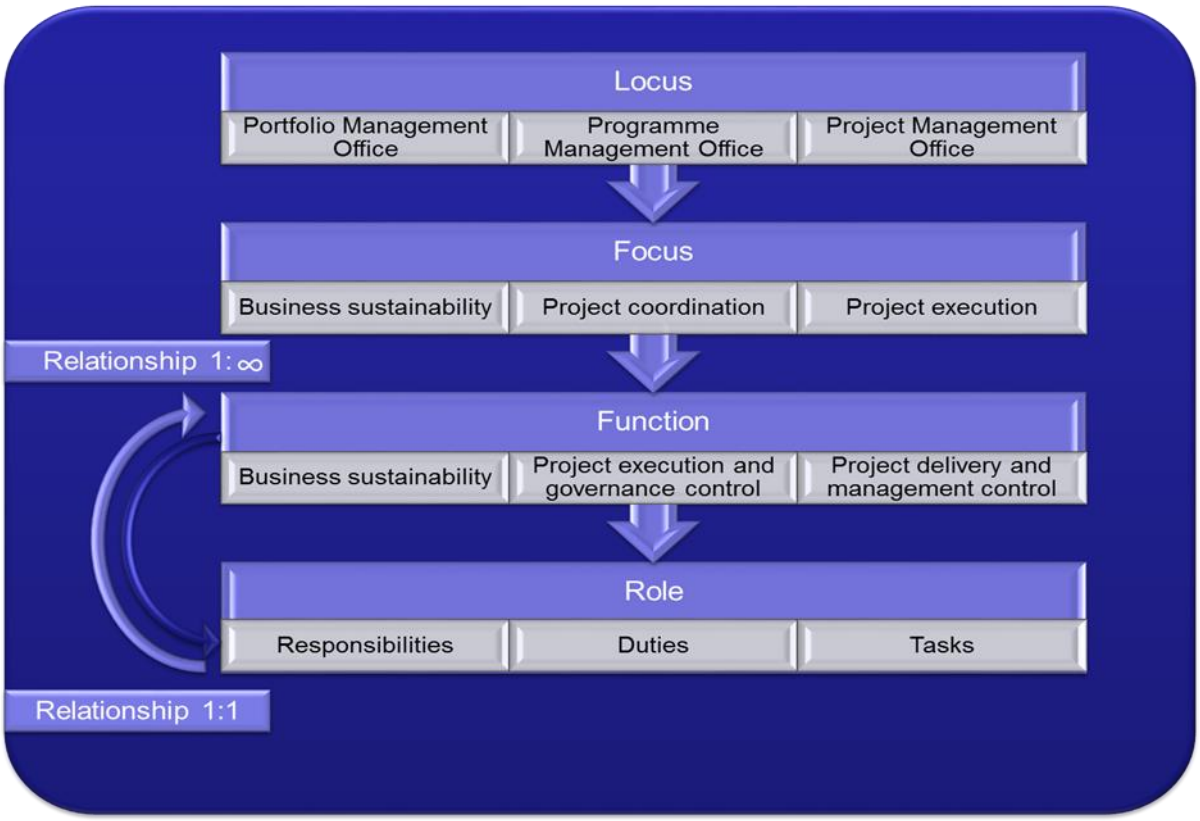


Figure 6-5: One-to-many and many-to-one relationships between functions and roles

It is important to take note of this anomaly in the relationships (1:1 vs 1:∞) at this stage, as it would require an explanation of the reason for its existence, as well as the effect that it would have on the definition of the job family. The anomaly can be explained in terms of the complexity of projects with an accompanying level of task density, as well as the level of maturity of the organisation. PM4D (Project Management for Development (PM4DEV), 2007a) also picks up on this notion. One can then deduce that, from a developmental perspective, when designing and choosing a particular organisational design, cognisance needs to be taken of the particular stage of maturity that the organisation has attained, as well as the level of complexity that the organisation can handle. This makes an addition to Figure 6-5 necessary. This addition is shown in Figure 6-6 below.

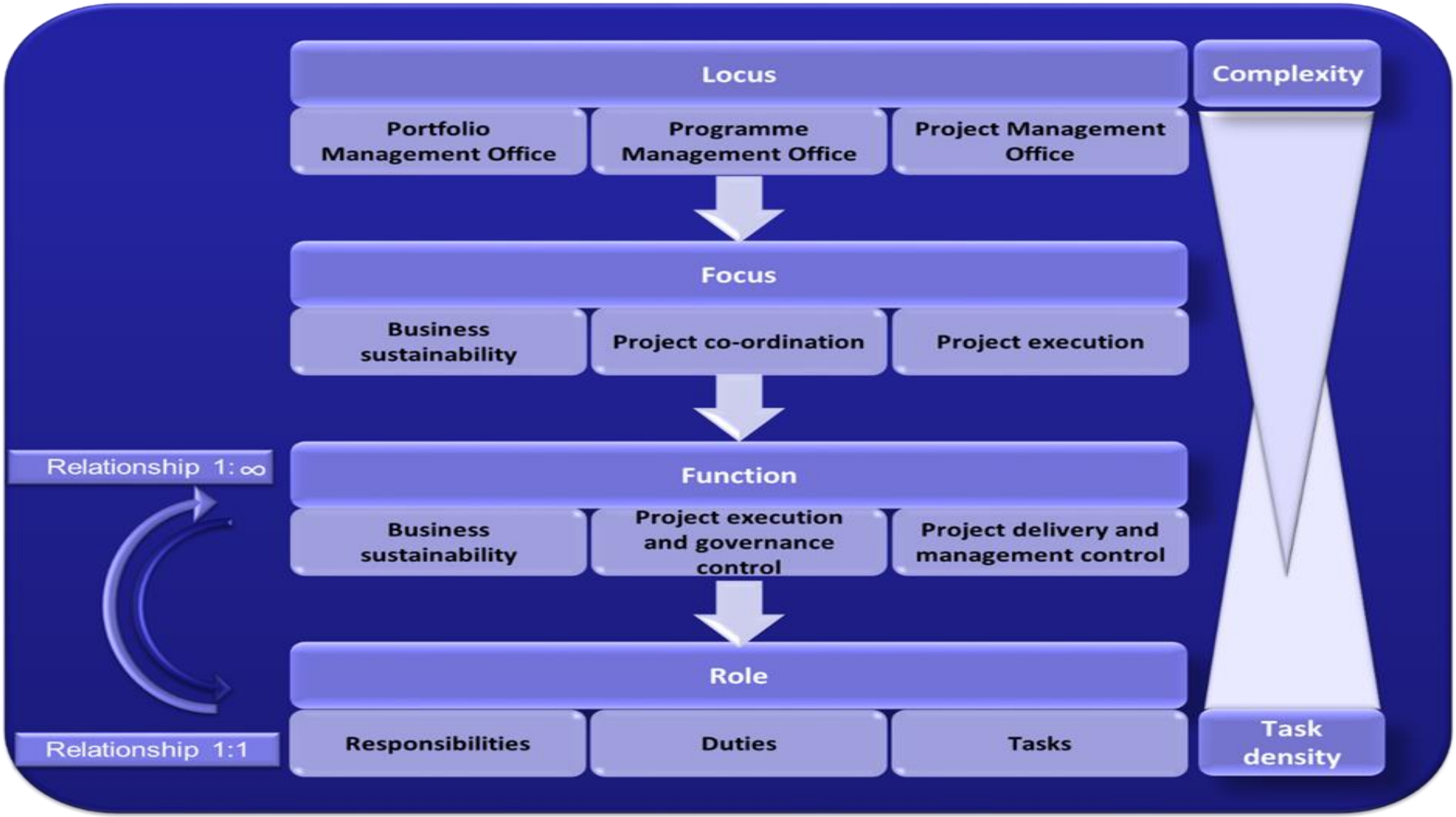


Figure 6-6: Explanation of the one-to-many and many-to-one relationships in accordance with task density and project complexity

Note from Figure 6-6 that where the areas of the triangles of complexity and task density intersect, a particular function may have multiple roles. In this area of intersection, with the increased size of the project and task density, one may find that a particular role will now be more definitely defined and can lead to supplementary roles as defined by task density. The implication on the organisational design would be a horizontal broadening in terms of complexity and a vertical deepening in terms of the growth of task density.

PM4Dev (2007) picks up on the issue of locus, focus and function, as the document states that the organisational chart not only shows where each person is placed in the project structure, but also gives a notion towards the authority and responsibility carried by each position. The relative location of each position designates the location of the individual and specifies the working relationships. The lines connecting the boxes designate formal supervision and lines of communication and control between the individuals.

From this, it can be concluded that the design of the project organisational structure entails the organisation function of general management, which is essential for organising the project. It delimitates the lines of authority, command, as well as control and communication, and while design is essential, implementation is more difficult. During design and implementation, care needs to be taken to ensure that the structure will meet the needs and requirements as the project proceeds through its life span. The aim is thus to design a structure that provides a formal environment that the project manager can use to influence team members, as well as create opportunities for growth in terms of responsibility and increased authority. Both these aspects would be required for development on a particular track in a particular career path. Further to the developmental aspects, the design should also facilitate motivation and collaboration, all in a cost-effective way with a minimum duplication of effort and overlap.

6.5 Projectised organisational structures

At first glance, this section's heading seems to be a repetition of what was discussed above. The difference, however, resides in the names of the various offices in which the personnel would reside given a certain organisational design.

During the data-gathering phase of the research, it was found that there is a common misunderstanding regarding the nomenclature used when referring to projectised

institutions. Terms such as PMO and PO refer to totally different concepts, given a particular industry, geographical region and perspective in terms of professional bodies and their publications (refer to section 6.5.1 for a validation of this statement). Following is a reference to the nomenclature required to institute a projectised organisation (Amat, 2012; Moustafaev, 2014).

In a projectised organisation, after the decision has been made regarding the organisational design and structure, the functions of project, programme and portfolio management may emerge. The location from which these functions is executed would entail the use of terms such as the following to designate various functions that would be located in the projectised organisation:

- Project Office
- Project Management Office
- Programme Management Office
- Programme Office
- Portfolio Office
- Portfolio Management Office

It was previously mentioned that these terms – and especially their abbreviations – do not follow a fixed taxonomy or lexicology in their interpretations. It is thus not difficult to conclude that there are vastly different meanings and interpretations between what is actually meant to be conveyed when using these terms in organisational design (Amat, 2012; Moustafaev, 2014).

It is thus necessary to differentiate between a projectised organisation and the nomenclature used to describe the offices vis-à-vis the organisational design, which is commonly referred to as the continuum of functional to matrix.

6.5.1 What is a PMO and how does one differentiate between PMOs?

With the advancement and widespread acceptance of project management, the acronym PMO has become highly recognised and quite a popular term. Many organisations today have some or other form of PMO. However, this term is still quite misunderstood, and these three letters could mean different things to different people. In reality, one finds that not all PMOs are the same, and that the functions are not generically spread. The reader's attention is now turned to the acronym PMO.

On a blog discussion posted on 22 September 2012, an attempt was made to clarify the acronym PMO in terms of the function that a project, programme or portfolio management office should fulfil (Moustafaev, 2014). The conclusion is that the acronym is widely used, but often with a confusion of what is meant by the acronym. It was found that it could convey the following understandings:

- Project Management Office: this is the most commonly used term.
- Programme Management Office: this is the second-most common definition.
- Portfolio Management Office: this is not very common … if the organisation has a portfolio management office, it might refer to it as an ePMO (e stands for enterprise) or cPMO (c stands for corporate) (Moustafaev, 2014).

Across industries, the meaning is found to differ, and there is no common understanding whereby the term can be defined. For the sake of clarity in this discussion, it is suggested that the terms be used to convey the following meanings:

- The term PjMO will convey the locus of project management functions and focus on project execution.
- The term PgMO will convey the locus of the programme management functions and focus on aggregating projects into a coherent programme.
- The term PtMO will convey the locus of the portfolio management function and will focus on the strategic selection of courses or direction which projects will execute (Moustafaev, 2014).

Practically, the main difference conveyed by the terms PjMO and PgMO is that the PgMO is considered more strategic with a focus on programmes and programme management. This focus on programme management leads to a conclusion that the PgMO will exert governance control over the constituent projects. This governance control has the elements of conformity and assurance. Conformity is measured in terms of the business's particular life span management approach, methodologies and policies, in order to give assurance in terms of reporting to a higher level. In contrast, the PjMO is more operational with the emphasis on managing single projects. The control focus of a PjMO will thus be on the project's constraints and can be stated as performance, cost, time, scope quality and risk (Moustafaev, 2014). These relationships can be contextualised in terms of locus, focus and function, as depicted in Figure 6-7 below.

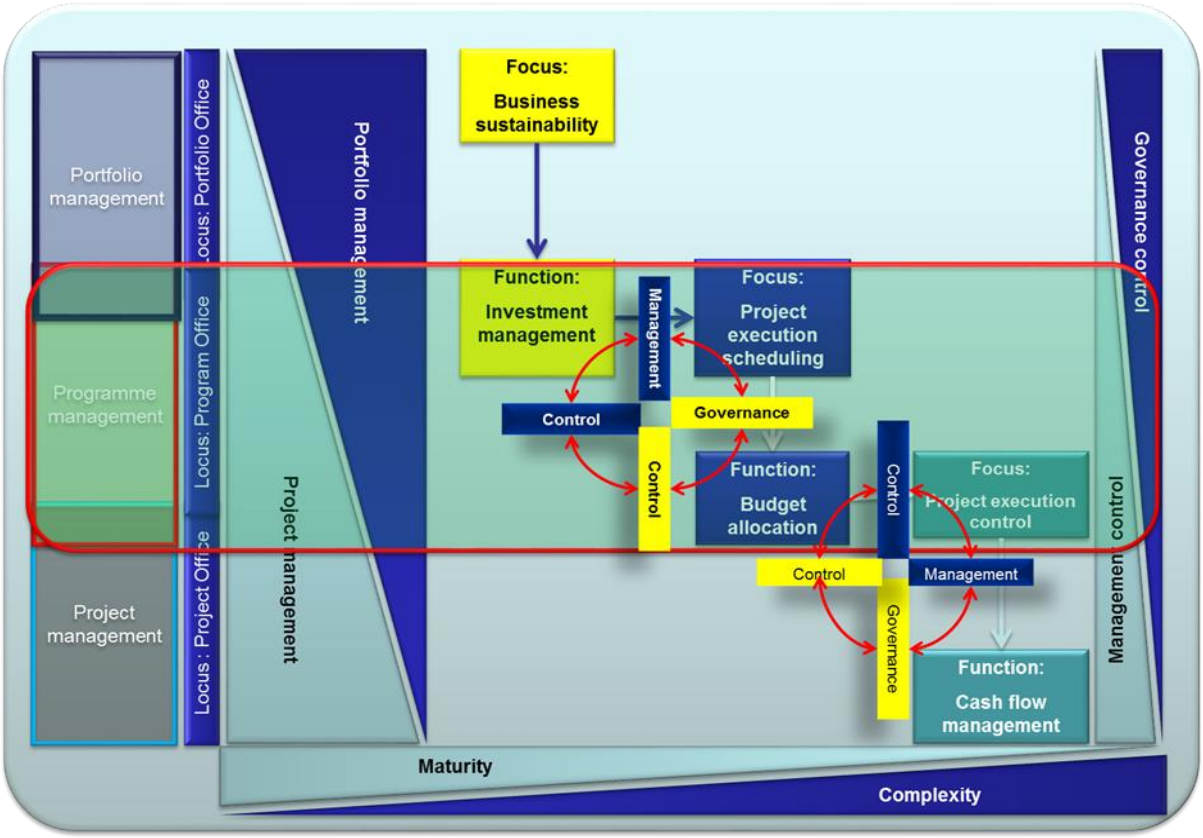


Figure 6-7: Graphic depiction of the control focus of the various project-orientated offices

Note from Figure 6-7 that there are areas of overlap between the functions of governance control vs managerial control, and that the largest area of overlap is at the locus of the Programme Office. From this, one can conclude that, at the PgMO location, there would be roles and functions concerned with assurance and conformity as they relate to the portfolio and ultimately back to the permanent organisation and the overall governance framework. Note that the function of a programme manager within the location of a PgMO also has the responsibility of managerial control. The managerial control stands in relation to the day-to-day management of the programme management function.

This confusion in terminology leads to a conclusion that there should be confusion regarding the roles and functions of the offices as well. For this reason, the author then poses the question of what the roles and functions of such offices should be. The blog's response (Moustafaev, 2014) is echoed in reports from PM Solutions (2010; 2012) that investigated the state of the PgMO, and what respondents understood regarding its function. It is alarming that the reports stated a growth in the institutionalisation of PgMOs, but also a confusion in terms of what it is and what it

should do. The next section will elaborate on the functions of what is called a “PMO”, but will argue for the distinction between a PjMO and a PgMO.

6.5.2 Differentiation: Are all PjMOs and PgMOs the same?

The short answer to this question is: “No”. It can be deduced from the above discussion that if there is confusion in terms of the naming convention, then this confusion extends to what the functions of the various offices should be. To resolve this confusion, attention needs to be given to the areas in which the confusion arises.

First area of confusion: PMO, project or programme office?

> *The section above explained that the differences start with whether the “PMO” is a PjMO, PgMO or PtMO[11]. Literature is sparse on the use of the term “PMO” to infer a portfolio management office or function, which leaves us with project management office (PjMO) or programme management office (PgMO). To distinguish whether a PjMO or PgMO is inferred, attention is drawn to what the functions of the implied office would be. It is thus necessary to revisit the definition of what constitutes a programme: a programme consists of many projects, typically interrelated and linked to a business goal. Programme management is about managing programmes. This distinction is important since it leads to different approaches of management; managing a programme is quite different from managing a project* (Moustafaev, 2014).

Thus, to solve the confusion with regard to the naming convention, one would need to determine the focus of the particular office. A primary focus on managing individual projects will denote a PjMO, and a broader programme execution focus will denote a PgMO.

Second area of confusion: Organisational structure or locus:

> *This area of confusion goes towards whether the organisation is on a path or journey to become mature in project execution and thus transforming it into a projectised organisation. If singular project execution is the aim, then a project office will fulfil the administrative*

[11] In this context, PjMO refers to Project Management Office, PgMO refers to Programme Management Office and PtMO refers to Portfolio Management Office.

> *tasks for a singular project, hence a PjMO. This can further be explained by the following example: A client organisation appoints a company to manage and execute a particular project. We see that where the execution company establishes a dedicated "PMO" … then the term PMO is another way to refer to a project (or programme) management team (PMT). This type of office will be temporary in nature and will dissolve at project completion* (Moustafaev, 2014).

As companies progress on the journey to becoming a projectised organisation and commensurately grow in maturity, a more permanent structure will be implemented. This is also the more widely accepted approach. Here the use of the term "PMO" refers to the establishment of an office within the permanent organisation and could constitute a strategic business unit in itself. Here should then be reference to a PgMO. This type of office fulfils tasks and duties for projects and programmes across the organisation.

It is clear that what is commonly referred to as a PMO can convey vastly different meanings, and that differentiation is needed through denoting it as a PjMo or PgMo according to the locus, focus and function (refer to Figure 6-6 and Figure 6-7).

When the locus of a "PMO" is within the permanent organisation, then most would agree that such an office is not for one project or programme alone, but for all of the projects and programmes in the organisation and would hence be denoted as a PgMO. With a permanently institutionalised office, what then would the functions of such an office be?

The PMO should be responsible for the functioning of project management within an organisation and its functions should be comparable in terms of what the HR or finance departments do in an organisation. To accomplish the tasks of facilitating project execution, there can be:

- a programme management office;
- a project management office; or
- both.

Another issue regarding a PMO is its size. Generally, one size does not fit all. This is commensurate with the level of complexity in projects handled, the level of maturity in both the projectised and the permanent organisation, as well as the level of competence of the staff in the project teams and the Programme Management

Office. We thus see that each organisation should design and build its PMO in accordance with the abovementioned factors (Moustafaev, 2014; PM Solutions, 2012).

6.5.3 Conclusion

To conclude this section of the discussion, reference is made to Gallienne and Stott-Briggs (2011) who states that no one form of organisational design can be stated as being inherently right. All structures have inherent advantages, as well as disadvantages, with each one being suitable for a specific project environment. This calls for organisations being able to change as the situations' demands change. However, to manage transitions and changes in the structure as the project demands requires a holistic perspective that considers the following:

- Creating clarity of roles as part of a project community
- Linking individual and team roles to the project objectives
- Aligning team structure to project values
- Connecting multidisciplinary/organisational work groups and challenging standard design models

It is through the achievement of an awareness of both lines of authority, as well as lines of communication, that projects can achieve the right balance of adaptability and control, innovation and effectiveness (Gallienne & Stott-Briggs, 2011).

Thus, the researcher posits that the design of the project organisation and the projectised organisation would be influenced by the paradigm for project management that prevails in the organisation, meaning whether the organisation is steeped in the American perspective, whether it is PMI orientated, whether it has a European perspective or whether it has an IPMA-grounded base. Furthermore, their roles are also defined through the methodologies and life span management approach that are taken that would affect the organisational structure in terms of role and function definition.

In the last instance, there seems to be a relationship between the level of maturity in the permanent organisation and project execution. It would seem that the more mature the permanent organisation, the more it would lean towards adopting a projectised structure, not only for individual project execution, but also for long-term sustainability. Then another relationship develops, i.e. that with maturity comes the ability to handle more complexity in projects, necessitating the institution of a proper

organisational design both for the individual projects, as well as for the projectised organisation.

6.6 The common ground and elements between the locus, focus and function of portfolio, programme and project management

In the world of project management, incumbents are easily coerced to relegate and simplify project management into either the *PMBOK® Guide'*s ten knowledge areas, or even into a methodology such as that of *ISO 21500 Standard.* However, the main challenge facing businesses today is not just singular project execution excellence, but rather how they muster the multifaceted collaborations necessary to successfully execute the key project components seamlessly – and do this as a natural extension of the business rather than as separate, alien and conflicting entities.

When businesses are still entrepreneurial, the owner-manager can collate and integrate most of the actions of management in the business. However, with growth and commensurate complexity, this task becomes more daunting. The culture and the language in the business suddenly changes towards:

- successful integration at the strategic and operational levels;
- addressing issues by enabling the business to align resources;
- choosing investment opportunities so that projects can be executed in alignment with corporate objectives; and
- driving a greater return on investment from projects across the board (Keyed In Solutions, 2012).

The main point is still that the business needs to see a point for better project management, as well as better organisational design, and offices to enable effective execution. If an integrated view is taken for project execution, certain risks can be minimised:

- Lack of uniformity and rigour in how initiatives and projects are proposed, budgets requested and assigned, and impacts supported and justified.
- Forecasting and planning activities that are not synchronised with subsequent project execution and management.
- Senior management not having the vision of project execution, including milestones, issues and benefits realisation.

- Individual projects and initiatives not being synchronised with activities elsewhere, causing dependencies to be overlooked or ignored and leading to adverse impact on customers and employees (Keyed In Solutions, 2012).

Other than mitigating risks, there is another argument to make for an organisational design in which the projectised organisation is a fully fledged participant in the business through its processes. This argument states the following:

- From a strategic viewpoint, stakeholders can see which projects are delivering the organisation's strategy.
- From an operational viewpoint, managers are empowered with the tools, resources and accountability to successfully execute project delivery as part of the organisation's overall strategy.

This can be graphically depicted as indicated in Figure 6-8 (Keyed In Solutions, 2012). From Figure 6-8 (Keyed In Solutions, 2012), one can see a hint towards the organisational design and offices that would be required for better project execution at a higher level of complexity and maturity. So one can deduce that it is one thing to shout: "Implement a PMO", but quite another task to do so in a functional hierarchical organisation. The next section will elaborate on the difficulties encountered when a projectised organisational structure is aligned with a functional hierarchy.

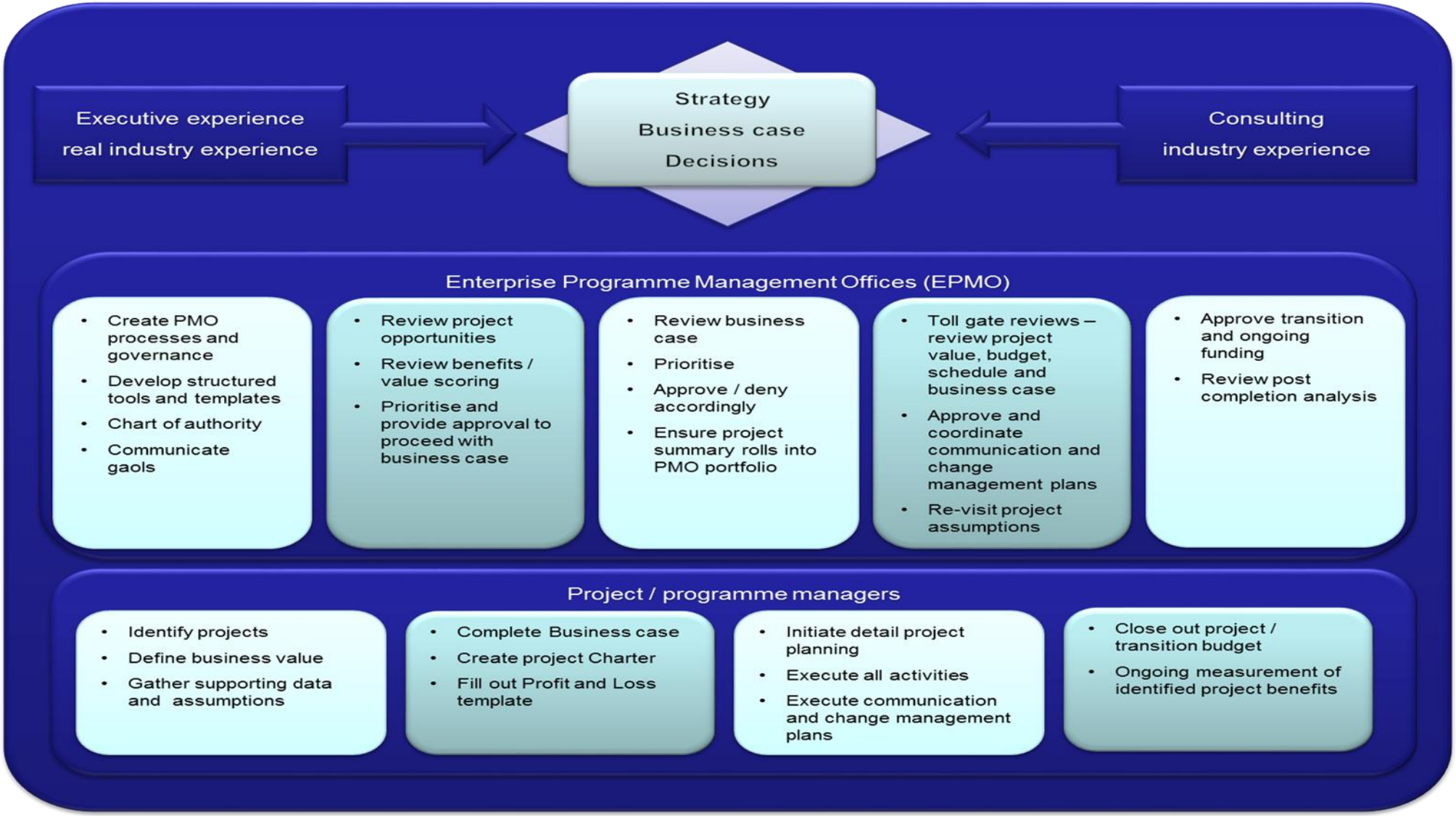


Figure 6-8: Organisational roles of players within a project framework

6.6.1 Common elements, factors and denominators in project, programme and portfolio management

It should be clear by now that projects are the vehicle through which strategies are implemented. The programme management function seeks to coordinate individual strategic actions into coherency and unity. The portfolio perspective sets the trend for the company's future sustainability. It flows from this that there should be common elements that bind these functions together. A summary of such common elements is provided in Table 6-4 (Sukad Group, 2012). The left column shows the areas of commonality, with the other three columns showing the difference in the focus of the common elements.

Table 6-4: Common elements in projects, programmes and portfolios

Common element	Projects	Programmes	Portfolios
Scope	Projects have defined objectives. Scope is progressively elaborated throughout the project life cycle.	Programmes have larger scope and provide more significant benefits.	Portfolios have a business scope that changes with the strategic goals of the organisation.
Change	Project managers expect change and implement processes to keep change managed and controlled.	Programme managers must expect change from both inside and outside the programme and be prepared to manage it.	Portfolio managers continually monitor changes in the broad environment.
Planning	Project managers progressively elaborate high-level information into detailed plans throughout the project life cycle.	Programme managers develop the overall programme plan and create high-level plans to guide detailed planning at the component level.	Portfolio managers create and maintain necessary processes and communication relative to the aggregate portfolio.
Management	Project managers manage the project team to meet the project objectives.	Programme managers manage the programme staff and the project managers; they provide vision and overall leadership.	Portfolio managers may manage or coordinate the portfolio management staff.
Success	Success is managed by product and project quality, timeliness, budget compliance and degree of customer satisfaction.	Success is measured by the degree to which the programme satisfies the needs and benefits for which it was undertaken.	Success is measured in terms of the aggregate performance of portfolio components.
Monitoring	Project managers monitor and control the work of producing the products, services or results that the project was undertaken to produce.	Programme managers monitor the progress of programme components to ensure that the overall goals, budget and benefits of the programme will be met.	Portfolio managers monitor aggregate performance and value indicators.

One can see from Table 6-4 and the identified common elements that the idea of locus, focus and function again comes to the fore. The following section will explore the locus of the function of project, programme and portfolio management further. The discussion will take the form of identifying the focus area of the function from the various acronyms.

To further show that there are definite areas of overlap and commonalities, Figure 6-9, taken from the OGC's publication on programme management offices (P3O) (Office of Government Commerce (OGC), 2009), shows the common elements found.

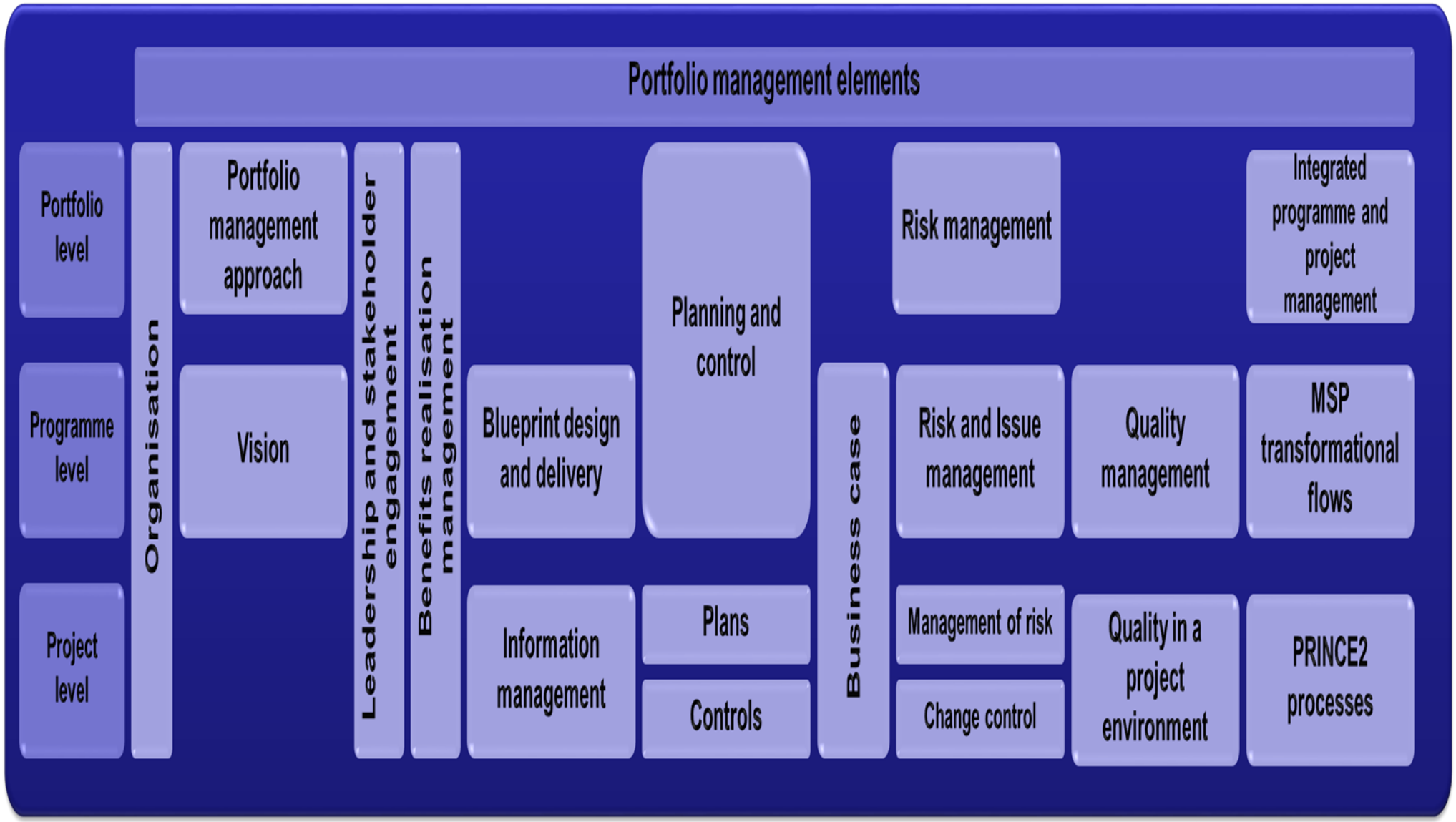


Figure 6-9: Common elements found at the project, programme and portfolio management levels

6.7 The locus, focus and function of a Portfolio Management Office (PfMO)

In order to define where a function should be located, it is necessary to first define what that function does. In the following section, these terms will be clarified to determine their influence on roles and functions that would affect the ultimate aim of the research: to define a job family for those people who have occupations in the projectised part of the organisation.

Historically, most businesses did not find it difficult to generate ideas. Putting these ideas into workable action plans, however, is quite different. More often than not, the inability to implement ideas is placed in the lap of the CIO, and it is argued that, had there been a better portfolio management platform, the organisation would have performed better. Having said this, one finds that the PPM is often cited as a major problem that needs to be remedied (Moustafaev, 2009).

As organisations continue to rely on IT as an enabler for today's businesses, and as an area that receives a large and growing capital investment, project, programme and portfolio management tools will also vie for their fair share of the attention. One sees that PPM has become a focus for many CEOs, CFOs and CIOs, but can the real problem be solved?

PPM is defined as a methodology for analysing, selecting and collectively managing a group of current or proposed projects based on numerous key characteristics, while honouring constraints imposed by management or external real-world factors. To understand this better, PPM can be viewed as a process with two separate phases:

- Prioritisation and selection of candidate projects for the portfolio
- Maintaining the pipeline: continuing, delaying or terminating approved projects (Moustafaev, 2009)

During the first phase, there is no mention of a real project yet, as it happens before project initiation. Work is being done on a business case, and subsequent projects will be evaluated against their own business cases. Once the overall strategic fit has been determined, the focus shifts towards determining the balance or imbalance that a particular project would bring to the overall portfolio.

In following a process to select and schedule projects for execution, the next step is to apply a ranking to all the successful candidates according to their selection criteria

and assessments of the overall company resources available for the next period. The resources are assigned to projects on the list until all the resources are exhausted.

During this process, decisions need to be made regarding the inventory and availability of resources (this includes HR). With this perspective in mind, a decision needs to be made regarding the optimum size of future project pipelines (refer to Figure 6-1), as well as the current drain. Estimate durations, costs and HR requirements for each candidate project should be made.

During the second phase, the emphasis shifts to maintaining the “pressure” in the pipeline (Moustafaev, 2009).

Pressure can be translated into traditional project initiation, execution and control techniques, as well as periodic reviews of each project. These reviews re-examine the original three pillars of portfolio management:

- Value to the company
- Part of balanced portfolio mix
- Fit with the company's strategic goals (Moustafaev, 2009)

Hence, the questions that should be asked at each review – especially at the end of the project initiation and planning stages – include the following:

- Is the original business case for the project with respect to value, balance and strategic fit still supported?
- Are any drastic changes to the project budget, duration, revenue projections and any other factors considered at selection?
- What projects should be killed because they no longer fit the original criteria?
- What projects should be added to the mix because of changed conditions, new ideas and market demands? (Moustafaev, 2009)

Once the projects move into the execution phase, the following questions are added to the mix

- Is the project on time?
- Is it on budget?
- What are the key milestones?
- What are the technical and design issues? (Moustafaev, 2009)

6.7.1 What project portfolio management is not

Due to the locus, focus and function not being defined clearly in an organisation, there is often a common confusion regarding what project portfolio management actually is. The confusion frequently relates to enterprise project management, professional services automation, the management of multiple projects, and programme management. These are all expansions of project management, since they do not address the alignment of projects with strategies or the science of selecting the right projects.

6.7.2 Project vs. portfolio management

This study aims to build a framework that would help give project managers a professional developmental home within an organisation. Now, as before, one again sees confusion between the roles of the project manager and the portfolio manager. They can be regarded as sharing more of the same DNA than their counterparts in a production environment, but instead of being twins, they are rather siblings or cousins. It is thus necessary to establish a boundary between these relatives. The boundaries come from an unusual source, not from clearly defined roles as one would have expected, but rather from what is not being done. What is not being done falls particularly in the domain of the project manager and, as such, gives credence to the role of the portfolio manager. This can be clarified as follows:

> There is a group of activities that is often attributed to project managers when, in fact, it should be attributed to a completely different group of people, known as portfolio managers. Identifying needs and opportunities, deciding which projects should be undertaken and which ones should be killed are all activities that correctly fall into the portfolio management domain.

Similarly, establishing project priorities, assessing revenue and cash flow projections, aligning project mix with organisational goals and balancing the project portfolio also fall within this domain. These should all be the responsibility of portfolio managers or high-level executives, rather than project managers.

6.7.3 Prerequisites for successful project portfolio management

Other than having systems, tools, templates, techniques and the will to do something, there should be a properly defined governance framework. Such a framework forms the context for, and gives understanding to everybody else who will participate in the process. Attention is again drawn to the graphic of the project

pipeline (Figure 6-1). If the pipe does not have a particular wall thickness, it will not be able to withstand the pressure. If the diameter is too thin for the volume that it must carry, there will be problems. In short, it can be said that the pipe governs and regulates what goes through it, as well as what is in it (Moustafaev, 2009).

It was demonstrated in the previous sections that running proper portfolio management processes implies having well-developed and centralised project management capabilities in place, especially project scoping and estimating. It is in particular through scoping and estimating that the characteristics of the pipeline are determined.

Finally, depending on how far a company is along the project management path, new roles may need to be created to support these processes. These may include the roles of project and programme managers, portfolio directors, portfolio management offices, etc. The next section will thus elaborate on the growth path towards maturity in becoming a fully-fledged projectised organisation when functions such as programme management have to be located somewhere (Moustafaev, 2009).

6.7.4 What is the function of project portfolio management?

Aligned with Figure 6-1 in the introduction, the function of good project portfolio management will be summarised in Figure 6-11. Attention is drawn to the fact that the benefits are stated in a negated state. Thus, if the function of project portfolio management is not fulfilled correctly, what is shown in Figure 6-10 (Moustafaev, 2009) will manifest.

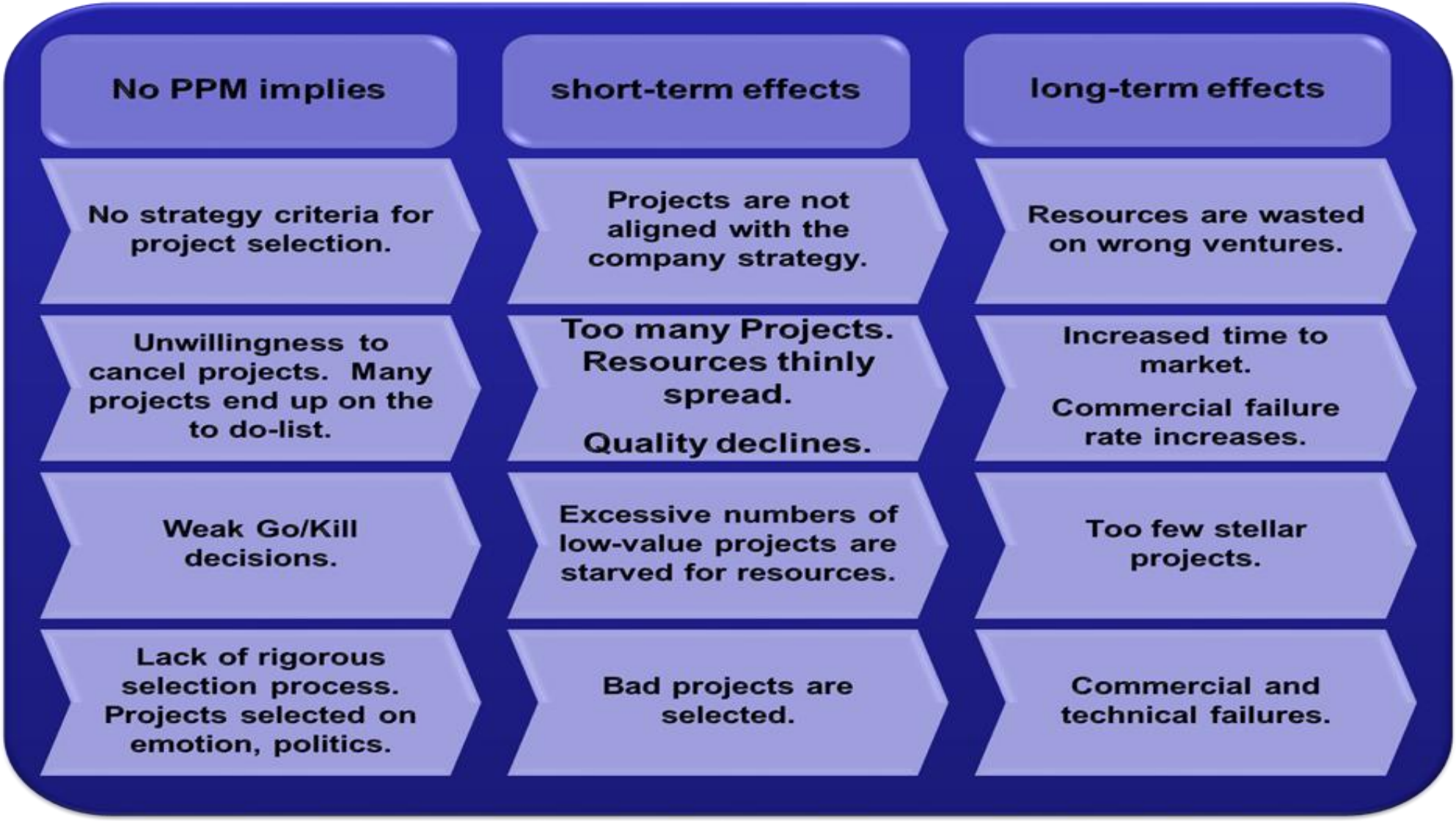


Figure 6-10: Short- and long-term effects of a project portfolio management (PPM) function not being fulfilled correctly

6.7.5 The locus of a Portfolio Management Office

The portfolio management function was found to be vested with senior managers in the line execution part of the business. Only in highly mature organisations can this function be located within the projectised organisation, and then in an office with the designation of Portfolio Management Office (PfMO).

6.7.6 The focus of a Portfolio Management Office

The role of a Portfolio Manager is inferred in a book review by R. Max Wideman of Harvey A. Levine's *Project portfolio management: a practical guide to selecting projects, managing portfolios and maximising benefits*. (Wideman, 2006)

Levine (2006) refers to three different groups in the project, programme and portfolio management environment that do not necessarily speak the same language:

> *The first group entails the governance group – this group encompasses the business executives, such as CEOs, COOs, CFOs, CIOs, senior functional managers or even strategic planners. These are the people that run the enterprise within which projects take place and have a focus on business sustainability and keeping the business afloat. This is the group that can be likened to fulfilling the portfolio management function and have their focus on successful products and services that will ensure business sustainability.*
>
> *Their primary project management involvement focus is thus not on project execution issues such as "Will the project be 'on time' and 'within budget'?", but rather on "What benefits will this project bring to the organisation, when, and how risky is it?* (Levine, 2006).

6.7.7 The functions of portfolio management

We have thus far seen that the concept of a project cannot survive on its own. It is at least part of a portfolio, and it has to fall within the ambit of the strategic decision-makers at some stage in its life span. To facilitate these strategic decisions, and run the portfolio effectively, a proper prioritisation model is needed. Such a model provides a decision support tool to assist senior management (such as a portfolio board) to prioritise those programmes and projects that represent the best alignment to strategic drivers, with the least risk of achievement. For this reason, the PMI's

Standard for Portfolio Management (Project Management Institute (PMI), 2013) defines a portfolio as follows:

> *A collection of projects or programmes and other work that are grouped together to facilitate effective management of that work to meet the strategic business objectives. The projects or programmes of a portfolio may not necessarily be interdependent or directly related* (Project Management Institute (PMI), 2013).

Furthermore, portfolio management is defined as follows:

> *The centralised management of one or more portfolios, which includes identifying, prioritising, authoring, managing and controlling projects, programmes and other related work, to achieve specific strategic business objectives* (Project Management Institute (PMI), 2013).

One sees from the definition that there should be authorisation, as well as prioritisation in terms of where and when a business will invest, and that this investment must be aligned with the business strategy. For this reason, it is commonly found that the portfolio management function utilises a prioritisation process or model.

A prioritisation model takes a list of potential programmes and projects, and assesses each to identify the optimum portfolio, acknowledging organisational constraints such as availability of investment funds and resources. This prioritisation model assesses two components of the potential programme or project:

- The “idea” itself and the level of alignment to strategy, including returns on investment and size in terms of total cost.
- The delivery and execution capability of the organisation to be able to manage and deliver the programme or project outcomes (Office of Government Commerce, 2008).

To enable programme and project prioritisation to occur, it is necessary to collect key information about a programme or project proposal. This is usually undertaken using a portfolio project assessment and prioritisation form, which has two goals:

- To allow business operations to register an idea with the PgMO for investment evaluation and to make a potential funding decision through governance arrangements.

- To collect only enough information for the PgMO to evaluate the proposal in a prioritisation model before significant work commences (Office of Government Commerce, 2008).

Information collected through a project prioritisation form does not form part of the project brief, it precedes it. The information gathered will be used as an entry point into an investment stage gating process, which assesses the ongoing viability of a project or programme at key points of its life cycle and benefits realisation. In order to achieve this, the business should have an integrated portfolio management approach (Office of Government Commerce, 2008).

The portfolio model is generally populated as part of the business planning process and should be updated periodically (such as quarterly) to assess potential new programmes and projects for merit against the existing portfolio (Office of Government Commerce, 2008).

It is critical that the information used to populate the prioritisation model is not developed in isolation by the programme management function. Stakeholders should be carefully identified and used to build a level of consensus as to the weightings of each of the parameters (Office of Government Commerce, 2008).

When tailoring or developing a portfolio model, it is advisable to utilise clear parameters or metrics to remove subjectivity where possible. It is also necessary to review and refine the weightings and parameters periodically to ensure that the project remains relevant (Office of Government Commerce, 2008).

When the results of the prioritisation model are produced, it is recommended that this information is used as the basis of a facilitated workshop with key stakeholders (such as representatives of the portfolio board) to be validated and refined where necessary. This acknowledges that the prioritisation model provides decision support only and provides an opportunity for strategic discussion to support buy-in to the planned portfolio. Equally, reporting should be done at the level of a management dashboard (Office of Government Commerce, 2008).

The objective of the management dashboard technique is to provide key decision support information across a portfolio using highlights and exception-based reporting, such that it provides a rolled-up view of more detailed information. It is generally provided as a top-tier report (exception based) with links to programme and project information to enable the board to drill down to detailed information if required. Its key

benefit is to supplement larger volumes of detailed reporting, allowing the decision-makers to determine progress more effectively and understand where attention and management intervention may be required. The key input into the management dashboard is information and progress reporting from the programmes and projects within the portfolio. Most importantly, the dashboard will only be valuable if there is confidence in the information, and this is directly related to the quality of the programme and project information, programme management processes and skills, as well as the level and quality of the challenge and scrutiny role within the PgMO (Office of Government Commerce, 2008).

6.7.8 The role of Portfolio Manager

The reporting, command and control relationships of the ICT portfolio manager role is attributed to the Head of IT and (where relevant) to managers/heads of department/project boards in respect of each project (Careeronestop.org, 2014). The role may also report to a board or steering committee in respect of a particular project(s). Furthermore, the following roles of the ICT Portfolio Manager were obtained:

- To provide overall control and coordination for ICT change
- To combine strategic and advisory elements, as well as more hands-on management and analysis activities (Careeronestop.org, 2014)

Key activities include the following:

- Overseeing and coordinating ICT-related change at the Office of Technology and that governance processes are followed
- Ensuring that projects fit into the organisational IT strategy
- Portfolio level planning and reporting
- Managing portfolio level risk for ICT change
- Managing the programme office function
- Supporting the process of project prioritisation, approval and initiation, including supplier selection (where applicable)
- Supporting individual projects by providing advice and guidance regarding project governance, management and benefits realisation
- Providing a quality assurance role to ensure that projects are well managed, and adhere to appropriate standards and good practice

- Being a “critical friend” to those leading and managing ICT-related change within the organisation
- Project managing some individual projects within the overall ICT programme
- Providing business analysis input and managing the provision of business analysis services (this is likely to involve managing both contract and permanent business analysis resources, as well as directly undertaking some business analysis)

The position also involves being part of the overall ITC management team and contributing to the collective leadership of the work of the team.

The role of Portfolio Manager would only be found in a pure state in a very mature organisation. Usually the portfolio management perspective resides within roles and functions such as those of project sponsor, client and line manager in the business. The reason for this is that these people and positions would have the budget in terms of a ten-year strategic plan (Office of Government Commerce, 2008).

6.7.9 Portfolio Management Office duties

The natural conclusion to come to in terms of the duties that personnel employed in a PfMO would fulfil is that this office is responsible for setting the strategic direction for the rest of the organisation to follow in terms of project, programme and portfolio management. It is here that the main responsibility for governance over the projectised organisation resides. Thus, the incumbents of positions in this office could be referred to as project governors and business sustainability managers in terms of their job content, while executing their duties in the context of project, programme and portfolio management.

6.8 The locus, focus and function of a Programme Management Office

6.8.1 Programme management

When looking at the elements of the definition of what a programme entails, the following comes to the fore:

> *The action of carrying out the coordinated organisation, direction and implementation of a dossier of projects and transformational activities (i.e. the programme) to achieve outcomes and realise benefits of strategic importance to the business* (Office of Government Commerce, 2008).

The elements dictate that a framework is needed through which to accomplish this transformational change. The elements of the definition also give a clue to the tension area in which programmes exist. This tension zone has the strategic direction of the organisation, and the delivery of change capability by projects on the one hand, and the need to maintain business performance and stability while realising and exploiting the benefits from investments on the other. In a graphic form, this tension zone (Office of Government Commerce, 2008) can be presented in Figure 6-12 below.

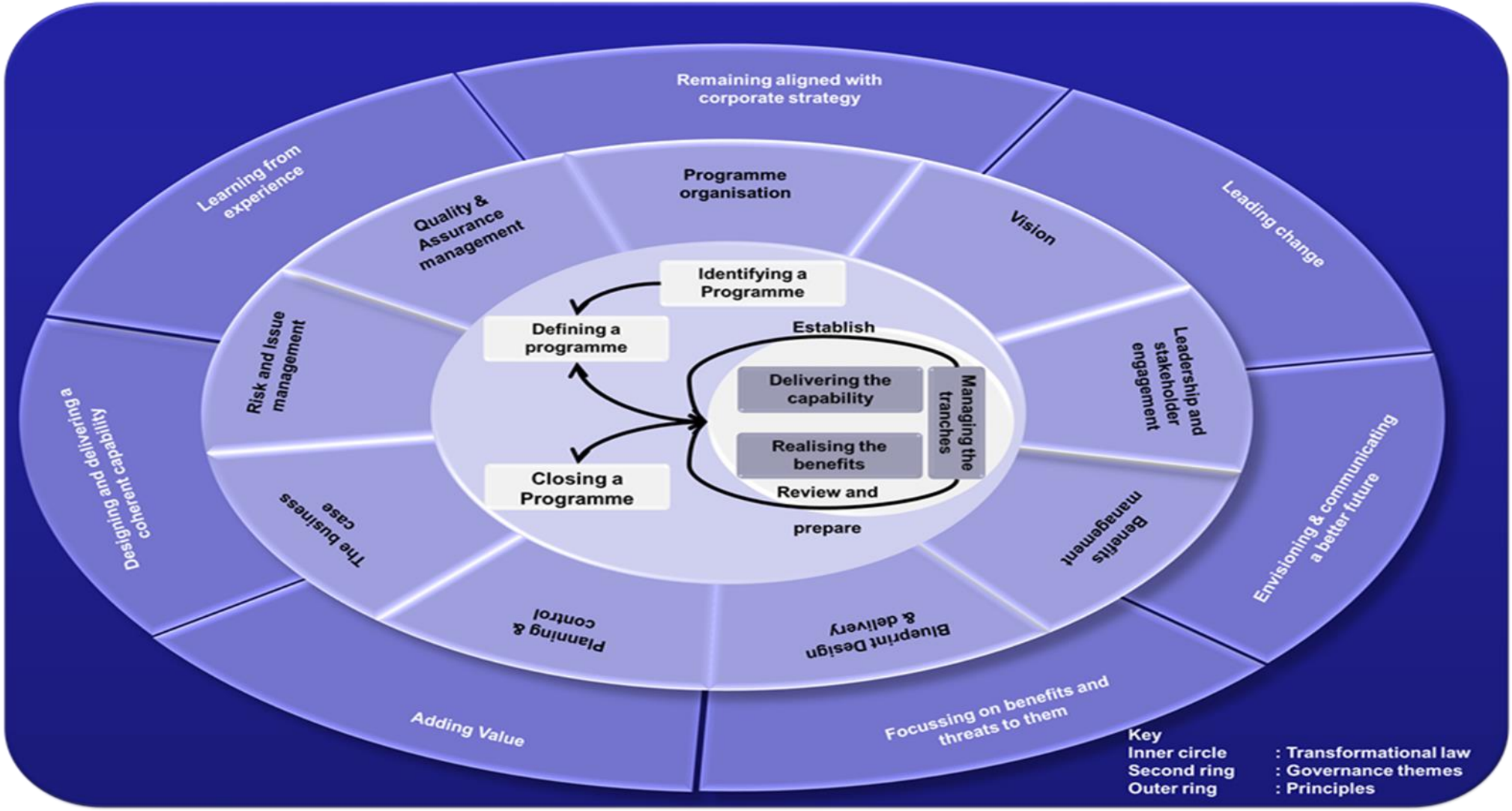


Figure 6-11: Framework for managing successful programmes

Further to a required framework, programmes can be categorised as follows:

- Vision-led programmes that start with a clearly defined vision have top-down approaches, and focus on strategic or innovative opportunities with radical transformation of business, culture or both.
- Emergent programmes evolve from current uncoordinated initiatives, where there is recognition of the value of joined-up approaches with an emergent vision and end goal.
- Compliance programmes can also be called “must do” programmes. The organisation has no choice but to change, for example, because of market forces or the potential negative impact of not changing.

Each will require a different focus and intensity of resources and control.

Unlike project management, which thrives on certainty, programme management recognises and exploits the ambiguity within which it exists (Office of Government Commerce, 2008).

6.8.2 What is a programme?

A programme aims to achieve benefits from synergy. It aims to achieve collective benefits that individual projects would not be able to achieve on their own. The constituent projects in the programme have to be tied together through one or other type of relationship.

Due to the pressure zone where programmes exists, it is often found that programmes, like projects, are means of achieving organisational goals and objectives, often in the context of the strategic plan. Some projects within a programme can deliver useful incremental benefits to the organisation before the programme itself is completed. For many programmes, all the benefits come at the very end of the programme and are delivered at once.

6.8.3 What is programme management?

Programmes comprise constituent projects. These projects are managed through a concerted and centralised effort to achieve a strategic goal that is higher than that of an individual project. It follows from this that programme management strives to achieve its own set of strategic and tactical objectives. This is achieved through the alignment of the individual projects’ objectives and outcomes. This involves aligning multiple projects to achieve the programme goals and allows optimised or integrated cost, schedule and effort (AXELOS, n.d.).

The relationship between projects in a programme is found in common outcomes or a collective capability that is delivered. The important focus of programme management is then to integrate, monitor and control the interdependencies among the constituent projects. Programme management focuses on these projects' interdependencies and helps to determine the optimal approach for managing them. Actions related to these interdependencies may include the following:

- Coordinating the supply of components, work or phases as experienced in similar and related projects
- For internal programmes, resolving resource constraints and/or conflicts that affect multiple projects within the programme
- Mitigating risk activities that run across components, such as contingency planning
- Aligning organisational/strategic direction that affects project and programme goals and objectives
- Resolving issues and scope/cost/schedule/quality changes with a shared governance structure
- Tailoring programme management processes and interfaces across the global programme to handle culture, language, time and distance differences (AXELOS, n.d.)

In contrast to the managerial control focus of project management, the programme manager has a much stronger focus on structured governance. This governance focus enables the appropriate planning, scheduling, execution, monitoring and control across the projects within the programme to achieve the desired benefits. Refer to Figure 6-12, which has duality and reciprocity in the control focus added to the design aspect of the projectised organisation where it pertains to programme management in particular and project portfolio management in general.

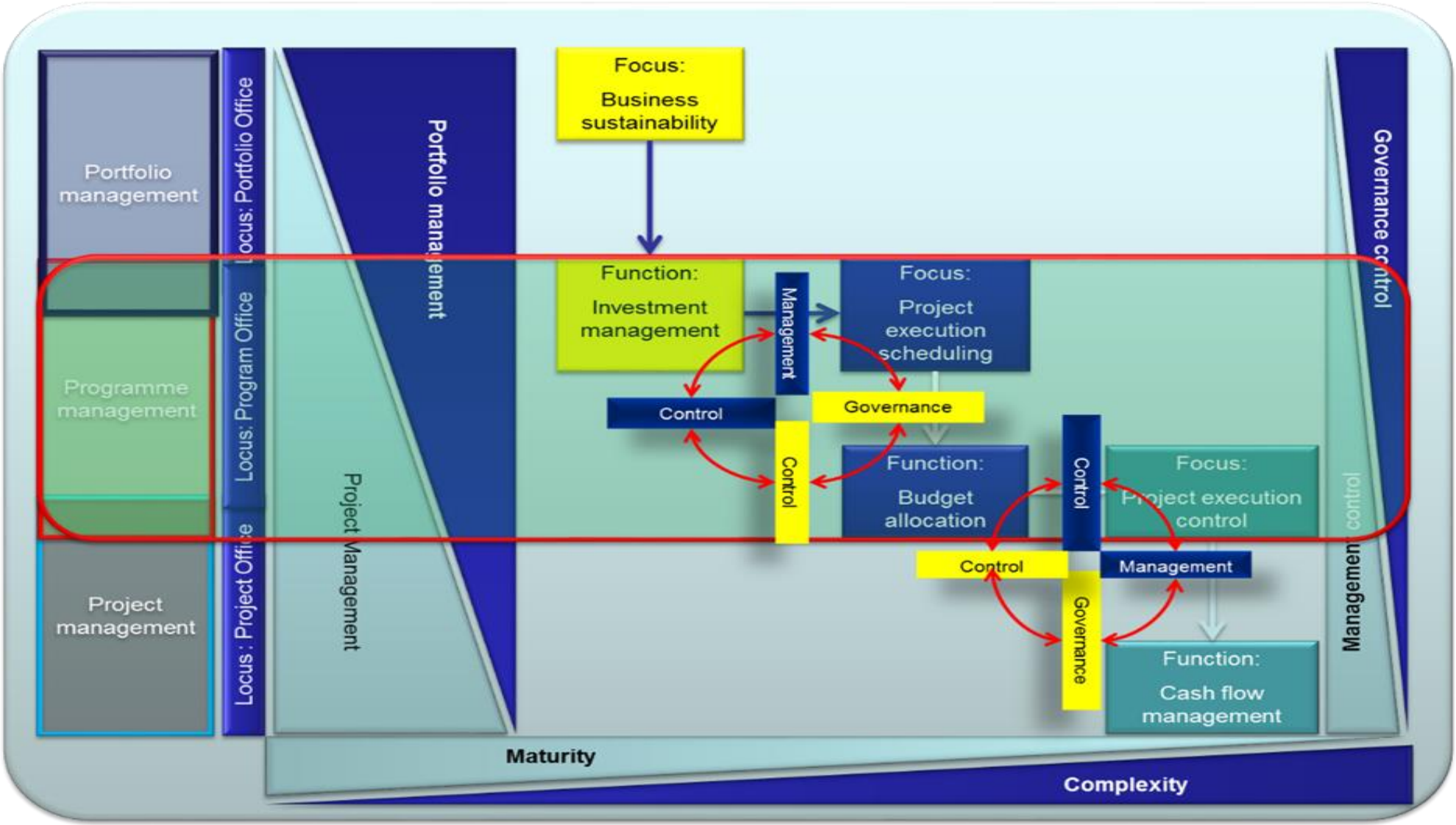


Figure 6-12: Duality and reciprocity in the control focus of the programme management function

It can thus be concluded that:

- A programme equals a group of related projects.
- Projects are coordinated to obtain benefits and control that are not available if managed individually.
- It is different to a portfolio – components within a portfolio are not necessarily related, but are coordinated to achieve organisational objectives.
- Programme management focuses on project interdependencies and determines the optimal approach for managing them.
- There is a duality and reciprocity in the control focus of a programme manager as it entails governing a project, as well as reporting in terms of managerial control over the activities of the Programme Management Office.

In order to achieve successful programme management, defined processes can be employed. As with the management of individual projects, it was found that there are processes unique to programme management that are employed during the life span of the programme. These processes are focused on initialising projects, and coordinating efforts, resources and outcomes. It is the role and function of the programme manager to oversee and guide project managers through these processes. The main aim is to provide coordinative efforts for project managers, but not to get involved with the management of individual projects. It can therefore be concluded that the responsibilities of the programme manager include the identification, monitoring and control of the interdependencies between projects, dealing with the escalated issues among the projects that comprise the programme, and tracking the contribution of each project and non-project work to the consolidated programme benefits (AXELOS, n.d.).

6.8.4 Programme management challenges

In an article by Ward (2013), published on the website of Max Wideman, there is an elaboration in a two-part article series on the challenges concerning programme management. Ward quotes statistics from a Gartner report on programme failures. According to the Gartner statistics, failure rates are as high as 66%. Furthermore, they are delivered late or substantially over budget. Most of these failures are related to people and can be traced back to the following:

- Underestimating programme complexity
- Lack of firm leadership, commitment and sponsorship

- Poor cross-functional communication
- Lack of integrated planning
- No defined success metrics
- Poor requirements management
- Lack of broad change management
- Misaligned stakeholder expectations
- Inadequate programme management skills
- Lack of resources (Ward, 2013)

Ward (2013) goes further to suggest ten essential steps that can be taken to eliminate future failures. With regard to the aim of this study, these steps suggest what should be done from a programme management perspective and shed light on the focus and function of the Programme Management Office. A summary of these steps (Ward, 2013) is given in Table 6-5:

Table 6-5: Ten essential steps to effective programme management

Step	Action	Description
1.	Generate a solid business case	To determine whether a programme should be initiated and continued through to its conclusion, a business case is needed. An effective business case provides the required justification to commit the organisation's resources (time, money and effort) towards a programme's intended outcomes and benefits. In particular, it should reflect the most important strategic dimensions and clearly articulate how the programme will address and support these dimensions.
2.	Establish the right programme organisation	While programmes will differ vastly in terms of team size, a number of crucial roles must exist to ensure proper governance. These roles entail the following: • Programme sponsor • Programme manager • Change manager • Risk manager • Business analyst • Programme office manager
3.	Build a well-defined programme architecture	The programme architecture is the road map for getting from the as-is to the to-be state. It provides an outline demonstrating how the projects within the programme will deliver the required benefits.
4.	Manage stakeholder expectations	Addressing stakeholder needs while remaining cognisant of the constraints of programme boundaries requires dexterity and sensitivity. A fine balance must be sought between managing out-of-scope requirements and expectations and seeking support for the organisational change and its consequences. Effective programme management demands many skills, including: • Strong negotiating skills • An ability to manage cross-functional conflict • A properly balanced approach to coping with multiple interests
5.	Adopt integrated programme planning	Because of the complexity of programmes, programme managers must adopt a highly integrated approach to planning to properly reflect deliverables, resources and external dependencies.

Step	Action	Description
6.	Use scenario-based execution simulation	With programmes, scenario analysis techniques are key to evaluating possible programme outcomes and maximising credibility with sponsors and governance boards. Two primary methods advocated are alternative execution strategy assessment and probabilistic forecasting and analysis.
7.	Practice systematic risk management	Effective programme risk management involves a coordinated, holistic approach. For each project within a programme, the programme risk manager should direct and ensure: • Assessment of both programme and project-level risks • Prioritisation of all assessed risks • Definition of response strategies • Integration of all response strategies into the work breakdown structure • Allocation of risk reserves
8.	Implement the right control processes	In 2008, Gartner predicted that three out of four successful $500 000 projects would be planned and tracked with project office support, while three out of four failed projects would not be. The stakes are higher with programmes because the consequences of missing targets are more severe and there are simply more things that can go wrong.
9.	Identify achievable benefits and requirements	The attainability of programme benefits is directly linked to the achievability of the stipulated requirements. For a programme to have any chance of success, it is vital that requirements and benefits are: • realistic; • clearly articulated; • understood by all stakeholders; • accepted and signed off as viable; and • supported by a rigorous change management process.
10.	Facilitate effective change management	A programme's deliverables will typically impact on multiple facets of an organisation, so effective change management is essential. An appointed change manager, as mentioned earlier, will facilitate widespread understanding and acceptance of programme goals, solutions and outcomes.

From the above, it is clear that there should be a concerted effort to do the following:

- Establish a locus from which to manage projects and programmes.
- Establish a definite design for the focus and function of a PgMO.
- Determine well-defined roles and functions that are fulfilled from within the locus of a PgMO.
- Understand that the skills and competencies of a programme manager are somewhat similar, but also vastly different from that of a project manager.
- Understand that complexity is prevalent in the amalgamation of projects towards a singular goal.
- Understand that the focus of control from a programme management perspective resides in governance and not so much in managerial control.

In conclusion, programme management can be summarised as follows:

- Programme management establishes the coordinated support of strategic objectives.
- It provides a focal point for ownership and accountability for business results.
- It aligns functional objectives to business objectives.
- It considers cross-project and multidisciplinary impacts.
- It enables horizontal collaboration.
- A capable business leader is needed to undertake the programme management of related projects in order to achieve a set of business objectives.
- Programme management provides the framework for implementing business strategies through multiple projects to produce better business results, reduce risk and save time and money.

6.8.5 The locus of the Programme Management Office

The work done from the location of a PgMO is such that there are two perspectives in its control focus (refer to Figure 6-5). When looking upwards towards the function of portfolio management, it is from a managerial control perspective. However, when looking downwards towards the respective projects, the focus is one of governance. In this realisation lies the controversy when designing such an office and structure to render programme management services. It is found that the skills and competencies of a programme management employee are different to those of a project management employee.

6.8.6 The focus of the Programme Management Office

In terms of the focus of the programme management function, it is evident that there is a duality and reciprocity involved. As it reports upwards to the portfolio management function, one sees normal managerial control. When exerting influence over a project, one sees that there is a change in the role, and that the programme manager now becomes more of a governor than a manager. In this relationship, one sees that the programme is affected by the projects, while at the same time the projects are affected by the programme management function.

6.8.7 The functions of the Programme Management Office

When conducting projects on a continual basis, the PgMO is a crucial portion of the organisation's infrastructure. The PgMO[12] supports the programme manager with the management of a multitude of unrelated projects. While there are many variations of PgMOs within organisations, typically the PgMO provides support to the programme manager and subsequent project managers by:

- defining the programme management processes that will be followed;
- managing the schedule and budget at the programme level;
- defining the quality standards for the programme and for the programme's components;
- providing document configuration management; and
- providing centralised support for managing changes and tracking risks and issues (Sukad Group, 2013).

For long, risky or complex programmes, the PgMO may provide additional support in areas of managing personnel resources, managing contracts and procurement, legal support, and other support as required.

To ensure that the programme delivers the expected benefits, there is management oversight of a programme through governance, often by means of regular status updates, audits, phase-gate reviews and change control.

[12] This section entails a summary of information sourced from the website of the Sukad Group regarding its experiences in PgMO implementation, as well as experiences from the author himself. As part of a roll-out team for PgMO implementation, many of the author's experiences are echoed in the Sukad Group's documented cases.

It is through the Programme Management Office (or as it is confusingly called, the PMO) that coordination and alignment of goals are achieved. This office, which fulfils the function of managing projects and achieving strategic alignment, can be a central office, or it can be decentralised, but it forms part of the permanent organisation.

At a high level of abstraction, the functions of the PgMO are to:

- provide support;
- set standards and guidelines for the managers of the different projects and programmes;
- collect project management data from the projects;
- consolidate these; and
- report to some governing body.

It has to ensure that the projects are aligned to the organisation's strategy and vision. This is generally performed through business case management.

The functions of the PgMO according to the Sukad Group's perspective can be summarised in Figure 6-13 below:[13]

Figure 6-13: The Sukad Group's PgMO continuum: PgMO typical roles and functions (Sukad Group, 2012)

The PgMO continuum is the way the Sukad Group represents the various functions and roles (focus) of the PgMO on a continuum. Reference is made to the aspect that

[13] The Sukad Group's view is in alignment with the perspective of locus, focus and function. The same nomenclature was used in its published articles, hence the use of its published articles for the discussion. Its views are also aligned with the researcher's own experiences in establishing a PgMO function in a large corporation.

the continuum represents a logical sequence, but that, due to the differing nature of organisations, the order can be different.

The eight functions entail the following:

- Passive reporting
- Active reporting
- Training support
- Career management
- Project coordination
- Project management system (approach and methodology)
- Management of projects and programmes
- Strategic project management with a focus on the portfolio

Passive reporting

In its most basic form, the PgMO would be a reporting PgMO. The function would entail the collection and collation of information regarding constituent projects in the programme. The collected information would then be summarised and distributed within the organisation (Sukad Group, 2012).

Active reporting

An active reporting PgMO would establish standard guidelines for the project managers in terms of requirements for the various reports (Sukad Group, 2012).

Training support

In terms of training and support, the focus is on collaborative efforts with the HR and Learning and Development departments. Thus, the PgMO would work with Learning and Development to recommend the right professional learning programmes for the organisation's staff in the domain of project management (Sukad Group, 2012).

Career management

Career management entails the establishment of formal job descriptions and career paths for project management personnel across the organisation. This includes a professional development programme with a mentoring and coaching programme (Sukad Group, 2012).

Project coordination

The focus of project coordination is the management of interfaces and requirements across individual projects. The project manager would have a singular focus in terms of the project constraints, and would not have a holistic view of the required resources across the efforts and projects of the entire organisation. The programme manager is, however, not intended to become involved with the day-to-day management of the projects (Sukad Group, 2012).

Project management system

The PgMO should assume the responsibility for project management in the whole organisation. This means that a systems view to project execution should be taken. This systems view is inferred when referencing a project management system and not just the ICT infrastructure. Elements of this systems view entail that the PgMO should establish the following:

- the right project management methodology and processes, such as how to approve projects;
- procedures on how to launch or initiate projects;
- procedures on how to plan projects; and
- how to manage and control projects.

The project management system should include a proper life span management model. This life span management model should contain definitions of project stages and stage gates, as well as a system of lessons learned.

As part of the project management system, the PgMO should also assume responsibility for the historical databases (maybe included in reporting) and records for projects.

A further aspect to consider in this systems view should be the consideration of the performance metrics for the projects (Sukad Group, 2012).

Managing projects and programmes

The PgMO should work diligently to establish a strong matrix organisational structure for the projectised part of the organisation. This means that the PgMO should be the functional project management home for the career project managers and project management personnel. In alignment with the strong matrix organisational design, this means that when there is a project, the organisation will pull the project manager

from the PgMO, and other project resources and team members will join him or her from the other functional departments (Sukad Group, 2012).

Strategic project management

Finally, the project management system should ensure alignment with the organisation's strategic objectives, thus focus on business sustainability in the selection of projects, scheduling the right projects for execution at the right time and exerting governance control over the constituent projects (Sukad Group, 2012).

The information obtained from the literature study and the Sukad Group's perspective can be further augmented with two Excel spreadsheets that represent the results of a study in the researcher's professional capacity regarding the roles and functions of the PgMO[14].

The results of this study showed that there are, in essence, nine focus areas for the PgMO. They are shown in Figure 6-14 and Figure 6-15.

[14] The figures contain highly compounded information from sources like the OGC's P3O approach, and various articles – more than 50 sources. These sources are summarised in an Excel spreadsheet that will be presented and discussed.

Category	Function	Focuss
Organisational change management	Change management	Organisational change management
General Management functions	General Management functions	General Management functions
Functional Integration	Functional Integration	Functional Integration
Life cycle management	Programme Life Cycle	Life cycle management
Governance	Governance	Governance
Portfolio management	Strategic analysis	Strategic analysis
Programme management	Programme management plan	Quality orientation
PMO Duties & functions	Functional Support	Functional Support
PMO Organisation Model	PMO Organisation Model	PMO Organisation Model

Figure 6-14: Level 1 detail of a typical PgMO's function and focus

Organisational change management	Organisational change management
	Organisational change management Policies and Procedures
Life Cycle management	
	Life cycle management Programme Life Cycle
	Life cycle management PM Approach & Methodology
	Life cycle management Policies and Procedures
	Life cycle management Guidance and direction
	Life cycle management Information technology planning
	Life cycle management Quality management
	Project Life Cycle Alignment
Governance	
	Assurance Performance: Productivity
	Assurance Performance: Effeciency
	Assurance Conformance
	Assurance Guidance and direction Maturity management / Maturity Model
	Assurance Guidance and direction Project Complexity
	Assurance Guidance and direction Contracts management
	Assurance Guidance and direction Standards and BOK'S & Best practices
	Assurance Guidance and direction Training & Career Development : Competencies
	Assurance Guidance and direction Policies and procedures
	Assurance Guidance and direction PM Approach & Methodology
Portfolio management	
	Portfolio management Strategic analysis Partner selection
	Portfolio management Strategic analysis Planning
	Portfolio management Programme Alignment
	Portfolio management Guidnace and direction
Programme management	
	Programme management Programme management planning
	Programme management Programme alignment
	Programme management Establishing a PMO - PMO Strategy
	Programme management Guidance and direction Policies
	Functional Integration Engineering
	Functional Integration Construction management
	Functional Integration Financial functions
	Functional Integration Integration of Supply Chain / Procurement
PMO Duties and functions	
	PMO Duties & functions Functional support: PSI
	PMO Duties & functions Functional support:Cost Control
	PMO Duties & functions Functional support:Planning
	PMO Duties & functions Functional support: Contracts management
	PMO Duties & functions Functional support: Capital productivity - Knowledge management
	PMO Duties & functions Functional support:Functional support: PMCOE
	PMO Duties & functions Functional support: Doc Man
	PMO Duties & functions Functional support:PMO
	PMO Duties & functions Functional support: Risk and Issue management
	PMO Duties & functions Functional support: Health and Safety
	PMO Duties & functions Role Descriptions
	PMO Duties & functions Execution change management
	PMO Duties & functions Administrative support
	PMO Duties & functions Services
	PMO Duties & functions Service Delivery
	PMO Duties & functions Guidance and direction
PMO Organisational model	
	PMO Organisation Model Functional Integration
	PMO Organisation model Functions
	PMO Organisation Model Role Descriptions
	PMO Organisation Model Role Descriptions Guidance and direction
	Definition
	PMO Organisation Model The Typical Roles of the Project Management Office

Figure 6-15: Level 2 detail of expansion of the PgMO's focus areas (Eskom, 2007)

Level 2 displays similarities to the Sukad Group's eight functions. The main conclusion that can be drawn from this information is the following:

There is a duality and reciprocity in the functions of the PgMO, in the sense that it looks downwards towards the projects with a governance focus, and upwards towards the portfolio and business with a business sustainability focus. The reciprocity resides in the situation that what gets done at the level of the PgMO affects and is affected by everything else in the project management domain. Refer to Figure 6-6, which depicts this relationship

When considering a project organisational design, the roles and functions of the personnel employed in the PgMO should also be considered as, due to its locus, focus and function, it would require the definition of new and different roles within the project management job family.

In order to achieve the aims of coordination and alignment, this office employs an appropriate selection of the following actions:

- It owns or supports the organisation's project portfolio management.
- It establishes, reviews and supports the organisation's project management processes and standards.
- It serves as a process coach or auditor to project teams.
- It collects, evaluates and supplies project metrics to project teams.
- It monitors and manages cross-project dependencies among multiple concurrent projects.
- It coordinates, establishes and evaluates project performance measures.
- It assesses project management competence and organises project management training.
- It evaluates and summarises enterprise-wide project progress for executive management.
- It evaluates and acquires project management tools.
- It shares best practices, lessons learned, and new tools and techniques across the enterprise.
- It performs administrative functions in support of projects.

In the section that follows, the specific roles of the project, programme and portfolio managers will be discussed.

Endeavours that can be called programmes will generally originate for one of the following reasons:

- The work effort is so large and multidisciplinary that individual phases or deliverables are best managed in smaller increments as if they were independent projects (e.g., nuclear power plant construction).
- There is a combination of a new product development project and ongoing product support, all directed by the same person or group (e.g., a new airplane, printer or computer processor product line).
- There is a need to relate a collection of projects (e.g., an annual maintenance programme for a utility company or a fundraising project run by a non-profit organisation).
- There is a need to muster a massive, urgent response to a crisis where traditional project planning and staged execution cannot be done (e.g., hurricane disaster response).

One can thus see that programme management involves planning, organising, staffing, directing, motivating, leading, tracking, measuring and controlling all aspects of a programme with the aim of exerting control other than just the traditional project constraint parameters on the projects. This manifests as governance control over the constituent projects.

The programme management function may require the support of additional resources, such as the following:

- Executive steering committee or executive sponsor (an upward-looking focus)
- Project managers and team leaders (a downward-looking focus)
- Administrative and procurement/contract negotiation support (a horizontal focus)

6.8.8 The role of the Programme Manager

The second group that Levine (2006) refers to entails the programme/project group. This group plans and implements designated projects (Levine, 2006). The group focuses on the successful execution of projects. In this focus, the role of the Programme Manager is separate from that of the Project Manager. The Programme Manager needs to interact with each project manager to provide support and guidance on the individual projects. Furthermore, the Programme Manager needs to convey the important relationship of each project to the “bigger picture”, including the

larger programme and the organisational performance objectives, to the individual project managers.

Wideman (2006), in doing a review of Levine (2006), touches on similar aspects as found in the Sukad Group's publications, in that reference is made to the programme manager being responsible for ensuring that the overall programme structure and programme management processes enable the component teams to successfully complete their work and that components' deliverables can be integrated into the programme's end product, service, results and/or benefits. The programme manager also ensures that projects are organised and executed consistently and/or fulfilled within established standards. Thus, there is a congruence between Levine and the Sukad Group (Sukad Group, 2012) in terms of a project management system through which individual project execution should be facilitated (Wideman, 2006).

Wideman (2006), in reviewing Levine, continues to argue that the Programme Manager should have a broad view of both programme objectives and organisational culture and processes, leveraging resources among the constituent projects in the programme, evaluating the total cost of ownership, as well as requirements and configuration management across projects.

In order to fulfil the specifics of the programme management role, the Programme Manager executes an appropriate selection of the following programme management activities (Project Management Institute (PMI), 1997):

- He or she serves as the visionary leader of the programme to maintain alignment with the organisation's goals and the programme's goals and objectives.
- He or she performs business development in the area of the programme's domain, or coordinates that activity with others.
- He or she establishes or coordinates the product concept and develops a convincing business case.
- He or she establishes criteria for resource allocation.
- He or she spans a product's entire life cycle, from concept, through multiple projects and operations, and into product or programme retirement.
- He or she coordinates with product management, if he or she is not responsible for this business process.
- He or she ensures that the programme efforts remain feasible and the promised benefits are delivered, even as the business climate changes.

- He or she manages the staging of multiple versions or releases of the programme or programme's product.
- He or she maintains executive visibility, support and interest through the extended duration of each programme.
- He or she coordinates the growth, skill and competence development of project managers and team leaders in the programme.
- He or she demonstrates exemplary team skills, including leadership and team building, influence and communication.
- He or she directs the efforts of a PgMO to support the abovementioned activities.
- A programme benefits from the direct or indirect support of a PgMO to assist the programme.
- He or she acts as a manager in the abovementioned activities.

A PgMO is helpful in the following areas of the programme:

- Providing management and administrative support
- Coordinating the availability and use of enterprise resources that are not within the programme's control
- Providing programme accounting for programme control and progress billing
- Providing administrative support to projects, including time tracking, status aggregation and report roll-ups
- Managing cross-project dependencies within the programme and across other programmes
- Ensuring the use of consistent process, techniques and tools across the projects and subprojects within the programme
- Managing contracts, both as a buyer and as a seller; as a seller, managing the relationship with external customers; and as a buyer, managing subcontracts, where needed

The role of the Programme Manager is thus to guide the development of the project team culture and to ensure that the programme is aligned with organisational goals while following enterprise or portfolio strategy.

6.8.9 Duties of the Programme Management Office:

The duties that personnel in a PgMO would fulfil can be listed as follows:

- Define the programme and project management processes and ensure that they are followed.
- Provide and maintain a standardised project, programme and portfolio reporting system.
- Provide and maintain project/programme/portfolio management templates and update them when necessary.
- Provide technical support for project/programme/portfolio management tools.
- Provide administrative support to project, programme and portfolio managers.
- Oversee the management of the programme scope – defined programme areas categorising overall corporate initiatives into more manageable business areas.
- Define the PgMO organisational structure – a defined hierarchy and interrelationships among business units governing PgMO processes.
- Draw up a project inventory – an inventory of projects within the programme scope.
- Draw up a project priority list – a prioritised list of corporate initiatives aligned with the corporate strategy and business objectives.
- Draft a strategic governance process – a defined process for the review and renewal of project priorities and delivery schedules.
- Develop a PgMO to oversee or support the management of all programmes, projects and subprojects. This can also refer to a strategic team that is set up to manage a specific programme.
- The maturity of the PgMO is an indicator of the culture within the organisation that surrounds the PgMO.
- Top management must show clear support of the PgMO.
- Management experts should be utilised to form and run the PgMO.
- There should be feedback between the PgMO and other groups on policies and standards, since the PgMO will see the most practical application of those requirements.

6.9 The locus, focus and function of a Project Management Office

6.9.1 The functions of project management

According to Kerzner (1995, pp. 10-13), the main responsibilities of a project manager are twofold. On the one hand, there are major responsibilities, and on the other, there are implicit responsibilities. The project manager's major responsibilities include the following:

- Produce the end state within the constraints of available resources, allotted time and allocated funding.
- Produce the end state within the constraints of available technology and performance expectations.
- Meet the contractual profit objectives.
- Make all the required decisions.
- Act as the focal point for communication with the external customer, and internally with senior and functional management.
- Negotiate with functional management for the completion of the work packages within the time, budget, performance and technology constraints.
- Resolve all conflicts, if possible.

In addition to the major responsibilities, Kerzner (1995, pp. 10-13) lists the following implicit responsibilities:

- Interface management
- Resource management
- Planning and control management

During the execution of his or her responsibilities, the project manager must constantly focus on the following functions and issues (Kerzner, 1995, pp. 10-13):

- Training
- Engineering
- Procurement
- Construction
- Environmental impact and control
- Economic feasibility analysis
- Public support
- Governmental relations

- Socio-economic issues
- Cultural issues

With the understanding gained from the discussion thus far, it is time to turn to the locations in the organisational design, where the functions of project, programme and portfolio management would reside. For this reason, the following section will discuss the term and meaning of the PjMO.

6.9.2 The locus of the Project Management Office

According to the OGC's *Portfolio, Programme and Project Offices (P3O) Guide* (Office of Government Commerce (OGC), 2013), the locus of the PjMO is closest to the action of executing the project. In this *P3O Guide*, the PjMO is depicted as a temporary structure erected and staffed to render services to a specific project. In Figure 6-16, the relationship of the office locations in accordance with the OGC's P3O is shown.

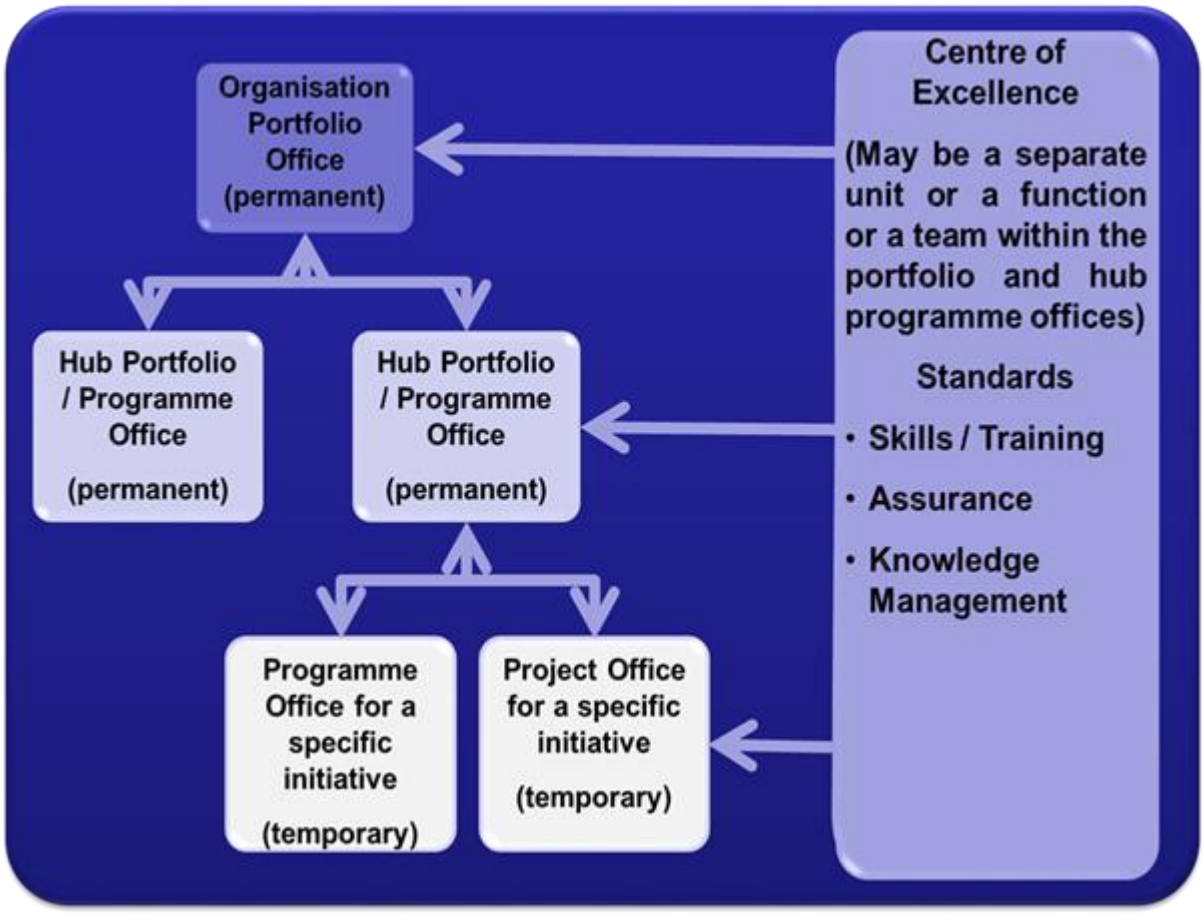


Figure 6-16: *P3O Guide*'s depiction of a project organisation (Cabinet Office, 2013)

6.9.3 The focus of the Project Management Office

Wallace (2007) clarifies the term "project office". (Again the confusion of terms and acronyms reigns supreme as yet another term and acronym were used.) However,

the site states that the PjMO would designate staff that renders support to the project manager in terms of the management and administration of the project. In smaller projects, the project manager would not require an organisational unit, and the tasks and activities would be conducted by the project manager himself or herself. However, in larger and more complex projects, there is likely to be a whole team of people providing services to the project team (Wallace, 2007).

Within the designation of the PjMO, one sees that there can be differentiation as well. Some are purely administrative in nature, while others would supply a wide-ranging spectrum of cross-functional and specialist services.

In general, the PjMO has an administrative function and the commensurate focus is project support. In the support focus, incumbents of positions in this locus would exert managerial control over projects in the following typical areas:

- Cost
- Performance
- Quality
- Risk
- Scope
- Time or schedule (Wallace, 2007)

The function of the PjMO is discussed in the following section.

6.9.4 The function of the Project Management Office

The function of the PjMO is to render administrative and technical support to the project.

According to Kerzner (2004), the PjMO is set up for large projects or by organisations that specialise in project management or undertaking projects as their core business to support project managers in performing their functions. This office may be dedicated to a single large project or it may serve multiple projects. The duties performed include the following:

- Act as a central point of information for in-house control and report to customers.
- Control time, cost and performance to ensure that contractual requirements are adhered to.
- Ensure that all work and decisions are documented and distributed to all key personnel and other interested parties who may require such information.

- Ensure that all work performed is authorised and funded by contractual documentation.

The PjMO will also produce the project plan and keep the plan up to date with the latest information, in conjunction with the project manager.

The project manager and PjMO are jointly responsible for integrating the work across functional boundaries in the organisation. However, the project manager remains accountable for ensuring that this is successfully achieved.

Kerzner (1995) continues to elaborate on further responsibilities of the PjMO, but it seems as if there is still confusion regarding the concept of an office that renders administrative support to the project, as opposed to an office that takes responsibility for institutionalising project management in an organisation.

Clarity was then sought in the MPMM® of Westland (2006). According to this methodology, during the initiation phase of the project, a project support office needs to be set up. The methodology refers to the following functions that would need to be fulfilled by this office:

- Acceptance management
- Auditing and compliance
- Change management
- Communications management
- Cost management
- Documentation management
- General administration
- Issue management
- Phase reviews
- Procurement management
- Providing tools
- Risk management
- Supporting staff
- Time management
- Undertaking closure reviews

In order to fulfil these functions, the following positions need to be filled:

- Project administrator

- Quality manager
- Risk manager
- Change manager
- Procurement manager
- Communications manager

It is from the location of this PjMO that administrative support will be rendered to the project. Attention needs to be drawn to the fact that the MPMM® (Method123® Project Management Methodology, 2011) focuses on the execution of a singular project, which is evident from the following steps in the methodology in terms of setting up the PjMO. It states that the tools to run a project office need to be created.

These tools include the following:

- Standards
- Methodologies
- Project planning tools
- Resource planning tools
- Financial planning tools

If the methodology has the perspective of a projectised organisation, these tools need not be recreated for each project, but it would have been a standardised set-up procedure for each project. Nevertheless, it gives some perspective on the function and tasks of the lowest level of project execution office (Westland, 2006).

Further to Westland's methodology (Westland, 2006), Kerzner (1995) states the following responsibilities of the PjMO:

- Ensuring the standardisation of scheduling, control and reporting
- Clarifying project management roles and responsibilities
- Preparing job descriptions
- Preparing archived data on lessons learned
- Carrying out continuous benchmarking
- Developing project management templates and methodologies
- Recommending and implementing changes and improvements to existing methodologies
- Identifying project standards and best practices
- Coordinating and/or conducting project management training programmes

- Transferring knowledge through coaching and mentorship
- Developing a corporate resource capacity/utilisation plan
- Performing risk assessments
- Planning for disaster recovery

According to Kerzner (1995), there is a hint of more permanent project-orientated work than takes place on a single project and in a single PjMO. Most of the actions in the abovementioned list refer to a focus of receptiveness in project execution, rather than just the once-off execution of project work.

The following section discusses and clarifies the role of the Project Manager.

6.9.5 The role of Project Manager

According to the website of the University of Glasgow (n.d.), the role of Project Manager carries the responsibility, in conjunction with the project sponsor, of defining the project as a whole. The project manager is then endowed with the responsibility and authority to ensure that the project is delivered on time, according to budget and to the required quality standard (within agreed specifications). Responsibility to resource and staff the project, as well managing relationships with a wide range of groups (including all project contributors), resides with the project manager. This role will also accept responsibility for managing the work of consulting parties/consultants. The final responsibility for which the project manager is held accountable is to allocate and utilise resources in an efficient manner and maintain a cooperative, motivated and successful team (University of Glasgow, n.d.).

Further expansion of the role of the project manager comes from the website of Holland and Holland (2010). In an article entitled “The project management role – superhero or visionary leader?”, the authors state that the role of Project Manager is arguably the most challenging role in the project team. The challenges come from the project’s progression through its various life span phases where the project manager must be able to adapt himself or herself to the changing demands of the project and the team. It is in these transitions that the foremost role of Project Manager is that of being a leader. Holland and Holland (2010) further state that the role of Project Manager consists of three dimensions. These dimensions are depicted in Figure 6-17 (Holland & Holland, 2010).

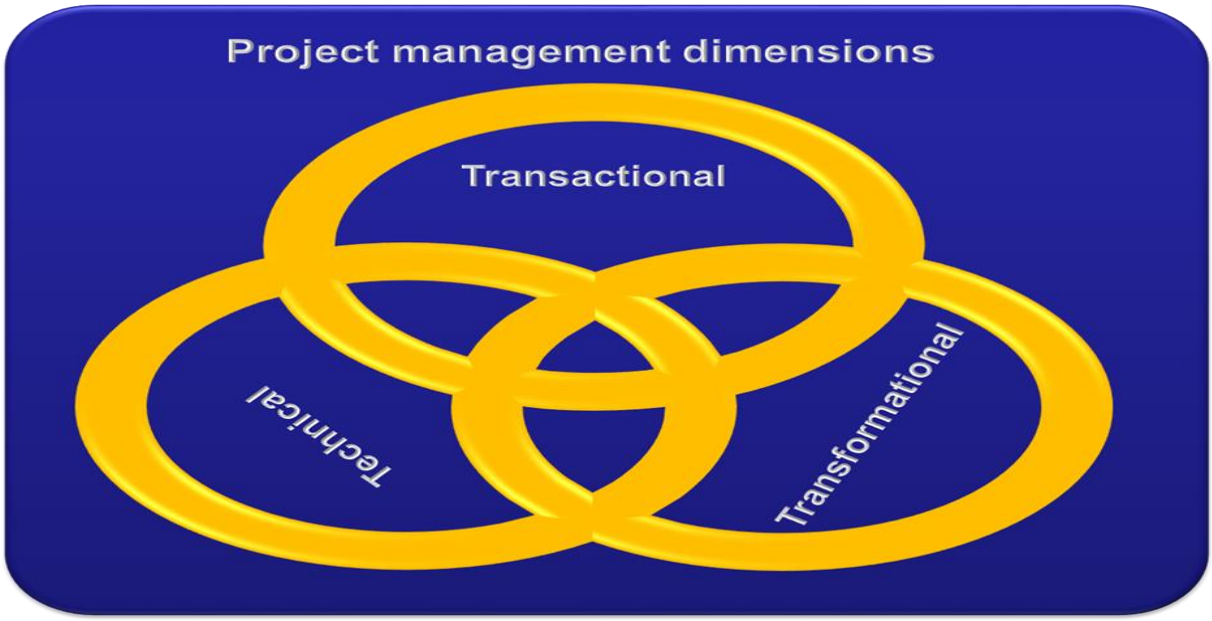


Figure 6-17: The three dimensions of the project management role

Technical

The technical aspects of the project manager's role entails the incumbent being able to get his or her sleeves rolled up and get stuck into technical issues at a detailed level. There is, however, a caveat to this: the project manager should not desert the wheel house and be caught in the engine room. However, during the initiation phase of the project, the team is at its leanest and sometimes it would be required from the project manager to get involved in progressing the detail of technical issues or else the project will stall.

Again, there is a caveat that entails the project manager not being required to have technical expertise regarding everyone's tasks within the project. However, he or she needs to appreciate all the processes being carried out and should be able to confidently challenge others at a level of informed understanding. Thus, the technical requirements would include those activities needed to develop and complete the project definition, and then to implement the project according to its implementation plan, controlling the project, and assuring the required quality of delivery (Holland & Holland, 2010).

The issue of the technical dimensions that are relevant to managing a team of project managers is then explained. This entails the "accountable" project manager being involved with a large and complex project. As such, the project manager needs to

coordinate the efforts of multiple streams, each with their own project manager or stream leader.

In conclusion, it is stated that:

While project management is a team sport, the project management role is not necessarily the same thing as the project manager's role.

Transactional

In terms of the transactional dimensions of the role of Project Manager, reference is made to the more traditional activities of project management. This would entail the project manager being responsible and accountable for the activities associated with managing the project's workflows and performance. Such activities would initially include establishing the project baseline metrics and parameters required to control the project during the implementation stage.

It is especially during the project's initiation phase that the transactional activities would entail control, with tasks such as measurement, data analysis and reporting that need to be carried out regularly. In this instance, the project manager executes managerial activities and acts foremost as a "manager" (Holland & Holland, 2010).

Transformational

In terms of the transformational dimension, the project manager gets involved with activities concerning leading the team, thus the project manager acts as the project leader. This would call on the project manager's ability to communicate effectively and build relationships. These are commonly labelled "the softer skills".

Holland and Holland (2010) state that:

> *This is where we believe project managers should be at their most effective. The project is delivered by the team, and therefore regular ongoing team maintenance, development and motivation are essential activities if the project is to be successful* (Holland & Holland, 2010).

It is interesting to note that Holland and Holland (2010) and the IPMA ICB3 (International Project Management Association (IPMA), 2006a) share a great measure of commonality. Holland and Holland (2010) discuss three dimensions of project management (technical, transactional and transformational), while the IPMA discusses technical, contextual and behavioural competencies.

6.9.6 Roles additional to Project Manager, located in the PjMO

In addition to the roles already identified in section 5.2.3, where the methodologies were analysed according to their roles and functions, Wallace (2007) supplied the following typical roles in the locus of the PjMO. The list as in Table 6-6 is presented directly as it appears in the sources consulted because it is comprehensive and exhaustive in terms the typical roles in the PjMO. The most common roles are listed first. Note that these are all roles where the specialist advice, management, control or support would be applied across all sub-teams and aspects of the project.

Table 6-6: Typical roles in the PjMO

Role	Description
Administrator	Handles day-to-day administration such as team communications, procedural controls (e.g. documentation control and issues control), filing, organising meetings, tracking the whereabouts of participants, obtaining facilities, services and materials as required.
Project Planning and Tracking Assistant	Handles the main detailed workload of creating, consolidating and managing project plans; processes timesheet data; updates progress tracking information and reports.
Secretary	Provides a resource for all typing needs; receives and routes telephone calls.
Project Office Manager	Manages overall project office functions. Typically, the Project Office Manager is also the lead for specialised project management tasks, such as detailed planning and tracking.
Graphics support	Specialist graphics staff create visual content, e.g. website content, presentations and diagrams.
Technical support	Installs and maintains the team's technology, e.g. servers, networks, PCs and software; provides technical assistance to team members.
Change Manager/ specialist(s)	Responsible for organisational/behavioural change management; assesses needs for change; plans strategy and tactics to achieve that change; manages and controls activities to bring about change.
Training Manager/ specialist(s)	Provides specialist advice on needs for training; defines training programmes; creates training content; organises training resources (venues, facilities and trainers); ensures that adequate training is received as required.
Solutions Architect	Has responsibility for the design of the overall business solution, including applications, processes, organisational design, procedures, facilities, etc.
Testing Manager/ specialist(s)	Provides specialist advice on needs and approaches for testing; defines and oversees testing programmes.
Webmaster	Responsible for the creation, development and maintenance of the project's website(s); provides specialist advice regarding web components of the business solution.

Role	Description
Technology Architect	Has overall responsibility for the technology architecture; ensures that the technology design meets all needs, across sub-teams and functions.
Configuration Manager	Responsible for the version control of the various deliverable components.
Quality Manager	Oversees the quality processes; identifies specific quality requirements; monitors work and deliverables to ensure that requirements are being met; audits completed work and deliverables for compliance with quality standards.
Communications specialist(s)	Handles external and internal communications relating to the project; establishes needs for communication in conjunction with the Change Manager; determines the best media and distribution channels; creates communications; monitors effectiveness.
Security Manager/ specialist(s)	Provides specialist advice on needs and approaches for security; builds, tests, controls and maintains security features.
Database Manager	Responsible for the creation, development, tuning and maintenance of the project's database(s); ensures standards and compatibility of usage across the various sub-teams and functions.
Organisational Design Manager/specialist(s)	Provides specialist advice on needs and approaches for creating or changing the organisational structure, defining job descriptions, assessing skills requirements, recruiting and laying off staff, etc.
Project Accountant	Deals with all financial aspects; has prime responsibility for creating and managing the benefit case; tracks and reports progress against financial targets (budget, expected benefit); handles the financial dealings of the project, e.g. purchases and payments to sub-contractors.
Note: large projects can be more like free-standing businesses that require the full range of support functions, e.g. purchasing, stock control, stores, inventory control, accounting, HR, facilities management, maintenance, catering, cleaning, receptionist duties, etc.	
Note: A set of tools will normally have been chosen to assist in the administration of the project. Several of these will require some level of specialist knowledge. PjMO staff will need to be trained as appropriate.	

6.9.7 PjMO duties

Due to the confusion in terms when referring to the various offices that would need to be instituted for a mature projectised organisation, very little information could be found for the term Project Management Office that actually refers to the location from which administrative support is rendered to the project. In terms of the research objective, to define a job family for those whose work context is a project, but whose job content does not necessarily entail executing the project, it would be the locus where they work. The duties can thus be inferred to be those of administrative support for the execution responsibilities of the project. Hence, this would be the place where project administration staff would work. The administration can again be classified in accordance with the relevant level of complexity and task density. The increase in both would require more specialisation. Hence, there can be a whole occupation in the job family definition that would provide administrative support.

In conclusion, it can be stated that:

- there are those who support through their contribution – i.e. project technical support staff (planners, risk managers, quality assurers, etc.); and
- there are those contribute through their support – i.e. project administrative support staff (HR, office managers, filing clerks, etc.).

6.9.8 Why some (or maybe many) PjMOs fail

It has become evident thus far that the office for managing projects from a holistic perspective should be called a Programme Management Office, and that the acronym regularly ascribed to this office is that of PMO (or PgMO). It was also shown that there is confusion about the function of such an office. In this section, attention will be given to the following:

- The gaps in implementing a more permanent projectised organisational structure
- The impact of such implementation on the permanent organisation
- The effect of failed PjMO/PgMO implementation on the image of project management in the organisation

Research into the efficiency and effectiveness of the institution of a PgMO (the more traditional reference is a PMO, but this term causes confusion) was conducted by various institutions. A verbatim summary of this research is given by Needs (2014):

- Some 50% of PgMOs close within three years (Association for Project Management).
- Since 2008, the correlated PgMO implementation failure rate is over 50% (Gartner Project Manager 2014).
- Only a third of all projects were successfully completed on time and within budget over the past year (The Standish Group's CHAOS report).
- Some 68% of stakeholders perceive their PgMOs to be bureaucratic (2013 Gartner PPM Summit).
- Only 40% of projects met schedule, budget and quality goals (IBM Change Management Survey of 1 500 executives).

From these results, the following questions were raised:

- Why do some PgMOs fail?
- What are the qualities required to create a worthy PgMO?

Reference is made here to a project, to the same extent that PgMO implementation can be done in accordance with project management techniques. Subsequently, two factors that were found by The Sukad Group (Sukad Group, 2013) to be inhibitors for successful PgMO implementations are discussed as follows:

- The executive factor
- The consultant factor

The executive factor

In the same manner as stakeholder communication and involvement can cause a project to fail, so too can communicating the roles and functions of a PgMO to executives and senior managers. It is often found that, despite the fact that PgMOs have been around for many years, executives and senior managers still misunderstand their roles and functions. This is especially true in instances where these managers do not have project management expertise or proper awareness of the discipline. Due to failed projects and a dismal record in project execution, executives often seek the solution to problems in a PgMO. This can be due to them:

- having heard of such a thing; or
- being sold on the idea by a consultant.

The problem with this approach is that executives see a quick fix in their mind's eye and do not realise that there is more to it than just locating a function somewhere.

The real issue is that they need to understand what they really want: is it the office or an improvement of organisational performance in project execution? To solve this issue, there is a need for a clear vision of what the PgMO should be developed into, because the PgMO can be a facilitator, a bystander or a leader. The issue at hand is that executives are asking for PgMOs, thinking that they will have improved project performance. In other words, the requirement is for a PgMO, but the expectation is improving performance.

The caveat in this instance is that by merely implementing a PgMO (the office) or giving a function a certain locus, and staffing it with a few employees, they are only structuring an office for project management, and not establishing a PgMO.

This office might end up being responsible for reporting or other functions. In other words, this office becomes another layer between management and project managers. In blunt terms, it results in more bureaucracy, or even worse, policing force, which is a turn-off (Sukad Group, 2013).

The consultant factor

The caveat in terms of the consultant factor entails the difference between expectations and requirements. Traditional management and project management teach us to focus on requirements and deliver our projects as per the requirements. Since a PgMO implementation is a project, the consultants comply with the requirements and implement a PgMO. In this case, the consultant's focus is on the "office" since no one asked them to do more.

Another way to state the problem is that there should be a clear distinction between needs and wants. It is the job of a good consultant to facilitate the investigation as to what the root cause of the problem is, and then to design a solution in terms of what the client's requirements are. In most instances, there is incongruence in terms of what is needed and what is wanted (Sukad Group, 2013).

In conclusion then, what can be done to ensure that the implementation of the PgMO would be successful?

- First: be clear about understanding the needs and wants, and that they are more often than not incongruent. Thus, be prepared to spend time gaining a clear understanding of the needs and wants, and design a PgMO solution that will address both.

- Second: communicate that a holistic approach to project management is needed in the organisation. Attention should be given to the projectised organisation as a “system”. This means that there needs to be a combination of PgMO implementation and project management system implementation. The latter reference to the project management system does not entail only an IT system or tools, but rather the full system, from governance and strategic aspects, adding project management methodology, down to the processes, professional development and competency.

It has been shown throughout the discussion in this chapter that there are relationships between the strategy of the organisation and the way in which projects are executed. It is clear that the organisational design encompasses much more than the understanding that there is a continuum of designs. Commensurate with the concept of locus, focus and function, the institution of the project, programme and portfolio management functions was discussed. There are two more figures that can shed light on a holistic and systems thinking approach to achieving maturity in project portfolio management. Figure 6-18 shows how the organisational design in terms of the permanent organisation and the projectised organisation needs to be aligned, and Figure 6-19 shows how the various functions would work together.

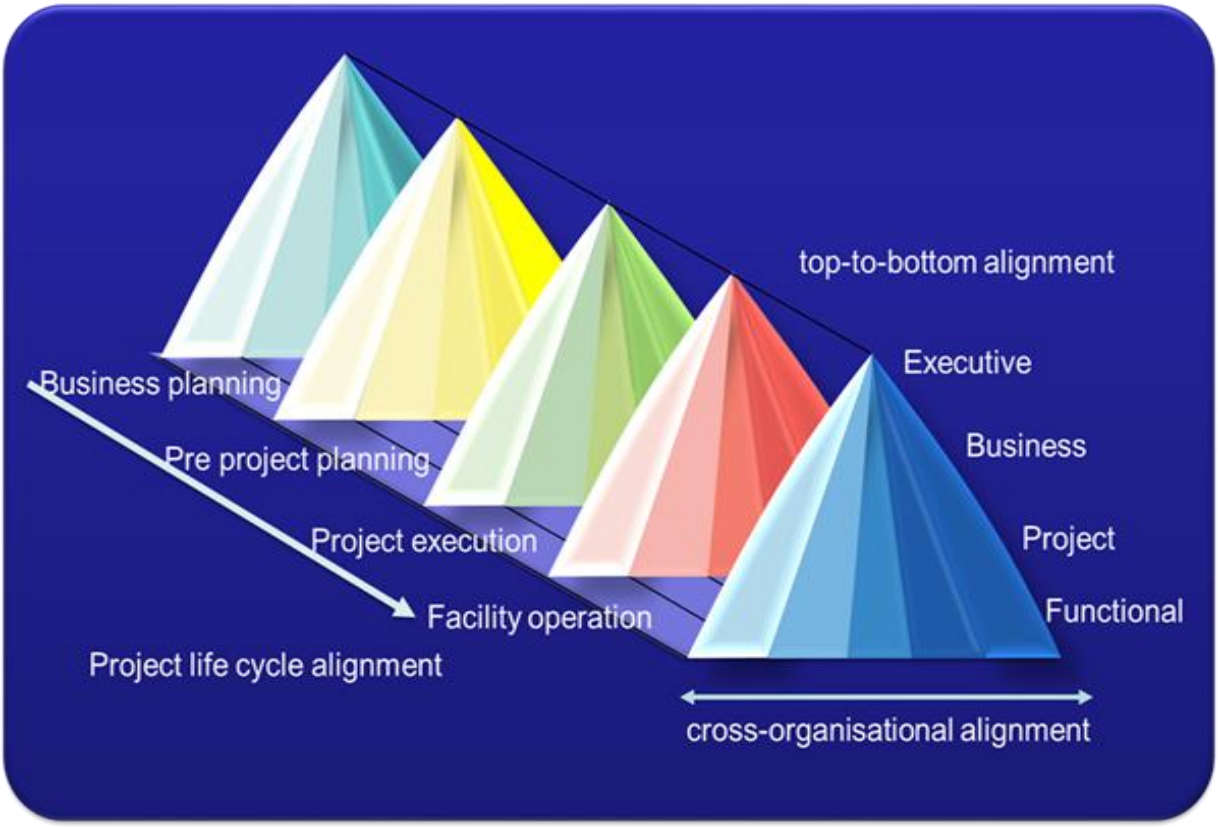


Figure 6-18: Cross-functional and cross-organisational flow

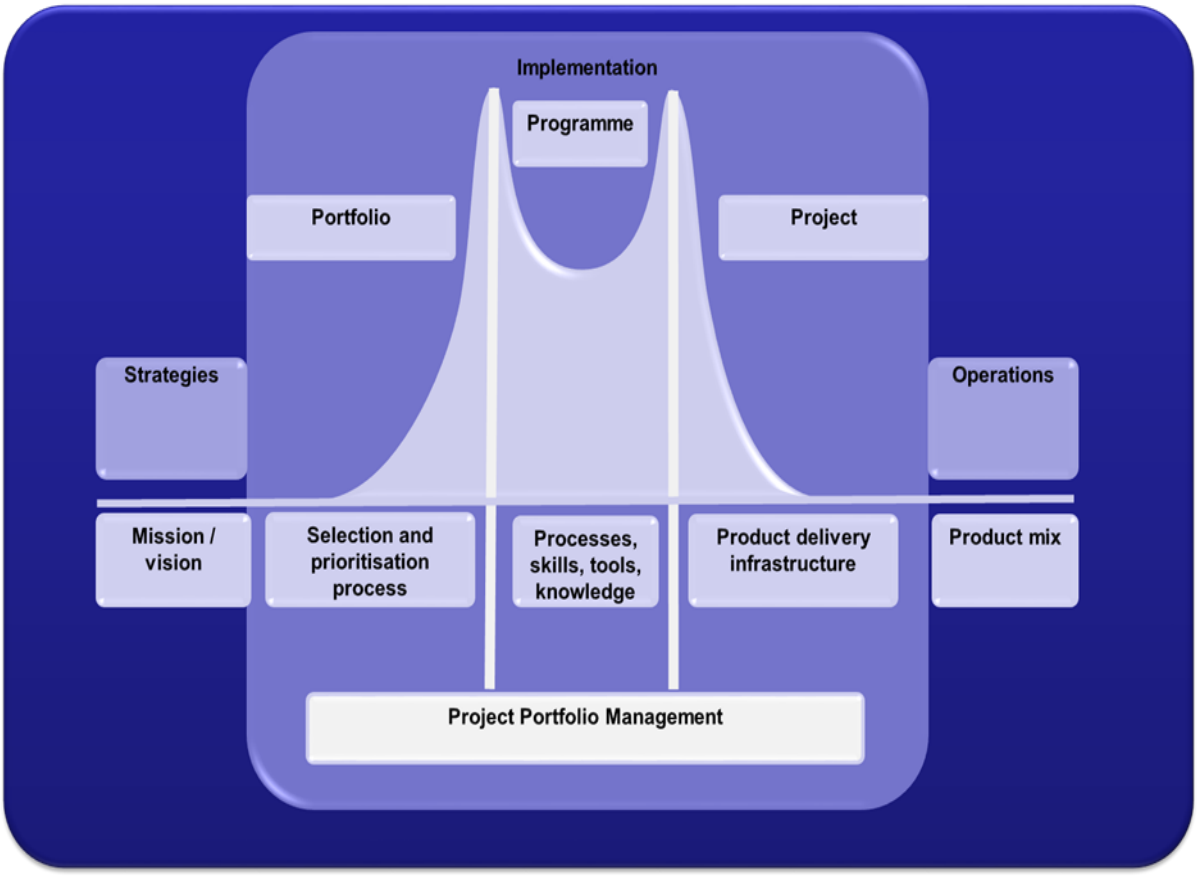


Figure 6-19: How project management, PgMO and project portfolio management work together

The consequences of failure to implement an integrated project, programme and portfolio management project portfolio management/PgMO/project management approach influences the business in several ways. The absence of a framework to provide actionable insights into projects, both at the individual and aggregate levels, causes a reluctance to kill poor and mediocre projects. Sustaining such projects causes resources to be thinly spread. At the strategic level, choices regarding projects on which to embark are made on skimpy information, and projects with little or no alignment with the overall corporate mission are launched. At the lowest level, that of project execution, the business also suffers, due to low employee morale, loss of goodwill with customers and even revenues. In contrast to this, a well-designed, planned and implemented framework bears a multitude of fruit. Expected benefits can be stated as follows:

- More effective and efficient utilisation of resources
- Projects that generate a positive cash flow and contribute to the company's health and future success

The most important factor that needs to be done right entails the synchronisation of the PgMO, project portfolio management, and project management resources that make projects work from top to bottom (Needs, 2014).

6.10 Conclusion

Commensurate with the consideration of aspects to take heed of and aspects that are prerequisites to successful implementation, the following organisational design structure is proposed for the projectised organisation. Although not an entirely new development, it was adopted to incorporate the roles and functions that would be required in the locations where the various functions would have to exert their influence. The structure also gives room for growth for individuals within a broad definition of work in the job family where they share the same context, but different content for their positions. This suggested design is presented in Figure 6-20.

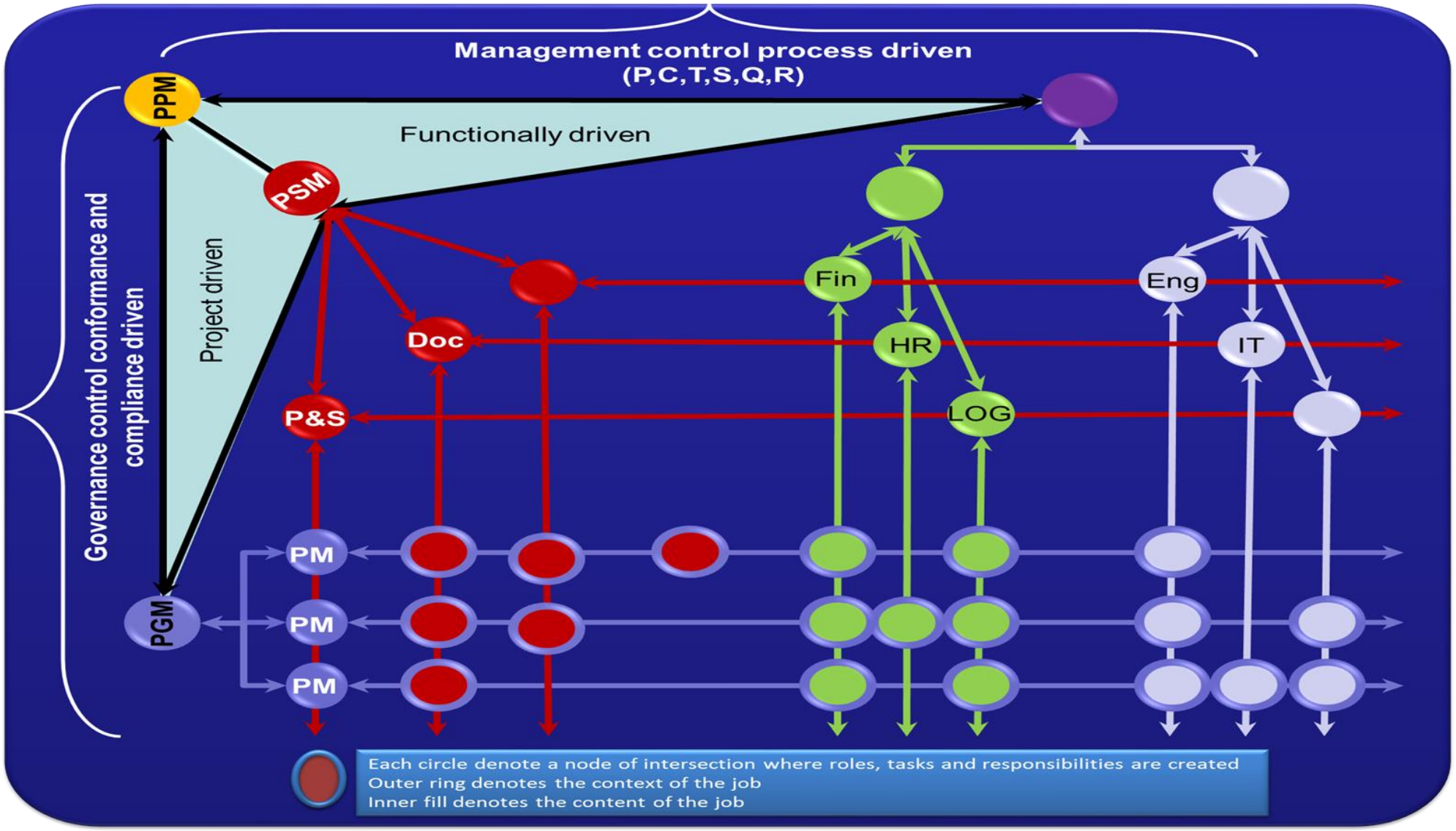


Figure 6-20: Suggested organisational design highlighting more programme management functions to incorporate in the job family

In an organisation with the correct design and definition of roles and functions, there is a better chance that mechanisms can be created that will ensure the alignment of projects to the strategic intent. This continuous alignment means that the governance structure is implemented and working correctly, thus ensuring that the assumptions defined in the original business cases of projects are adhered to, and that decisions made during development are based on timely and accurate data.

A continuous mechanism with the right measure and mix of focus in terms of governance control and managerial control, through the right institutions located at the right places in the organisation, and endowed with the right measure of authority, can ensure that projects remain aligned with their strategic intent, and that they will deliver many important benefits to your organisation. Such benefits can be stated as follows:

- A standard methodology for starting projects, managing them and making them accountable to the business can be implemented.
- There is empowerment of the business with control over project go/kill/hold/fix decision-making.
- The creation of a repeatable process for prioritising, selecting and executing projects.
- The provision of early warning systems for any potential problems in meeting programme and project milestones.
- Easy access to information for different stakeholders to project information relevant to their interests.
- A better understanding of resource utilisation, ensuring that the right staff is deployed on the right projects.
- Helping stakeholders calculate the financial impact of cancelling an underperforming project.
- Helping decision-makers switch priorities based on organisational needs.
- Redeploying staff quickly based on accurate real-time information.
- Reducing project reporting time scales at the executive and board level, allowing more accurate decision-making and faster reactions to market changes.

It is a function of the PgMO to establish the job family concept for project managers' career pathing and professional progress and development in the organisation. It is a focus area of strategic management or, in instances where a PfMO is instituted, to

affect the organisational design and determine the strategic direction for the training and development of ICT project managers in the organisation.

It was shown that there is confusion in terms of where the locus is, and what the focus and functions of the various types of projectised offices should be. This can then be translated to create the same confusion in terms of the roles that are housed in each of these functions and locations, hence one sees people deployed/employed in the wrong job context or busying themselves with the wrong job content.

It was shown that the size of the project does not affect the essential functions, but rather that:

- complexity will cause an increase in the number of roles that are found in the project;
- complexity will move the focus and function of the PgMO from just supporting the project towards strategic project management; this movement can be equated to a growth in maturity in terms of organisational project management effectiveness;
- task density will cause an increase in positions on a project structure; and
- organisational maturity will cause a focus on institutioning permanent projectised offices such as a PjMO and PgMO.

There is a definite difference between the roles and functions of project managers vs those of programme managers, yet there is confusion in terms of the location of the offices in which they work. A project manager can be found to work in a PgMO, but is not the programme manager.

Even though the PgMO has definite benefits, failure in executing its roles and functions can cause more damage than the benefits it can bring.

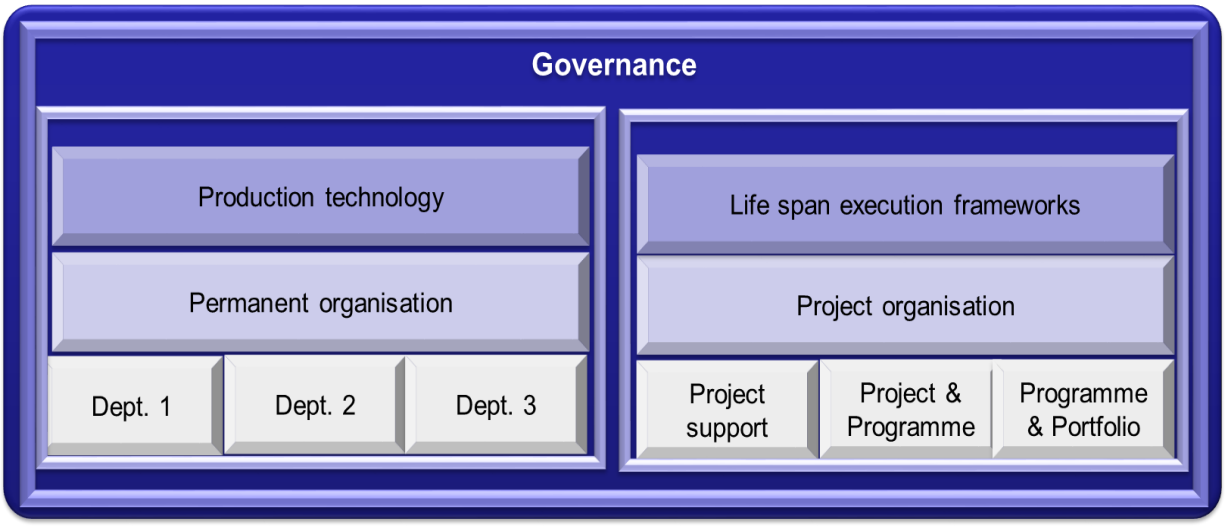
Typically, the PgMO is for the organisation and not for one project or programme. The PgMO is typically an organisational unit. Not all PgMOs are the same (a PjMO may perform the same function in some organisations). A PgMO may consist of as little as two team members or many more.

Training alone in the aspects of project management will not cause better project execution performance, an organisation-wide decision is needed to projectise the organisation, and the locus, focus and function of the various offices that would do the following need to be considered:

- Render administrative support to the projects

- Exert governance control over projects
- Ensure strategic alignment of the various projects
- Ensure strategic selection of the projects

For this reason, the issue of where the development home of the projectised

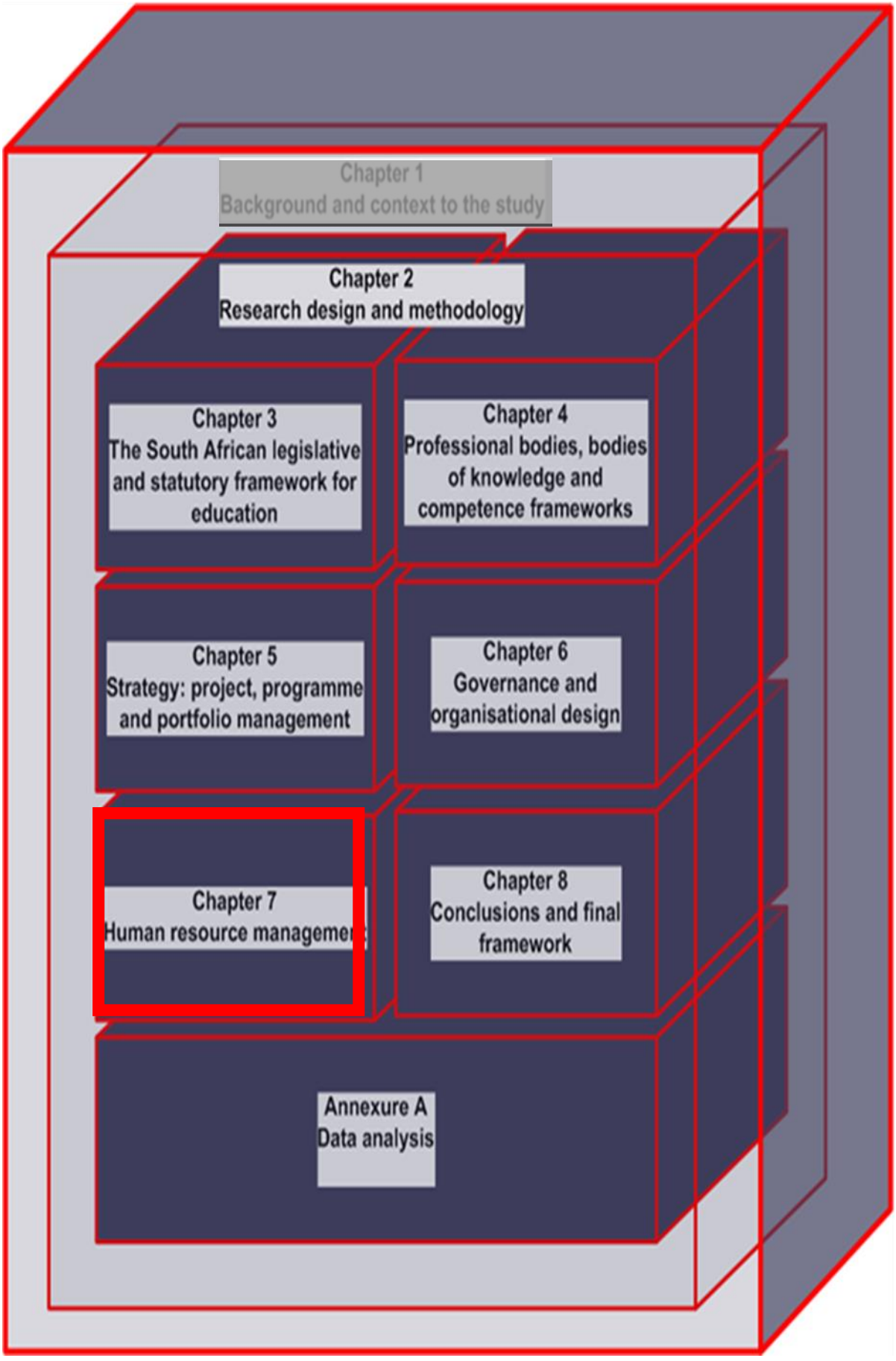


personnel should be is again emphasised, and reiterates the fact that thought needs to be given to the job family of project execution and support personnel. For this reason, the layer of governance and organisational structure design is added to the stratified framework. This addition is shown in Figure 6-21 below.

Figure 6-21: Organisational design, strategy and governance layer

With the addition of the next stratified layer to the development of the framework, it can be concluded that, in an increasingly dynamic and complex world, where the viscosity and density of information flow is increasing, companies must know that they are doing the right things, doing them fast and doing them right. In order to achieve faster times to market for products, organisations are realising that the traditional operating model, with separate silos, cannot solve the rising challenges, and it will prove to be increasingly difficult to protect and grow revenue. To rise to the challenge of competing in this transformed world, competitors have to realise that, in the end, an organisation is nothing more than the collective capacity of its people to create value.

Chapter 7. HR management in ICT project execution



7.1 Introduction

In the previous chapter, it became evident what the context for the development of ICT project managers entails from the perspective of the locus, focus and function of the various offices and organisational institutions for project execution. From the introduction to Chapter 5, it is evident how project management has developed during the past 300 years. In this chapter, the focus is turned to the required HR practices that would enable an organisation to grow in maturity and establish project management as a career by employing the concept of a job family in the organisation.

A definition of what project management entails renders the following:

- A time- and cost-restrained operation to realise a set of defined deliverables (the scope to fulfil the project's objectives) up to quality standards and requirements (International Project Management Association (IPMA), 2013a).
- A temporary endeavour undertaken to create a unique product or service (Project Management Institute (PMI), 2011).

Whatever the phrasing or exact sequence of words, these definitions purport to make it clear that a project can be long, short, small or large. What should, however, be inferred from the definitions is that project managers are expected to deliver the same results – outputs and outcomes that satisfy the needs of and are acceptable to the various stakeholders. From the above definitions, one sees that the context within which these results are achieved can differ totally. The contextual framework of the project brings with it the issue of project complexity, which infers that project managers who are competent in a small and uncomplicated project would not necessarily be the best choice for a larger, more complex project. Thus, in determining the requirement for skills and project management competencies, a suitable process should be developed to ensure that organisational and individual needs are met.

The nature of project management is such that, in some organisations, Project Manager is a position with a title, while in others it is a temporary assignment. Whether a full-time occupation or a role and function fulfilled in a temporary capacity, the project manager faces a wide variety of responsibilities. Goatham (2009) states that the variety of tasks that can be related to project management can be explained as follows:

- Being responsible for all aspects of the feasibility, design construction and commissioning of a power plant with a large budget
- Being responsible for the development of a research report with a budget of less than 100 hours
- Being responsible for a sub-project that forms an element of a larger project or programme

Project management, as a profession, is becoming more important in the business environment. Historically, project management developed from the engineering professions. Therefore, most project managers are from that fraternity.

However, recent developments in the training of project managers have led to the development of specialist courses, as well as the registration of separate professional bodies for the profession. As such, an individual who has undergone training in project management, and does not come from the engineering fraternity, can be registered as a professional in his or her own right.

Robert Goatham published an article on the website of Max Wideman highlighting the high failure rates in ICT projects (Goatham, 2009). Goatham (2009) states that project failure rates in the ICT industry are considerably higher than the failure rates for other types of engineering projects, and that these failures have been well documented in the following reports:

- *Chaos Report,* Standish Group
- *Dobbs defining success*, S Ambler, October 2007
- "OMB and agencies need to improve planning, management and oversight of projects", *GAO-08-1051T,* United States Government Accountability Office, July 2008

These reports highlight failures in the public sector, and can lead to the misconception that things are better in the private sector. Goatham (2009) quotes research conducted in 2008 by the Information Systems Audit and Control Association, as published in *IT Week Magazine* (19 May 2008), which found that 43% of 400 respondents admitted that their organisation had had a recent project failure.

Goatham (2009) likens ICT projects to projects in the construction industry:

If the failure rates experienced in the IT sector were replicated in civil

> *engineering projects, our cities would be littered with abandoned construction projects, the electrical supply to our homes would work intermittently and many of our bridges would have gaping holes that would routinely swallow vehicles brave enough to attempt a crossing* (Goatham, 2009).

Goatham (2009) states that, given that ICT project managers use the same basic tools, techniques and principles as their counterparts in civil engineering, the difference in success rates raises some interesting questions.

- Are ICT projects inherently different from other types of projects such as those found in the civil engineering sector?
- Are the differences in success rates just a reflection of the fact that the application of project management principles in the ICT sector has not attained the same level of maturity as it has in the civil engineering sector?
- Are there possibly environmental factors in the ICT sector that are poorly recognised and hence poorly managed? (Goatham, 2009).

At first glance, the answers to these questions would probably be “yes!”

Goatham (2009) goes on to state that if an increase in the success rate of ICT projects is to be achieved, one needs to go beyond superficial solutions, and understand the problems in a much more fundamental way. He quotes an old proverb: *“You can't truly solve a problem until you truly understand the nature of the problem you're solving”.*

Goatham (2009) states that when ICT projects fail, one of the most common reactions is for the organisation to adopt a programme of process improvement. In his view, this is only a theoretic solution, and is much harder to implement.

In order to really improve ICT project execution success rates, Goatham (2009) suggests that one should take a step back from the traditional view of projects and project management, and examine the work being done at its most fundamental level.

Goatham (2009) then refers to the view of work presented in the project environment as a Gantt chart, showing dependencies and interdependencies. The opinion is that, although this is a useful representation, it shows the work in a perspective that is too simplistic. The danger with oversimplification resides in the fact that it obscures the

more complex reality. In the case of the IT industry, the gap between the simplified view and reality is significant and the space between the two is the breeding ground for problems that lead to project failure.

Goatham (2009) proposes a view that diverges from the task-centric perspective. His view of work is categorised in Table 7-1:

Table 7-1: Task-centric view of project management

Task-centric view of project management
Physical tasks, such as laying foundations, building walls, etc.
Information acquisition and analysis
Information and knowledge transfer
Decision-making

This view entails work being viewed at its most elementary levels of utilising all four elements of the categorisation. Thus, the percentage of effort spent on each activity varies according to the type of project. While construction projects have a heavy bias towards physical activities, design-type projects are dominated by decision-making. In Figure 7-1 below, a graphic representation is given of Goatham's view of the different profiles of work that might be seen in different types of projects (Goatham, 2009).

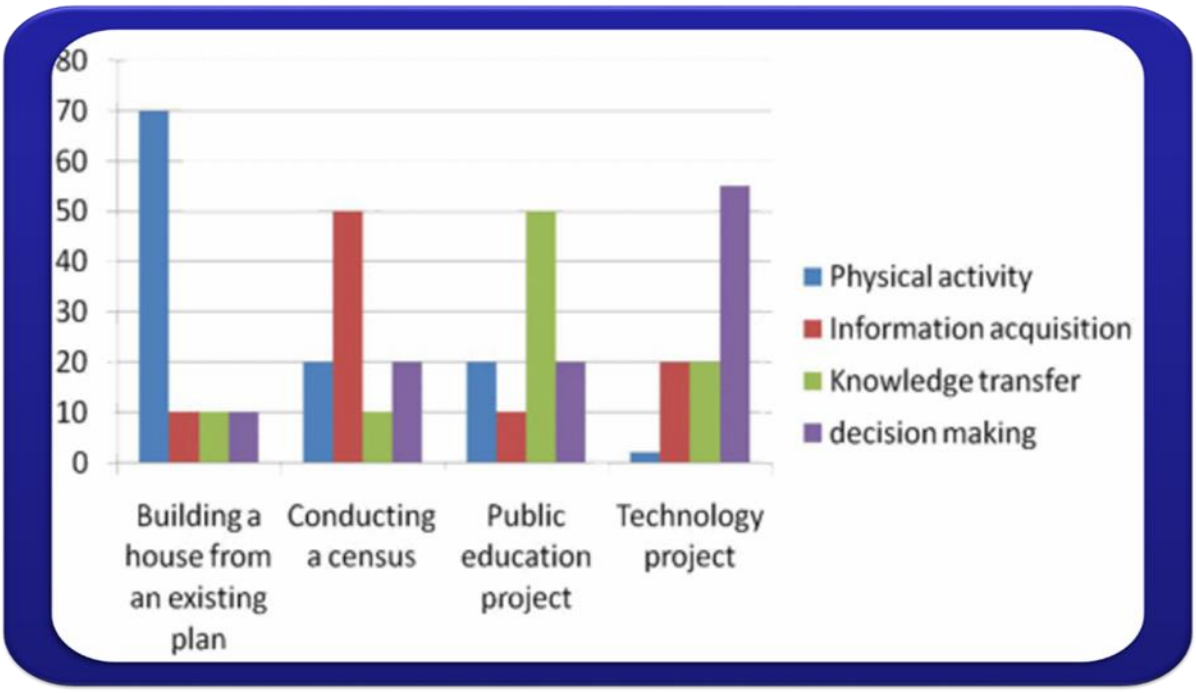


Figure 7-1: Typical percentage of effort by category of work

The realisation that dawned in this lengthy introduction to the high failure rates of ICT projects resides in this figure. From Figure 7-1, it can be seen that the work in an ICT project is dominated by decision-making.

Rather than being “physical tasks”, the majority of the work referred to as “tasks” in a technology project is in fact “decision-making”. From strategy development to developing code, the primary activity that absorbs the majority of the effort that goes into an ICT project is decision-making.

Building further on the insight gained from Figure 7-1, one finds that although the “task-centric” view and the Gantt chart are firmly entrenched, one needs to change one’s perspective of ICT projects towards a complex web of interrelated decisions, which can best be illustrated in Figure 7-2 below (Goatham, 2009).

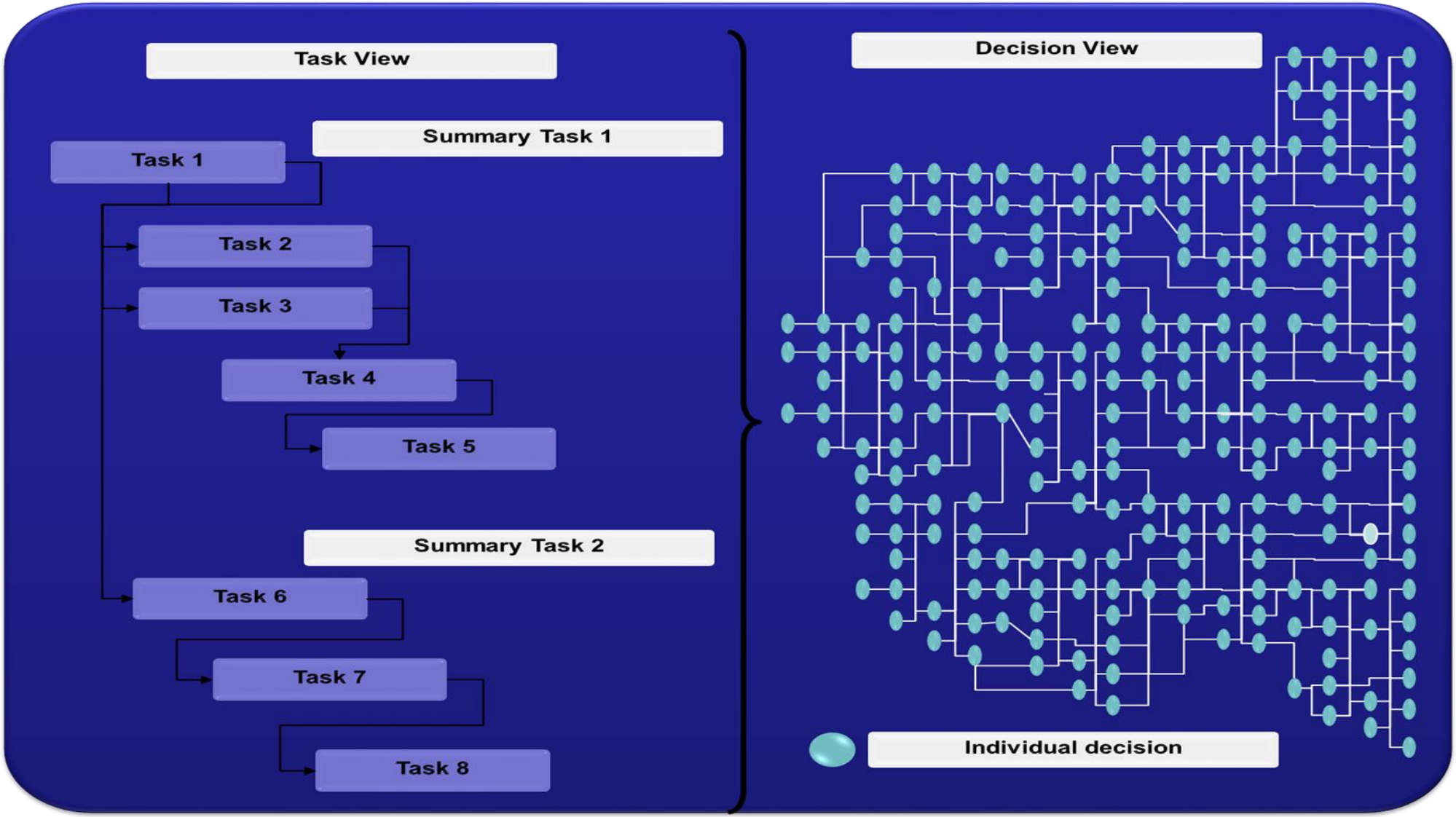


Figure 7-2: Task-centric versus decision-centric views

Making decisions is so inherent to our work life that we often disregard its importance. In a project, major decisions can usually be scheduled as milestone events, but few team members will have considered decision-making to be the pervasive act that determines even the smallest detail of a project's outcome. The central role that decision-making plays means that the level of success a project team achieves is directly related to the effectiveness of the team's collective decision-making capabilities. If the team can consistently make good decisions, the chances are that they will succeed. If the team makes too many bad decisions, the chances of success are much reduced. Therefore, complexity in decision-making would be a skill and competence requirement for a project manager in an ICT project and such skills and competencies should permeate the training of ICT project managers (Goatham, 2009).

The aim of this chapter can then be stated as follows:

- Discuss the aspects of ICT project management training and development in the context of the introduction: high failure rates and complexity of decisions.

Subsequent to the aim, the following objectives are set:

- Relate the career management of project personnel to the permanent organisation and the South African legislative framework for training and development.
- Relate the HR management of projectised personnel to the concepts of competence and complexity.
- Discuss HR management in the context of project execution (the projectised organisational design of the PjMO, PgMO and PfMO).
- Relate training and development back to the concept of a job family, without which there can be no career pathing or organisational growth for individuals in the projectised organisation.

In accordance with the data analysis method and the use of the Excel tool, the scope of this chapter emerged as a pattern formed by the key words. The particular patterns that emerged from the literature review and data sources indicated that this chapter should include and focus on the following:

- Training and development in the context of the South African legislative framework
- HR management in the context of project execution
- Job roles and functions and where they find execution in the organisation design
- Career management, career paths and occupations
- The job family bringing it together

7.2 Training in the context of the South African legislative framework

In the introductory chapters, as well as in Chapter 3, one has seen a graphic representation (refer to Figure 3-1) of the legislative framework that governs training and development in South Africa.

7.2.1 The OFO and training and development

In section 3.2.12, the reader was introduced to the OFO. Whether the OFO is the ultimate framework remains to be seen. However, reporting against it in terms of a workplace skills development plan, as well as utilising the codes for occupations that need to be reported is a given. Seeing that reporting against the OFO codes will become compulsory, training and development should also be aligned with the governing structures of SAQA and NQF.

It has also been seen that the OFO makes provision for occupations that support the execution of a project (refer to code 441903 in Figure 3.7). One can thus deduce that the training and development of incumbents in the projectised organisation should also be aligned with the OFO's occupational codes, yet there are not many qualifications on offer to qualify such support personnel. From Chapter 3, one can see that there is an alignment in the OFO and what would be required in the different locations in a projectised organisation to some extent. This is discussed further in the sections below.

7.3 Complexity, competence and training and development

7.3.1 The concept of complexity

Given the rapid rate of change that is experienced, individuals are increasingly called on to manage complexities. This holds true for both the project domain and the developmental domain of project managers.

The concept of complexity does not only apply to the management of careers and development paths, but also to the management of projects. It is through exposure to complexity that growth and development can take place.

On the website of ASAPM, Dr Lew Ireland (2007) identified two aspects of project complexity. These aspects entail the total complexity of a project consisting of the following:

Technical complexity

This includes all technical aspects of the project, such as:

- The number of technologies involved
- The team's familiarity with technologies
- Bleeding-edge or well-established technologies
- The number of technical interfaces (Ireland, 2007)

Management complexity

This includes all business and organisational aspects of the project, such as:

- Project staffing and management (team composition, size, management hierarchy, etc.)
- Number of parties involved (external vendors, internal departments, etc.)
- Change-related issues
- Stability and complexity of requirements
- Political issues
- Time/cost issues, etc. (Ireland, 2007)

The application of project management skills and the eventual success of the project will be determined by the best fit between the skills of the project manager and the project complexity. It follows from the required skills sets that the development of these skills will depend on the measure and extent to which the project manager was exposed to the application during a project. Obviously, projects differ in complexity, and someone who has excelled in a small project, will not necessarily excel in a more complex project. It is thus necessary to compile teams by choosing a project manager, and subsequently compiling the project team according to the complexity of the tasks that need to be performed. It is foreseen that the project team will be compiled in accordance with the following:

- The technical complexity of the project
- The management complexity of the project
- The individual requirements for development

Goatham (2009) refers to the fact that ICT projects cannot claim the sole right to being decision-centric, but that there are a number of factors that make decision-making in the ICT sector particularly tricky. Goatham (2009) then states that:

- ICT projects usually involve many individuals and, as a result, the decision-making is often heavily decentralised across the team.
- Many decisions are subjective and there are no definitively right or wrong answers.
- Most decisions lack the physical attributes that more readily lend themselves to visualisation, verification and communication (such as height, depth, breadth and mass).
- People with diverse paradigms and perspectives need to work together. Those differing backgrounds compound the difficulty of communicating effectively.
- Many decisions in an ICT project involve significant uncertainty.
- The decisions are often mutually dependent. A decision in one part of the project can have implications across many other parts of the project.

Due to the many decisions made on a typical ICT project, with the accompanying complex interactions and dependencies that exist between those decisions, the simple representation of a project in terms of a Gantt chart cannot capture the skills and competencies required to complete such a project. If the decision view calls for a review of how a project is presented, should this view not also call for a review of how training and development should be viewed (Goatham, 2009)?

The question in terms of training and development is: “How do we train and develop people to manage a large-scale, complex, decentralised, decision-making activity?”

The paradigm shift to view an ICT project as “a large-scale, complex, decentralised, decision-making activity” provides a point of departure for a discussion on training and development, but alas, again, there is no single position that holds true and again there are layers and multitudes of challenges in determining the training interventions to be chosen. There are at least six challenges in terms of training and development that require attention:

- Installing competence and skills in the incumbent with regard to knowing what decisions need to be made and when
- Installing competence and skills in the incumbent with regard to identifying optimal choices for each decision
- Installing competence and skills in the incumbent with regard to managing the complexity inherent in the sheer number of decisions that need to be made
- Installing competence and skills in the incumbent with regard to recognising and managing the uncertainties inherent in the decisions
- Installing competence and skills in the incumbent with regard to maintaining the integrity of the whole, i.e. ensuring the compatibility and alignment of all of the decisions made
- Installing competence and skills in the incumbent with regard to detecting and eliminating errors in the decisions made (Goatham, 2009)

These six challenges can easily be expressed in definition, however, solving them in terms of training and development interventions can be considerable challenges in themselves. The objective of overcoming the complexity in training challenge should be to build competence and expertise. Experts, through their training and exposure, should have the insight needed to address the six great challenges listed in the previous section, and because of their experience, they should be better equipped to navigate the complex domain within which project decisions are made (Goatham, 2009).

One can conclude that the current training does not focus on handling complexity in decision-making, as attested to by the high failure rates that persist.

The following has been seen thus far:

The governance framework in the OFO determines that a reporting of skills should be developed at an organisational level in the form of a workplace skills development plan. It was seen that the traditional view of projects in terms of task-centric expressions in a Gantt chart does not portray the full understanding of the complexities in terms of decisions, and it was deduced that traditional training does not qualify ICT project personnel to handle these complexities. This is attested by the fact that ICT projects have a high failure rate.

7.3.2 Complexity in career progression

With the increase in complexity and strategic impact, the roles, skills and knowledge

required by an individual to perform this job increases exponentially. This means that project resources need to be developed in accordance with the individuals' own career stage and the complexities they can manage. In order to develop the skills needed to handle complexities, it is necessary to define the job family of project management. Currently, these career paths are isolated due to the higher level of context, i.e. due to the job family being non-existent in the project management bodies of knowledge (Goatham, 2009; Ireland, 2007).

During the life cycle of a project, it is evident that various members of the project team display various project management-based competencies. These competencies are not all deployed in managing the project, but are found in areas in which individuals render support to the project. Although their job context is grounded in project management, they are not project managers as such, but do something else on the occupational level. This is also evident in the fact that the OFO makes provision for occupations that have the sole purpose of supporting projects and project managers.

It has been seen that the various professional bodies also have qualifications and that, in accordance with the research of Giamvalvo (2010), the prestige qualification of the PMI's PMP does not measure up to the required level of competence. Furthermore, in the article of Goatham (2009), it has been seen that the ICT project management domain is complex in nature due to the high level of decision-making involved. The current qualifications do not equip ICT project managers with sufficient behavioural and contextual competencies to handle the complexity of decision-making, nor does SAQA or the NQF (South African Qualifications Authority (SAQA), 2012b).

One can thus conclude that the training and development in the context of SAQA and the NQF that manifest in the institution of positions with OFO codes are also not sufficient to equip ICT project managers with sufficient levels of competence to deal with complexity.

7.3.3 The concept of competence

Generally, the concept of competence entails an individual's ability to do a job properly.

Competence, as defined on the site of Business dictionary.com (2013), entails the following:

> *A cluster of related abilities, commitments, knowledge and skills that enables a person (or an organisation) to act effectively in a job or situation. Competence indicates sufficiency of knowledge and skills that enables someone to act in a wide variety of situations. Because each level of responsibility has its own requirements, competence can occur in any period of a person's life or at any stage of his or her career* (BusinessDictionary.com, 2013).

Smith (2005a) gives quite an elaborate discussion of what competence entails. Smith reiterates what was found on the Wikipedia sources as stated above by stating that the actual meaning of what competence entails has undergone a change during the last 20 years or so. Smith (2005a) quotes research of Jessup (1989), which has shown that, in particular in the UK, there has been a particular lack of vocational training in the gaining of skills and a rather exaggerated focus on the gaining of knowledge. He goes further to say that it is the gaining of competence that allows countries and economies to compete (Smith, 2005a).

Smith states that the current state of affairs is testimony to the continuing power of functionalism and scientific management. This current state has led to a watered down notion of competence. So what then is the true meaning of the word "competence" and how should it be understood?

Competence can be understood from two perspectives:

- A mechanistic perspective
- An intuitive perspective

From the mechanistic perspective, one can see that competence is concerned with what people can do, rather than what they know. This gives rise to the elements of competence from a mechanistic perspective. (It is called mechanistic due to the continuing decomposition of work and asks to derive the elements of which it consists, and then to determine the knowledge and skills required to give execution to such activities.) These elements are cited below (Smith, 2005a):

- Firstly, if competence is concerned with doing, then it must have a context.
- Secondly, competence is an outcome: It describes what someone can do. It does not describe the learning process that the individual has undergone.

- Thirdly, in order to measure reliably someone's ability to do something, there must be clearly defined and widely accessible standards through which performance is measured and accredited.
- Fourthly, competence is a measure of what someone can do at a particular point in time (UDACE 1989, quoted by Tight 1996).

According to Smith (2005a), the intuitive perspective comes from the work of CeVe who is of the opinion that the language of competence is often misunderstood. The misunderstanding originates from the association of the word "competence" with "skill", rather than "understanding". According to CeVe, the meaning of competence is concerned with the Greek philosophical approach, and an understanding of the meaning can be gained from Ancient Rome and the Greek notion of "aretè" or "virtus". Smith (2005a) further refers to Brezinka (1988) who relates competence to a relatively permanent quality of personality that is valued by the community to which an individual belongs. According to Brezinka, competence is not a mere skill, but a virtue; a general sense of excellence and goodness. It involves being up to those tasks that life presents us.

Smith (2005a) then refers to Brezinka, stating that the current use and understanding of the term has been whittled down to the ability to undertake specific tasks. There is thus no notion to infer social, moral and intellectual qualities. A distinction needs to be made between competence (and competences) and competency (and competencies). Smith (2005a) also refers to Hyland regarding the understanding of the differences, namely:

> *Competence and competences are broad capacities (with a close relation to the sort of virtues that Brezinka was concerned with). In contrast, competency (plural competencies) is a narrower, more atomistic concept used to label particular abilities or episodes. In the case of the former, we might talk of a competent informal educator; in the latter, a competent piece of driving. In this way, the first (capacity) sense of the term refers to the evaluation of persons; whereas the second (dispositional) sense refers to activities* (Smith, 2005a).

Smith then concludes the article with the following:

> *In the current discourse, competence, as a fully human attribute, has been reduced to competencies – a series of discrete activities that*

> *people possess the necessary skills, knowledge and understanding to engage in effectively. The implication here is that behaviour can be objectively and mechanistically measured. This is a highly questionable assumption – there always has to be some uncertainty about what is being measured. We only have to reflect on questions of success in our work. It is often very difficult to judge what the impact of particular experiences has been. Sometimes it is years after the event that we come to appreciate something of what has happened. Yet, there is something more. In order to measure them, things have to be broken down into smaller and smaller units. The result is often long lists of trivial skills as is frequently encountered in* [the UK's] *BTEC programmes and NVQ competency assessments. This can lead to a focus on the parts rather than the whole; on the trivial, rather than the significant. It can lead to an approach to education and assessment which resembles a shopping list. When all the items are ticked, the person has passed the course or has learnt something. The role of overall judgment is side-lined. The problem here is that in the act of deconstruction can come destruction. This is not to argue against analysis, rather it is to say that we must attend very carefully to our frame of mind or disposition when undertaking it. The move from competence as a human virtue to a discrete thing that we possess is fundamental. In essence, it involves adopting a way of viewing the world that undermines the very qualities that many of us would argue make for liberatory education* (Smith, 2005a).

7.3.3.1 Competence in project management

With specific reference to project management, it was shown in Chapter 4 that the literature specific to project management includes competence frameworks. The GAPPS competence framework defines competence as follows:

> *Competent comes from the Latin root competere, which has the meaning that something or someone "be suitable" for a specific application. In the modern application of the concept, the term competent would generally refer to somebody who is sufficiently skilled to perform a specified task or to fill a defined position. Pressures from the various environments that affect the organisation cause the*

> *measurement and assessment of levels of competence to be increasingly important* (Global Alliance for Project Performance Standards, 2013).

The other authoritative source for competence in project management is that of IPMA. From its ICB-IPMA Competence Baseline® Version 3.0 (2006a), the following definition of competence is given:

> *Competence has its origins in the Latin word "competentia", which means "is authorised to judge", as well as "has the right to speak"… so the world hasn't changed so much in this regard. We're looking for competent project managers to orchestrate project activities. Increasingly, competence descriptions and competence management have changed human resource management in many organisations* (International Project Management Association (IPMA), 2006a).

The ICB3 goes further to state:

> *A competence is a collection of knowledge, personal attitudes, skills and relevant experience needed to be successful in a certain function. To help candidates measure and develop themselves and to help assessors to judge a candidate's competence, the competence is broken down into competence ranges. The ranges are mainly dimensions that together describe the function and are more or less independent. Each range contains competence elements that cover the most important competence aspects in the particular range* (International Project Management Association (IPMA), 2006a), namely:

- *The technical competence range – to describe the fundamental project management competence elements. This range covers the project management content, sometimes referred to as the solid elements. The ICB® contains 20 technical competence elements.*
- *The behavioural competence range – to describe the personal project management competence elements. This range covers the project manager's attitudes and skills. The ICB® contains 15 behavioural competence elements.*

- *The contextual competence range – to describe the project management competence elements related to the context of the project. This range covers the project manager's competence in managing relations with the line management organisation and the ability to function in a project-focused organisation. The ICB® contains 11 contextual competence elements* (International Project Management Association (IPMA), 2006a).

7.3.3.2 Conclusions on competence in career progression

It can be deduced from the information, as well as the discussion thus far, that:

- there is ambiguity regarding the meaning of competence;
- competence is of importance to the ICT and the project management fraternity;
- an increased level of competence would be required as an individual progresses through jobs and positions with varying levels of complexity, authority and responsibilities attached;
- the projectised organisation needs to consider the levels of competence that would be required at the levels of complexity in projects that are undertaken; and
- competence, rather than knowledge and skill, needs to be the driving force in terms of project managers' development.

7.4 Job roles and functions and where they find execution in the organisation design

It has been seen thus far in the discourse of the discussion, as well as in the introduction of the concept of locus, focus and function, that the roles people play in the execution of projects are a prominent feature. In the discussion of the methodologies, the organisational design, as well as the discussion on project life span management, it became evident that throughout the project and the various phases it undergoes, different people play different roles. What was not evident from the discussion was the fact that, during the initiation of the project, while the team structure should be determined, a proper job analysis should be conducted to ascertain which people, with which competences and skills, are required to fulfil a role in the project. During the set-up of the project, it is important for the team and the organisational structure to be designed for total efficiency across the competence areas of technical, behavioural and contextual competencies. If these are known competence areas in project execution, why are they not determined beforehand during the project set-up? Why does HR management fail project management in

conducting a job analysis in accordance to the project team's needs, as well as the specifics of an organisational design through which the project can be executed?

In the section that follows, the importance of conducting a job analysis will be described as it pertains to training, staffing and maintaining skills and competence in the projectised organisation.

7.4.1 The job analysis

From the website of HR-Guide.com (2001), it was found that several methods exist that may be used individually or in combination when conducting a job analysis. These include the following:

- Job classification system reviews
- Incumbent interviews
- Supervisor interviews
- Expert panels
- Structured questionnaires
- Task inventories
- Checklists
- Open-ended questionnaires
- Observation
- Incumbent work logs

A typical method of job analysis would be to give the incumbent a simple questionnaire to identify job duties, responsibilities, equipment used, work relationships and the work environment. The completed questionnaire would then be used to assist the job analyst, who would then conduct an interview of the incumbent(s). A draft of the identified job duties, responsibilities, equipment, relationships, and work environment would be reviewed with the supervisor for accuracy. The job analyst would then prepare a job description and/or job specifications (HR-Guide.com, 2001).

The method of job analysis will depend on practical concerns, such as type of job, number of jobs, number of incumbents, and location of jobs (HR-Guide.com, 2001).

What aspects of a job are analysed? Job analysis should collect information on the following areas:

- Duties and tasks: The basic unit of a job is the performance of specific tasks and duties. Information to be collected about these items may include frequency, duration, effort, skill, complexity, equipment, standards, etc.
- Environment: This may have a significant impact on the physical requirements of performing a job. The work environment may include unpleasant conditions, such as offensive odours and temperature extremes. There may also be definite risks to the incumbent, such as noxious fumes, radioactive substances, hostile and aggressive people and dangerous explosives.
- Tools and equipment: Some duties and tasks are performed using specific equipment and tools. Equipment may include protective clothing. These items need to be specified in a job analysis.
- Relationships: This includes supervision given and received, as well as relationships with internal or external people.
- Requirements: The knowledge, skills, and abilities required to perform the job. While an incumbent may have higher knowledge, skills, and abilities than those required for the job, a job analysis typically only states the minimum requirements to perform the job (HR-Guide.com, 2001).

The job analysis serves the purpose of determining and documenting the relations between the job to be done and employment procedures, such as training, selection, the determination of compensation and performance reviews. In Table 7-2, a synopsis of these various employment procedures is given (HR-Guide.com, 2001).

Table 7-2: Summary of the uses of a job analysis

Procedure	Description
The job analysis can be used in training/needs assessment to identify or develop:	Training content (this will affect the choice of a project management paradigm in relation to the various professional bodies, their qualifications on offer and the roles that are implied in the use of a specific methodology)
	Assessment tests to measure the effectiveness of the training intervention
	The equipment to be used in delivering the training
	The methods that need to be developed to deliver the training (i.e., small group, computer-based, video, classroom, etc.)
The job analysis can be used in selection procedures to identify or develop:	Job duties that should be included in advertisements of vacant positions
	Appropriate salary level for the position to help determine what salary should be offered to a candidate
	Minimum requirements (education and/or experience) for screening applicants
	Interview questions
	Selection tests/instruments (e.g., written tests, oral tests, job simulations)
	Applicant appraisal/evaluation forms
	Orientation materials for applicants/new hires
The job analysis can be used in compensation to identify or determine:	Skill levels
	Compensable job factors
	Work environment (e.g., hazards, attention, physical effort)
	Responsibilities (e.g., fiscal, supervisory)
	Required level of education (indirectly related to salary level)
The job analysis can be used in performance review to identify or develop:	Goals and objectives
	Performance standards
	Evaluation criteria
	Length of probationary periods
	Duties to be evaluated

It is only after conducting a proper job analysis that job descriptions can be drafted. The section below will elaborate on the importance of the job description in staffing project roles (HR-Guide.com, 2001).

7.4.2 Job descriptions

Following the analysis of the job described above is the writing of the job description. In general, a job description entails the following:

> *A job description sets out the purpose of a job, where it fits in the organisation structure, the context within which the jobholder functions and the principal accountabilities of jobholders, or the main tasks they have to carry out* (Chapman, 2011).

From the above, it can be seen that a job description encompasses the following:

- The title by which the job would be known in the structure.
- The description of the overall purpose of the job with its accompanying positional title.
- The description of the key result areas in which the incumbent of the position must perform. It can be at such a low level to include tasks. (The inclusion of tasks would be at low levels of authority and more for junior positions.)
- The key performance indicators, measures that would be required to establish the level of performance of the incumbent.
- It sets out the communication, command and control relationships in terms of the position. It entails the definition of the line of control, endowing the position with authority and responsibility, thus determining which decisions can be made autonomously, who controls the position from a superior position and who is under the control of the position from a subordinate perspective. This would also entail the definition of the reporting channels (Chapman, 2011).

One can further see that a job description defines a person's role and accountability. Without a job description, it is not possible for a person to properly commit to or be held accountable for a role. It is interesting to note that there is reference to the role of the person occupying the position. This is in alignment with the concept of the job family as well (Chapman, 2011).

Chapman (2011) also refers to the difference that would be found in job descriptions for companies of various sizes. In the project context, it would entail that there would

be differences between positions on projects. The differences arise from the complexity of the project, the competence levels of the project management personnel, the maturity of the organisation in project execution and the level of task density. The same source refers to the detail that would be included and allude to writing a job manual rather than too many cumbersome lists of tasks in one job description. This would then entail responsibilities being defined rather than lists of tasks. It also mentions that not all responsibilities would be tied to a single role.

Table 7-3 provides a summary (Chapman, 2011) of the reasons why job descriptions are important.

Table 7-3: The reasons why job descriptions are important

The reasons why job descriptions are important	
1.	It clarifies employer expectations for the employee.
2.	It provides the basis of measuring job performance.
3.	It provides a clear description of the role for job candidates.
4.	It provides a structure and discipline for the company to understand and structure all jobs and ensure that the necessary activities, duties and responsibilities are covered by one job or another.
5.	It provides continuity of role parameters irrespective of manager interpretation.
6.	It enables pay and grading systems to be structured fairly and logically.
7.	It prevents the arbitrary interpretation of role content and limits by the employee, employer and manager.
8.	It is an essential reference tool in issues of employee/employer disputes.
9.	It is an essential reference tool for discipline issues.
10.	It provides important reference points for training and development areas.
11.	It provides neutral and objective (as opposed to subjective or arbitrary) reference points for appraisals, performance reviews and counselling.
12.	It enables the formulation of skill set and behaviour set requirements per role.
13.	It enables the organisation to structure and manage roles in a uniform way, thus increasing the efficiency and effectiveness of recruitment, training and development, organisational structure, work flow and activities, customer service, etc.
14.	It enables a factual view (as opposed to instinctual) to be taken by employees and managers in career progression and succession planning.

From the table above, it is clear that job descriptions are vital for structuring the organisation. It was found in the research on organisational structures in the projectised organisation that the literature is sparse on the aspect of job descriptions when discussing organisational designs, yet it is clear that the job description plays a central part in any organisational design. Furthermore, there was no mention in project management literature of the process of conducting a job analysis. This is of concern, as complex and large projects can be seen as a temporary organisation with ties to the permanent organisation, which would exist for a period of time (this can be lengthy). The concern is that when the team composition is planned, there was no mention of the complexity of the role (refer to Figure 7-2). In Figure 7.2, Goatham (2009) explicitly refers to the complexity of the role in terms of decisions, yet one sees that structures are designed in accordance with the work breakdown structure. In conclusion, the importance of conducting a job analysis, with the writing of a proper job description in accordance with the project complexity and size, is just not done.

7.5 HR management in the context of project execution (the projectised organisational design: PjMO, PgMO and PfMO)

7.5.1 The need for a Project Management Development Policy

To achieve a higher level of maturity and execute more complex projects, the organisation is required to continuously invest in the development of the skills and competencies of its project managers. For this reason, there should be a development policy for project managers. From the discussion in the various chapters thus far, it can be concluded that a development policy for ICT project managers should address the following:

- Project management development plans need to be linked to the overall business strategy, and be in parallel to HR planning and employment policies.
- A definite responsibility needs to be determined for the development of ICT project managers.
- The characteristics of an effective manager need to be defined.
- Project management competencies that are needed to execute the overall business objective need to be defined.
- The organisational culture needs to be analysed and sensitised as to the importance of the development of ICT project managers.

- Good communication needs to be established between the organisation's strategic managers and the project managers as far as they pertain to project management and project managers' development.
- Project management development must relate to the practical aspects of project execution, as opposed to the organisational views on project management development.
- The development plan must be flexible so that it can fulfil the needs of both the organisation and the individual.

The list above refers to both the acquisition of skills and competencies. As was seen in Chapter 3, there can be confusion regarding the true meaning of competence. With regard to this discussion, there is segregation between the outcomes of training and the gaining of competence. Training relates to skill, whereas development relates to competence.

As was stated in Chapter 4 and the legal framework within which project management training and development must be accomplished, the organisation needs to define the context of training and development, given the specific requirements of the country in which it resides. These frameworks, like in the South African situation, can determine the outcomes that need to be achieved. The frameworks (OFO, SAQA and NQF) also need to be considered from an organisational perspective.

Other than managing the team for the individual project, an organisational perspective to the development of project resources is also needed. This is a requirement in terms of NSDS III and the workplace skills development plan.

Given that an organisation has implemented the design as discussed in Chapter 6, the roles now have to be staffed. The point of departure for this staffing should be that the current incumbents of project management positions will need to form part of a skills audit. This skills audit needs to be executed in conjunction with the PgMO (refer to Chapter 6) and the HR manager of the organisation. Outflows of such a skills audit entail the following:

- An indication of the skills gap in the organisation (organisational need)
- Guidelines for training and development paths (maintenance/broadening of skills)
- Guidelines for the management of the career path (organisational career path planning and performance management)

7.5.2 An indication of the skills gap in the organisation

Before there can be any decision on training, the organisation needs to be aware of where it currently stands and where it wants to go in terms of being a mature projectised organisation. To understand the current situation, a skills audit needs to be conducted regarding project management employees, as well as other employees in the project management job family. Once the skills audit has been conducted, the current level of skills/competence can be analysed and compared with the standard that the organisation chooses to implement (refer to chapters 4 and 5). In accordance with the organisational design (refer to Chapter 6), the skills audit can also determine with whom and where the responsibility for the development of project management skills should reside (Watson, 2004).

A typical process of conducting a skills gap audit should have the following objectives:

- Determining the “as-is” situation
- Determining the “to-be” situation
- Deciding on interventions:
  - training interventions
  - development interventions
- Determining the professional bodies with whom accreditation would be done
- Determining the accredited training providers and institutions
- Determining the levels of qualifications at the various levels of occupational deployment, as well as organisational position levels (Eskom, 2007)

In terms of determining the training and development interventions, the introductory paragraphs need to be revisited, where the difference was identified in terms of a task view of project management vis-à-vis a decision view.

7.6 Best fit between organisational needs, individual needs, skills and resource requirements and relevant HR processes

Invariably, individuals and companies have needs and requirements, which form a symbiotic relationship that will allow both to function to satisfy their needs.

It becomes imperative that, from the onset of the recruitment of prospective project managers, the interdependencies in terms of organisational vs. individual needs are understood.

The individual brings to the organisation a set of skills, needs and requirements for which he or she expects to be remunerated. The organisation, on the other hand, offers the prospect of employment.

If the above two elements do not agree with each other, the result will be a high level of dissatisfaction and subsequent high staff turnover. Therefore, it is imperative that when the HR process of recruitment, selection and placement takes place, due cognisance is given to the needs of both the individual and the organisation, as dictated by the strategic intent of the business (Gerber, et al., 1996).

Figure 7-3 depicts the dynamics and interaction between the individual and the organisation in so far as it concerns skills and resource requirements and offerings (Gerber, et al., 1996).

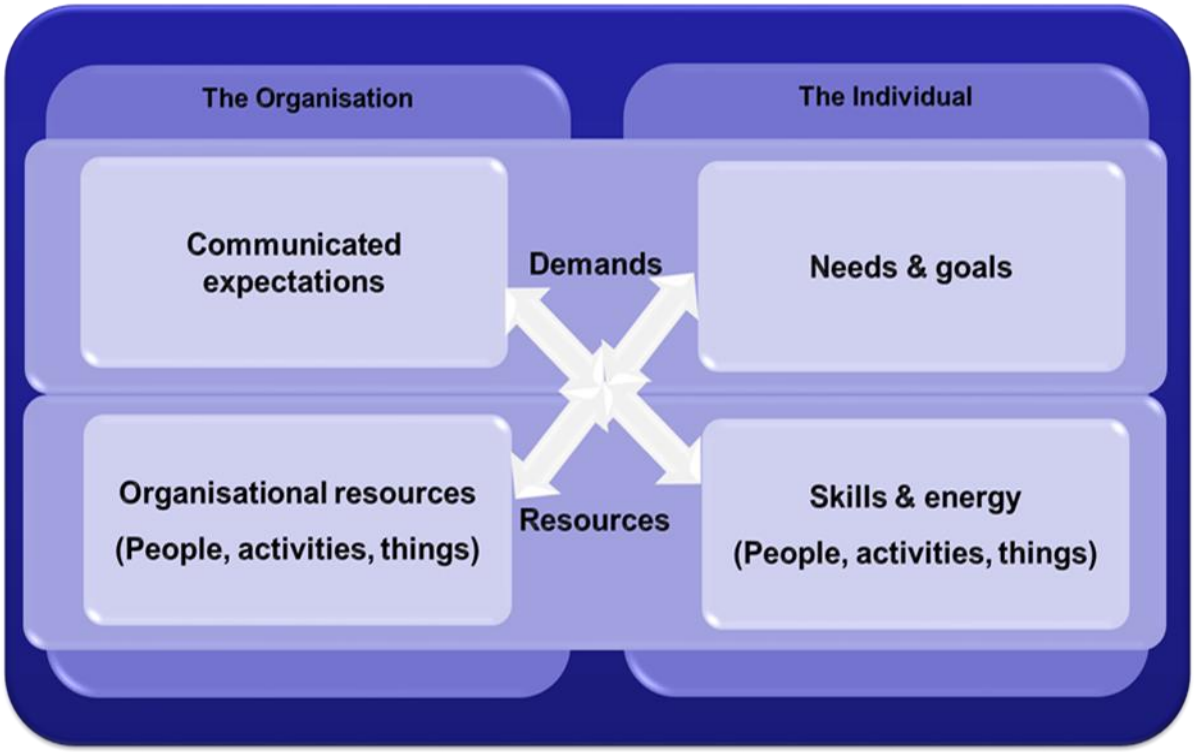


Figure 7-3: The dynamics of organisational and individual interaction

The following can be determined from Figure 7-3:

The arrows indicate the different requirements of the individuals and the organisation, thus tapping into common resources. The communicated expectations of the organisation make demands on the skills and energy of individuals, while the satisfaction of the individual's needs depends on the provision of certain resources by the organisation.

It follows that, for the relationship to be mutually beneficial, both parties need to

respond to mutual expectations and needs.

Further to the achievement of a best fit situation is the management of the skills base, and its migration through the organisation through time. It will become necessary to determine the composition of the project management skills base. The organisation thus needs to determine the following for project managers:

- Type of appointment
- Job family of appointment
- Level of appointment for new entrants
- Level of appointment for developing managers that join the organisation from outside
- The department that will carry the cost of developing or training project managers (Eskom, 2007)

For the maintenance and development of project managers as individuals, as required by the organisation, it is imperative that the organisation determines the requirements of skills for the future and communicates this to individuals, and that the individuals interested and involved in project management be aware of the requirements and demands of project management as a career.

In order to achieve the best fit of individuals to the job, and to achieve alignment to the governance framework of South African skills development, it is important to understand the work life of a project. For this reason, a job analysis will need to be conducted of the work on the project. This would entail considering the following:

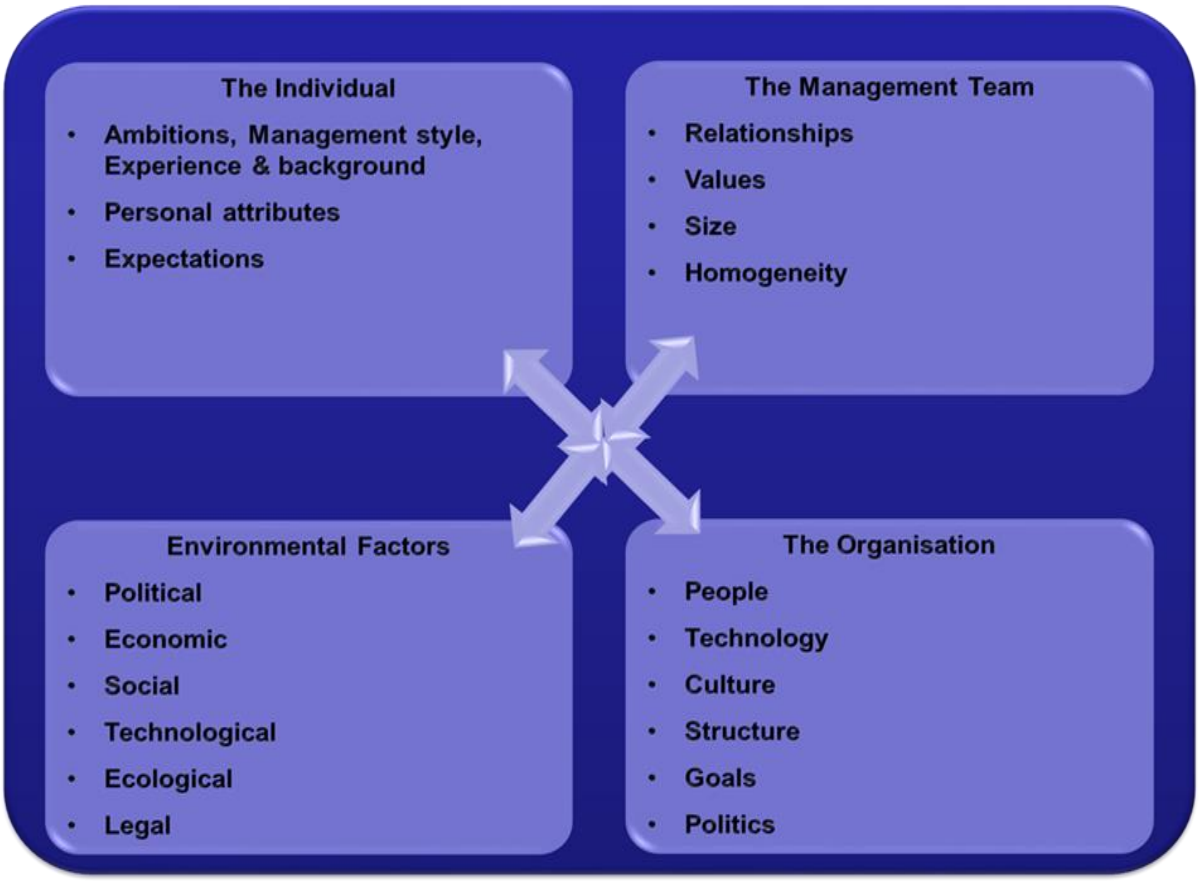
- Project size
- Project complexity
- Decision complexity vs task complexity
- The technical nature of the project
- Project organisational structure

This needs to be done to align the OFO with the ultimate writing of job profiles (Eskom, 2007).

7.6.1 Organisational needs and the needs of the individual

The outcomes of the skills gap audit should be used to determine the needs of the organisation on the one hand and the individuals on the other. The section that follows will elaborate on this aspect.

In Figure 7-4, one can see that there are three relationships between the organisation and the individual that affect the development of an individual, as well as



the ability of the organisation to attain maturity (Gerber, et al., 1996).

Figure 7-4: The individual, management, the environment and the organisation

From Figure 7-4, the following can be deduced:

The organisation should have clear guidelines in terms of its expectations (hence the need for the policy referred to above). Through employing organisational resources such as the structure (PgMO) and the people who fulfil roles in this location, the organisation will position itself to manage certain projects at certain levels of size and complexity. The organisation would also be required, through its policy, to organise occupations in terms of job families and prescribe the training content for ICT project managers. The organisation should consider the implications of an increase in complexity and align its prescribed training curricula accordingly.

On the other hand, the individual would like to better himself or herself in accordance with his or her needs and goals. Thus, he or she would expend a certain amount of

energy to be rewarded with a certain qualification, as well as job satisfaction, a promotion and career growth.

In this, one now finds a dilemma: in the absence of the policy that has already been discussed, and the defined job family, the individual undergoes project management training, misconstrued by public opinion. This would mostly entail a PMP qualification. However, as shown by Giamvalvo (2010) and Goatham (2009), this qualification does not equip project managers to handle complexity.

Thus, one sees that, within the current paradigm of project management training, if the organisation cannot determine the level of complexity within projects, and subsequently the content of the qualification, failure will prevail. One will end up with a situation of "qualified individuals" who cannot perform to the level of competence that is required by the complexities of the organisation. Thus, the training and development of the individual should:

- be based on the content of the job as per the job analysis;
- be commensurate with the level of complexity of the job and tasks;
- consider the level of maturity of the organisation; and
- consider the development need of the individual.

Having reached this conclusion, the following section references the work of Donald Super (2012), who studied the development of the careers of individuals. This discourse is included to show the importance of the developmental home, i.e. the job family, as well as to lead to the discussion regarding career management.

7.6.2 Organisational growth vs. career growth

The need to develop the career of a project manager needs to consider the fact that the project manager functions on the perimeter of the organisation, yet the appointment of a senior project manager for a complex project is political in nature. Considering this, it is imperative that the career development plan considers that the project manager needs to understand the political, as well as the business culture of the organisation. Here, the role and function of the project sponsor can be invaluable. The project sponsor should fulfil the role of a mentor to the project manager, and coach the project manager in the nuances of the company's culture (Eskom, 2007).

7.6.3 Career stages

Given the importance of career management to both parties in an employment

contract, cognisance needs to be given to the drivers of careers. It is thus important to obtain knowledge regarding the relationship between the natural developments of an individual vis-à-vis the development of the career. Super (2012) has mapped the career and life stages, which are presented in Figure 7-5 below.

Figure 7-5: Career and life stages chronological depiction

Figure 7-5 above shows:

- how an individual develops from a natural perspective as the progression through the stages of development culminate in reaching adulthood;
- how an individual undergoes career development phases in terms of work life; and
- that there is a similarity in terms of the natural development and the development of the work life.

Having gained this understanding of how an individual goes through life and career stages, the following deductions can be made:

- Few people choose project management as a primary career during adolescence and the establishment of their careers.

- It seems as if there is a trend for project management to become viable as a career only when the incumbent has reached a certain phase in his or her primary career.
- This may also be the reason why there are so many accidental project managers.

The following can then be argued:

- Project management construes a secondary career.
- There is a transition from technical job content to a focus on more contextual and behavioural aspects of work.
- There are incumbents with a high degree of technical knowledge regarding the area of the project, but with little competence in the aspects of management.

Graphically, what happens when an individual reaches “adulthood” in his or her career can be depicted in Figure 7-6 below.

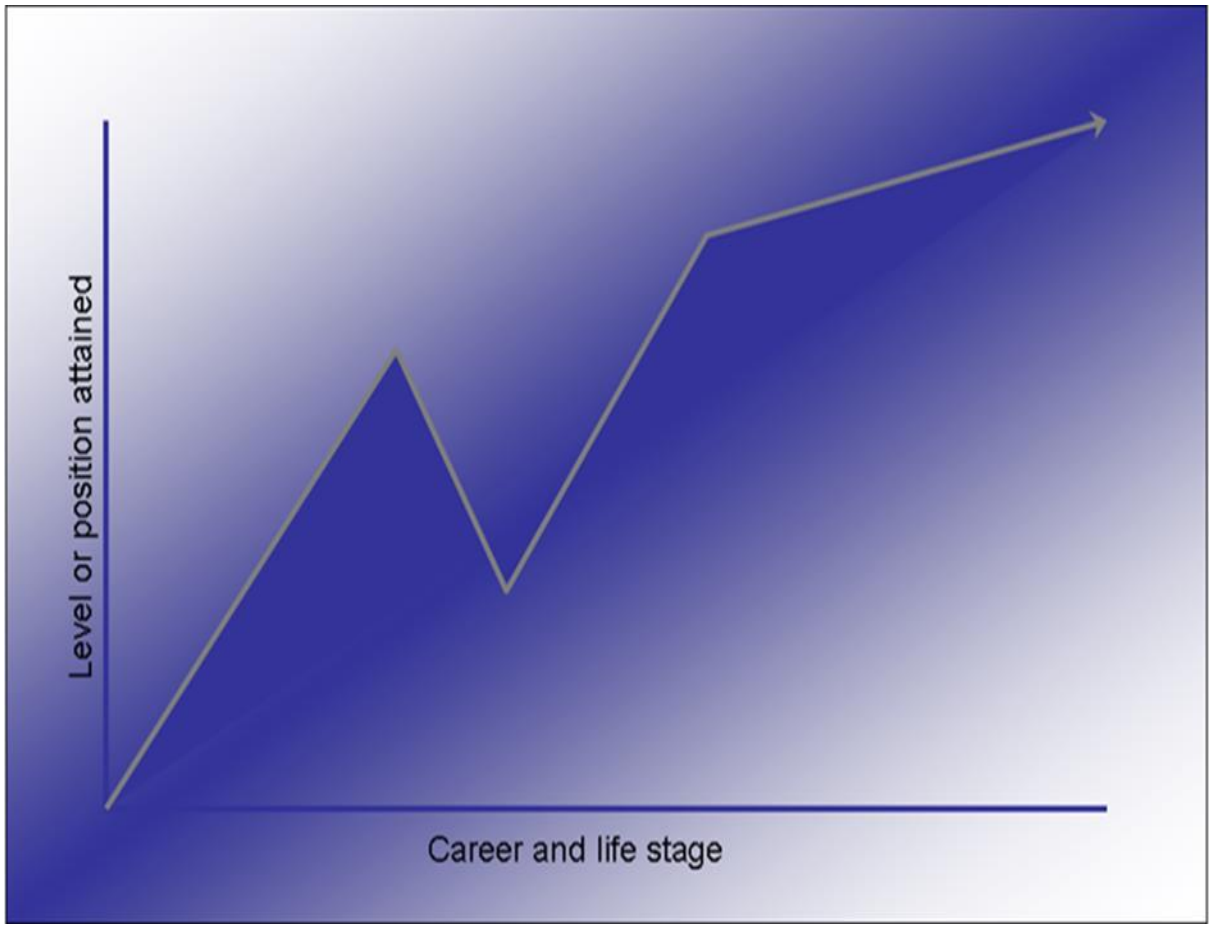


Figure 7-6: Graphic depiction of career and life stages

The following can be concluded:

- The most important decision a person must make is what career to follow, and this happens quite early on in life.

- At the life stage of making a primary career choice, the individual may not be emotionally mature enough to comprehend the implications of the choices. This may be the reason why so many people find themselves “stuck” in a career, or why they leave their primary career to follow a secondary career.

The various needs and the career and life stages of employees need to be considered in the design of career planning and development programmes. This is particularly important when considering the career of a project manager. It was stated above that project management constitutes a secondary career, or a branching out from a primary career.

The author therefore comes to the following conclusion: Individuals entering project management can be expected to be in the adulthood stage of their lives and in the advancement/maintenance stage of their careers. Coupled to the stages that can be expected from and inherent to project management is the level of emotional maturity that the individual has attained.

The nature of project management is such that the individual will be called on to draw on a magnitude of skills, and to apply those skills in a pressurised environment, thus drawing on emotional reserves. It is thus imperative that the selection of individuals to enter into project management as a career is done in accordance with their life stages and the corresponding stage of their primary career development stage.

7.7 Career management, career paths and occupations for project managers

In Chapter 3, it was seen that there is confusion about the use of the terms “occupation” vs “vocation”. The conclusion is that most project managers in the ICT domain end up managing projects by accident. Thus, with project management being an accidental career, what needs to happen in terms of the long-term sustainability and growth of maturity to develop this resource in the organisation?

Once the transition towards a secondary career has been made, an understanding is needed regarding what happens when the individual progresses through a series of jobs and positions while establishing his or her career and progression. A graphic depiction of this process can be seen in Figure 7-7.

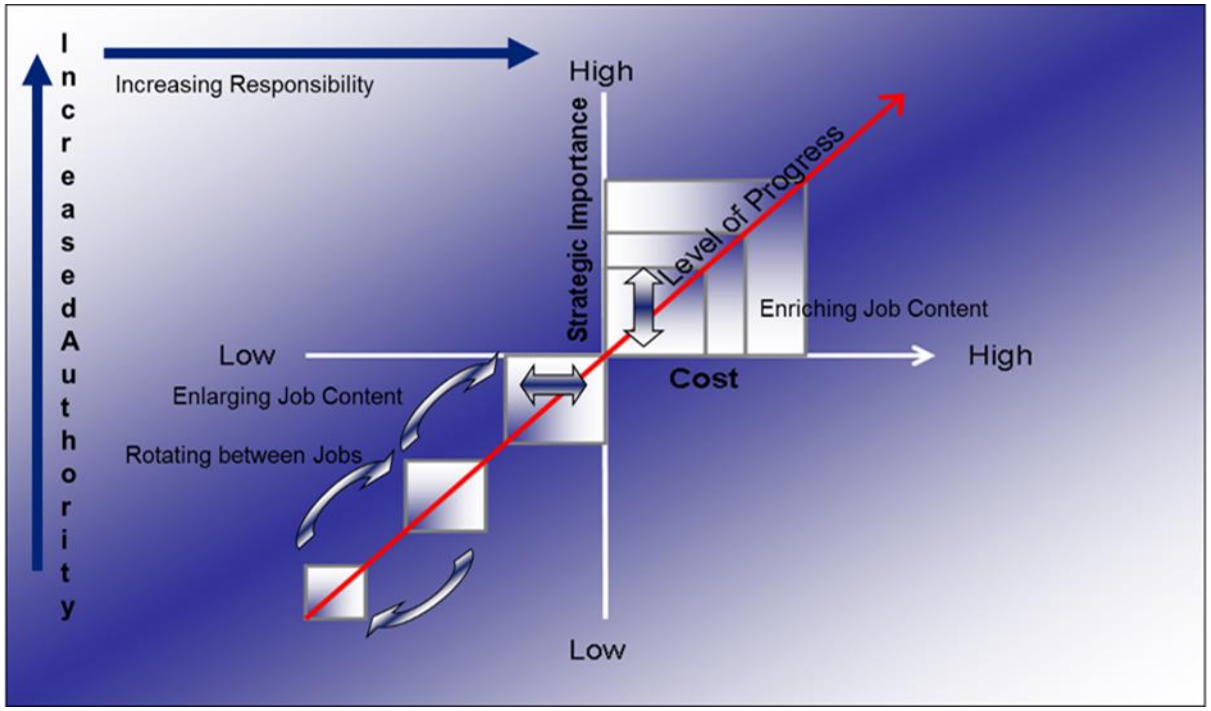


Figure 7-7: Career growth phases

From the figure above, one can see the following:

- Advancement would entail progressing to a position in which an individual can grow. This implies that two things can change: the level of authority with which the new position is endowed, and the level of responsibility that must be assumed.
- In order to grow towards higher levels of authority, an individual will require a broad level of exposure in the particular context of the work. Therefore, the incumbent will need to be exposed to as many of the aspects of the context of the new position as possible at lower levels of authority. This construes a process of job enlargement, and is the stage where knowledge is gained through the process of job rotation.

With reference to the project context, it would entail the incumbent acting in various capacities in non-complex projects, first as a team member, then as the team leader, and then as a member of the team concerned with a specific area. In short, job rotation should take place. This process establishes growth in the understanding of the job content.

In order to facilitate growth in the acceptance of responsibility, exposure is needed towards supervisory and managerial aspects within a certain position.[15] To improve the confidence level on which the growth can take place, it is necessary for the individual to undergo a deepening of knowledge regarding the job context. Thus, a process of job enrichment is needed.

The process through which job enlargement and job enrichment takes place needs a context of its own. This context would be the design of the projectised organisation, which would take place within the loci of the PjMO, PgMO and PfMO.

7.7.1 The importance of career management to employers and employees

In terms of the requirement for a workplace skills development plan, and to ensure that the organisation has a sufficient stream of sufficiently qualified and competent resources, the organisation needs to take a holistic view of the resources of the projectised organisation, and not just of staffing individual projects.

From an organisational perspective, the purpose of career management is to match the employee's needs, abilities and goals with the organisation's current or future needs. The objective is to ensure that the organisation places the right employee in the right place at the right time, and in so doing, offers the employee the opportunity of achieving personal fulfilment in his or her given career and occupation. Through achieving a match between the employee's needs and those of the organisation, the first step is to ensure a later match of the employee's potential with the job requirements. Therefore, there are a number of reasons why career management is important in organisations.

- Employees have become highly mobile, not only in a local context, but also in a global context.
- Employees, and especially younger professionals, want to have a measure of control over their career progression and inherent job satisfaction.
- Career management helps prevent obsolescence of employees' skills.
- Career management can help minimise the turnover of staff.
- A better fit between the individual's aptitudes and skills can be achieved by placing individuals in jobs that best suit their skills sets (Eskom, 2007).

[15] This construes the development part, and although there are courses that can endow the individual with knowledge regarding the theoretical aspects of management, good managers are groomed.

Career management thus integrates the objectives of the individual and the organisation to such an extent that both will gain. This results in an organisation staffed with committed employees who are well trained and contribute productively to the organisation.

7.7.2 Benefits of career management to the organisation

From an organisational perspective, the benefits of managing the careers of individuals are as follows:

- Staffing inventories can be maintained.
- Key positions can be filled from within.
- Staffing problems across business units and divisions can be solved internally.
- Employees' needs in terms of career development can be satisfied.
- Motivation of employees can be enhanced.
- The employment equity strategy of the business can be executed (Gerber, et al., 1995).

To achieve successful career management, the organisation must ensure that the following four elements are present:

- Diligent planning for career management
- Support from top management for career management
- The execution of career management in full
- A good career match between individual needs and those of the organisation (Gerber, et al., 1996)

7.7.3 Training, development and project management careers

In order to supply qualified and skilled personnel in the job family of project management, the training and development path and journey needs to be mapped. The elements and components of such a journey should include the following:

- Qualification requirements of the feeder career[16]
- Training requirements in terms of proprietary knowledge

[16] The split at the occupational level in the job family (those involved with project execution vs. those involved with technical support vs. those involved with administrative support).

- Needs in terms of further knowledge courses
- Practical skills course needs
- Software application courses
- Practical element training
- Registration requirements (Eskom, 2007)

As a point of departure for this section, Figure 7-8 gives a synopsis of the training environment as per the current qualifications offered by the various professional bodies.

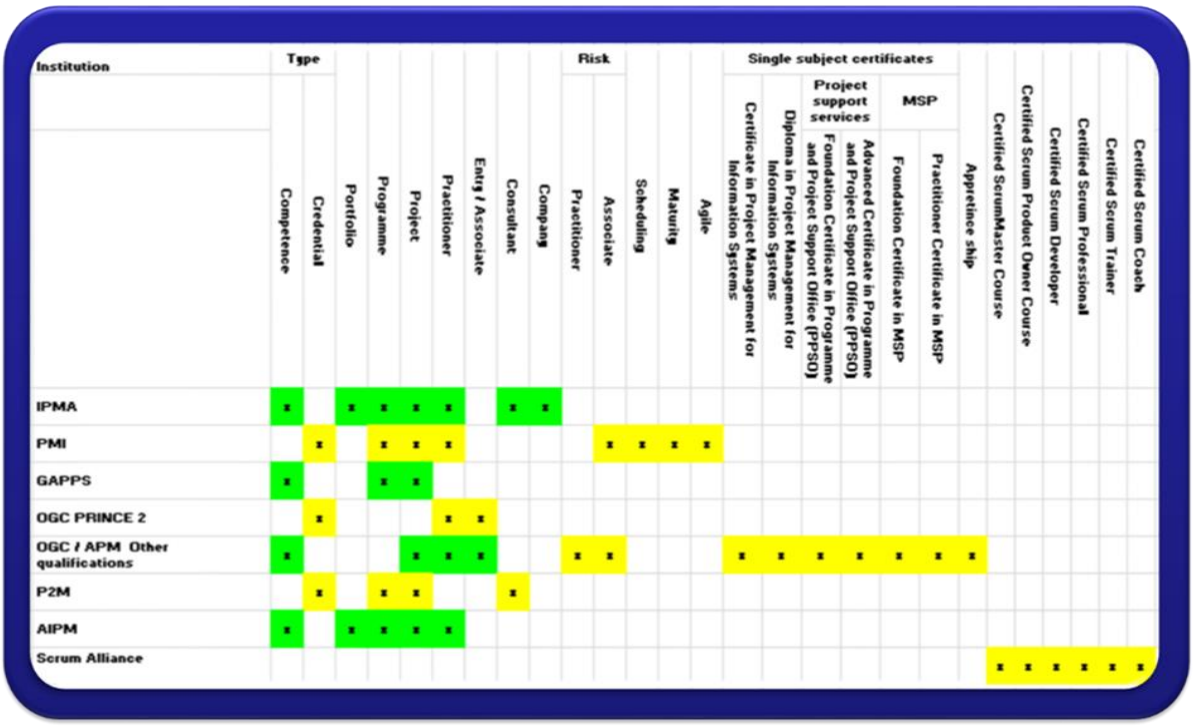


Figure 7-8: Project management training environment as per the current qualifications offered by the various professional bodies

From the discussion in section 3.2.3 regarding SAQA and NQF, one will recall that minimal reference was made to the input from professional bodies in the NQF. An analysis of the NQF revealed the level and content of project management qualifications in that framework. The level of qualifications was no higher than a diploma level.

As was shown in section 7.6.3, particularly in Figure 7-5, an individual is faced with life and career choices at a stage when there is little life stage maturity. This is important to note. Arras People (2002) states that there would be no right or wrong entry avenue or time scale for a career in project management.

7.7.4 Project managers' career development

Project management is slowly becoming a career of choice, where students can take a degree in the subject and actively pursue a career as a project management professional straight out of university or college. For many years, and indeed if you ask many of the professionals who work in this field how they came to work in project management, many will tell you that it was accidental, that they were in the right place at the right time when a project needed managing in their company and there was no-one else available to manage it (Cottrell, et al., 2013).[17]

At the organisation level, projects are tied to the organisation's strategy and hence, sustainability (Ohara, 2003). On the individual level, there is a need for meaningful employment. In this regard, on a continuum of career interest, an individual can view work as "just a job" on the one end, or as a career on the other end of the continuum. In an organisational context, it should be imperative to give attention to the career end of the spectrum. For this reason, the following clarification of terms is necessary (Cottrell, et al., 2013):

- Career: A sequence of jobs held during a person's working life. This succession can entail a hierarchy of levels or degrees of difficulty, responsibility and status being attained.
- Career management: The process of designing and implementing goals, plans and strategies that enables HR professionals and managers to satisfy workforce needs and allows individuals to achieve their career objectives.
- Individual career planning: The process whereby each employee personally plans career goals.
- Organisational career planning: The process whereby management plans career goals for employees.
- Career path (organisational perspective): Flexible lines of progression through which an employee typically moves in his or her career. By following an established career path, the individual participates in career development, with the organisation's assistance.

[17] This was stated on the Arras People website, but was not found to be true in the South African context in terms of the SAQA framework. There the project management qualifications were still only at a diploma level. Most of the professional bodies' qualifications also depend on a primary qualification being attained first.

- Career development: A formal approach taken by an organisation to ensure that employees with proper qualifications and experience are available when they are needed by the organisation.
- Succession planning: Through tracking the stages of the careers of various individuals, timeous decisions can be implemented to retain a critical mass of knowledge when individuals leave the organisation. Proper succession planning can also smooth the transition for the organisation of one individual leaving the service, and another having to take over the roles and responsibilities (Cottrell, et al., 2013).

In its endeavour to define a career path through which to develop project management skills and competencies, the organisation's focus should be on developing performance criteria that focus on threshold performance (this became evident in the discussion of the importance of the job analysis). Threshold performance can be defined as the demonstration of the ability to do something at a standard considered to be acceptable in the workplace. Following on the definition of threshold performance is a definition of performance criteria, i.e. a set of criteria that defines the minimum level of performance required. This is followed by a determination of the areas of competence that a project manager should possess. (Refer to the discussion on competence frameworks, i.e. GAPPS, IPMA and AIPM in section 4.3.4)

The project management career path is not necessarily a straight road from project support to project management, and then upwards to programme management and portfolio management. Project management professionals all over the world take different routes as they climb the ladder. In fact, many project managers are happy not to climb the ladder to senior management, as it takes them away from doing the things they love: the hands-on management and delivery of projects (Cottrell, et al., 2013).

To facilitate building the framework, as stated in the research aim, it is imperative to look at some of the roles available in project management, some proposed routes along the project management career path, and some hints and tips to help navigate the path (Cottrell, et al., 2013).

On the website of Arras People (2011), the most comprehensive information was found on the career management of ICT project management individuals. The source stated that an individual has three avenues towards a career in project management:

- The project organisational path
- The project support path
- The assistant project manager path

The project organisation path

> *The entry avenue for individuals with a project mind-set is to start off in an entry career framed in the context of project management. This avenue would entail that individuals seek projectised organisations and start their working life there. Seeing that the context is projects, much of the job content will entail an introduction to concepts that prevail, and which would define the roles and ultimately the job content* (Arras People, 2002).

The project support path

In the discussion on the projectised organisational design, it became evident that there would be opportunities for roles to be defined where the contribution would entail rendering support to the project (refer to the discussion on the PO, PjMO and PgMO in Chapter 6). Examples of such roles are those of project administrator, project assistant, project support officer and project coordinator or project management support (Arras People, 2002).

> *As the possible job titles suggest, the roles would entail rendering support to the projects, thus supporting the project manager and project team in all areas of project-based administration. At this level, there would be a combination of general administrative tasks with those specific to project management* (Arras People, 2002).

As indicated by Arras People (2002), the role of project support can be seen as an entry level position. However, there is a caveat to consider. As maturity, complexity and task density regarding projects and project management in an organisation grow, the project support roles can become an occupation and a career in itself (Arras People, 2002).

The assistant project manager path

> *The third route towards entry into project management as a career for young individuals would entail that a position be secured in a junior execution capacity on a project. Roles that would be in this category would be designated as "junior" or "assistant". This avenue would be more suited for individuals already holding a certain level of qualification in project management and would be considered to be at the novice state of competence. As the designation determines, there is a much closer link to the project manager charged with actual product/service delivery and work would be executed under guidance and direction of a more senior manager* (Arras People, 2002).

Arras People (2002) further elaborates on career growth and maintenance. It states that the next stages in an individual's project management career path would entail growth into roles and positions such as the project support plus path. This path entails the development of competencies to handle greater complexity and task density in terms of project administration. The term administration should not lull one into a false sense of security, as it means that the permanent organisation has become projectised and would have permanent structures in terms of the locus, focus and function definitions of the roles in its organisational design. The roles in the project support plus path would typically include the following:

- Project analyst and project coordinator: these titles indicate a senior level of support to one large project.
- Programme coordinator and programme analyst: these titles indicate support of a programme of projects.
- PgMO: this title and any succeeding words to this title indicate working within a programme or project office function (Arras People, 2002).

From where these roles would be located (location in terms of organisational design, and not just the positional demarcation in terms of an organigram), one can see that each of these roles would require growth in terms of skill, knowledge and ultimately competence in programme and project management. The level of knowledge would have deepened and experiences would have to be at an in-depth level. The scope of the experience would have to include process, control and methodologies. It can thus be seen that, in a project execution career, the content does not necessarily have to be the execution of the project through active participation in the execution team, but

a separate career can be built in terms of project administration and support.

Instances can also be found where projects are so large and complex that they would require specialist support in terms of the areas of knowledge stated in the *ISO 21500 Standard*, *APMBOK* and *PMBOK® Guide*. In such instances, the following would be true:

- There are those who support through their contribution (planners, schedulers, risk managers, quality managers).
- There are those who contribute through their support (the administrative function).

One can conclude from Arras People (2002) that there is an underlying hint of the definition of a job family in terms of its view of the development of project management resources. It was clear that there would be a definition of the context of the work to be done, a subsequent determination of roles and functions and the demarcation of the job content. One needs to bear in mind that the context of work for projectised personnel would be the project execution domain, and whether the support is in terms of the contribution or whether the contribution is through the support, all would have to belong to the project management job family.

7.7.5 Examples of career paths

There are various ways to portray the progression of an individual through positions, roles and responsibilities in an organisation. It speaks for itself that at each new level attained, there should be an addition of skills, knowledge and competence (refer to Figure 7-7). All of the major professional bodies (IPMA, PMI, APM and AIPM) depict possible career paths. However, the most comprehensive and specific example of a career path that was found was on the website of BCS, the chartered institute for IT professionals (BCS, 2014). This source provides a contextual framework for development, as well as examples of project, programme and project support career paths. The website states that a project support career path is available. However, this could not be found. Nonetheless, this source came the closest to defining developmental paths, commensurate qualification levels and avenues of job succession for ICT project managers. The examples that were obtained are provided in Figure 7-9 and Figure 7-10 (BCS, 2014).

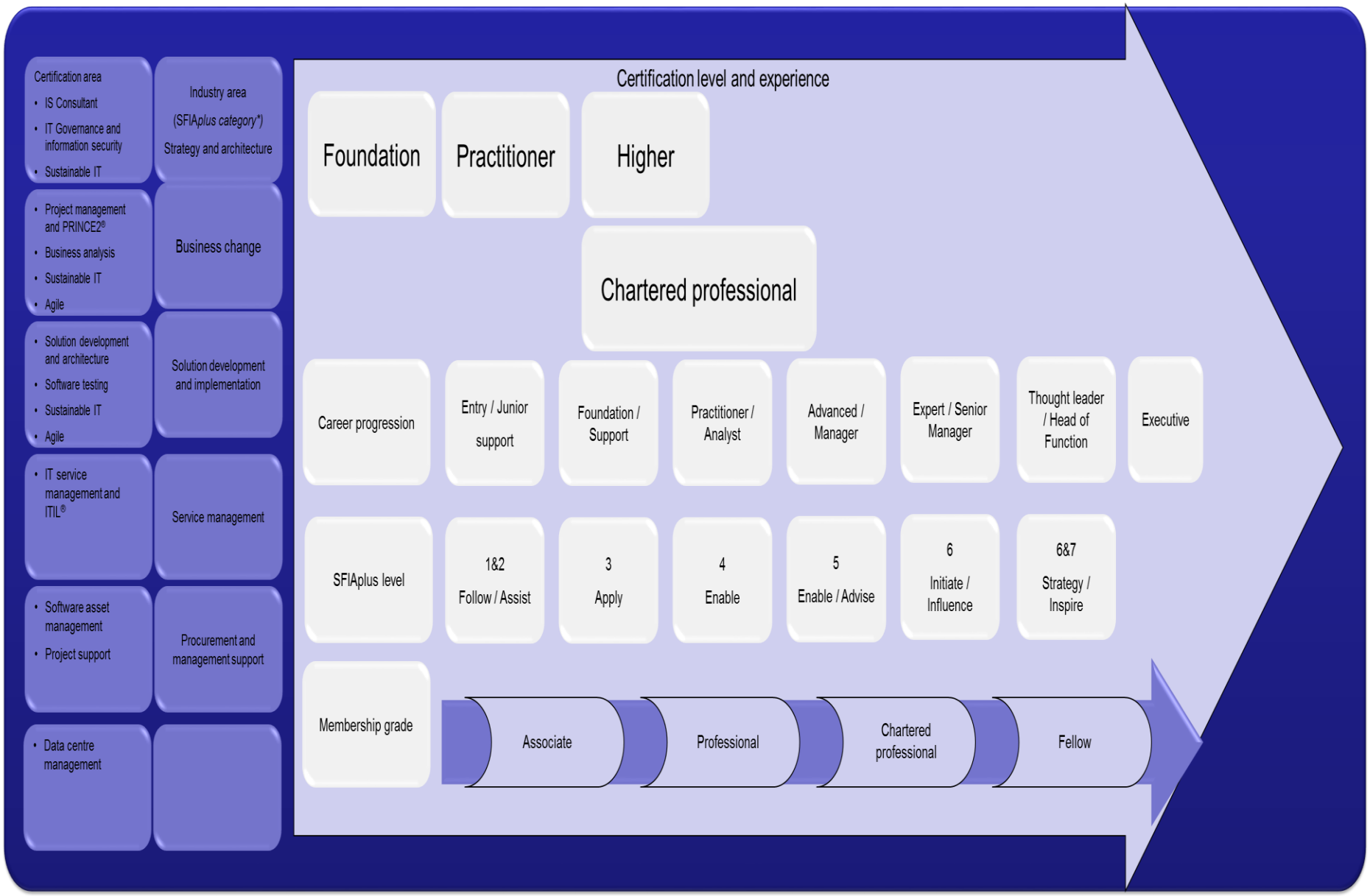


Figure 7-9: ICT managers' career framework

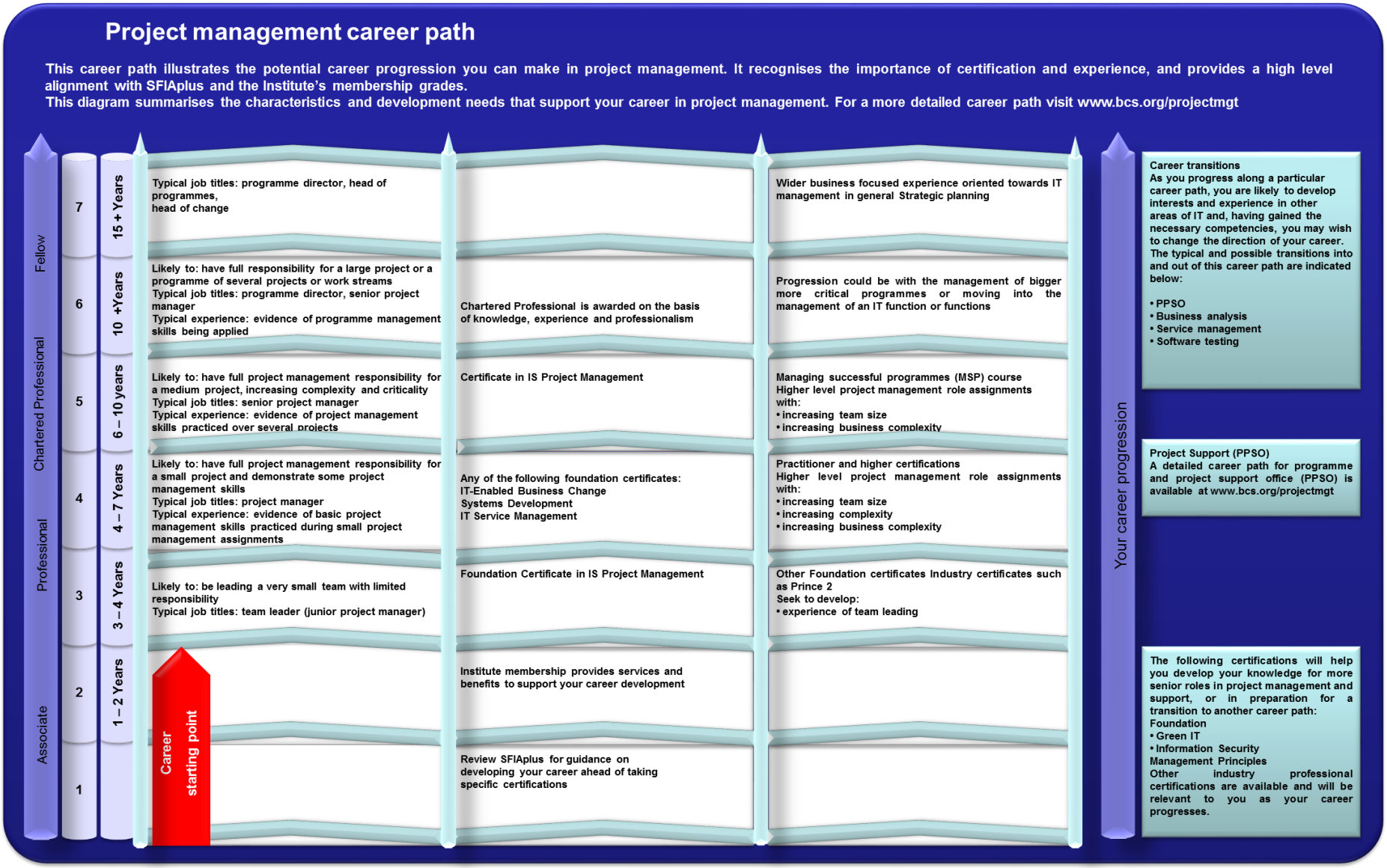


Figure 7-10: Project management career path

The importance given by the professional bodies, as well as BCS, regarding career paths leads to the following conclusion:

A well-defined career path is necessary for the development of competence in ICT project management.

Cognisance has to be taken of the fact that a career as an ICT project manager would be considered a secondary career; hence it is important to note the work of Donald Super (2012) again, as depicted in Figure 7-5 and Figure 7-6, which shows how individuals make career choices.

7.7.6 Performance evaluation and appraisal

In terms of the assessment of an individual, the team and the overall project success, it is imperative that a standard is developed that will assess the competencies of the individual, which not only ties back to his or her remuneration, but also identifies areas or gaps in his or her skills make-up and gaps in terms of training (refer to the discussion on the importance of the job analysis in section 7.4.1).

For this reason, both the GAPPS (Global Alliance for Project Performance Standards, 2013) and the APM Standards (Association for Project Management (APM), 2008) give measures according to which the performance of a particular individual can be measured.

The aim of measuring performance would be to ascertain the level of individual's proficiency. To this avail, it is important to know which areas need measurement. Mention will therefore be made of the different competence measurement frameworks as performance-based standards and attribute-based standards.

- **Performance-based standards**

  The outcomes of work and performance levels are identified and assessed.

- **Attribute-based standards**

  Attributes refer to personal attributes and other characteristics that are identified and assessed. Competence is then inferred based on the presence and prevalence of these attributes.

With regard to this chapter's objectives and the stage reached at this point, it is necessary to show how this will contribute to the development of the envisioned

framework. For this reason, the next level of the stratified framework can now be added. This addition is shown in Figure 7-11 below.

Figure 7-11: Addition of the HR management component to the model

7.8 The job family: Bringing it together

The graphic depiction of what a job family entails has been revealed as an underlying concept for discussion (refer to Figure 1-2). It would, however, be insufficient to conduct a discussion towards the conclusion of this thesis and not show a variant of this graphic again. Figure 7-12 below contextualises the interpretation of the information presented.

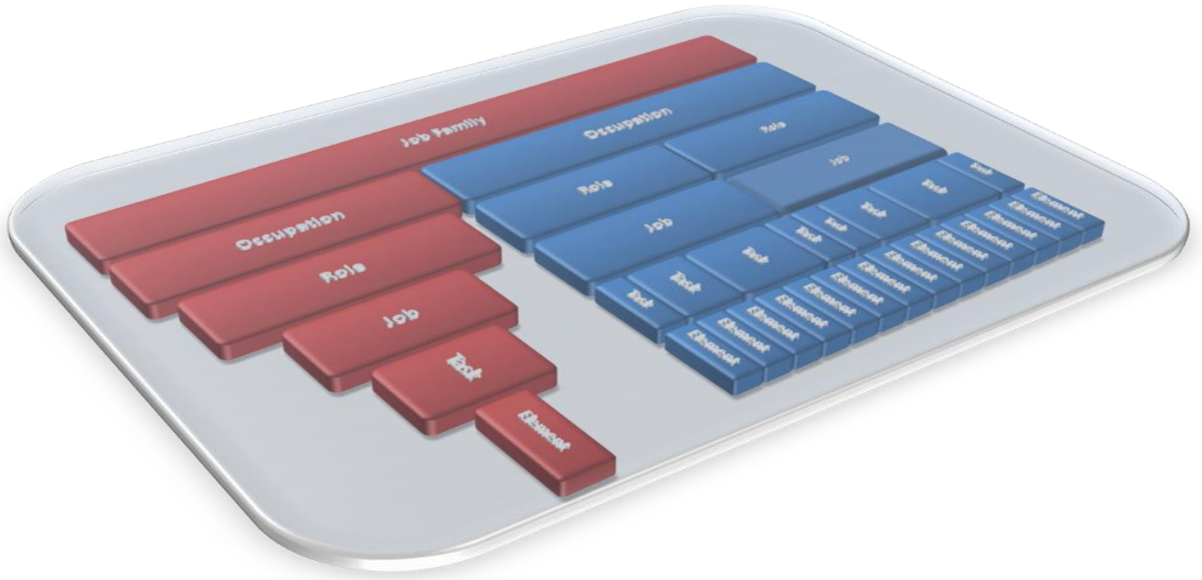


Figure 7-12: Graphic depiction of the concept of a job family

7.8.1 Why job families?

The most prominent information regarding the implementation of a job family was found on the official websites of the University of Nebraska-Lincoln (2014), the University of Auburn (n.d) and the Massachusetts Institute of Technology (MIT).

In other instances where a similar concept was inferred, the term job clusters was used.

MIT (n.d) states that certain aspects of the job family need to be considered.

- Some job families include more jobs than others, and those with many jobs may have speciality areas.
- In all cases, a job can only reside in one job family. However, jobs in a job family may not be unique to just one department, laboratory or centre; they may reside in the same department or in different departments across the institution (Massachusetts Institute of Technology (MIT), n.d).

According to University of Nebraska-Lincoln (2014), the definition of a job family entails the following:

> *Groupings of jobs related by common vocations/professions. Accordingly, they have many similarities.*

Jobs in a job family are similar in that they:

- require similar knowledge, skills and abilities (competencies);
- have a continuum of knowledge, skills and abilities that represent a career path from the lowest to the highest job level;
- possess associated and related key behaviours; and
- have similar market competitive pay characteristics and conditions (University of Nebraska-Lincoln, 2014).

The following section will highlight the most important aspects of the job family as implemented at the mentioned universities. The discussion will focus on the relevance of the concept in alleviating problems with ICT project managers' training and development. Conclusions will be drawn to see whether this concept would help to alleviate the problem of failing projects due to the lack of the development of incumbents in project management positions.

The job family comprises jobs that share a common context, which would involve work of the same nature, but can often require different levels of skills and

responsibility. For example, it would be common to find an accountant in the financial management job family. At the entry level would be incumbents who have only recently graduated, with little experience, a low level of skill, and in need of development. The level of responsibility carried by such a position would be low and work would be done under supervision. On the other side of the spectrum, an accountant would be a senior position. This person would have many years of experience with skills and competencies that would be exemplary; he or she would also be endowed with a high measure of responsibility. From this example, it is clear that, in both instances, one is looking at the position of an accountant, but that the intrinsic value of these individuals' contributions, as well as the market value of their remuneration, would differ (University of Auburn, n.d).

7.8.2 The purpose and advantages of job families

According to MIT (n.d), knowledge regarding the purpose and use of a job family in managing the careers of ICT project managers is useful for the following reasons:

- It is used to define career development opportunities for staff within a current or other job family.
- It is used to facilitate career planning discussions, clarify the need for specific training, and assist staff members considering course enrolment and career advancement.
- It is used in compliance reporting for mandated affirmative action reporting, job applicant tracking and associated data analysis.
- It is used to obtain accurate market pricing through a greater understanding of job content and job requirements.
- It is used to ensure greater consistency in job evaluations through the comparison of similar jobs within the same job family.
- The Compensation Office can use job family information to assist department managers with questions regarding internal equity and/or external competitiveness.

Furthermore, the University of Auburn (n.d) states that job families are useful to:

- improve competencies of the workforce through better selection and placement;
- increase training and development participation;
- increase the retention of competent employees;
- improve individual performance and contributions;

- provide flexibility to line managers in staffing decisions; and
- provide flexibility to line managers when assigning job duties.

Table 7-4 gives a summary as obtained from the website of the University of Auburn (n.d), where it is shown that certain aspects and elements of HR management are enhanced and facilitated when the concept of a job family is used.

Table 7-4: Aspects and elements that are facilitated through the use of a job family

Aspect	Description
General characteristics	Job families are designed to take advantage of successful HR practices such as the following: • Generalised job descriptions • Broad salary structures, grades and bands within an occupation • Flatter organisational structures • Competency/skill-based remuneration management • Comprehensive management of positions • Decentralised decisions regarding position classification • Greater emphasis on individual development
Key elements of job families	The implementation of a job family and its key elements facilitate the assignment and promotion of personnel to a level within the job family through: • Promotions and advancements being based on identified competencies and needs of the department • Promotions and advancements being based on supervisor recommendation and/or committee review • Promotions and advancements being based on a standardised procedure for all incumbents of positions within the projectised structure
Defining job family levels	Job families function to provide both a structure for departmental HR decisions and a career ladder by which an employee may plan his or her professional growth and advancement. A job description for a job within a job family describes, in broad terms, the duties and responsibilities one would be expected to perform at the various levels within a job family. The levels within a job family are defined more on the competencies expected of the employee than a list of specific tasks and responsibilities. The number of levels for a job family is determined by the value of the job in the marketplace and to the

Aspect	Description
	organisation. When recruiting for a position within a job family, the supervisor may recruit for a broad skill set ranging across several levels of a job family and then assign the specific level based on the competency of the selected candidate. Promotions of individuals within a job family are tied to demonstrated competencies and performance, the completion of individual development activities and the needs of the department. Supervisors of employees in a job family have the primary responsibility for deciding on the level of the job family assigned to an individual. The placement of an individual at a particular level within a job family depends on the competencies of the individual, the level of responsibility and the needs of the department. However, employees in a job family are also empowered because promotions focus on individual performance, development and training based on the competencies established for each level.
Determining salary grade levels	The assignment of an employee to a particular grade level in a job family is based on the competencies identified for each level. For example, entry level positions are characterised by more routine work under close supervision. However, at the mid-range or intermediate levels, positions follow established guidelines, but work under more general supervision. Finally, at the advanced level, incumbents work independently and, in some cases, lead projects or work in their area. The job description for a job within a job family has “job family levelling guidelines” that provide descriptions of the responsibilities, knowledge, education and experience required for each level of the job family. These “levelling guidelines” provide a broad description of the requirements of each level and are designed to assist a supervisor in determining the appropriate level for an employee.
Performance standards	Performance standards within a department or the projectised organisation can be standardised as they would: • focus on individual competencies and the acquisition of new competencies; • focus on contributions to the team, departmental image and service; and • be required to be met or exceeded to qualify for promotion to a higher level.
Promotional opportunities	The institution of a job family would ensure fair promotional opportunities because: • promotional opportunities become non-competitive; • promotional opportunities must be initiated by a supervisor, based on organisational objectives;

Aspect	Description
	• promotional opportunities are based on recognised increases in job responsibilities, competencies and quality of performance; • promotional opportunities are based on the completion of development plans, assigned training and/or time in service; and • promotional opportunities are only considered and approved during the annual job family promotion cycle.
Development and training opportunities	The institution of a job family would facilitate development and training opportunities because: • a review of the positions and their training needs would have to be done and identified by the supervisor as part of the annual performance review cycle; • they are based on competencies established for each level; and • they may include job enrichment activities, job rotation, and in-house, on-the-job and external sources.
Job family training and development	The goal of development programmes is to define the quantity, content and sources of accessible programmes, which enable employees to fulfil competency expectations of the job family, while allowing supervisors maximum flexibility in managing staff training.
Job-specific development	Such programmes do not necessarily require a lock-step training sequence per level. Development programmes should be designed to promote an employee's career objective and fulfil annual training and development activities, which supervisors are expected to assign and employees are expected to fulfil in order to qualify for future promotions within the job family. Additional expectations of professional and service activities, certifications, etc. may be assigned to the employee by the supervisor as the employee progresses to the upper levels of the job family.
General professional development	Under the category of general professional development, the HR Development Office offers training activities that stress the continuing development of HR-related skills and abilities that are of major importance in job effectiveness, focusing on the following categories: communications, leadership, service, teamwork and process improvement. The supervisor should assess the employee's proficiency in each category to determine development priorities. The existing curriculum of the permanent organisation should offer courses in a broad range of programmes in these categories. As the employee completes all appropriate internal training courses, the supervisor should substitute content from other sources to provide continuing development in these categories throughout the employee's career. Areas of focus could include the same categories of communications,

Aspect	Description
	leadership, service, teamwork and process improvement.
Unit, job-specific and/or technical training	Through having a specialised group of people whose job content draws on the same context, job-specific and technical training can more easily be designed to improve an employee's technical or professional knowledge for his or her specific job. Areas of focus could include the following: • Office administration courses • ICT courses • Self-directed courses • External training providers – project management-specific courses or qualifications • Online sources • Training certifications (as identified for advanced-level positions) • Major disciplinary certifications
Professional development	Participation in appropriate professional activities enhances professional expertise and fosters an environment that promotes continued learning and improvement. Areas of focus could include the following: • Annual regional/national organisational participation (conferences, committees, presentations, papers) • Organisational service (committees, task forces, advisory teams)

Table 7-4 is comprehensive, but the aspect column and the references to competence in the description column are especially important.

The concept as implemented at the University of Auburn (n.d) shows that it forces the organisation to deliberately think about the development of its staff and does not allow it to happen haphazardly. It also shows that the structured approach creates the developmental home for jobs and occupations that share the same context of work, i.e. projects in their broadest sense. It illustrates the fact that career pathing can happen in a structured way and that the responsibility for progression is shared between the incumbent of a position and the specific manager.

As a last word, it is necessary to caution that not all jobs can be categorised in terms of the job family concept. The reason for this is that some jobs consist of much repetitive routine work. Others require candidates to have extensive experience and specific competencies or credentials prior to being placed into the job. The value of such jobs is typically more narrowly defined; therefore, such jobs are not placed into a job family (HR-Guide.com, 2001).

The next section of the discussion of the concept of the job family will conclude with a definition of the ICT project management job family. The definition will take the form of a genealogical perspective.

7.8.3 The definition of the project management job family: A genealogical perspective

From the onset of the research, the concept of the job family was introduced. It formed the backdrop to the aim and objectives of the research, and will be the last component to be added to the stratified framework.

As has been seen in Table 7-4, the concept can be implemented and brings definite advantages. This was shown from a pure academic perspective. As the word “family” refers to genealogy, it was interesting to see whether the “family” can be drawn in the form of a family tree. Through various discussions with colleagues, an effort was made to accomplish this. What is given in Figure 7-13 constitutes the genealogical perspective to the career management concept, otherwise known as the job family.

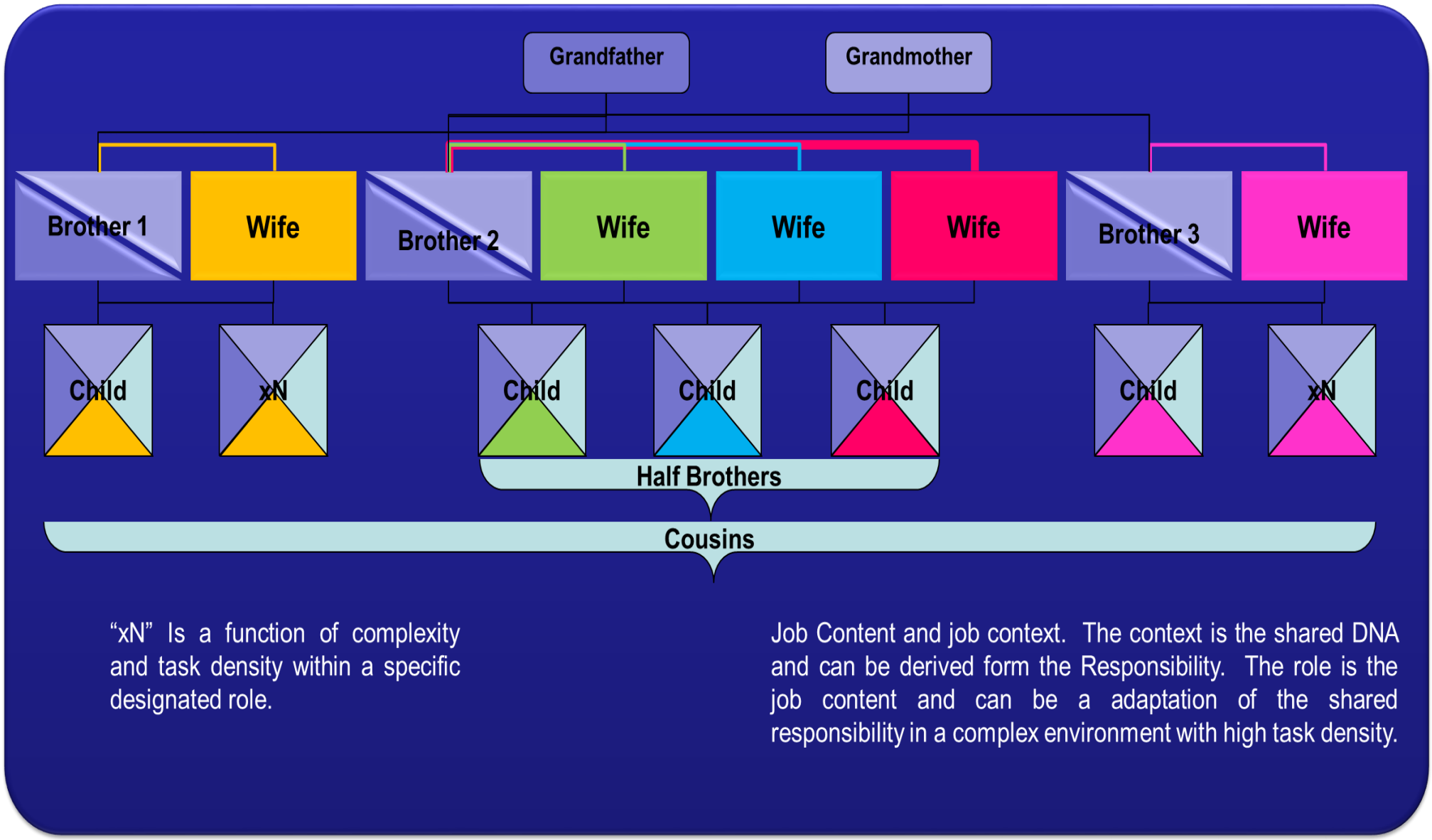


Figure 7-13: A genealogical perspective of the job family

With reference to Figure 7-13, the following can be stated:

The family originates with the grandfather and grandmother, as shown in the dark blue and lighter blue shapes. These two people then have three male children or brothers. These brothers share 50% of their father's DNA, as well as 50% of their mother's DNA, hence brother 1, brother 2 and brother 3 are a combination of the dark blue of the grandfather and the lighter blue of the grandmother. In terms of the offspring of the brothers, the combined blue triangle denotes the DNA from the father's side. The two differently coloured triangles denote the DNA contribution from the spouse's side, being the respective mothers of the brothers' offspring. The DNA contribution from the respective brothers, denotes the commonality in the work context, thus it carries the family surname and is the root of the job family.

The first brother carries the job context in his DNA from his father. When he marries, his children will inherit part of this DNA, but his wife (the children's mother) will also contribute to the child's DNA. The mother of the first grandchild carries the content of project administration in her DNA. The same holds true for the second brother and his wife, except that, at the grandchild level, there would be a DNA contribution of project support due to the mother's contribution.

The third brother complicates the argument. Over a period of time, he has had three wives, each giving birth to a child. Thus, the three children of the third brother share only their father's DNA, but all have different DNA from their mothers. It is suggested that the first mother carries the DNA of project management, the second that of programme management and the third that of portfolio management. It now follows that all of the third child's children are grandchildren of the grandfather and that their DNA contains the contextual element, but they all differ in terms of content. Thus, at the sibling level, they are different from each other due to them being only half-brothers.

A very interesting phenomenon now occurs. When all of the grandchildren are viewed from the perspective of being cousins, through the contributed DNA of their grandfather, they share just as strong a bond between them as their half-brothers do.

In conclusion, it is at the level of the cousins that the occupational level of the job family crystallises. They all share the same job context, but differ in terms of job content and contribution.

To a certain extent, this explanation may seem comical, but it explains what happens with an increase in project complexity, task density and maturity of the projectised organisation. All of these would require the grandchildren to reproduce, hence enlarging the contextual pool of DNA, as well as giving more definition in terms of added content, which would be contributed through their wives. Thus, the structure would at the same time grow deeper and wider as more children (jobs that are defined in a more complex way and with higher task densities) are added.

In the instance of the aim and objectives of the research, the final addition to the stratified framework would be the addition of the job family. This is depicted in Figure 7-14 below.

Figure 7-14: Addition of the job family to the framework

7.9 Conclusion

Career choices take place in accordance with the life stage that the individual has achieved, as well as the relevant level attained. In ICT project management, one sees that most of the entrants to the career path would be at the level where the individual feels as if he or she has reached a plateau, or even a depression in his or her first career, and then makes the transition to project management.

In addition to just a succession of positions, one needs to see what actually happens when an individual goes through transitions in his or her career. In essence, there are two things that change: authority and responsibility. In a well-constructed career path, the growth in terms of increased authority and responsibility can be facilitated

through HR management techniques, such as job enlargement, job rotation and job enrichment.

One can see that, in terms of project managers' development, it is important that a career path is designed. It is within this career path that the development and pipelining of future ICT project managers should take place, and not as stated in the bodies of knowledge that training should only happen on the individual project levels.

The concept of the job family can make an important contribution to a better outcome when ICT project managers' careers are planned. Thus, better planning from the organisation's perspective, as well as the development of competence from the employee's perspective can contribute to better success rates in project execution.

This chapter contributed two layers to the final stratified framework: that of HR management in the projectised organisation, as well as the final addition of the job family. The total contribution is given in Figure 7-15 below.

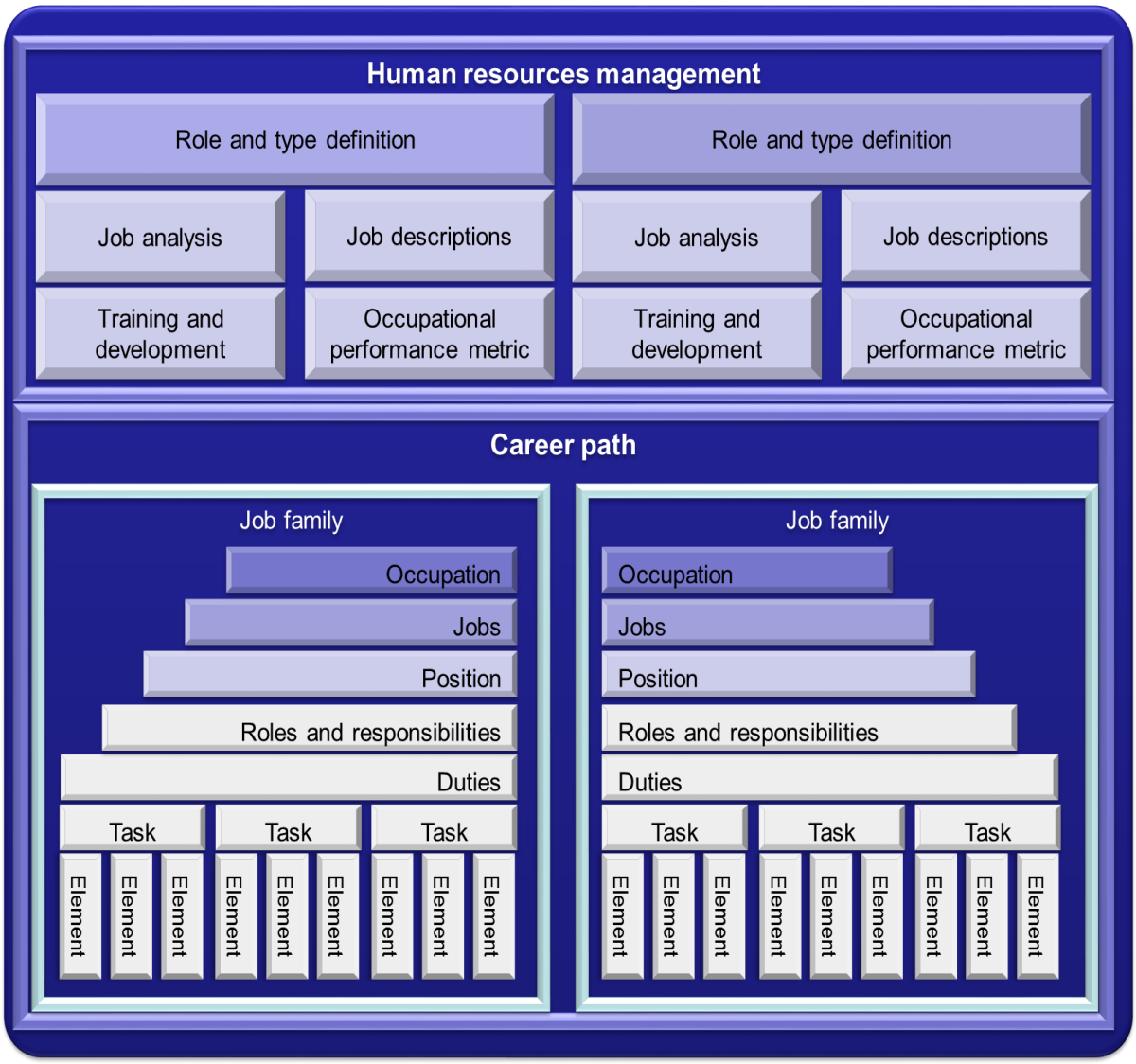
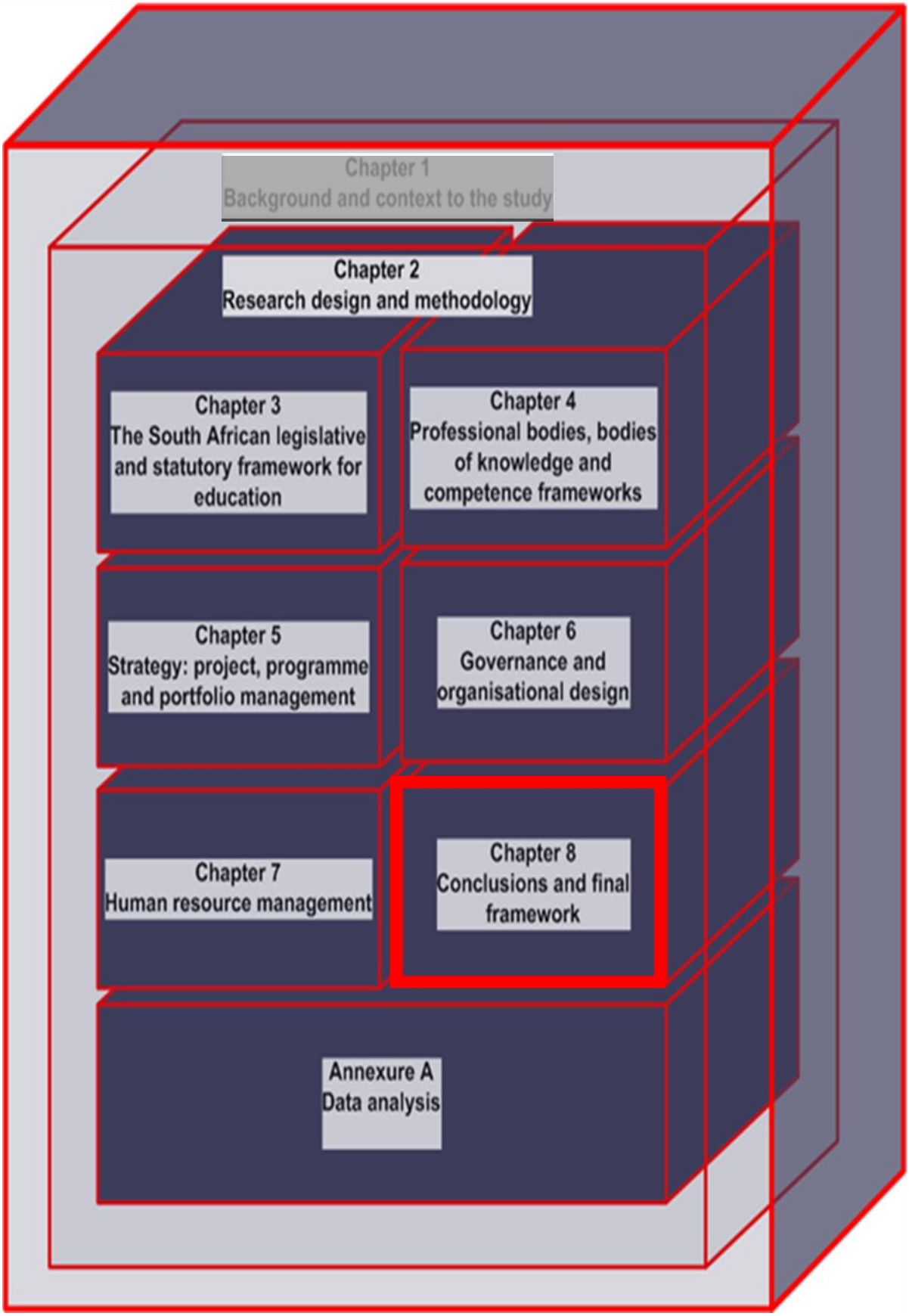


Figure 7-15: Addition of the HR component, as well as the job family to the stratified framework

Chapter 8. Conclusion, recommendations and framework presentation

8.1 Introduction



According to Adrianni (2007), various reports and research spanning the 1990s and early 2000s (among others, the OASIG survey (1995), the KPMG Canada survey (1997), the Robins-Gioia survey (2001) and the Conference Board survey (2001)) have shown that ICT projects have failed dismally. These reports include that of Goatham (2009), which likened failed ICT projects to construction projects. The result would be a dysfunctional infrastructure.

The whole notion of conducting the research in terms of theory and model-building was triggered by this high failure rate of projects in the ICT domain, and specifically where it pertains to the HR aspects that contribute to such failures. The research paradigm that was followed was that of interpretive research with triangulation to constructivism. Under the interpretivist paradigm, two substrains were used and triangulated where data analysis and interpretation were concerned. These substrains involved the reflexive approach and participant observation.

At this point, the reader is reminded of the quote from Mankletow (2014), where he states the following:

> *There is a need to look at the complex relationship between tasks, workflow, responsibility and authority, and making sure these all support the objectives of the business… Good organisational design facilitates communication, productivity and innovation* (Manktelow, 2014).

In an effort to understand what Manktelow means, the graphic as depicted in Figure 8-1 was constructed.

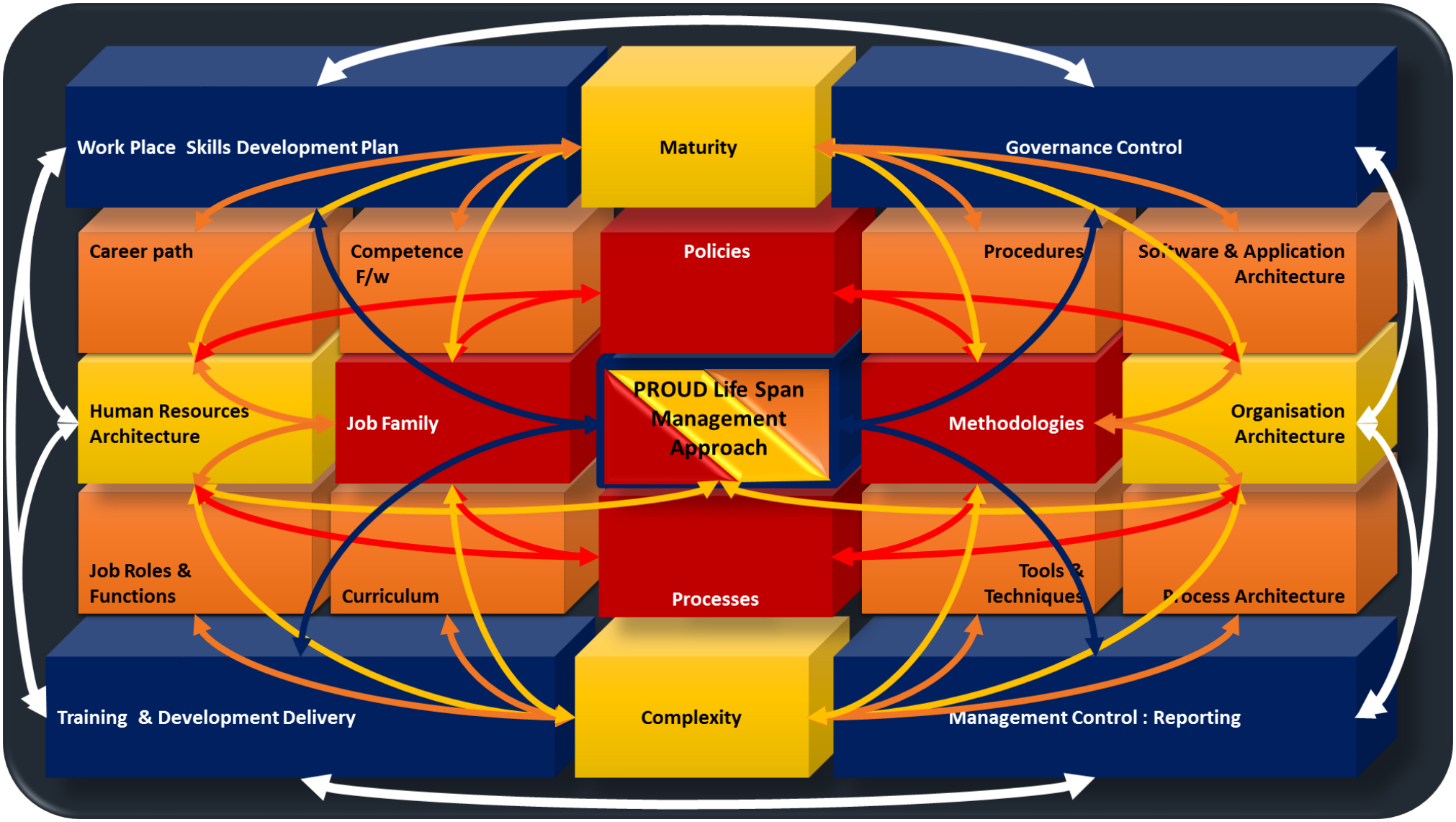


Figure 8-1: Illustrative figure: Understanding the complexities and the complicated environment of ICT project manager's training

From Figure 8-1 above, it can be seen that whenever one field is addressed, like traditional training and development, a domino effect comes about and the principle of duality and reciprocity takes effect. With one area receiving attention, it will alleviate pressure for a short while, but the pressure will build up in another area, causing attention to be focused there. If this area is handled in isolation, the time and effort exerted will only give a short-term solution as pressure builds up in yet another area that did not receive attention previously. The cycle will continue until all the aspects that require attention are in equilibrium in accordance with the level of competence of the people and the level of complexity that the organisation can handle.

The various chapters focused on the specific project management and HR management aspects that would require attention in the endeavour to reduce failure rates in ICT projects. The reasons that were addressed, in particular, were those that concerned the training and development of ICT project managers.

The aim of this chapter can thus be stated as:

To present the developed stratified framework as the end result of the research.

The objectives of this chapter can be stated as follows:

- To revisit the individual chapters and their questions to ascertain whether the framework will enhance understanding and/or alleviate the problem addressed.
- To conclude the process of constructing the conceptual framework. It will contextualise the conclusions of the various chapters and present the final stratified framework as the result of the research. It will revisit the conclusions that were drawn in the various chapters and will conclude the study with the presentation of the final framework.

A number of aspects should be considered as part of the scope of this chapter in order to state the contribution of the research in terms of the following:

- The critical contribution
- The academic contribution
- The practical contribution

These aspects are the following:

- The conclusions and recommendations of the various chapters (chapters 3

to 7)

- The presentation of the finalised framework
- The statement of the contribution
- Final conclusions and recommendations

The stated aim of the research in its entirety is as follows:

“To develop a contextual framework in accordance with the job family concept through which ICT project managers’ careers can be managed.”

With this as a point of departure, research questions were developed. Each research question formed part of the main context of the study and was further developed into questions that construed the content of each chapter. In the section that follows, these questions will be revisited and their contribution to the framework stated.

8.2 Conclusions and recommendations

8.2.1 Conclusions and recommendations: Chapter 3

The aim of chapter 3 was stated as:

- To discuss the relevant documents at a governance level to which there should be adherence and conformity when considering the development of the project management function and career development in an organisation.

Following from this, the governance landscape, as it pertains to the South African labour market, was discussed. Particular focus was on aspects such as the following:

- The Organising Framework for Occupations (OFO)
- The educational framework in terms of SAQA and the NQF
- Strategic direction for South African skills development (NSDS III)

A singular and cumulative perspective on these documents unveiled the PIVOTAL principle. This principal has particular relevance and reference to the study topic, and strengthens the problem statement:

In the absence of a defined occupational group and professional development home for project managers in organisations, their development will be inferior.

In particular, NSDS III called for the alignment of training and development interventions that should entail a triumvirate relationship between employers, educational institutions and SETAs. It is thus apparent that, in the context of South Africa, there needs to be an alignment between training and development

interventions at an occupational level, and the broader framework of the country's development policy and strategy. It was noted that the SETAs received more attention than the professional bodies. The implication of this situation is that the training and development offered by professional bodies would have to be accredited and recognised through this state organ. This accreditation would then lead to a comparison between the SAQA and the NQF frameworks of South Africa. Hence, what is offered in a particular country, in this case South Africa, in terms of project management training and developmental courses, would have to be aligned with the overarching training and developmental framework of such a country.

Reference is made to vocations in NSDS III, however, a closer investigation revealed that vocations are more in relation to a calling than an occupation or vocation would be. Having said this, the documents do not place the occupations within a broader context such as a job family.

For ICT project managers, it was found that the OFO makes reference to ICT project management as a managerial occupation. However, there was no further elaboration in terms of support staff that would be required on ICT projects, hence the OFO does not describe the totality of occupations that would be involved in ICT project execution, and hence a job family concept would be better.

NSDS III calls for a higher degree of differentiation of work in that it calls for the definition of occupations and occupational pathways by linking them to the OFO.

It was seen in Chapter 3 that the OFO hints at the concept of a job family, through the reference to job clusters at the occupational level, but that it is only at the occupational level. To some extent, the use of the word "occupation" in the OFO makes use of circular reasoning in that it defines occupations in terms of itself, and not in terms of a higher context.

With reference to the construction of the framework as set out in the aim of Chapter 1, it can be seen that the South African government has established a broad general framework for development in terms of NSDS III and the OFO. It is not sufficient to manage careers related to individual occupations. Having said this, it cannot be disregarded in the total perspective of managing ICT project managers' careers within the context of South Africa. It thus calls for industry and academic institutions to be involved.

In order to get a holistic perspective through the collaborative effort of various training providers and their courses, the training and education framework of a sovereign country, and the industry, it is recommended that a good understanding should be developed of the relationships that would form and would be required to execute the strategy. It is therefore recommended that this relationship forms in accordance with the graphic representation in Figure 3-9, which would construe the first tier of planning and alignment for the professional development of ICT project managers.

This first tier would then also, in accordance with the aim and objective of the study to build a framework, form the first component of the stratified framework. This is presented as Figure 8-2 below.

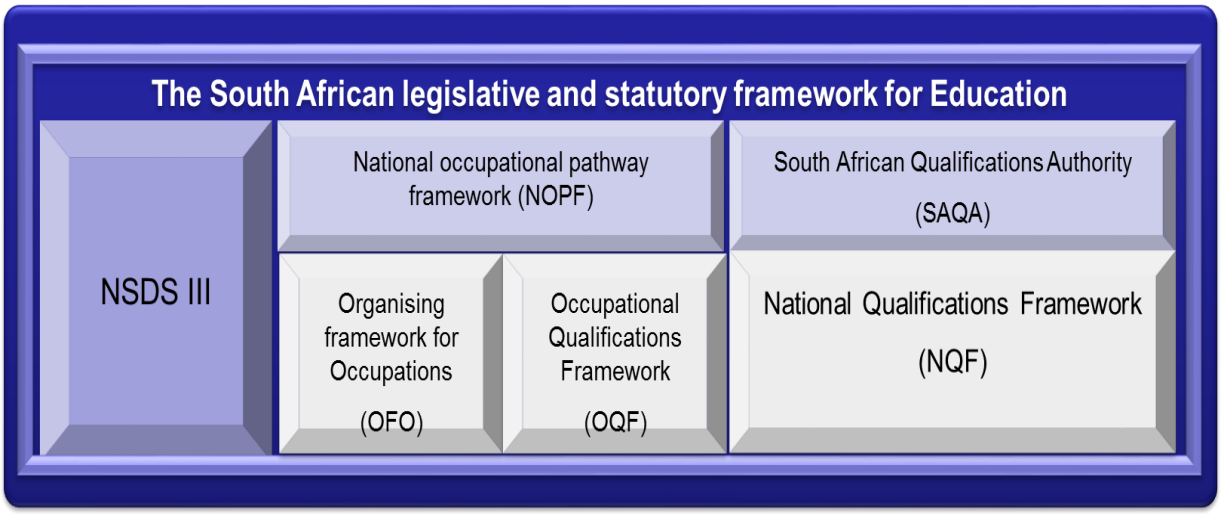


Figure 8-2: The first level of the stratified framework: governance framework of development in South Africa

8.2.2 Conclusions and recommendations: Chapter 4

Projects are the vehicles through which organisations affect change and translate strategy into actions.

The aim of Chapter 4 was stated as:

- To discuss the aspects of ICT project management in terms of the groupings of the main and internationally recognised professional project management bodies and their publications.

This discussion was done to provide a perspective on the standards and bodies of knowledge of the relevant professional bodies that have had an influence on ICT project managers' career development and progression. From this discussion would then lead the addition of the second stratified layer of the framework.

Special attention was given to the career and occupational aspects that are inferred when an organisation refers to project management in general. However, there was a differentiation of the roles, responsibilities and functions of project, programme and portfolio managers. Secondary roles and responsibilities that were unearthed also received attention as and how they affected project execution teams.

With the determination of the aim and goals of the particular chapter, the discourse set out to accomplish the following:

- Do a review of the various national and international professional bodies.
- Do a review of the various publications from these professional bodies and how they affect the development of ICT project managers.
- Do a review and discussion of the various methodologies that are available for project execution.
- Do a review of the qualifications and certifications offered at the various levels of competence and proficiency.

Charles and Smith (2006, p. 15) stated their critical insights that were gained during their research. This entails that:

- bodies of knowledge are based on unrealistic views of how companies and individuals behave;
- an accurate understanding is gained of the challenges and realities of contemporary project management;
- professional associations have a limited understanding of the real world;
- growing links are developed between organisation theory and project management literature; and
- project management remains more of a craft than a science.

It is important to identify the political and cultural contexts before designing the scope, structure, style and process, as well as the quality assurance and communication strategies for a project.

Further to this, Thomas and Mengel (2008) have an even harsher opinion of the current state of affairs in terms of project management and the training of project managers. They state as follows regarding the current model of project management training and qualifications:

> *This model indicates that the PMBOK® Guide and training based on linear, rational, analytical knowledge only moves practitioners to the competent or proficient performer level. Given that projects in a real-time environment tend to unfold as complex adaptive systems, effective project managers need to be the masters and leaders who can act and react in a timely manner without having to resort to time-consuming analytical applications of context-dependent or -independent techniques. Advanced project managers need to be capable of "staying with the ambivalence and ambiguity of the not-yet-known; recognising that how a situation emerges crucially shapes its meaning, interpretation and social significance", thus the development of the master project manager requires going beyond the inculcation of standards of best practice.*

The study unearthed the fact that the world has a very narrow view of project management as purported by the various bodies of knowledge, with the PMBOK® as the main contender going far ahead. In an effort to rectify this situation, other bodies of knowledge were found to be better, with competence frameworks topping the scales, albeit rarely mentioned. A call to heed the situation should be issued to the project management fraternity and HR practitioners to break free from the stronghold of just one particular organisation, and to consider the best curriculum in terms of bodies of knowledge when it comes to recruitment and development choices.

It was found at the basic and most obvious level that most of the professional bodies focus on qualifications for the project management role alone, and very little attention was given to project support roles and functions. Even worse was the realisation that the foremost body of knowledge focused entirely on processes and not on roles and functions. At a deeper level, it was established that different libraries were in existence for other occupations within the project management collection.

It was found that, where competence frameworks are concerned, the focus was at task execution level, with at least a hint of growth in terms of task density and task complexity, which can be construed as an effort towards career pathing and growth.

Within the definition of methodologies, it was found that roles are inferred and sometimes explicitly defined. It was also found that an explicit life span management framework would be present. As and how the project moved through the stages

and/or phases different roles and responsibilities emerged, which required different competencies and skills.

The analysis of the various qualifications on offer revealed that the European approach of APM was aligned to the British qualification levels, but that the American approach was not aligned to these qualification levels. This poses a question in terms of what Chapter 1 set out to accomplish in terms of the wide acceptance of the PMBOK®. The study revealed that various qualifications are offered that distinguish between roles and responsibilities.

It became evident that the training and development pathway of ICT project managers should allow for growth in terms of task density and complexity. There should be a dialectic transition from one specialist area, such as risk, for example, at a low level of complexity towards the generalist area of managing the project at a higher level of complexity, with each transition allowing for growth in competence, skill and knowledge.

The chapter concluded with the following recommendations:

- Before embarking on developmental training in project management, a study should be conducted as to which body of knowledge should form the basis for the training curriculum.
- A study should be conducted as to the various qualifications and credentials offered by and through the various professional bodies.

In alignment with a systems thinking approach, the whole ambit of the projectised organisation needs to be considered when deciding on project management qualifications.

In alignment with framework development, the chapter contributed the following layer to the stratified framework. This addition is showed in Figure 8-3 below.

Figure 8-3: Context of professional bodies added to the stratified framework

8.2.3 Conclusions and recommendations: Chapter 5

The aim of Chapter 5 was stated as:

- To discuss the aspects of ICT project management in terms of the portfolio, programme and project elements of project management in its broadest sense.

A scope was then developed to provide a perspective on the relevant topics and definitions, as well as what is meant when these terms are used in organisations. This entailed the following:

- Introducing the concept of locus, focus and function
- Establishing the links between project and strategy execution
- Establishing the link between strategy execution, project execution and governance
- Defining and discussing the concept of project management and its components
- Defining and discussing the concept of programme management and its components
- Defining and discussing the concept of portfolio management and its components

Special attention was given to the career and occupational aspects that are inferred when an organisation refers to portfolio, programme and project management in an ICT context.

The chapter rendered the following conclusions:

The concept of locus, focus and function is required to ascertain where, by whom and what decisions are made. Decision-making in the projectised organisation should be in concert and in support of the other corporate governance structures. The various and different roles that are required to make those decisions should be assigned to the organisational design structure with commensurate responsibilities and authority assigned.

From a strategic perspective, individual projects contribute towards overall business sustainability. Sustainable growth should be accomplished by maintaining a fine balance between the detailed management of the projects themselves and the portfolio perspective that is required to inform the business of its impact. It was, however, found that most projects were not seen contributing to the overall strategy of the organisation.

Shenhar's concept of Strategic Project Leadership as an approach that can be used to connect project management to business results to achieve a competitive advantage was introduced (Shenhar, 2007). The premise is postulated that if business strategy is better understood and translated into project strategy, the overall performance of project management would be improved significantly, and project management would have a higher profile in business management in general.

Project governance, located in the right organisational position, with the right definition of its functions, domain and focus, can assist in the alignment of business and project execution strategy. Locus, focus and function also have relevance to projects and programmes.

In particular, attention was given to project management components, and the research investigated the function and roles that can be determined from various execution frameworks and methodologies.

In terms of execution frameworks, it was determined that the way in which a project proceeds through its life cycle brings about different areas of focus. Thus, in a particular stage and phase, there are requirements for different as well as differing

skills and competencies. The locus and focus of decision-making is also different, with a duality in the decisions that are driven by the governance framework. The "governor" of the project would look downward and exert governance control over the constituent projects. Yet, when an upward perspective is taken, the "governor" is only a manager again, in his or her own right.

In terms of methodologies, it was determined that methodologies gives rise to the definition of roles and functions. As such, the choice of a particular methodology cannot be seen in isolation. It goes further in the sense that the methodology affects the qualifications, the curriculum and the method of training delivery within the organisation.

Methodologies offer generic role descriptions that, through the implementation of a specific methodology, could be incorporated into the project organogram. These roles and functions cover the entire project management spectrum:

- Project management
- Programme management
- Portfolio management
- Project support

A surprising aspect that came to the fore was that only a few of the methodologies referred to roles being defined in terms of the knowledge areas of either the ISO 21500 standard or the PMBOK®.

When the context of positions within a projectised structure is considered, an ambiguity was found. This ambiguity entails that, in some instances, roles are derived from a specific function. In other instances, roles define a function. In yet others, a function contains so many roles that the roles are split at a task-density level. The level of ambiguity seemed to increase with overall project complexity and task density. Typically within the ICT project domain, it was found that other roles, such as assurance and support roles, could be incorporated into the project team as well.

Duties of team members were not necessarily related to their tasks, as a work breakdown structure is mostly presented at the task level, and not in the definition of work in terms of the organisational structure and commensurate decision-making levels.

Given that the need for a strategic link was determined, it was surprising to find that there was very little mention of portfolio management roles. It would seem that most of the functions of these roles would be left to project boards, steering committees and functional line managers. It can thus be concluded that portfolio management roles seem to be confused with senior general management roles. When the strategic link is considered, the following can be stated:

The portfolio perspective in the project management job family would be contextual roles, with a high level of understanding of project, as well as programme management, but with a low level of technical content in terms of project execution.

It was found that certain aspects in terms of a specific project would determine the commensurate design of the organisational structure, as well as the definition of the various roles. These aspects entail:

- the size of the project;
- the technical nature of the product; and
- the level of complexity of projects undertaken.

The above finding was somewhat to be expected, but was also surprising. With an increase in size and complexity, there would be a more pressing need for the role of programme manager, specifically where the management of the business context is concerned.

The chapter concluded with its contribution of a third layer to the stratified framework, where consideration needs to be given to the overall role that projects play within the organisation. The choice of an appropriate life cycle management approach, as well as an appropriate methodology, was highlighted through the effect that they can have on the definition of roles and functions within the project team. It can thus be recommended that the next layer be added to the framework, as depicted in Figure 8-4 below.

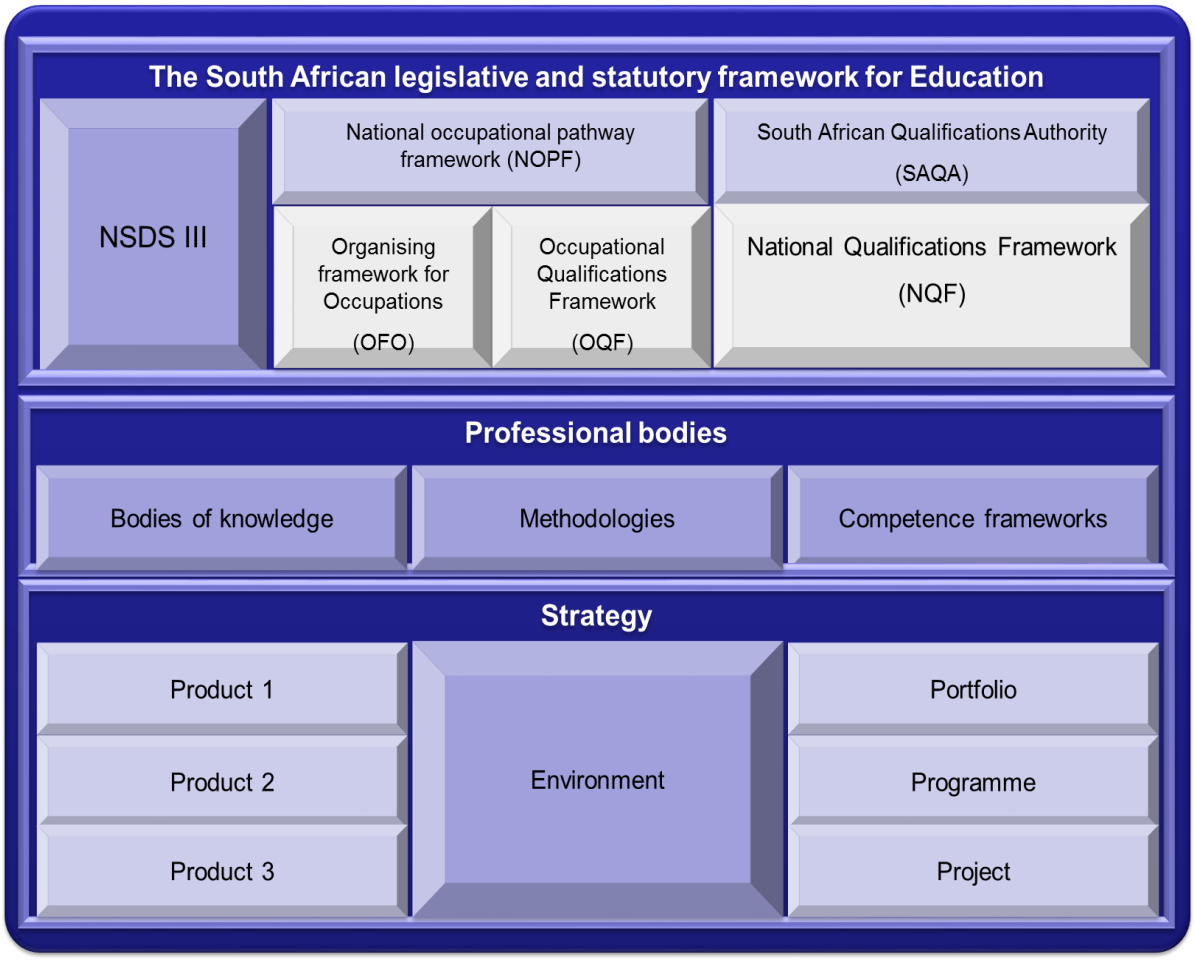


Figure 8-4: The third level of the stratified framework

8.2.4 Conclusions and recommendations: Chapter 6

Chapter 5 and Chapter 6 built on each other and can be viewed as being parallel in the discussion. With the introduction of the concepts of locus, focus and function, this chapter investigated project, programme and portfolio management offices from an organisational design perspective.

The objectives that this chapter set out to accomplish entailed the following:

- To determine whether there are common ground and elements between the locus, focus and function of portfolio, programme and project management.
- To determine whether there are different and differing roles located in the various functions and offices in a projectised organisation's design.

The detail scope of this chapter entailed that a discussion be conducted on:

- the definition of the common ground elements among the locus, focus and function of portfolio, programme and project management;
- the definition of the main functions of a portfolio management office;

- the definition of the main functions of a programme management office;
- the definition of the main functions of a project management office; and
- the definition of the roles and functions that would be located in the various projectised organisational structures, such as project, programme and portfolio management offices.

The chapter concluded with the addition of a proposed organisational design that could be implemented when considering a projectised organisation. The proposed design incorporated the roles and functions that would be required in the locations where the various functions would have to exert their influence. The proposed structure allows room for the development of individuals within a broad definition of work in the job family where they share the same context, but different content for their positions.

It was shown that there is confusion in terms of where the locus is, and what the focus and functions of the various types of projectised offices should be. This can then be translated to create the same confusion in terms of the roles that are housed in each of these functions and locations, hence one sees people deployed/employed in the wrong job context or busying themselves with the wrong job content.

It was shown that there should be alignment of the organisation's strategic intent and its projects. It is through the correct design and the definition of roles and functions that this can be accomplished. With structural alignment of the projectised organisation, it is easier to implement a governance and oversight function over projects. The research has shown that, at the level of a programme management Office (PgMO), there is a duality in the focus of the function. This can be described as follows: The project manager looks down at the project and exerts governance control. When upward communication takes place, it is only in the sense of management control. It was also found that it is from the location of the PgMO that the standardised methodology should be implemented and the PMIS maintained. Implementation and maintenance of the said aspects would then render the following benefits:

- There is a standardised and unified way for project execution in the business.
- There is empowerment of the business with control over project go/kill/hold/fix decision-making.

- Repetition of successes can be achieved through repeatable processes.
- The organisation can be enabled through an early warning system for any potential problems in meeting programme and project milestones.
- Access to information relevant to their interests is eased for project stakeholders.
- Resource utilisation and productivity can be better understood.
- Individual project performance can be evaluated.
- Projects can be prioritised.
- The redeployment of staff is facilitated.
- Project reporting times are reduced, allowing for more accurate decision-making and faster reactions to market changes.

It was found that the main focus of HR management and the establishment of a job family would reside with the PgMO. It is from this location that the career management and career pathing should be done.

The findings of this chapter revealed that project size does not affect the essential functions of the project team, but rather that:

- complexity will cause an increase in the number of roles that are found in the project;
- complexity will move the focus and function of the PgMO from just supporting the project towards strategic project management (this movement can be equated to a growth in maturity in terms of organisational project management effectiveness);
- task density will cause an increase in positions on a project structure; and
- organisational maturity will cause a focus on instituting permanent projectised offices, such as a PjMO and PgMO.

The results of the documentary analysis revealed that the roles and functions of project and programme managers differ, yet there is confusion in terms of the location of the offices in which they work. A project manager can be found to work in a PgMO, but is not fulfilling the role of “programme manager”.

Confusion was shown to exist in the nomenclature and terminology that are used for referring to the various structures in a projectised design. With the confusion clarified, the following was found:

- The PgMO is for the organisation and not for one project or programme.
- The PgMO is typically an organisational unit.
- Not all PgMOs are the same (a PjMO may perform the same function in some organisations).
- A PgMO may consist of as little as two team members or many more.
- Even though the PgMO has definite benefits, failure in executing its roles and functions can cause more damage than the benefits it can bring.

The chapter contributed the finding that training in the aspects of project management alone will not cause better project execution performance. What is needed is an organisation-wide decision to transform a part of the business to being projectised. It was found that when designing a projectised organisation, the locus, focus and function of the various offices, as well as what they would be doing, needs to be considered in terms of the following:

- The offices that are instituted should be able to render administrative support to the projects.
- The offices that are instituted should be able to exert governance control over projects.
- The offices that are instituted should be able to ensure strategic alignment of the various projects.
- The offices that are instituted should be able to ensure strategic selection of the projects.

The chapter concluded with the contribution of the next stratified layer to the overall model as it again highlighted the issue of the need for a development house for the projectised personnel. The fact was reiterated that thought needs to be given to the job family of project execution and support personnel. This addition is shown in

below.

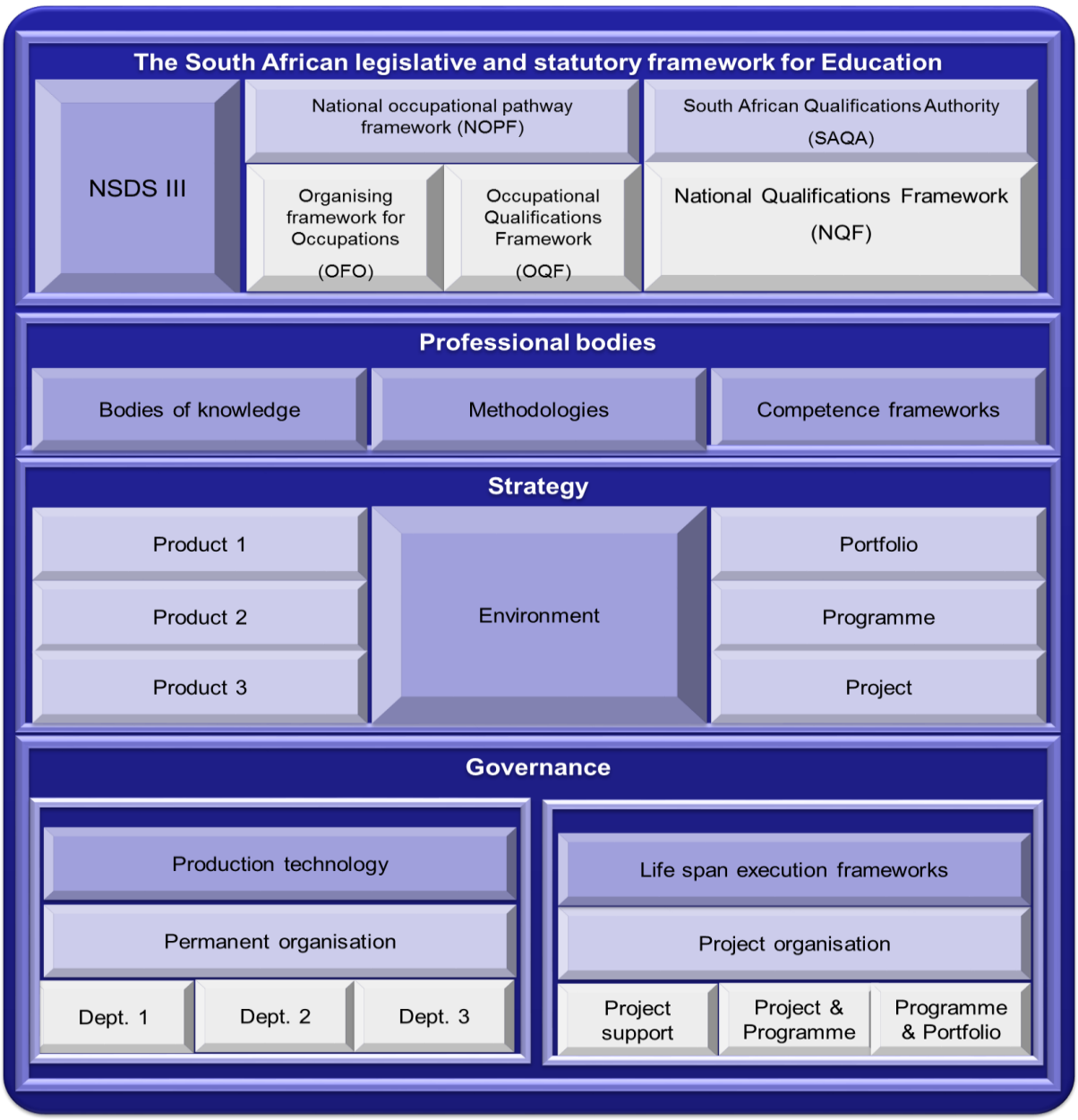


Figure 8-5: Addition of the governance element

8.2.5 Conclusions and recommendations: Chapter 7

Chapter 7 served the purpose of discussing the now familiar concept of a job family as the central theme that would hold the framework together. It set the following as its aim and objectives:

- To discuss the aspects of ICT project management training and development in the context of the introduction: high failure rates and complexity of decisions.
- To relate the career management of project personnel to the permanent organisation and the South African legislative framework for training and development.

- To relate the HR management of projectised personnel to the concepts of competence and complexity.
- To discuss HR management in the context of project execution (the projectised organisational design of the PjMO, PgMO and PfMO).
- To relate training and development back to the concept of a job family, without which there can be no career pathing or organisational growth for individuals in the projectised organisation.

The discussion brought into context the South African educational system and the training of ICT project managers, especially as and how it relates to the OFO, but again, it was clear that the OFO did not allow for job progression and career paths.

The research then focused on the aspect of complexity and competence and evaluated the current state with regard to what would be required to train ICT managers in handling more complex situations in terms of projects.

The role that the HR practitioner should play during the project set-up was then investigated. It became clear that HR practitioners are not involved in the set-up of project teams as very little mention was made in the project management literature to the process of conducting a job analysis. I came to the conclusion that HR practitioners had very little knowledge of project management roles and functions, especially the required qualifications of projectised personnel. HR practitioners had very little insight into the career management and performance evaluation of the people employed in a projectised organisation.

The contribution of the chapter was to show, from a genealogical perspective, that it is possible to define a job family for project management occupations. This genealogical perspective reiterated the notion that there should be differentiation between the roles and functions in organisation design, as well as at the level of education and training. It begs the question as to why so few professional organisations promote the career of project support personnel.

The chapter concluded with the contribution of the graphic depiction of a job family. In Figure 8-6, the addition of the HR component is shown.

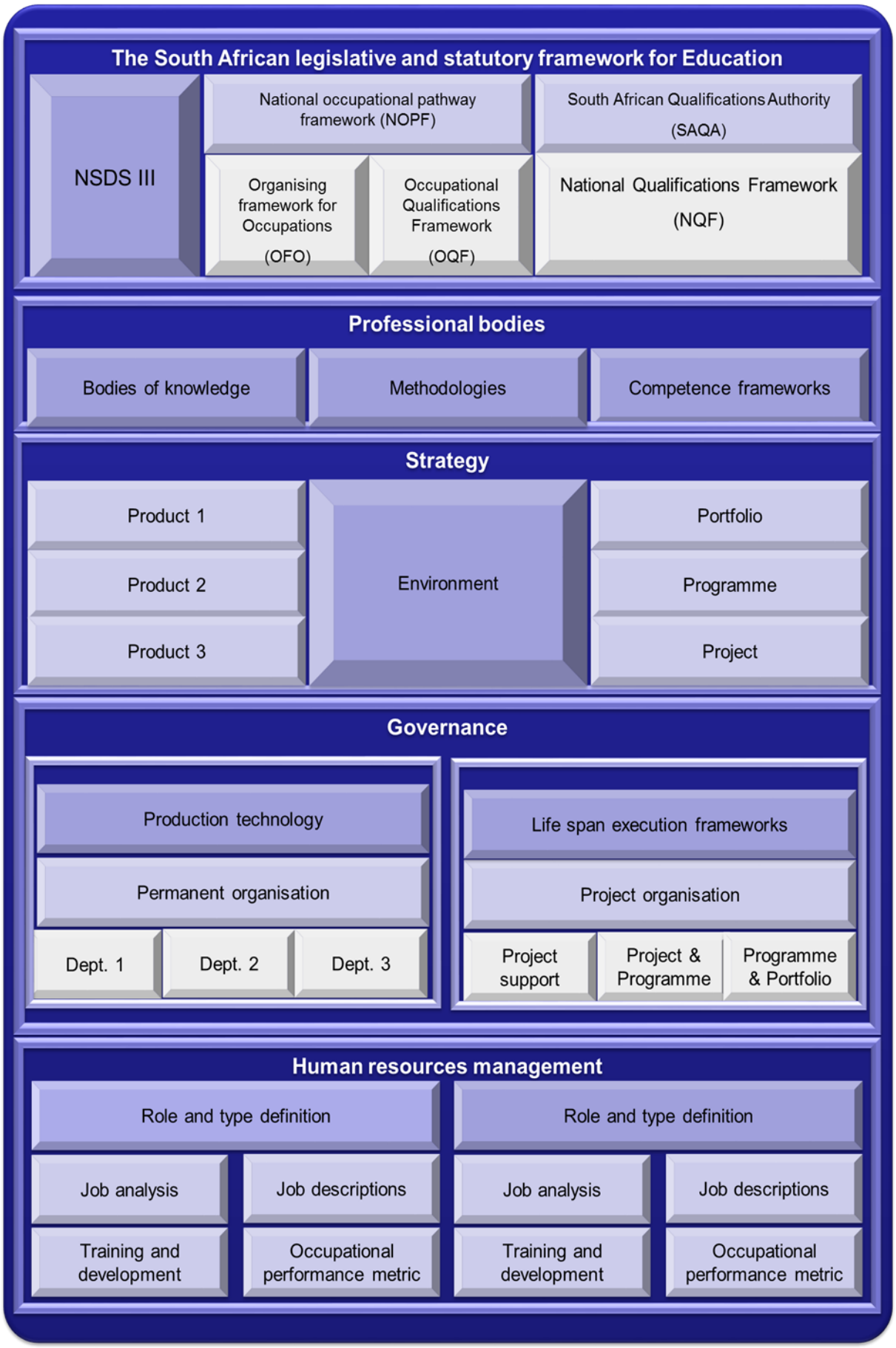


Figure 8-6: Addition of the HR management component

8.2.6 The job family: bringing it all together

The addition of the job family concept to the framework stemmed from its successful implementation in academic institutions, in particular. The concept proved useful in the following ways:

- It is useful for the identification of career and job development opportunities for people in a specific family, as well as for personnel who are considering career changes.
- It is useful as a facilitation tool for career development discussions.
- It facilitates compliance reporting for reporting against educational requirements (think of the OFO in the context of this study).
- It facilitates decisions regarding remuneration and pay due to a greater understanding of job content and job requirements that is achieved.

The organisation of positions in accordance with the job family concept has the following advantages:

- It improves competencies of the workforce through better selection and placement.
- It gives rise to increased training and development participation.
- It increases the retention of competent employees.
- It improves individual performance and contributions.
- It provides flexibility to line managers in staffing decisions.
- It provides flexibility to line managers when assigning job duties.

The contribution of the job family to the stratified model is presented below in Figure 8-7.

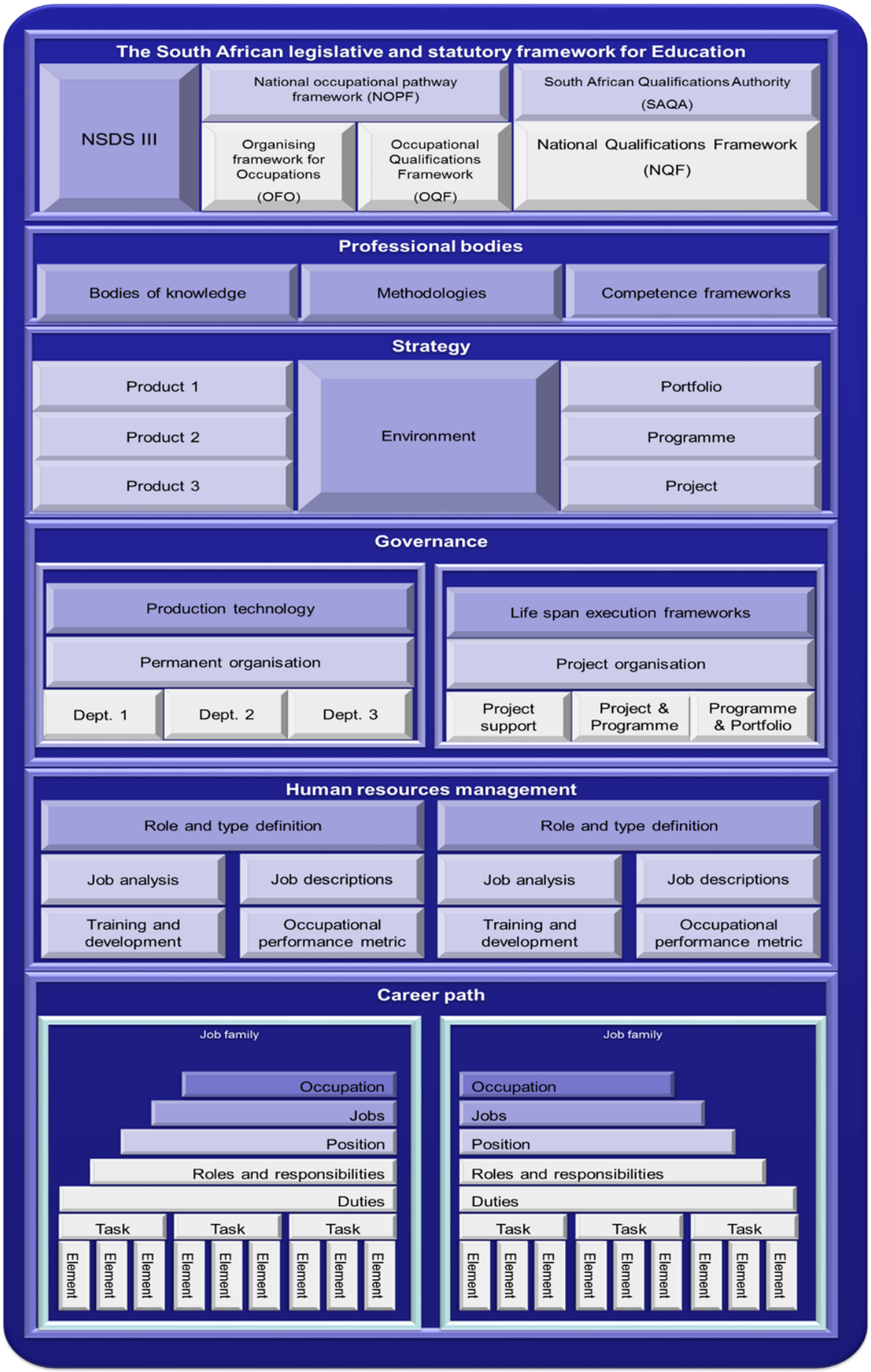


Figure 8-7: Addition of the job family

8.2.7 Maturity and complexity

The study has shown that the development of ICT project managers cannot happen outside the concepts of maturity and complexity, hence these two concepts are required as pillars to keep all the elements and components of the framework together. Finally, the component of the job family will be added to complete the framework. The inclusion hence shows that, in the training and development of ICT project managers, there should be a concerted effort to focus on the organisation as a whole, as encompassed by the complexity of the projects, as well as the level of maturity attained while executing ever more complex projects. The final and completed representation of the framework is given in Figure 8-8, where the components of maturity and complexity were added.

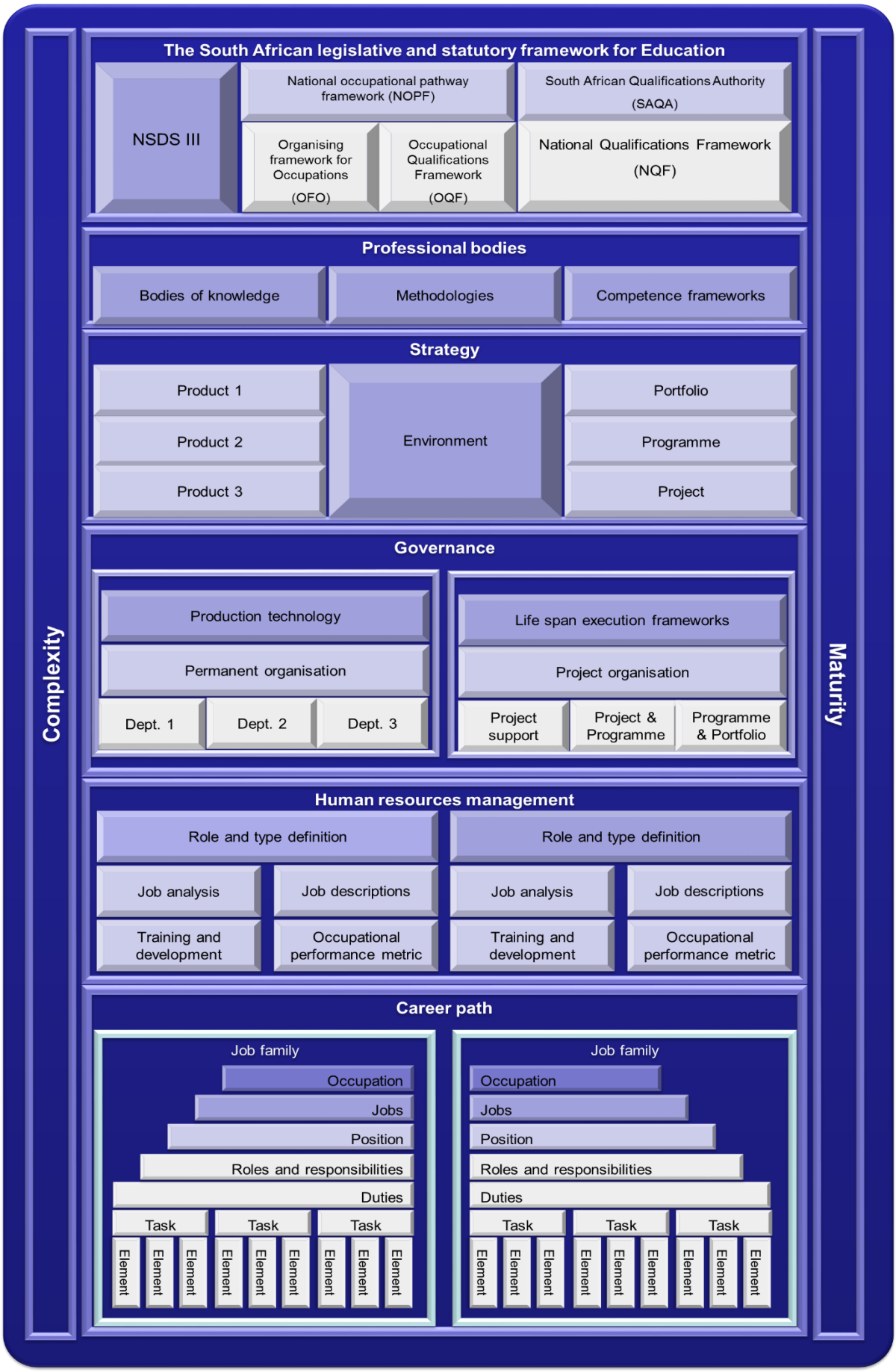


Figure 8-8: Final reperesentation of the completed framework

8.3 Final representation of the completed framework

In the final instance, the framework was built by consecutively adding a stratified element according to the contribution of each chapter's discussion. The reader is reminded of the aim and purpose of the whole research, i.e. to build a framework with the incorporation of the concept of the job family through which the development and training of ICT project managers can be better understood.

8.4 Contribution and recommendations of the research

The PMI is the biggest project management institute and boasts the most instances of its qualification (although called a certification) being issued. If this "certification", is the answer, why are ICT projects still experiencing such high failure rates? Is something else still lacking in terms of the overall management paradigm and our understanding of how the projectised organisation interacts with the permanent organisation in terms of supplying competent and qualified project personnel?

The following sections will shed light on the contribution of the research with the abovementioned questions in mind.

8.4.1 Critical contribution

The critical contribution of the research and the finalised framework is that it provides a way of viewing the current reality and understanding why the current success rate of ICT projects is so dismal. If the development and training of ICT project managers are viewed from this framework, it is evident that a one-size-fits-all approach to engaging with projects and project management would not do. This is especially true where the training and development currently on offer through professional organisations are concerned.

The framework allows for a gap analysis to be conducted in terms of the current reality and the desired future.

8.4.2 Academic contribution

On the academic front, the research has shown that the paradigm of the training and development of ICT project managers lacks substance in terms of the curriculum that is used. It was found that only the Japanese P2M approach can boast any academic validity in its content design. Most organisations ascribe to the curricula of their own bodies of knowledge.

In terms of talent management, this research offers insight into the critical development areas associated with project management in ICT. Furthermore, this enables industrial psychologists to compile particular selection criteria to ensure the best fit between the candidate and the position, based on appropriate psychometrics.

This study pens down an academic platform from which further studies and development in terms of project, programme and portfolio management could be launched.

From a tertiary training institution point of view, the study suggests specific content to include in the curriculum for project managers en-route to developing programme managers. It also distinguishes between particular areas that need more or less attention.

8.4.3 Practical contribution

The most important contribution resides on the practical level. Through the use of the framework, individuals get to make informed decisions regarding their own development, and organisations can strive towards compatibility in the needs of their workforce and what they can offer in terms of careers.

From an HR management perspective, this study enables career development to follow a particular structure.

From a performance management perspective, this study reveals specific criteria against which the performance of individuals appointed as project, programme and portfolio managers could be measured.

For new entrants to the career and occupation of project management, this study provides a particular structure according to which development targets, objectives and measures could be followed to ensure success in the capacity of a project, programme or portfolio manager.

8.4.4 Methodological contribution

The developed framework helps to identify gaps in the current perceived reality and proposes ways and means of addressing those gaps.

8.5 Conclusion

It can be concluded that the training and development of ICT project managers is a complex and complicated affair (refer to Figure 8-1). In the absence of a

framework that contextualises training and development, the current situation of ICT project failure will continue.

The framework, as built and presented, gives rise to practitioners in the HR, ICT and project management fields to give due cognisance to the following:

- Developing a good and proper understanding of the context and content of a specific country's education framework.
- Developing a good and proper understanding of the current state in terms of professional bodies that affect the training and development of ICT project managers.
- Developing a good and proper understanding of the relation between successful project execution and business strategy, as well as the role played by ICT project managers.
- Developing a good and proper understanding of the governance of projects and their roles and functions as and how they relate to ICT project managers, and the incorporation of these roles and function in the job family and/or career paths.
- Developing a good and proper understanding of the relevant aspects in HR management that need to be added to the current paradigm of ICT project managers' career development.

8.5.1 Recommendations

The framework can be used in organisations as a guideline to plan and implement career and growth paths for ICT project managers. The framework provides a structure towards establishing a holistic view of the strategic importance of having competent and qualified ICT project managers.

It is recommended that a framework such as the one developed through this research is implemented in organisations.

8.5.2 Limitations

The top-most level of the framework will need to be contextualised for the circumstances in a particular country and limits the framework to being totally universal in its application.

The very narrow and one-sided view that the world has towards the training and development of project managers is perhaps the most limiting factor and one that the framework cannot address. Individuals and organisations are called upon to

broaden their view, contextualise their training in terms of their own countries'requirements and have the qualifications that are on offer aligned with their educational frameworks.

8.5.3 Recommendations for further research

It is recommended that the training and development of ICT project managers should be further studied in terms of the requirements of handling complexity and achieving growth on the path towards maturity.

Furthermore it is recommended that a more academic, scientific and universally accepted knowledge base for project management be developed. The ISO standard is very biased towards the PMBOK®, both in terms of its structure and its content, while a vast majority of the project management fraternity has no knowledge of the existence of other bodies of knowledge.

Research needs to be conducted regarding the professionalisation of project management. Too often, it is found that large consulting firms, based on their name and stature, encroach on the field of project management.

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Annexure A to The development of a contextual training and career management framework for ICT project managers

Index

List of Tables

List of Figures

In this annexure the patterns obtained from the primary method of data analysis is shown. Data was collected over an extended period of time and captured in an Excel spreadsheet. This spreadsheet was developed into a relational matrix, and became the main tool for data analysis. This sheet has in the first section the following columns as displayed in **Error! Reference source not found.** below:

Annexure A Table 1 : Spreadsheet columns

Script Outline	**Model Component**	**Section heading**	**Where to use**	**Reference Colum**
Article name	Topic Heading 1	Topic Heading 2	Topic Heading 3	Content 1
Content 2	Conclusion	Recommendation	Notes	Author 1
Author 2	Referring to	Date of Publication		

All materials that were deemed of importance as a data source were meticulously captured in this first section of the spreadsheet. An initial reading of the materials occurred during the capturing process. With this reading, key words were identified with regards to their topical relation. A column with the key word as heading, was created, and with an X placed in the row where the word of relevance was found. For example, if a data artefact was topical about project management, the artefact would be in the topical column of project management as well as in the column with project management as a key word. The physical content of the data artefact would be in the column of content 1 – 2 and the content would be organised according to the original author's structure with the headings in column topic heading 1 – 3. The initial reading gave an indication of the relevance to achieving the aim and objectives of the research and as such, in the column for "Where to use" and "Model component", a note was made (in a later iteration of data analysis, sub columns were formed). The process of capturing, initial reading and identification of key words and concepts continued in parallel, and over an extended period, as each chapter was added, the data artefacts were captured and the key words columns were added in accordance with their relevance and applicability. It needs to be mentioned that not all data artefacts were relevant. This is where the use of the spreadsheet was

particularly useful. At first evaluation, an artefact may seem relevant, but when viewed in context of the aim and objectives of a certain chapter and its discussion topic, it was shown to be of lesser value. The process of capturing data artefacts continued, until the sources revealed that a particular topic has been saturated.

The point of saturation was determined as and when the same sources were revealed in the data sourcing process, or when the same author was referenced by other data artefacts (thus the inclusion of the Author 1, Author 2 and Referring to columns). With saturation, and sufficient data artefacts captured, analysis could commence. Using the functionality of excel, the data could now be sorted and organised according to topics, authors, time lines etc. using the filtering and sorting functions, the structure of the research report started to emerge, and the original data artefacts and sources were grouped for interpretation. The use of the key word columns (a total of 139) provided the functionality of revealing patterns in the literature of concepts that were related to each other, but not handled as such by the respective authors. It is also these patterns that determined the importance of the content of the data artefacts and whether the content had to be analysed further for inclusion in the framework development. The spreadsheet has in total 169 Columns, 139 key words, 6608 rows and 23537 crosses. It is in no way possible to give a clear detail graphical presentation other to show that patterns emerged.

The value derived from this mapping was that certain patterns emerged of how and where the key words were related to each other. With the emergence of these patterns, the content of the relevant articles was read in the context of a discussion topic, and conclusions were drawn. From the conclusions, recommendations were derived. These recommendations were then placed in a hierarchical order to form the various horizontal bands and strata of the envisaged framework. Thus, the framework emerged and could be validated and referenced back to a particular data item. Listed below in Annexure A Table 2 are the Key words identified and used in alphabetical order.

Annexure A Table 2 Alphabetical lsting of key words

Adaptive paradigms	Administration	Analytical thinking / linear thinking	APMSA	NCB 3
Benefit	Blue Print	Bodies of Knowledge	Business case	Career clusters / JOB FAMILY
Career path	Centralised control	Certainty based theory	Certification	Chaos Theory
COG TA	Colleges	Communication	Competence	Competence frameworks
Complexity	Content	Context	Cost management	Curricula / Curriculum
Decentralised execution	Dependent	DHET	DPSA	DTI
Employers	EPMO	Experience	FABCOS	Failure
FET	Financial management	Focus	Function	GAPPS
General management	GET	GFETQF	Governance	Hermes
HET	HR / HRM / Human resources	HRDSSA III	Independent	Industry Bodies
Information management / IT platform	Interdependent	Investment	IPAP2	IPMA ICB 3

IT Projects	JIPSA	Job Description	Job Title/Job Titles	Knowledge
Lateral Thinking	Life cycle management	Linear Lateral and circular Thinking	Locus	Management paradigm
Maturity	Methodologies	Metrics	MPMM	Multi-tasking
NAMB	NOPF	NOS	NQF	NSF
NVQ	Occupation / Vocation	OFO	OLS	On the Job training
OQF	Organisational Change management	Organisational Design	Performance Management	PIVOTAL
PM Philosophy or mind set or paradigm	PMO	PMO Approach	PO Project Office	Portfolio management
Portfolio office	PPM	Prince	Process	Profession
Professional Bodies	Professional Bodies AIPM	Professional Bodies APM	Professional Bodies IPMA	Professional Bodies OGC
Professional Bodies PMI	Programme board	Programme management	Programme Office	Project Control
Project Management	Project Office	Project phases and stages	QCTO	Qualifications

Responsibilities	Retention	Risk Analysis	Role / Roles	SAQA / Unit Standards
Scope	SEDA	SETA	Size of project	Skill not NSD
Skills	Specialisation	Sponsor	Stage gate reviews	Standards
Steering Committee	STRAT not NSDS	Strategy	Success	Systems Thinking
Techniques	Tenstep	Theory of constraints	Titles (Job)	Tools
Trade Unions	Training	Universities	Vision	

From the website of the University of Surrey, a document: “Introduction to Research and Managing Information” was accessed which gives a more theoretical perspective of the process that was followed. The process is summarised in the following ten steps of content analysis:

1) Copy and read through the transcript - make brief notes in the margin when interesting or relevant information is found – (Captue th information n the spreadsheet)

2) Go through the notes made in the margins and list the different types of information found – (Filter accoding to topics)

3) Read through the list and categorise each item in a way that offers a description of what it is about- (Filter accoding to topics)

4) Identify whether or not the categories can be linked any way and list them as major categories (or themes) and / or minor categories (or themes) - (Filter accoding to topics)

5) Compare and contrast the various major and minor categories – (Use the filter results to constru a discussion framework)

6) If there is more than one transcript, repeat the first five stages again for each transcript – (Check the relevance of the topics and resultant data nalysis pattern)

7) When you have done the above with all of the transcripts, collect all of the categories or themes and examine each in detail and consider if it fits and its relevance – (Check the relevance of te topics and resultant data nalysis pattern)

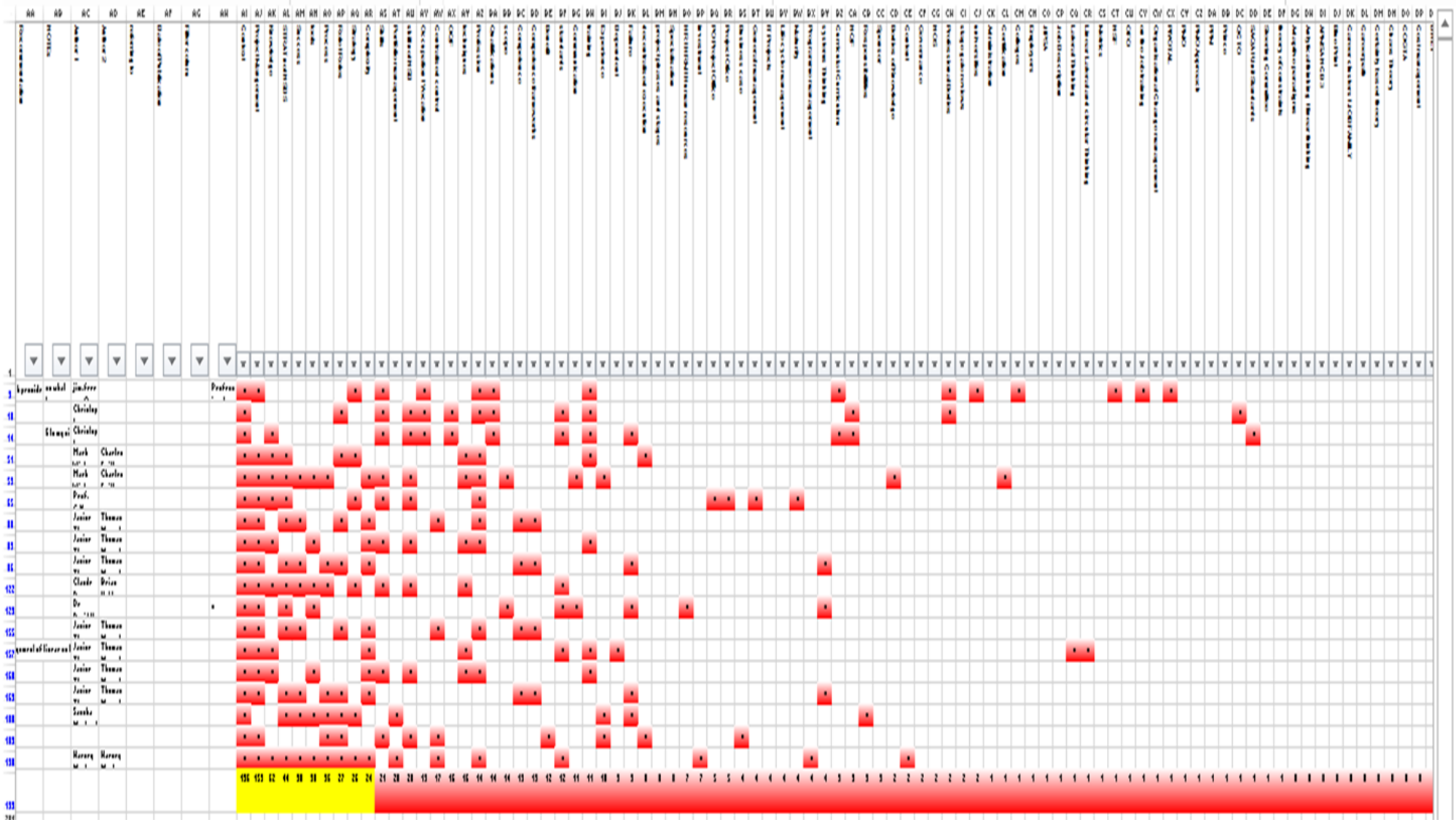
8) Once all the transcript data is categorised into minor and major categories/themes, review in order to ensure that the information is categorised as it should be. – (Check the relevance of te topics and resultant data nalysis pattern)

9) Review all of the categories and ascertain whether some categories can be merged or if some need to them be sub-categorised

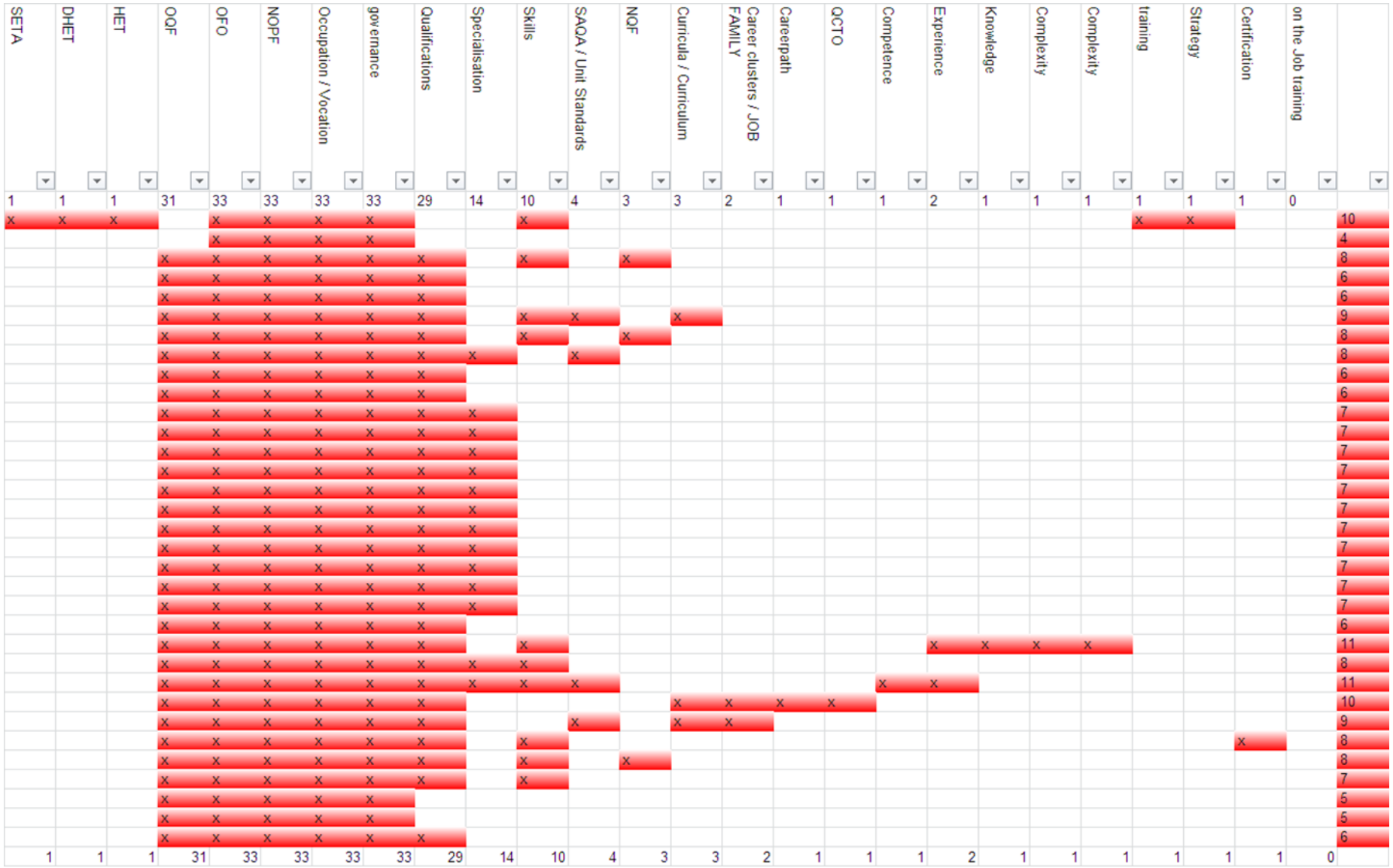
10) Return to the original transcripts and ensure that all the information that needs to be categorised has been so.

The process of content analysis is lengthy and may require the researcher to go over and over the data to ensure they have done a thorough job of the analysis. (University of Surrey, n.d)[18]

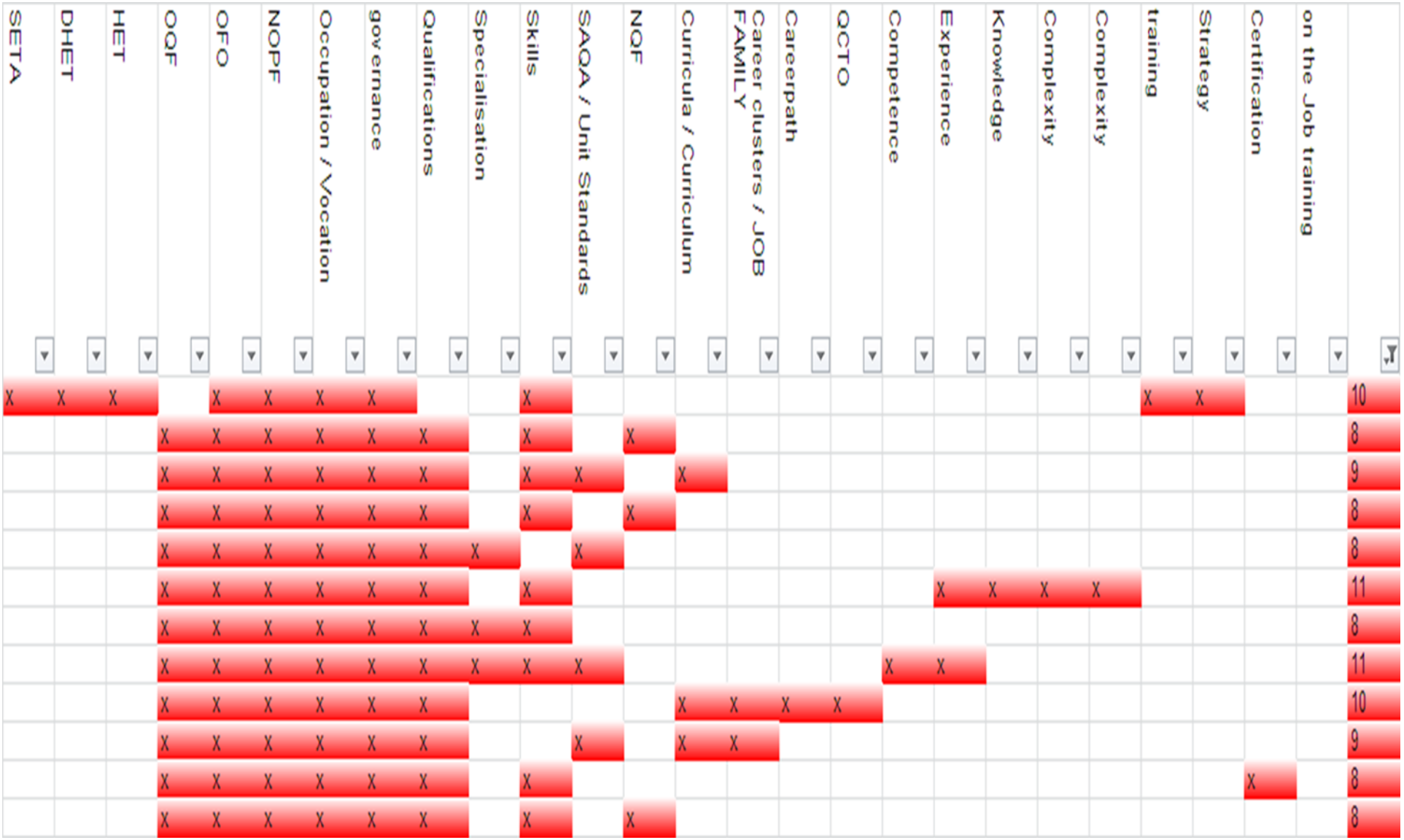
[18] NVivo or Atlas Ti software was later found to be doing the same as the spreadsheet that was developed independently.



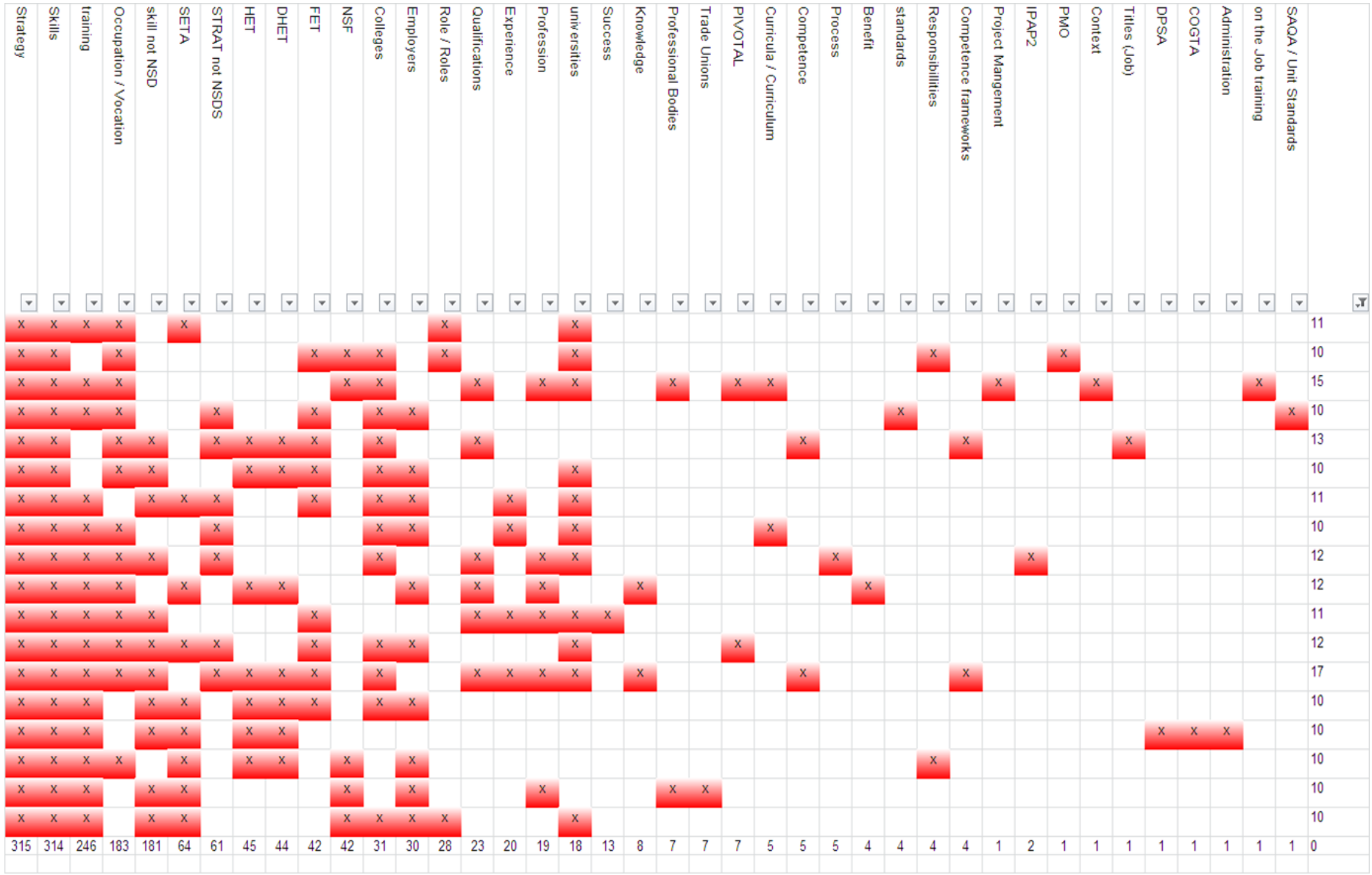
Annexure A Figure A: Data analysis and scope determination Chapter 3



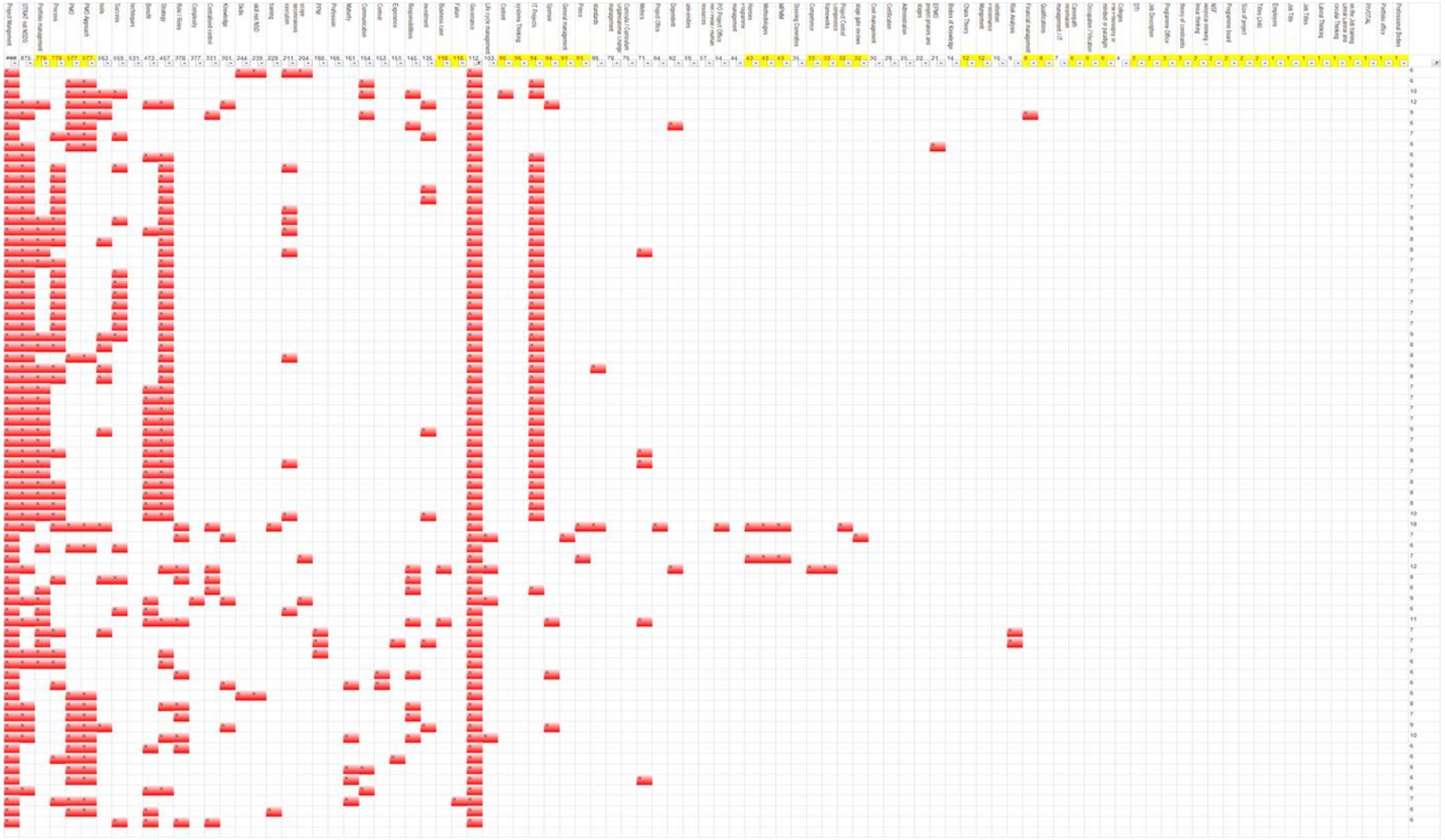
Annexure A Figure B: NSDS-III Literature Review Pattern (Chapter3)



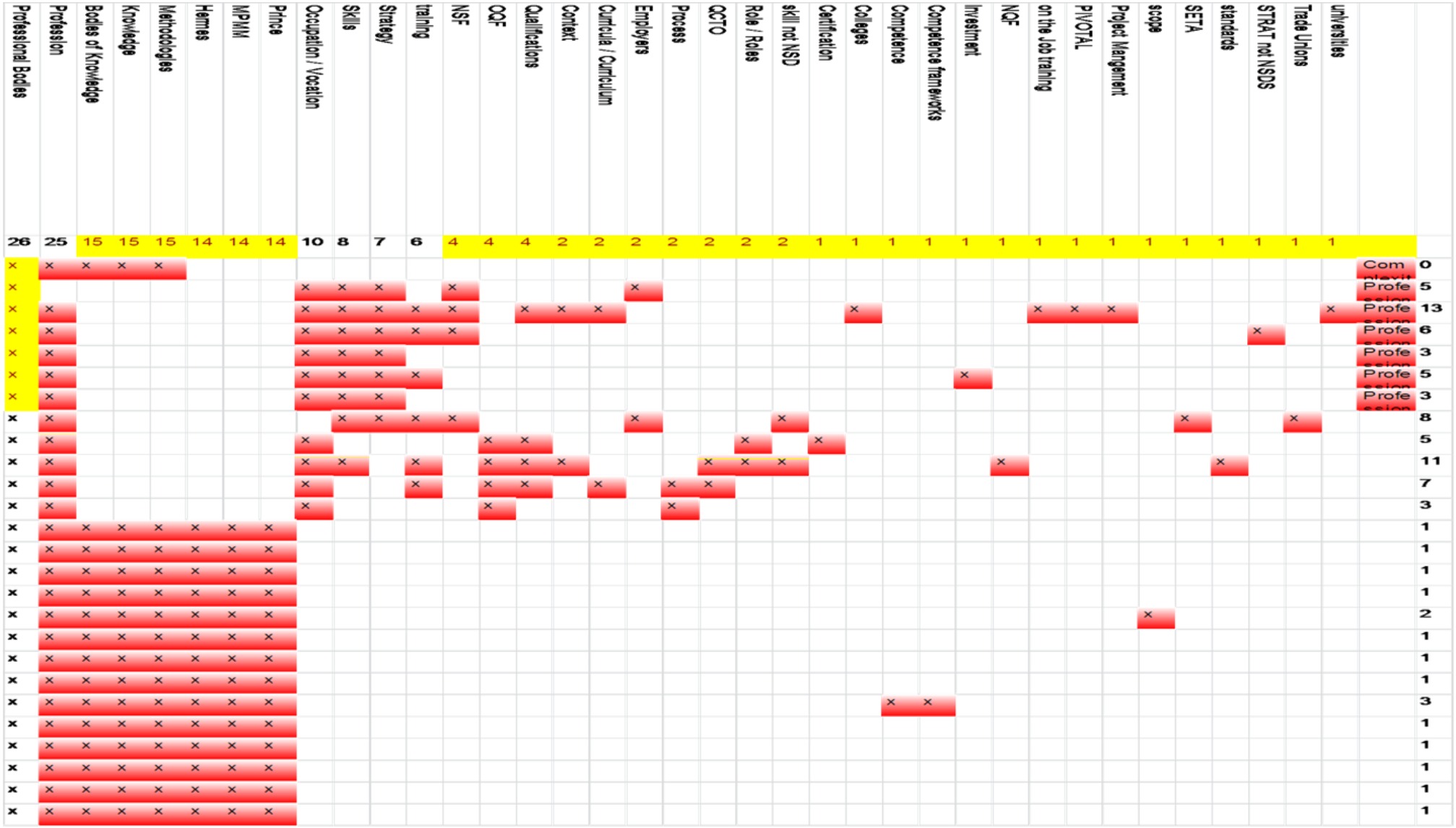
Annexure A Figure C: Key word analysis National Occupational Framework (NOPF) top 10 ranking (Chapter3)



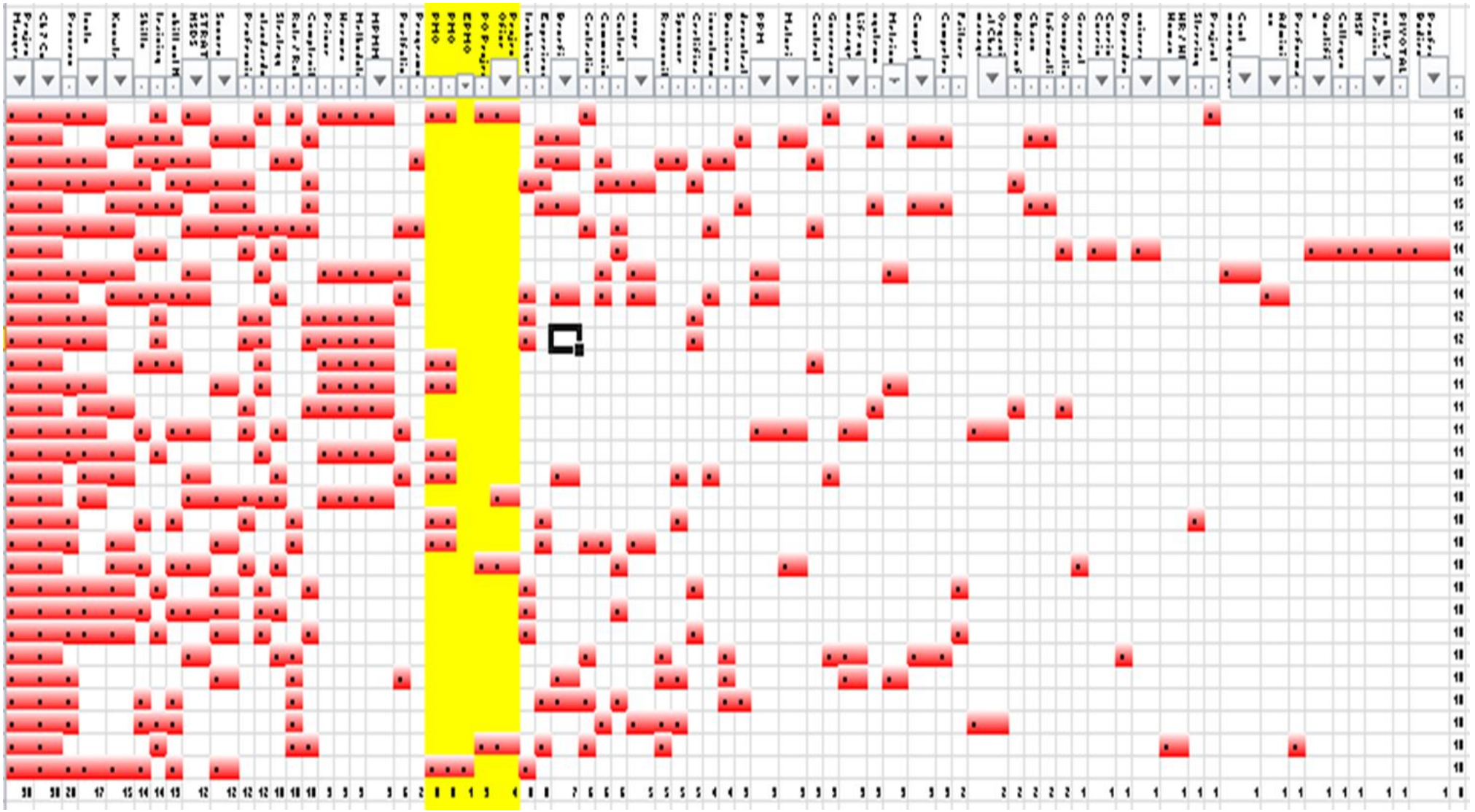
Annexure A Figure D: data analysis and scope determination for Chapter 4



Anaexure A Figure E: Data analysis and scope determination Chapter 5



Anaexure A Figure F: Data analysis and scope determination Chapter 6



Anaexure A Figure G: Data analysis and scope determination Chapter 7