The Formulation of Competencies for General Workers within an International Foods Manufacturer

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Jacqueline Ambrose

Centre for Industrial and Labour Studies

University of Natal

Durban

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ABSTRACT

The problem investigated within this research is how an organisation can overcome its skills gaps, whilst ensuring national and international recognition of those skills, and contribute to an increase of skills nationally. This problem is addressed through the formulation of competencies. The eclectic approach forms the theoretical paradigm of the studies. The methodology used for the formulation of competencies is an adaptation of Spencer and Spencer's (1993) classic competency study model. Competencies formulated are aligned with the latest developments within the South African vocational qualification system and incorporate elements of the behaviourist approach.

The study is conducted in an international food manufacturing company. The target population consists of male Zulu-speaking workers. Education levels established through assessments indicate that the population is situated at an adult basic education level of four, the equivalent of a grade nine within the formal schooling system. Demographics show that workers have on average more than two years' experience within their current job roles and their mean age is forty years, an indication of their experience within the manufacturing environment.

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Introduction

A.1 BACKGROUND TO THE STUDY

A.1.1 South African Training Context

The difficulties currently confronted in the South African training and educational context are numerous and a great deal of emphasis has been placed by local media on issues such as poor matric results, teacher strikes, school boycotts, the value of degrees and the lack of skilled resource (Jones, 1998; Paton, 1997). The origins of some of these problems are historical: institutional hearings between business and labour have highlighted business's role in the creation of a largely unskilled labour force (Truth and Reconciliation Commission, 1998). Three major challenges, arising from this context have been identified by the Human Sciences Research Council (HSRC, 1995). Firstly, training systems need to be equitable. They need to support those students in conventional schools and training institutions and in addition, those who have not had access to formal education and training, who are currently stranded without recognised skills in a country where an increasing value is placed upon skill and knowledge. Secondly, it is understood that in order to achieve greater levels of economic growth, and to compete globally the quality of our education and training systems needs to be improved (Gates, 1999; Sikhakhane, 1997). Nic Segal, deputy chairman of Business South Africa states that

> Business recognises the critical need to upgrade skills. It is a crucial element in our drive for international competitiveness. South Africa has a poorly developed skills base partly because the economy itself did not demand skills, this must change dramatically (Paton, 1997:1).

Finally, education and training have previously been separated. This has led to unequal and disparate development within the two systems which should have provided one developmental pathway for an individual learner. There is a need to integrate education and training into one system which would allow for vocational as well as academic development (HSRC, 1995, Paton, 1997). Improvement in all of these areas is important to overall development within South Africa. Current trends towards globalisation and changes to technology have impacted upon skills requirements (Sikhakhane, 1997). The application of knowledge and capabilities has become essential and the white paper on Education and Training reflects this argument:

> Successful modern economies and societies require the elimination of artificial hierarchies, in social organisation, in the organisation and management of work, and in the way in which learning is organised. They require citizens with a strong foundation of general education, the desire and ability to continue to learn, to adapt to and develop new knowledge, skills and technologies, to move flexibly between occupations, to take responsibility for personal performance, to set and achieve high standards and to work co-operatively (RSAb, 1995:15).

The context within which this research is situated is one in which moves have been made to address these issues, through the development of an integrated education and training system, overseen by the South African Qualifications Authority (SAQA). However, this system is still in its earliest stages of development and implementation. As such, South Africa's current training records and statistics are noteworthy. They indicate the underlying symptoms of the apartheid education and training system, the cure for which

is being developed through SAQA. On average South African companies' expenditure on training is in line with that of other middle-income countries. Yet, it is well below the levels of industrialised and other fast industrialising countries. Currently South African companies spend two point seven percent of payroll on training. Smaller companies though, spend much less or nothing (RSA, 1996). At least forty percent of firms in South Africa do not provide their employees with any structured learning or training. (RSA, 1996). The green paper on Human Resources Development notes that the International Labour Organisations' (ILO) country review of South Africa revealed that eighty-seven percent of a sample of South African manufacturing companies claim to train their workforce, of these seventy percent provide only initial induction or informal training to entry-level workers. Of the ninety-one percent of companies who claimed to provide retraining to their employees, seventy-four percent said that it was informal on-the-job training (RSA, 1996). The implication of this, is a continued lack of development of workers which has left South Africa with a shortage of transferable, marketable skills within the workforce. There are few learning pathways to provide continuous and structured training possibilities for labour. A high percentage of enterprise training is focused on trade, or higher level occupational training. This is confirmed by the ILO, which found that

> In no manufacturing firm did production workers account for more than ten percent of those receiving training in the past year (RSA, 1996:12).

Coupled with this lack of development, is the fact that international trends indicate that the number of unskilled jobs is declining (Phillips, 1996). There is a common belief that globalisation harms unskilled workers by freeing the movement of labour, capital and

goods among countries, leading to a shift in demand away from less skilled workers towards the more skilled (Sikhakhane, 1997). Slaughter, an International Monetary Fund (IMF) scholar and Swagel, an IMF economist, argue that policy-makers can help to minimise these adjustment costs through enhancing training and educational opportunities, enabling workers to upgrade their skills to meet the demand of the global economy (Sikhakhane, 1997). In addition Slaughter and Swagel note that the shift in demand for labour has led to large increases in wages and income inequality between the more and the less skilled in some countries, whilst resulting in unemployment among the less skilled in other countries. In short this leaves South Africa with an ever-increasing skill shortage, growing income inequality and a lack of education and training opportunities. The need has arisen for a new approach to human resource development (HRD).

A.1.2 Human Resource Development

Human resources are an important factor in the growth and development of South Africa. Development of these resources can be structured through the utilisation of a competency-based approach; Iles (1993) supports this approach in his examination of competency and its use as a tool for achieving strategic coherence in HRD.

The value of HRD, for organisations and nations, lies in its impact on economic growth and development. Within the rapidly changing environment of the competitive world

economy innovation, flexibility and adaptability are vital to the success of organisations (Klein, 1997; Paton, 1997, Pityana, 1997; Sikhakhane, 1997). Through its impact upon productivity, and flexibility within the workplace HRD directly influences organisational competitiveness and adaptability. The success of HRD in turn is dependent upon its relevance to the labour market and global trends. In South Africa's past, as suggested above, the schism between training and education has been an important factor in the lack of marketable skill development (Meyer, 1996; HSRC, 1995). One of the assumptions of this study is that HRD, using structured competency-based vocational systems, contributes to the development of individuals, organisations and nations. The following text from the green paper on Integrated HRD in South Africa explains how education and training contribute to economic growth (RSA, 1996):

> ... directly through its impact on productivity, and through supporting, or even being the catalyst for, the introduction of new technology, product and process innovation and improved customer services. Much of the benefit of technological change whether this involves the introduction of new plant machinery or new ways of organising production is achieved through its effective implementation and adaptation to local circumstances and diffusion through the firm and industry. The presence of a skilled workforce is essential to the efficiency of these processes.

Historically the approach within South Africa has been to utilise unskilled or semi-skilled labour for low value-adding activities. This has created a heritage of small numbers of highly skilled workers at the top of organisational hierarchies and large numbers of "unskilled" workers at the base. Learning within the base of the hierarchy is traditionally informal and ad-hoc on-the-job training which does not provide workers with an understanding of the process in which they are involved. Learning at the top of the hierarchy has tended to be highly-structured, formal and academic in nature. Integrated

HRD ties into a united education and training strategy - in other words a national framework that caters for the recognition of life-long learning both vocational and academic. This strategy, which is still in its infancy, aims to overcome the disparity between the traditional national approach and prevailing international economic strategies, which require an emphasis on product quality, high value-added activity and product innovation (RSA, 1996; Paton 1997; Pityana, 1997). The implication of these strategies is a necessity for core skills, better entry-level training, the constant upgrading of competencies and adaptability within the workforce (Competence Builders, 1998). This trend has led to the development of competency-based vocational training within a number of countries such as Australia (EdNA, 1998) The United Kingdom (GNVQ, 1998) and New Zealand (NZQA, 1998). The challenge of overcoming the skill shortage is being addressed nationally through SAQA.

A.2 AIMS AND RATIONALE OF THE STUDY

Increasing globalisation and a heritage of a less skilled workforce are creating an increasing skills gap within South Africa. Internationally, skill formation is receiving increasing attention as countries realise its value. In order to overcome skills gaps Australia, New Zealand, Malaysia and the United Kingdom have restructured their education and training systems (Pityana, 1997). South Africa is beginning to implement such restructuring, through SAQA. Organisations have to reexamine their training strategies to ensure that they are producing the skills required for competitive advantage

within a global economy. The problem which this research aims to address is how an individual organisation can overcome its skills gap's whilst ensuring national and international recognition and hence provide portability of those skills, contributing to an increase of skills nationally. I believe that this can be done through the utilisation of an eclectic competency-based approach. I have formulated a number of aims for this research in order to address the problem.

The first of these is to formulate competencies specific to the target group, namely, factory workers, within an international consumer goods manufacturing company. Formulated competencies will then be placed within a matrix. The target group falls within that described by the Department of Labour's HRD strategy (RSA, 1996) as unskilled or semi-skilled. It also shares many of the essential characteristics of this group, including a need for structured vocational training and development

Linked to this principal aim, are a number of sub-areas. The first of these is to utilise the verified competency matrix to demonstrate, across departments and a variety of roles, the existence of generic and meta-competencies which can be linked to the National Qualifications Framework in order to provide learners with portable skills.

The final objective is to, utilise the competency matrix to create learning pathways for the target group which would open up career paths and greater possibilities for career progression. Once this has been done, SAQA guidelines regarding levels and credits

(Gunthorp and Elliott, 1998; Isaacman, 1996) will be integrated into the matrix. In order to ensure future relevance and the possibility of linkages to the National Qualifications Framework.

An essential principle of the competency-based approach is to provide formal recognition for skills and knowledge to employees which they can use as currency within the workplace. Individual competencies form the building blocks of training and development. They can be used to form the basis of skills-based pay, performance assessment, and learning pathways and ultimately national vocational frameworks. This study then provides these building blocks and formats them into applicable tools for further HRD. The green paper on HRD published in 1996 (RSA, 1996) highlights the importance of finding ways to overcome current skills gaps through a process in which training for target groups is developed within a clear framework, supporting both basic and more specialised skills, and which is thoroughly linked to industry skill-needs, standards and design.

> Human resources development is an important factor determining the economic and social success of nations (RSA, 1996: 14).

Numerous authors discuss the importance of the skills and capabilities of the labour force (Berman, 1997; Dubois, 1996; HSRC, 1995; Mhel, 1997; RSA, 1996; Train, 1997). It is my argument that no matter how the system eventually evolves, the basic building blocks - competencies - remain the same across the diverse frameworks currently in existence. Building the competency of individual workers systematically leads to an increase in

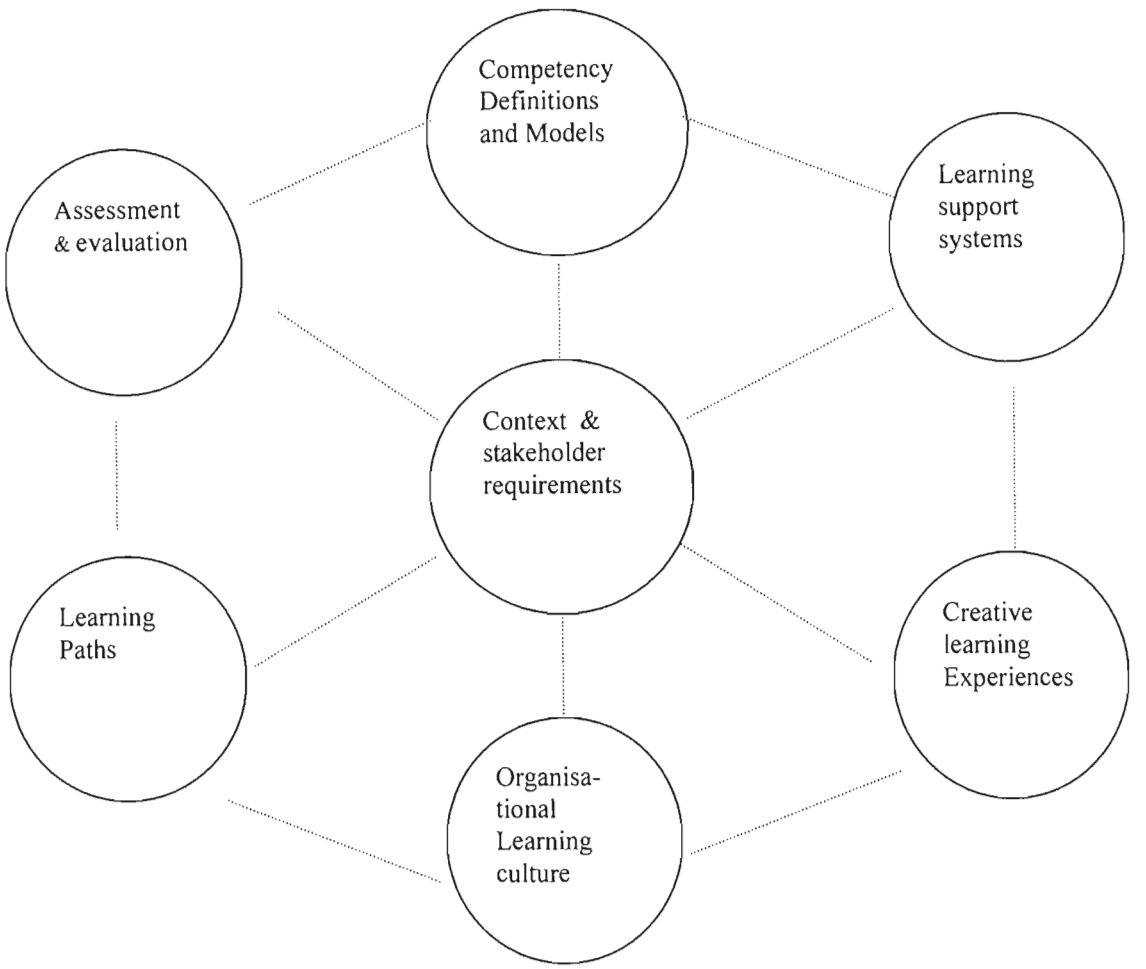
skills within communities, and eventually within nations. The National Qualifications Framework is the enabler within this process of skill transference. Essentially the goal is to

> enable the building of human capacity to achieve the social and economic goals of the country as a whole and organisations and individuals in particular. (Meyer, 1997: 30)

This study is a first step in this process for the individuals and organisation involved and contributes towards a holistic learning system as illustrated in Figure One. Meyer (1997) utilises this depiction to explain learning systems, in which competency definitions and models, as well as learning pathways are key components. Also of importance is the involvement of stakeholders within the design and development of these systems, an element which is essential to the structure of the research methodology.

FIGURE 1: A HOLISTIC LEARNING SYSTEMS MODEL

(Meyer, 1997:32)



The focus of this research is upon two of the areas above: learning pathways and the development of competency definitions and models (Matrix) and, further to extract possible generic and meta-competencies. The importance of these will be discussed in detail in the chapters which follow. Stakeholder requirements along with the organisational learning culture are also important contributors to the final research questions and structure.

A.2.1 Research Questions This Study Will Ask And Answer

The problem which this research aims to address is how an organisation can overcome its skills gaps whilst ensuring national and international recognition of those skills and contribute to an increase of skills nationally. A number of questions have arisen from the aims of this study they are listed below along with each of the studies aims.

1. The first aim is to formulate competencies specific to the target group and to place them within a matrix. The following questions need to be answered in order to achieve this aim:

a. What competencies exist within the target group?

b. Can the two main approaches to competencies, behavioral and vocational, be integrated to ensure that the benefits associated with both are exploited?

c. If so how should these competencies be formulated and formatted, so that they reflect this approach?

d. How can the formulated competencies be linked to developments within education and training in South Africa, and ensure that skills transfer and portability is possible?

e. Which methodology will best suit the formulation of competencies and ensure full stakeholder participation?

2. The second aim of this research is to demonstrate the existence of meta-competencies within the target population. The question which naturally arises from this aim are:

    a. Do meta-competencies exist within the target grouping?

    b. Can they be utilised to link organisational competencies to national competencies?

3. The third and final aim is to use the competency matrix to create learning pathways for the workforce, which would allow for career progression.

    a. Given this requirement, how can the competencies be sequenced to allow for structured learning and development?

    b. Does this sequence reflect the structure of the NQF and thereby validate the levels and credits applied?

    c. What does the use of levels and credits show about progression in the pathways?

Although each of these sub-questions is of value, their role is to build an answer to the question of how an organisation can address its skill shortages and those which have arisen due to historical shortcomings in South Africa's education and training systems.

A.3 SCOPE

In Chapter One I will examine the concept of integrating the two main approaches to competency: vocational and behavioral. Through investigating these two approaches and

their applications I will show that the deficiencies of each make the choice of only one inadequate for the purposes of this research. The use of an eclectic approach, on the other hand, integrates the benefits of both, filling the gaps which exist when they are used in isolation. An eclectic approach creates the opportunity to utilise the competencies which are formulated to demonstrate the existence of meta-competencies, to create learning pathways which link all levels of an organisation and to address skills shortages in a manner which meets organisational and national requirements.

In Chapter Two, I use the concept of integration and holism which underpins the use of an eclectic approach to demonstrate the nature of the context in which the research is situated and to examine the application of an eclectic approach within the national context. Within this chapter developments in education and training in South Africa are discussed in terms of a suprasystem which impacts upon organisational competencies which form the associated subsystem. The components of the system SAQA, the National Qualifications Framework (NQF), organisational core competencies, meta-competency and competency cycles - are examined in detail. The conclusion is that the systems and their components which comprise concepts from both behavioral and vocational paradigms are best integrated through an eclectic approach.

In Chapter Three, I will examine qualitative methodology demonstrating the suitability of grounded theory for this research, because of its general principles. These principles provide the basis for the use of classic competency studies, advocated by Spencer and

Spencer (1993) offering an approach which I would argue is both the most comprehensive and tested qualitative method for use in competency-based research. In addition classic studies can be adapted in order to suit the requirements of an eclectic approach and the organisational need for stakeholder participation. The suitability of this adaptation is shown in the final section of this chapter through the research design which explains in terms of phases how the adapted format for classic studies has been used to ensure that the resulting competencies reflect both aspects of the eclectic approach.

In Chapter Four, the results are presented and discussed in terms of the aims and questions which were derived from the research problem. The demographic profiles illustrate the organisational context and reveal, its suitability for the purposes of the study, both in terms of educational levels and an organisational climate of continuous learning. The results, presented within a format which utilises both behavioral and vocational elements, illustrate the importance of the use of an eclectic competency-based approach. This approach allows for the results to be applied on both a broad behavioral and a detailed vocational level. The broad level provides for the creation of a competency matrix which demonstrates the existence of meta-competencies and learning pathways which move a learner from entry-level towards supervisory positions and provide the foundation for managerial competencies. The detail vocational level provides the outcomes required for use within assessment, the development of training material and the recognition of prior learning. This shows that a competency-based eclectic approach can be used to address the skill shortage present within South Africa, through enabling

organisations to formulate competencies suitable for organisational and national requirements.

In conclusion I will show that the use of an eclectic approach contributes to the development of holistic and flexible competencies, which integrate the behavioral concepts of underlying characteristics, attitude and strategic competencies with the vocational concepts of learning credits, national competency frameworks, outcomes and assessment criteria. The behavioral approach of Spencer and Spencer (1993) also contributes the methodology applied within the research, which ensures that the collection of data is valid and inclusive. The investment required in such an approach in terms of resources and time is large. The results however are broadly applicable and provide developmental opportunities for employees through all levels of the organisation. The competencies formulated the meta-competencies and the learning pathways are an important means to address the requirements of the organisations skill-needs as well as the skill shortages which occur on a national level.

Chapter One

Competency: Towards an Eclectic approach

1.1 INTRODUCTION

Within the HRD context there are two broad approaches to the theory and application of competency; the behavioral approach pioneered by McBer and McClelland (McClelland, 1976) and the vocational approach used extensively in national qualification systems, whose main proponents are educators (Blank, 1986; NCVQ, 1995). The aim of this chapter is to examine the roots of these two approaches and to demonstrate through an analysis of the more common definitions utilised by theorists, the positive and negative aspects of each. This analysis highlights the need for an alternative approach which draws upon the positive aspects of both paradigms, showing that an eclectic approach meets requirements and is able to address the research problem.

1 .2 TOWARDS A DEFINITION OF COMPETENCY

Due to the divergence of the two main approaches, behavioral and vocational, there is no one definition of competency pervasively in use. Thus there is no common language amongst those who work in this field. For this reason, I would argue that it is important to examine various definitions, in order to demonstrate that an eclectic approach is more

suitable for this research. The purpose of examining the definitions of competency used by adherents of the two schools is to provide the groundwork for the approach which is used in this dissertation.

Brown (1993: 25) explains the need to define competencies succinctly as follows:

> Social science has a habit of taking a word which is in our common vocabulary and altering its meaning for adoption as a technical or academic term. This process is still happening to "competence" (and thus "competent" and "competency") and current differences in meaning result from the fact that a common consensus is not yet established as to what these words represent when removed from their lay meanings.

The lay meaning which Brown refers to is the definition of competency found in the dictionary, which is the common point of departure for any approach to competency and lies at the foundation of both the behavioral and the vocational approaches. Within this context competency is defined as

> Proficient, properly qualified; capable and efficient. (Readers Digest, 1996:242)

Boyatzis (Adams, 1996:45) further refines this, when he states that competencies are:

> Those characteristics that differentiate superior performance from average and poor performance.

This has led to a debate about how to define those characteristics that are essential to performing a job, but do not necessarily lead to superior performance. Such skills are numerous within the vocational approach. If his definition is applied, it excludes these skills which, whilst being performed competently, are not necessarily linked to superior

performance. Boyatzis's elaboration of his initial definition helps to overcome this problem and in addition introduces the concept of outcomes, which are the results of competent performance.

> Effective performance is the attainment of specific results (outcomes) through specific actions, while maintaining policies, procedures, and conditions of the organisational environment. A competency is ability, a persons set of competencies reflect his or her capability. They are describing what he or she can do, not necessarily what he or she does, nor does all the time, regardless of the situation or setting (Adams, 1996:45).

By defining competency in terms of specific results and performance Boyatzis moves into the field of vocational competency. This paradigm provides the parameters within which vocational institutions or bodies such as South Africa's National Qualifications Framework or the United Kingdoms National Council for Vocational Qualifications (NCVQ) operate. The vocational approach is further defined through the principles of the NQF (see Chapter Two) and the legislated procedures for the structuring of vocational competencies or unit standards provided by SAQA. Vocational competencies must for example be progressive or incremental and should allow for portability (HSRC, 1995). In short, vocational competencies focus upon the operational level of performance, the outcomes of the application of knowledge, skills and understanding in the workplace.

The alternative, behavioral paradigm, defines competency in more psychological terms. Spencer and Spencer (1993), firm adherents to the work pioneered by McClelland and McBer during the 1960's and 1970's, define competency as:

> An underlying characteristic of an individual that is causally related to criterion-reference effective and /or superior performance in a job or situation (Spencer and Spencer, 1993:9).

In my opinion this definition, although requiring further explanation before its application can be clearly understood. Spencer and Spencer (1993) themselves use a chapter of their book in order to do this. I will provide a summarised definition of each of the key terms, the first of which is 'underlying characteristic'. Spencer and Spencer (1993:9) explain this as follows:

> The competency is a fairly deep and enduring part of a person's personality and can predict behaviour in a wide variety of situations and job tasks.

According to Spencer and Spencer (1993) there are five types of underlying competency characteristics:

1. Motives, the things which an individual thinks about or wishes for which cause action.
2. Traits, physical characteristics and consistent responses to input.
3. Self-concept, a person's attitudes, values or self image.
4. Knowledge, information a person has in specific content areas.
5. Skill, the ability to perform a certain physical or mental task.

The second key term is 'causally related',

> Causally related means that a competency causes or predicts behavior and performance (Spencer and Spencer; 1993:9).

The final term which I believe requires further explanation is criterion-reference. Spencer and Spencer (1993:9) explain this as follows:

> Criterion-referenced means that the competency actually predicts who does something well or poorly, as measured on a specific criterion or standard.

This explanation outlines the basic premise of the behavioral approach clearly highlighting the strategic focus of behavioral competencies. Both approaches, behavioral and vocational, differ in their usage of the term competency and view themselves as discrete, as is illustrated by Woodruff (1991:17) who explains the differences in the two approaches through defining the terms competence (vocational approach) and competency (behavioral approach).

> Competency focuses on behavioral aspects of an individual, whilst competence looks at what enables an individual to be competent (Woodruff, 1991:17).

Both Spencer and Spencer's (1993) definition and that of Boyatzis (Adams, 1996), provide concepts which are value-adding. Spencer and Spencer (1993), provide concepts such as standards (criterion-referenced) against which an individual is measured, attitudes, underlying characteristics as well as the use of knowledge and skill as components of competency. Boyatzis (Adams, 1993) adds the concepts of effective performance, outcomes and capability. In summary both view competency as the behavior an individual needs to display in order to do the job effectively.

Woodruff (1991) argues that organisations combining behavioral and vocational styles cannot satisfactorily assess people because any behavior may be evidence of competencies of both types.

> Those making the assessment can become confused and double mark any given behavior (1991:30).

Woodruff's argument may be valid in a context where practitioners have not clearly defined the purpose and function of both approaches. However, in clearly defined contexts it may add value to utilise both ends of the spectrum. It is in the utilisation of this approach, which I would term eclectic, that this research differs from traditional approaches to competency. By utilising both behavioral, and vocational approaches the gaps which exist when only one approach is utilised are filled.

In conclusion it is important to highlight the concept of superior performance as a component of the definition of competency utilised in this research. It is inadequate to merely utilise unit standards, (the vocational application of competency) or competency statements, (the behavioral application), to describe an individual's current level of skill or knowledge, as current levels within business are not necessarily optimum, or required. Descriptors of competency need to incorporate what is referred as best operating practice (BOP) as well as superior performance. This ensures that individuals who are assessed as competent are capable of measurable increases in their productivity levels and impact positively on economic growth. In terms of the framework for this research, competency can be defined as:

> Knowledge and skills, which underlie effective job performance. (McLagan, 1980:22).

and as a combination of knowledge, understanding, skills, values (underlying characteristics) and attitudes (HSRC, 1995). These definitions, rather than those which seek to place competency exclusively in the realm of either strategic or operational performance, will be utilised in this research. This is in keeping with an eclectic approach to competency, which is investigated below.

Finally, it is important to note that in addition to the diversity of definitions, there are also different spellings of competency, which are dependent on the original background of the researcher. The American behavioral approach utilises the words competency (singular) and competencies (plural) whereas the vocational approach uses the spellings competence (singular) and competencies (plural). For the sake of continuity, as both schools of thought are integrated into an eclectic approach, the terms which I have used are competency (singular) and competencies (plural).

1.3 THE COMPETENCY MOVEMENT

The origins of use of competency within HRD began with the establishment of the Competency Movement in Britain and America in the 1960's and 1970's (Adams, 1996:44). With two distinct geographic areas of origin, two schools of thought have emerged. Their influence upon each other, in my opinion, is due to their common

understanding of the deficiencies within the traditional approach to training and education. David McClelland (Adams, 1996:44) a proponent of the American, behavioral approach highlights this commonality. McClelland argues that

> Traditional academic exams did not predict job performance or success in life, and were often biased against minorities, women and others. He indicated that researchers should be looking for ways to identify other variables (competencies) that could predict success and which were unbiased, or at least less biased. (Adams, 1996:44)

1.3.1 The Behavioral Approach

McClelland along with his associate McBer (McClelland, 1976; Spencer and Spencer, 1993) laid the foundation for the utilisation of the behavioral concept of competency worldwide. This has led to the use of terms such as "cognitive" competencies. The behavioral paradigm uses behavioral psychology as a foundation (Foster and Louw-Potgieter, 1991). Behaviorism is

> That approach to psychology which argues that the only appropriate subject matter for scientific psychological investigation is observable, measurable behavior. (Reber, 1985:86)

The behavioral approach is based upon the work of John B. Watson, I.P. Pavlov and B.F. Skinner and according to Reber (1985:87) has been largely an 'American pastime'. There are a number of points of view within behaviorism, Radical or Watsonian behaviorism for example maintains that a proper scientific approach is one that limits behavior to specific peripheral muscular and glandular responses (Reber,

1985). Skinner focused on the effects of behavior on the environment, an assumption on which the behavioral approach draws. The concept of the impact of an individual's behavior as an indicator of competency and a precursor to superior performance represents this assumption. Spencer and Spencer (1993) emphasise the links between behaviorism and the behavioral approach to competency in a number of ways. Firstly, it is a key component of their competency causal-flow model where the first phase is intent, which is linked to personal characteristics, motive, trait, self-concept and knowledge. The second phase is action, which is linked to behavior or skill. The third phase is the outcome or job performance. Competencies within this approach are also clustered according to underlying intent, which Spencer and Spencer (1993:23) describe as the

> Level of analysis between deep underlying social motives and superficial behaviors.

Finally, Spencer and Spencer format competencies according to levels or degrees of behavior and behavioral descriptions. An example of such a competency is intensity and completeness of achievement-motivated action, a description which I would argue requires further explanation. This is provided to some degree by the description of the various levels. Within this particular competency there are eight levels starting with 'no standards of excellence for work' at the lowest level and 'takes calculated entrepreneurial risks' at the top. Each level is in turn described to provide further clarity: 'takes calculated entrepreneurial risks', for example, is explained as:

> Commits significant resources and or time (in the face of uncertainty) to improve performance, try something new, reach a challenging goal (e.g. starts new products or services, takes on 'turn-around' operations), while also taking actions to minimise the risks involved (e.g., does market research, line up customers in advance, etc.) or in achievement for others, encourages subordinates in taking entrepreneurial risks (Spencer and Spencer, 1993:26).

These descriptions are problematic, in my opinion, as they require a thorough understanding of each term and do not provide easily measurable outcomes. However, this concept of competency has crossed national boundaries. It has been soundly in place within HRD for over three decades specifically as a management development tool (Berman, 1997). It has also been applied to technical, entrepreneurial, professional, sales and military jobs (Spencer and Spencer, 1993).

1.3.2 The Vocational Approach

The vocational approach is currently in use in Europe, America, Australia, and New Zealand as an educational, and HRD tool (Berman, 1997). Adherents of the vocational approach focus upon the application of competencies within the general training environment. The use of the concept of competency within the vocational paradigm focuses upon outcomes (descriptions of what an individual must be able to do) and the measurement of skills. The vocational approach does not arise form a particular psychological paradigm, but rather from the needs of business and education. Proponents of this approach are W. Blank (1986) and T.F. Gilbert (1978). Blank (1985:11) lists the following authors along with their best-known publications as pioneers in the field

> J.B. Carroll 'A Model of School Learning', J.H. Block 'Mastery Learning' and B.S. Bloom 'Human Characteristics and School Learning'.

This list demonstrates the background to this approach in education and training which a description of its principles highlights further. Blank (1985:12-16) lists the following seven principles:

> Any student in any training program can master almost any task at a high level of mastery if provided with high-quality instruction and sufficient time.
>
> A student's ability for learning a task need not predict how well the student learns the task.
>
> Individual student differences in levels of mastery of a task are caused primarily by errors in the training environment, not by characteristics of the students.
>
> We should focus more on the differences in learning and less on the differences in learners.
>
> What is worth teaching is worth learning.
>
> The most important element in the teaching-learning process is the kind and quality of instruction experienced by student.

These principles highlight some of the differences between the behavioral and vocational approaches to competency and demonstrate the shared assumptions of the vocational approach and the NQF (See Appendix B; Principles of the NQF) which is being implemented in South Africa. Gilbert's Human Competency Theorem explains (1978:18-19) vocational competency as it differs from the behavioral approach:

> The true value of human competency is derived from actual accomplishment, not from behavior.
>
> Great accomplishments are worthless if they incur great costs in terms of human behavior or activity.
>
> A system that rewards people for their behavior, rather than the net results of their behavior breeds incompetence.
>
> We should not confuse the 'plow' (behavior) with the 'crop' (accomplishment).

Reducing the required behavior to reach a given performance promotes human competence.

Knowledge and attitudes without worthy performance are meaningless.

Gilbert's theorem has been refined, and is integrated within Blank's (1985) approach. Ultimately, both schools of thought can be utilised in almost any HRD context. However, each has shortcomings, which will be discussed below in section 1.4, on the eclectic approach. Meyer (1996) summarises three areas of usage for competencies within the HRD context:

- The core competence of the organisation in the context of the strategy and organisational goals.
- Competency-based qualifications such as the British NVQs, Australian, New Zealand and South African qualification systems.
- Managerial competencies for the measurement of potential and managerial development.

The two latter areas, namely, competency-based qualifications and managerial competencies have had the greatest impact upon this study. The first is an outcome of the vocational approach and the second of the behavioral approach. All three areas however, have specific applications which influence the use of competencies within organisations. Applications widely used by various governmental, academic and business institutions are training needs analysis, performance assessment, recruitment and selection, individual career planning, vocational counseling, succession planning and career pathing (McLagan, 1980). All of these applications are evident within the British National Council for Vocational Qualifications, the Scottish Vocational Council, and the New Zealand National Qualification Framework (Berman, 1997; EdNA, 1998; GNVQ, 1998; NZQA, 1998). In addition the use of competency and competency models is well

established in European and American managerial training. Recent legislation, (Republic of South Africa (RSA), 1995) and the implementation of curriculum 2005 within the South African education system, ensure that they will become, in a vocational format, a national tool.

The frequently paradoxical and essentially divergent definitions of competency leave it in the hands of researchers either to redefine the concept, or utilise a definition which suits the nature and context of the particular research study which they are delineating. The approach which I believe offers the most benefit to this study is the eclectic approach. The approach which I have developed draws on the positive aspects of both the behavioral and vocational paradigms discussed above.

1.4 AN ECLECTIC APPROACH FOR COMPETENCY FRAMEWORKS

In the sections above I have discussed the two approaches to competency. Indicating that various organisations and theorists focus on one or the other depending upon their requirements. Within the South African context, I would argue that there is a need to draw on both in order to obtain the most benefit, using the approach commonly adopted for strategic or managerial jobs, which defines particular areas of competency required in behavioral terms, and the vocational approach, which defines competency as a set of skills placed in a unit standard format, usually applied to shop floor jobs. The integration of these two approaches is important, as it will ensure that the results of this research are

more widely applicable. Integration also allows for a holistic picture of an organisation by permitting the description of both desired behaviors and specific skills. It prevents a scenario where only some aspects of an individuals work described. Figure Two below describes this dichotomy.

FIGURE 2: RELATIONSHIP BETWEEN VOCATIONAL AND BEHAVIORAL BASED COMPETENCY.

Vocational based competency	Behavioral based competency: High	Behavioral based competency: Low
High	1 Behavior and skills-based Fewer gaps in individual role descriptions. Both operational and strategic components in roles are catered for	2 Well-defined skill descriptors Leaving gaps in behavior descriptions and therefore in the strategic component of the role
Low	3 Well-defined behavior characteristics but little room for skills, leaving gaps in skills component of competency and therefore in the operational application of competency	4 Roles are not defined clearly at all Individuals cannot ascertain required areas of performance or training needs

Block one within the model above describes the optimal situation, achieved through an eclectic approach. This integrates the positive aspects of both approaches into a single

model incorporating operational (vocational) and strategic (behavioral) elements. Block one has a high level of skills-based competency combined with a high level of behavioral competency, drawing on theorists from the American approach, McLagan and McClelland as well as those who support a vocational approach, NVQ and SAQA (McClelland, 1976; McLagan, 1980; GNVQ, 1998; SAQA, 1998). Block two illustrates a skills based or vocational approach, which has well-defined skill descriptors at the cost of attitudinal and behavioral elements. This model would be used to describe operational competencies and would exclude most strategic elements. Block three provides the details of a behavioral approach, such as that of Spencer and Spencer (1993), which provides well defined behavioral characteristic but does not describe how a learner should perform or what they would need to know. Block four describes a traditional approach in which requirements are not defined and learners are unable to determine how they should perform. This model has low levels of both behavioral and vocational competency.

In South Africa, the focus has been placed on the skills performance end of the competency continuum. In many ways, this is the most suitable approach for the country, which needs to improve the skills of its workforce and the relevance of its educational system. It does not, however, allow for the description of a large number of managerial or behavioral competencies, which are required within an organisation. It also does not incorporate some of the positive aspects of the behavioral approach, such as the understanding that underlying characteristics may affect performance and attitude can affect learning. This leaves a large gap in the holistic description of an individual's areas

of competency, a problem that is best addressed by incorporating the behavioral competency descriptors. In addition, the methodology used by behavioral in the classic competency studies, which have been tested over a twenty year period (Spencer and Spencer,1993) has a greater level of validity than that of the vocational approach (Blank, 1985). Many organisations currently make use of both managerial competency descriptors of performance for the upper hierarchy of their organisation and the adoption of unit standards as a means of describing the skills of those directly involved in the production process. Success in my opinion lies with the integrated use of both approaches, allowing for continuous learning and uninterrupted learning and career paths, from an operational to a strategic level.

1.5 CONCLUSION

In this chapter I have discussed the two approaches to competency and their definitions of competency, showing that the use of one approach on its own does not address the full spectrum of competency and can therefore not overcome the skills shortage within South Africa. I have argued that the concept of an eclectic approach for competency frameworks is the most useful approach as it draws upon the most relevant and applicable concepts from each school of thought. This allows for the incorporation of attitudes, outcomes and the principles, which have been laid out by Blank (1985), as well as the methodology advocated by Spencer and Spencer (1993). It is through the application of this model that a holistic picture of competency can be formulated and the problem of the skills shortage within our national context can be addressed.

Chapter Two

Organisational and National Competency Context

2.1 INTRODUCTION

The argument presented in this chapter, shows the systemic nature of the context in which this study is situated and the importance of the South African national context and the developments within education and training specific to it. Information moves between the organisational and the national context in a two-way process. This creates a dynamic relationship between the components of the system, which impacts upon the overarching problem of how an organisation can overcome its skills shortages whilst ensuring national and international recognition of those skills and contributing to an increase of skills nationally.

Given that the research problem requires the use of components of both the organisational and the national systems it is important to examine these components. In order to explain the organisational context, organisational core competencies are examined. Components of this context and issues that impact upon its function, namely competency value and competency cycles, are included in this section. These components illustrate the changing nature of the environment and the need for flexible and adaptable competencies. I will then show that meta-competency is a key link between the

organisational and the national contexts, and that its inclusion in this study contributes to the solution of the overarching problem of skill shortage. Finally, I will examine the suprasystem of the South African competency context. This examination demonstrates that the components of this system, namely national competencies, the South African Qualifications Authority (SAQA) and the structure of the National Qualifications Framework (NQF) have directly influenced the organisation and the manner in which competencies are formulated. This influence occurs because national competency systems comprise the vocational element of the eclectic approach in this context.

2.2 ORGANISATIONAL COMPETENCIES

Organisational core competency, is an outcome of the strategic path which the organisation is taking. They are described by Prahalad and Hamel (1990:30) in the Harvard Business Review as:

> The combination of individual technologies and production skills that identify a company's myriad product lines.

Snyder and Ebeling (Meyer, 1996:59) add further depth to this concept and in doing so explain the concept of BOP, as it applies to this study. They refer to core competency as;

> Tangible value-added activities that are performed more effectively and at a lower cost than that of the competition. These unique and enduring activities constitute a firm's core competency.

Core competency represents a competitive advantage to an organisation and therefore elements of core competency are not readily publicised. This presents a problem to those who are attempting to compile a national framework, which can only be overcome when organisations view the sharing of information as an advantage. Once organisations identify their core competencies they are able to compile a strategic plan for the development of employees which impacts directly on profitability. Meyer (1996) cites a number of examples which support this statement. The first of these is that of AT&T, who recognised their organisational core competency as being billing and the collection of fees from their vast base of users. This core competency according to Meyer (1996) has allowed them to expand their business into the credit card market and to become successful in this area. It is this ability to impact upon organisational success that lends to competencies a certain monetary value.

2.2.1 Value of Competencies

In the business context, the measurement of the monetary value of competencies is a difficult task. Nevertheless, Meyer (1996) provides the example of the Australian national framework in which over $1.4 billion is earned from foreign students studying in that country. In addition, a great deal of value has been placed upon the competencies designed for the wine-making industry within Australia which have proven their value through an increased level of wine sales for the country world-wide. Although difficult to measure directly, it is accepted that organisational core competencies are fundamental to competitiveness. The reason for this lies in one of the essential principles of competency frameworks - flexibility for both the learner and the organisation. In a global

environment of constant change, this is a significant advantage. Competencies, which are required to be current and relevant such as those utilised in the computer industry, are updated every six months, are tradeable and hence have a value (Computerweek, 1998). Within the South African context the value of the competency-based approach is increased through its impact upon the high levels of illiteracy, and its ability to bridge the gap between education and vocational training.

Although these examples indicate that competencies are valuable the difficulty, according to Meyer (1996), facing an increasing number of organisations utilising this approach, is how to put a monetary value upon what is essentially intellectual capital. In contemporary society a number of businesses, such as consultancies trade purely in intellectual capital. The assets of such businesses lie in the knowledge and skills of their employees. The measurement of these competencies holds the key to the success of training and indirectly to business as a whole. Peter Drucker (1998:1) highlights this aspect of competencies. He states that

> we are a knowledge society, and a knowledge society must strive to create an environment where organisations will assist in the development of knowledge workers.

The capital assets that are required to create wealth in the current global context are knowledge and skill assets. These assets must, in addition, be clearly defined and tied directly to the strategy of the business. I would argue that the link is made through the use of key stakeholders as participants at all stages of the collection and verification of data for the formulation of competencies.

Recognition of organisational competencies and their value is the first step towards restructuring an organisation. Burgoyne (1993) explains this further. He asserts that human resource managers tend to utilise the competency approach to deal with the organisational system in either a technical or a political sense. They use this approach in an overall plan and design for a human resource management system that influences the strategic direction of the organisation and the manner in which input is processed:

> through the structure formulated to deliver it, the roles and career structures get the right people into the roles and move them through in a dynamic career system, which keeps the changing roles of the system filled with competent people over time. Such a system is then implemented through the tactical process of recruitment, placement, training, assessment, promotion, reward systems and personnel planning. Notions of competence are a part of the language and process of these systems, used to describe job requirements, people, and hence their fit to specific jobs, to define training needs in terms of the gap between job requirements and person characteristics, to frame training and development objectives on programs, as frameworks for appraisal, and as commodities to be planned for, in macro personnel planning (Burgoyne,1993:9).

However, organisational competency is a concept, which can be, and has been, abused within the HRD field. Managers are quick to utilise the terminology relating to competency as a form of jargon or rhetoric which enables them to justify their function in management terms as financial, technical and marketing practitioners do (Burgoyne, 1993). This is a constant barrier to the development of sustainable competency frameworks. Organisational competencies need to be carefully formulated both for their contribution to national frameworks, and because of their monetary value and impact on competitiveness. Within this research it has been important to avoid creating a superficial framework which would not be value-adding. Careful analysis of what constitutes core

competency within a particular organisation must also take into consideration the life-span of the competency which virtually constitutes a 'best before' date. These life-spans are explained in terms of competency cycles and affect the value of the competency - both its monetary value and its value as a competitive advantage.

2.2.2 Competency Cycles

As the market changes and business requirements alter, competencies change. In order for both the individual and the organisation to reap the greatest benefit from a competency-based system, it is vital that the system itself be as flexible and as relevant as possible. Generally this means that every standard on a national standards system or within a particular organisation needs to be re-examined approximately every two years. Meyer (1996) highlights this with the example of deep-level gold mining. At a national level, the competency cluster associated with this type of mining will not be a significant competitive advantage for the country in the 21st century, where economic diversity is required. In addition to this, market fluctuations can completely alter the value of the product of such mining over a short period of time. One needs to understand this dynamic when dealing with competencies, either as an individual aiming to acquire future high value competencies, or as an organisation planning its competitive advantage into the future.

Iles (1993) indicates that there are three distinct stages in the life cycle of a competency. Firstly there are emerging competencies which tie into future trends and requirements.

Secondly there are maturing competencies whose value is steadily declining and thirdly there are transitional competencies which emerge and decline in accordance with the life-cycle of organisations. In addition to formulating competencies organisations must analyse the stage of development of the competency. This allows for the organisation to utilise competencies correctly. For example emerging competencies are important areas of training need and possible areas of competitive advantage as opposed to maturing competencies that are less valuable. In addition, emerging competencies provide competitive advantage not only to the particular sector or company which utilises them, but also to the national economy. Emerging markets, such as South Africa, need to identify emerging competencies, which can be included in a national framework and invest in them. National competencies are components of the suprasystem and they are linked to developments and changes within organisations through meta-competencies, which can emerge from organisational competencies. Essentially competencies identified within organisations which are generic and applicable to various contexts, are defined within this dissertation as meta-competencies, in order to differentiate them. Meta-competencies by definition can be used within national frameworks and therefore have value beyond the organisation.

2.2.3 Meta-competencies

To explain this more clearly, meta-competency can best be defined as competency which is broadly generic. In other words, generic not only within a company or across a department but across many different types of work and companies. Essentially meta-

competency refers to areas of knowledge and skill which are not linked to any particular occupation or profession (Meyer, 1996).

Meta-competencies have a number of shared characteristics. They underpin occupational competencies, they constitute part of the larger framework in which they are situated and they function as part of this greater whole (Meyer, 1996). It is these characteristics which make them the connection between the subsystem of organisational competencies and the suprasystem of national competencies and frameworks. For example, the concept of teamwork is generally universal but may be specifically framed within a particular context, i.e. sports, manufacturing teams, management teams. Meta-competencies have in the past been brushed aside; however, developments and discussions over recent years have led to the drafting of a number of basic meta-competencies. Researchers have examined various competency menus for different organisations and nations, and from them have synthesised meaningful meta-competencies. Management development within the United Kingdom, for example, has been a significant contributor (Brown, 1993).

Within the context of the British National Vocational System, these meta-competencies are described for each level of the vocational system (Pitman Qualifications, 1997). They are listed as follows: communication, the application of number, information technology, working with others, improving own learning and problem-solving.

Each competency is further defined as follows

1. Communication: take part in discussions, produce written material, use images and read and respond to written materials

2. Application of number: collect and record data, tackle problems and interpret and present data.

3. Information Technology: prepare information, process information, present information and evaluate the use of information technology.

4. Working with others: identify collective goals and responsibilities and work to collective goals.

5. Improving own learning and performance: identify targets and follow schedule to meet targets.

6. Problem solving: select procedures to clarify problems with a range of possible solutions and identify alternative solutions and select solutions to problems.

Meyer (1996:66) puts forward a similar list synthesised from various sources.

> The ability to locate and interpret relevant information from written, electronic and people resources and apply it to solve complex multidimensional problems, using processes of analysis, synthesis and systemic thinking. The ability to communicate effectively with diverse groups of people and individuals on complex issues. The ability to apply scientific and mathematical concepts and use relative technology effectively. The ability to operate effectively in multifunctional teams. The ability to use time effectively to manage a variety of tasks. The ability to manage one's own often multiple careers and balance occupational, family, community and other demands effectively.

Examining these lists effectively demonstrates the characteristics of meta-competency as broadly generic and applicable within a variety of contexts. Although they may be differently titled, they are in essence exactly the same. In conclusion, meta-competencies,

as stated at the outset of this section, are an important link between organisational and national competencies as they represent competencies which can be applied in more than one context or organisation. National competencies in turn are part of the broader context, which includes the qualification framework and the legislative body that has synthesised this framework and will in the future administer it.

2.3 NATIONAL COMPETENCIES

National competencies within the context described above become the end point of an organisational process. It is important to note that the opposite is also true and that interaction between the sub and suprasystem is reciprocal. The United Kingdom's National Vocational Qualifications System, for example, has been developed on a national basis (GNVQ, 1998). The advantage of first developing organisational competencies, is that national competencies are not imposed upon the target group, but rather the organisational meta-competencies link to the national framework ensuring relevance. A further advantage is that organisations can, during the initial stages of their interaction in national forums, bring information to the table, which has added value because it has been tested.

Competencies at a national level use a standards-based or vocational format that is dictated by SAQA. This allows for the integration of a variety of formats and approaches to competencies to be compiled into one typical format which is understood by all stakeholders. This facilitates the sharing of valuable information between stakeholders

and contributes to overall economic growth rather than to the success of just one organisation. This co-operative approach is one which Meyer (1996) believes will pull our economy into the 21st century.

National competencies can be defined (Meyer,1996:50) as

> those clusters of competencies, which have developed around strategic industries in a particular country.

In addition I believe there are organisational competencies which have been mutually agreed upon by specialists in the relevant field as meta-competencies and worthy of national recognition, which may also become national competencies, providing access to a pool of relevant and required skills and knowledge to all. This aspect is especially important within the South African context, where equal access has in the past been denied. National competencies may also be internationally recognised and exported adding further value. This is clearly demonstrated for example within the area of management competencies that have been exported from Britain around the world (Holmes & Joyce, 1993, Iles, 1993; Thomas and Sireno, 1980). Countries or local areas which have developed national competency menus or qualifications, are recognised for their expertise and attract more related industries (EdNa, 1998, Meyer, 1996, NZQA, 1998). To retain their value, however, national competencies must be relevant. The point at which the competency is positioned in terms of its life-cycle is therefore important. In addition national competencies are links to educational systems (Meyer,1996; RSAa, 1995; RSA, 1996). Enabling educational systems provide the workplace with learners who have relevant capacity timeously. Finally, as with organisational competencies national competencies, must be linked into an overall strategic plan to ensure that

competency cycles coincide with national skills requirements. National competencies are a vital component of a country's development as well as an important result of the development, within this context, of organisational competencies. As a suprasystem national competencies are regulated by the South African Qualifications Authority and are part of a national qualification framework. This regulation helps to ensure that they are linked to a collective strategic plan.

In the introduction to this dissertation a description of the human resource and training circumstances was provided. This furnishes some of the background to the South African competency context. The sections which follow below provide detailed information regarding the specifics of the system that has been designed to overcome the historical shortcomings of our separate training and education systems. Each of the main components dealt with contains legislative requirements which impact upon the subsystem of organisational competencies as input in such a way that they influence the formulation of these competencies. The first of these influences is SAQA.

2.3.1 The South African Qualifications Authority

The South African Qualifications Authority was enacted into law on the 28th September 1995. With it came a number of changes to our training and education systems. The Act outlines the establishment of the authority as well as its functions and powers (RSA, 1995). The principles laid out for the National Qualifications Framework as well as the

functions of the authority are of particular relevance. Section 5(1) states that the Authority shall oversee the development as well as implementation of the National Qualifications Framework (RSA,1995). The South African Qualifications Authority (SAQA) is responsible for: the registration of bodies responsible for establishing education and training standards or qualifications; the accreditation of bodies responsible for monitoring and auditing achievements in terms of such standards or qualifications; overseeing the implementation of the National Qualifications Framework; the registration, or accreditation of Standards Generating Bodies and Education and Training Assurers, and ensuring that through these processes, standards and qualifications are internationally comparable. (RSA, 1995)

In a number of ways SAQA serves as the catalyst for fundamental change within the South African education and training system. It does so firstly through moving towards integrating education and training, ensuring that there is continuity in which each offers. Secondly, it provides for the recognition of skills, which have in the past gone unnoticed, especially in the workplace. Thirdly, it offers all South Africans the opportunity to upskill themselves through whichever learning style or approach suits their particular needs. Essentially SAQA is the foundation for a structured, integrated, internationally recognised, competency-based education and training system and it provides strategic direction for the suprasystem. There are a number of reasons for the implementation of this approach within South Africa, which have impacted upon its use within the country as a whole and upon the formulation of competencies within this research.

2.3.1.1 Reasons for Competency-Based Education and Training

In Chapter One the principles and practices of competency-based training have been discussed. There are a number of key reasons for the adoption of a competency-based approach. The simplest of these lies within its definition. Competency encompasses skill and knowledge, as well as attitude and aptitude. Most human resource systems focus on only one of these areas leaving gaps within structures. The second reason for a competency-based system arises from a paper written by David McClelland. 'Testing for Competence Rather Than Intelligence' (McClelland, 1976) reviewed studies indicating that traditional academic attitude and knowledge content tests, as well as school grades and credentials did not predict job performance or success in life. In addition these tests were often biased against minorities or in the case of South Africa, the majority. This paper showed that there was a need to move away from such systems and to utilise an approach that was less biased. Current South African legislation, in the form of the Equity Act (1998), supports McClelland's (1976) conclusion and forces employers to move away from the predictive tests described above and to look at the potential of a candidate (Levy, 1998). A competency-based approach was the result of McClelland's decision to move away from traditional education and training.

The competency-based approach met McClelland's requirements because, in part, the methods used to identify competencies, such as criterion samples, identify characteristics associated with success and make them available to others for developmental purposes (Spencer and Spencer, 1993). Methods of identification and application of competencies

also allow for learners to assess their performance against a standard relevant to themselves rather than against other learners from different backgrounds or against artificial academic scores utilsed within our schooling system. This lessens to some extent elements of cultural bias. McClelland (Spencer and Spencer, 1993:7) explains this as follows:

> In the job-competency approach, analysis starts with the person-in-the-job, makes no prior assumptions as to what characteristics are needed to perform the job well, and determines from open-ended behavioral event interviews which human characteristics are associated with job success.

In addition, competencies identified by the competency process are context-sensitive, for example

> They describe what successful Indian entrepreneurs actually do in their own organisations and culture, not what western psychological or management theory say should be needed for success (Spencer and Spencer, 1993:8).

In conclusion, the competency-based approach is one that has been used internationally in a variety of situations. In 1991 the competency assessment method was being used by more than one hundred researchers in twenty-four countries. Twenty years of application and experience with this approach have generated a vast body of comparable work which tests many aspects of its function and viability (American Chemical Society, 1994; EdNa, 1998; GNVQ, 1998; NZQA, 1998, Spencer and Spencer, 1993). The ideas that support the use of a competency-based approach to education and training provide some of the rationale for a specifically South African competency framework.

2.3.1.2 Rationale for a South African Competency Framework

I should like to argue that one of the primary reasons for a local NQF is based on changes occurring internationally. International competitiveness and South Africa's role as an emerging market within a global economy require new competencies and a strategic approach to the development of these competencies. Underpinning the competitive ability of nations, organisations and individuals is the application of knowledge, skill and intellect. New ways of thinking about work and, in particular, new value-adding competencies are essential (Meyer, 1996).

South Africa has to formulate value-adding competencies that suit not only its context but also that of the international market. It must overcome what Meyer (1996:12) describes as a "profoundly South African" way of doing business and move into the international arena on equal footing with other competitors. The only way this can be done is if a common understanding of the requirements and standards used globally is embedded within the South African training and education framework which forms a bridge between global economies and job markets and that of South Africa. In order for business to remain competitive they will need a highly skilled and flexible workforce, able to adapt to the only constant within international business-change (Meyer, 1996; Phillips, 1996).

Further motivation for a drive within South Africa to devise a national framework is the lack of cohesion within previous education and training systems. This lack of cohesion resulted in individuals leaving their formal schooling ill-equipped to meet the skill requirements of the job market. Others have found it difficult to gain new skills that are recognised or to change careers. According to Phillips (1996), in many areas there are no nationally recognised courses or qualifications. In addition, the system has focused on the content of what is learnt rather than standards which people must achieve to gain qualifications. Learners frequently gain qualifications which have little or no value and are recognised neither nationally nor internationally.

A single qualifications system integrates school-based education, vocational training and tertiary education, overcoming some of the difficulties which arose in the past. Finally, I would argue that given South Africa's past, the inequalities within the education system, as well as the current situation of affirmative action, democratisation and reconstruction and development, it is vital for future success that past shortcomings are dealt with as effectively as is possible through a National Qualifications System.

2.3.1.3. Shortcomings of the previous systems.

Meyer (1996) describes two distinct historical paradigms that supported education and training policy in South Africa. Within the traditional education paradigm, which focuses on a long-term approach, courses take three to four years for completion. They are content-driven, teacher-centered, exam-based and focus upon differentiating between the

practical and the theoretical. The final aspect of the traditional approach is that its centre is the philosophy of failure: in some instances, the higher the failure rate, the more positively the course is viewed. The alternative paradigm is that of the traditional training approach. This approach has in the past focused upon narrow task behaviors, upon small areas of a job and upon learners being either competent or not yet competent rather than upon their passing or failing. Many aspects of this paradigm have been filtered through into our new national framework. In essence this leave us with a past which did not generally meet the needs of learners or of the workplace. Phillips (1996:5) summaries the shortcomings of our previous systems as follows:

> No national standards, varying quality, focus on inputs, learners ranked against each other, ad-hoc reporting, examinations, institution centered, one chance education, no recognition of prior learning, academic or vocational streaming.

His view is that the national framework will overcome these shortcomings and create a system, which will provide:

> Registered national standards, national quality management systems, focus on outputs, learners assessed against the standard, national record of learning database, contextual assessment, learner centered, lifelong learning, recognition of prior learning and multiple learning pathways (Phillips, 1996:5).

Although I agree with Phillips's (1996) argument for a national framework, I feel that it is important to be aware that unless the NQF is correctly administered, fully utilized and supported through the formulation of organizational competencies, it runs the risk of becoming a failed government initiative. This necessity for co-operation and support must be born in mind when examining the processes and principles of the NQF.

2.3.2 The South African National Qualifications Framework

The South African National Qualifications Framework was recommended by the HSRC in October 1995 (HSRC, 1995) as a way of ensuring an integrated approach to education and training. The necessity to integrate education and training has specific benefits. The first of these benefits is that individuals are able to enter the education and training system at any point depending upon their prior learning (HSRC, 1995). The NQF has various points of entry for the learning from level one through to level eight. In addition learners can continue to progress through the levels of the national framework by gaining credits for successfully completing units, and can move across different fields (French, 1998; HSRC, 1995; Meyer, 1996; Phillips, 1996).

The key principle of a national framework is that qualifications are based on clearly defined national standards.

> The system will recognise competence, no matter how or where it is gained (Phillips, 1996:4).

According to the HSRC (1995:7) the National Qualifications Framework will, in addition to the recognition which Phillips mentions,

> Generate coherence across traditional divides of education and training, and allow articulation between currently fragmented and divided sectors and institutions. It will also provide access to, and progression through, recognised qualifications for all learners, whatever their level, and allow the transfer of credits across different modes of study and qualifications within the National Framework.

The NQF is

> based on a system of credits for competency outcomes achieved. A competency outcome is essentially a capability developed in the learner reflecting an integration of knowledge and skill which can be understood, applied and transferred to different contexts. The achievement of a qualification in this system

> is not dependant upon attendance at a particular course, but by the learner accumulating credits on an agreed cluster of units of learning defined by industry or the bodies and which equates to a nationally determined level (NTSI report in Meyer, 1996:25).

This understanding of the NQF, and the role of industry within it, is important for the formulation of organisational competencies, as it makes it necessary for those who are developing competencies to be aware of and apply the principles of the national framework to their work if they wish to ensure broader recognition. The specific principles which need to be adhered to, and which I would argue provide the greatest benefits for all participants, are relevance, credibility, coherence, flexibility, standards, legitimacy, access, articulation, progression, portability and the recognition of prior learning (RPL) which will be discussed in more detail below. (HSRC, 1995; Phillips, 1996; RSA, 1995). Each of these principles is defined in detail in Appendix A.

Figure three shows the structure of the NQF, which has been laid out by SAQA. Ambitiously, this structure includes levels of academic learning which are not included in any other national frameworks. Also included within the figure three are the locations of learning, clearly showing how the framework allows for learning which suits the requirements of the learner within the South African context. Level one of the NQF encompassess the general education and training and includes ABET levels one to four. Learning in this band can take place at formal schools, workplaces, or through private providers, churches, industry training boards and unions. Completion of level one results in a general education and training certificate.

Completion of levels two, three and four results in a further education and training certificate. Learning within this level can occur in a number places such as formal high schools, technical colleges, nursing colleges, police colleges and the workplace. Level five of the NQF encompassess diplomas and occupational certificates. Level six represents the second level of higher education and training, completion of this level results in first degrees or higher diplomas. At both levels learners can attend universities, technikons, colleges and private or professional institutions to obtain their qualifications. At levels seven and eight of the framework learning takes place in tertiary, research or professional institutions. Level seven provides the learner with a higher degree or professional qualification. Completion of level eight, the final level of the framework, results in a Doctorate or further research degrees.

Each level of the framework is linked to structures which are currently recognised and to other places of learning which have in the past not been included in formal education structures or have been viewed as part of the training system. An example of this is the inclusion of NGO's (Non governmental organisation) and churches as places of learning. The NQF links various places and types of learning into one system through the mechanism of the unit standard. The structure and requirements for a nationally recognised standard or competency are important as they dictate how competencies should be formulated within an organisation if they are to be included within the NQF and within recognised qualifications.

FIGURE 3: THE NATIONAL QUALIFICATIONS FRAMEWORK (HRSC, 1995: 20)

NQF Level	Band	Types of Qualifications and Certificates		Locations of Learning for Units and Qualifications		
8	Higher Education and Training	doctorates further research degrees		tertiary / research/ professional institutions		
7		higher degrees professional qualifications		tertiary / research/ professional institutions		
6		first degrees higher diplomas		universities/ technikons/colleges/private/ professional institutions		
5		diplomas, occupational certificates		universities/ technikons/colleges/private/ professional institutions		
Further Education and Training Certificate						
4	Further Education and Training B and	school / college/ trade certifications mix of units from all		formal high schools private/ state schools	technical/ community/ police/ nursing/ private colleges	rdp and labour market schemes, industry training boards, union work-place etc.
3		school / college/ trade certifications mix of units from all				
2		school / college/ trade certifications mix of units from all				
General Education and Training Certificate						
1	General Education and Training Band	Std 7/Grd 9 (10years)	ABET level 4	formal schools (urban/ rural/ farm/ special)	occupation work-based training/RDP/labour market schemes/up liftment programs/ community programs	NGO's/ churches/ night schools/ABET programs/ private providers/ industry training boards/ unions/ work-place, etc
		Std 5 / Grd 7 (8years)	ABET level 3			
		Std 3/ Grd 5 (6years)	ABET level 2			
		Std 1/ Grd 3 (4 years)	ABET level 1			
		1 year reception				

2.3.2.1 Unit Standards

Unit standards are essentially a format for vocational competencies. They may differ slightly from country to country but in essence the information they contain remains the same. Although not all aspects of unit standards have been used within this study the basic structure and the principles behind the development of standards is applied. Within the South African context the following format criteria have been set for unit standards. Firstly, the basic rule of the unit standard is to ensure that it is accessible to the majority of its users and stakeholders with little additional translation, both in terms of language and the use of highly specialised technical jargon (Gunthorp & Elliot, 1998).

Secondly, the structure of the unit standard must contain the following categories of information: (Each of these requirements is defined in more detail in appendix B)

Title of the unit standard, logo, unit standard number, unit standard level, credit attached to the unit standard, field and sub-field within which the unit standard applies, issue date, review date, purpose of the unit standard, learning assumed to be in place, specific outcomes, assessment criteria, and range statements (Gunthorp & Elliot, 1998; HSRC, 1995; Phillips, 1996). These thirteen points provide the essential structure for the standard within the South African context. They provide the detail which ensures that the principles of the NQF listed above are achieved.

2.3.2.2. Level descriptors.

Within the context of this research level descriptors have been utilised to locate the competencies within a broad standards-based framework. A full table of the level descriptors utilsed in this research is provided in appendix C. All vocational frameworks have levels into which standards are slotted and which allow for the progression of learning (EdNa, 1998; GNVQ, NCVQ, 1995; NZQA, 1998). The competencies formulated within this study have also been allocated levels and credits, which have been described above, in order to allow for them to be placed within an organisational framework and to be structured, at a later date into nationally recognised qualifications. Level descriptors aid in the process of structuring and in addition provide all stakeholders with a common understanding of what is required at each level - an important factor when assessment is conducted.

2.3.2.3. Assessment

Assessment rather than examination is a key principle of the NQF. It may be conducted in a number of ways, depending upon the assessment criteria described within the unit standard. The principles of assessment provide the best descriptor of the purpose and application of the assessment process. Those described below are a synthesis of those provided by a number of authors (EdNa, 1998; HSRC, 1995; Meyer, 1996; NCVQ, 1995; NZQA, 1998; Phillips, 1996; Pitman, 1997).

Firstly, competency must be demonstrated under conditions which are as similar as possible to those in which learning will be applied. Secondly, assessment and

demonstration of competency must be in accordance with the assessment criteria and specific outcomes within the relevant unit. Where practical, more than one assessment method must be used to gather evidence from a variety of contexts. Thirdly, the assessor should be competent in the skill being assessed; assessors should also keep records of the assessment and provide feedback to the candidate.

Finally, assessments must be practical, cost-effective, reliable, valid and available to all learners seeking assessment. Assessment forms the basis of a new approach to learning and qualifications within the South African context, known as the recognition of prior learning (RPL).

2.3.2.4 Recognition of Prior Learning

The recognition of prior learning is vital within the South African context because it allows learners to be given credit for informal learning.

> One of the hallmarks of an integrated approach is that it will take into account and give value to the kind of learning that people have already achieved in their lives, whether at school, on-the-job, or even on the street. This recognition of what people already know is called Recognition of Prior Learning (HSRC, 1995:7).

RPL has a high profile within South Africa since many people have developed capabilities outside of the formal education and training arena. In the past this recognition has been available to very few South Africans. The structure and principles of the NQF as a whole allow for the recognition of competency no matter how it was achieved. An example of RPL in this study is the educational data of the target population taken from results achieved through an RPL exercise conducted within the Adult Basic Education and Training (ABET) arena. Assessments were conducted within the company utilising

tools designed by an external consultant which were aligned with Independent Examinations Board requirements for competency within ABET subjects of maths and English. These assessments were voluntary and allowed learners to gain certificates of competency for levels of ABET which they had not formally studied. These results provided a more valid profile of the learners as they were based upon current levels rather than upon certificates achieved in some cases over twenty years previously. This provides a base from which training requirements can be assessed for the target population. The competencies formulated within this study provide a useful tool for such RPL within the workplace, giving workers the opportunity to gain recognition and possibly nationally recognised and transferable qualifications for knowledge and skill acquired over a long period of time through experience.

2.3.3 Impact of the National Context on the Formulation of Organisational Competencies

All of the areas described above work together to form the suprasystem within which the formulation of competencies is situated. Each area therefore has some impact upon the manner in which competencies have been either formulated or presented within this dissertation.

Firstly, competency areas identified within this research are tied to a benchmarking process, utilised within the manufacturing sector, known as Best Operating Practice (BOP). The standards, competencies or elements thereof which are deemed by the expert panels to be BOP for the company, are adapted and included in the final design. BOP can best be described within the context of this study, as being the identification of

standards or competencies which are known to have a positive effect upon workplace performance. This is relevant because areas of competency which are deemed to be BOP, tend to be emerging competencies within the South African context, although they may not be elsewhere.

Secondly, the concept of meta-competencies has been used as a link between organisational and national competencies. Meta-competencies will initially be identified as part of specific roles or departments researched within this paper. Once frameworks are defined for both departments, a pattern of generic and meta-competencies will be investigated.

Thirdly, the shortcomings of the previous education and training system are reflected to some degree within all organisations, including the organisation in which this research is situated. The researcher must be aware of these shortcomings and ensure that any competencies formulated adhere to the principles of the NQF and contribute to the success of a national system, rather than repeat the mistakes of the previous system. These are some of the more notable areas of influence: however, I feel that all of the sections above help to define the system in which this research is situated. In addition, I would argue that this is an open system in which continuous reciprocal input takes place in such a manner that both the supra and subsystems are integral to one another.

2.4 CONCLUSION

In conclusion, I would argue that the areas discussed above illustrate the impact of organisational and national competencies on each other. Organisational competencies have been examined in detail. Components of the organisational context which influence competencies namely the value of competencies and competency cycles, show the changing nature of this context and support that the use of an eclectic approach could provide flexible competencies. Meta-competencies are shown to be an important contributor to this research because by providing a link between organisational and national contexts they create a mechanism for skills transfer.

The national context is explained through the description of the principles of the NQF, the requirements for unit standards, level descriptors and the importance of RPL and assessment for both organisational and national competencies. The impact which this context has upon the research is significant, because it provides the vocational component of the eclectic approach and dictates the use of competencies beyond the organisation.

Chapter Three

Methodology

3.1 INTRODUCTION

In this chapter I will show that the choices I have made in terms of methodology and research design are the most appropriate for an eclectic approach and for addressing the problem of skills shortages. The final selection of research method, philosophy and the structure of the research design impact upon the results of this study and their future application in the organisational, national and international contexts. Qualitative research methodology provides the broad paradigm, whilst the philosophy of the approach lies within grounded theory. I will demonstrate how that method supports an eclectic approach and provides the foundation for the use of an adapted classic competency study design. The research process is explained in detail, with reference to the overall methodological paradigm in which it is grounded in order to show how the results are achieved.

3.2 THE DESIGN OF COMPETENCY STUDIES

3.2.1 Design Types

There are three basic approaches to the design of competency studies outlined by Spencer and Spencer (1993). The classic approach is the short study using expert panels and studies of a single incumbent and future jobs where there are not enough jobholders to offer samples of superior and average performance. Although Spencer and Spencer offer models which have all been tested over a twenty-year period and which are based on the work of McClelland and McBer, pioneers in the field, each researcher tends to utilise a variety of approaches. Blank (1986), for example, outlines the following basic steps in research methodology:

1. The identification and description of specific occupations
2. The identification of essential candidate prerequisites
3. The identification and verification of job tasks
4. The analysis of the job tasks and addition of the necessary knowledge tasks
5. The formulation of performance objectives
6. The sequencing of both job tasks and objectives

This provides a valid alternative to the work of Spencer and Spencer (1993). However, in my opinion, an adaptation of the classic model is the most suitable design for this research. A closer examination of the classic model and some of the problems which components of this model present within my research design provides the rationale for this choice.

3.2.2 Classic Studies

According to Spencer and Spencer (1993) classic competency studies are composed of six steps.

1. The researcher needs to define performance effectiveness criteria
2. Identify a criterion sample
3. Collect the data
4. Analyse the data and develop a competency model
5. Validate the competency model
6. Prepare applications or outcomes of the competency model.

These applications include the identification of training needs, measurement of job performance, recruitment and selection, individual career planning, vocational counseling, succession planning and career pathing as outlined by McLagan (1980) as well as the development of skills-based remuneration models and organisational re-engineering, all of which apply to this study.

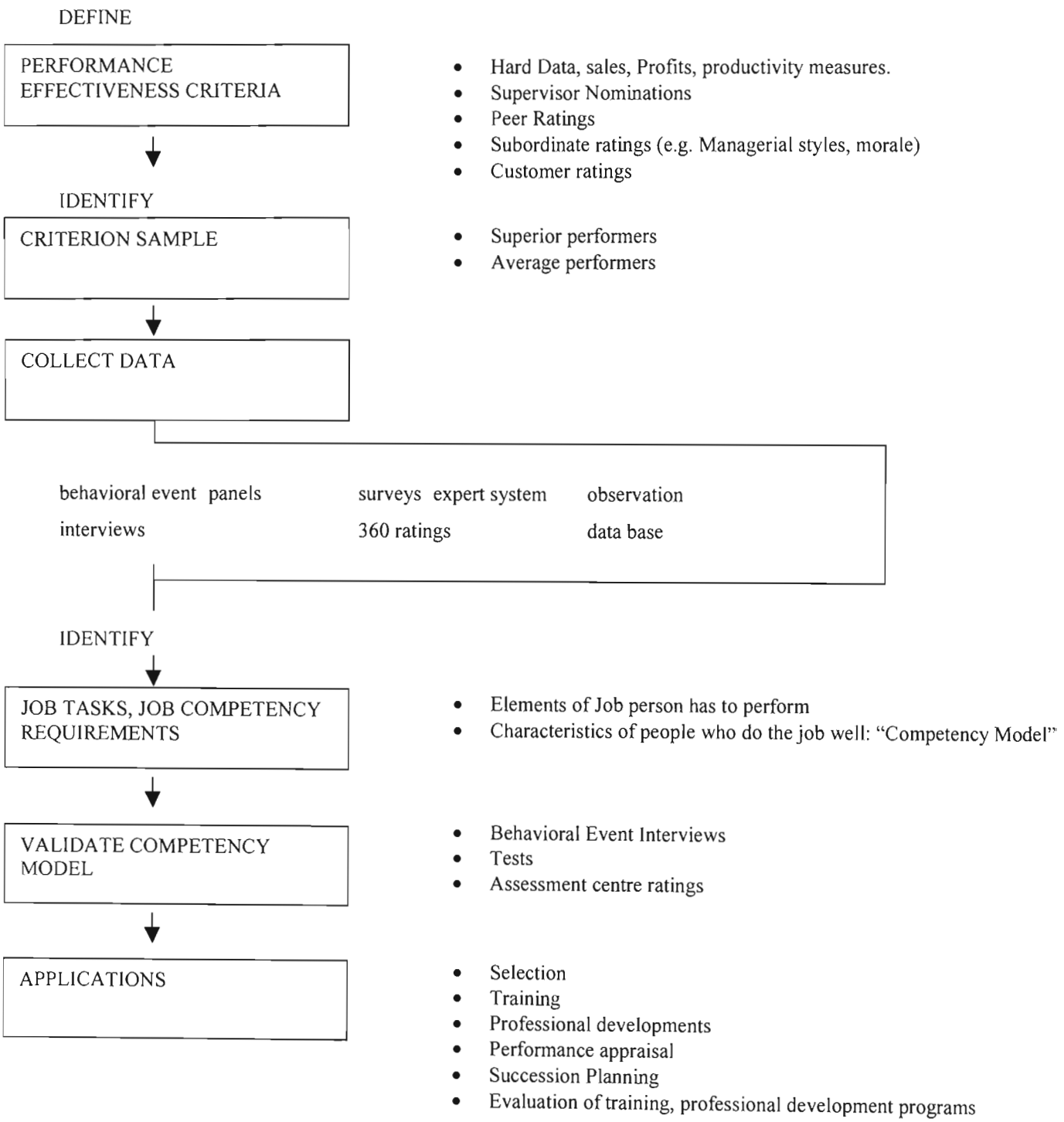
The steps which Spencer and Spencer suggest for the classic model (Figure four) however, are not entirely suitable for the purposes of this research. Steps one and two specifically, require data which is not readily available within the organisation in which my research is situated. Due to an agreement between the union and the company, performance data in the form of peer, subordinate and customer ratings is not collected.

In addition, the division of performance into categories of superior and average performance is not possible. To avoid alienating the target population these steps were not included within my research design. I am also of the opinion that methods utilised to distinguish superior and average performance, in the form of performance reviews, are not necessarily reliable or valid. Further, the context in which the majority of Spencer and Spencer's (1993) work was conducted, namely the USA, differs greatly from that of South Africa, especially within the ranks of organised labour. Limited time and resources (only one researcher) are also a factors in my decision to adapt the classic model. For example, Spencer and Spencer utilise Behavioral Event Interviewing (BEI). This form of interviewing, although technically thorough and reliable, requires one and a half days of interviewing time per person. Given the target populations of one hundred and eighty-one people, this would require two hundred and seventy-two days of interviewing time, which is not feasible for this research or for the organisation. In addition, missed job tasks would impact upon the cost of the research to the business. The BEI does, however, elicit information which is of importance to this study. It provides very specific descriptions of effective and ineffective job behaviors as well as clear descriptions of how the competency applies in the specific business environment. This aspect of the interviews has been included in this research within the expert panels. Figure four provides a diagrammatic breakdown of Spencer and Spencer's classic model and clearly illustrates the steps detailed in the discussion above.

As a replacement for the BEI I have utilised the second form of competency design, namely the expert panel, for data collection. This decision is supported by Spencer and

Spencer (1993) who describe as an alternative data source expert panels - as a panel of experts who brainstorm personal characteristics needed by employees to perform the job at an adequate and superior level. Utilising this approach has distinct advantages: valuable data is collected quickly and efficiently, and the process of stakeholder participation and understanding is initiated. Expert panels have been utilised within this study to outline the key process areas and transformations within the manufacturing and packing areas as well as to outline some of the requirements for superior performance. When conducting expert panels however one has to be aware of the possibility of the identification of items which sound good but are reflections of organisational traditions rather than workers superior performance or best practice. Expert panels may also tend to omit areas of competency for which they do not have the technical vocabulary or descriptor. For this reason, a thorough investigation of other research and possible competency models is vital as preparatory work.

FIGURE 4 CLASSIC COMPETENCY STUDIES (SPENCER AND SPENCER, 1993:93)



Another method of data collection utilised in this study is job task/function analysis. With task function analysis employees or observers list in great detail each task, function, or action the jobholder performs. The advantages of this approach are that very complete job descriptions are created and these are useful for job design, compensation analysis and competency analysis. It also serves to confirm information gathered during other procedures. In conclusion, for the purposes of this research an adapted model of the classic approach advocated by Spencer and Spencer has been utilised, including within the data-gathering phase, the use of expert panels in the place of BEI.

3.3 GENERAL PROCEDURE

3.3.1 Qualitative versus Quantitative Research Design

Of the two broad categories of research methodology, qualitative and quantitative, I have selected qualitative methodology for the purposes of this study. The basis of this choice lies not within a particular bias towards either of these approaches, but rather in the suitability of a structured qualitative approach for competency-based studies. The rationale for this decision will be discussed in more depth within the section that follows. It is important to note though, that information provided in general research methodology texts on the details of qualitative design (Leedy 1997) is sparse. However, some more recent texts as well as the Internet provide a wealth of information, validated in a variety

of contexts, on the use of qualitative research in the social sciences (Bowen, 1997, Chenail, 1997; Decker, 1998; Labuschagne, 1996; Sekaran, 1992; Leedy, 1997).

An examination of quantitative research, is the first step towards clarifying my decisions regarding the suitability of qualitative methodology. This approach is generally concerned with causal relationships that exist between certain phenomena. Its aim is to quantify phenomena examined in the research through statistical aggregation of data collected through clearly prescribed methods (Leedy, 1997). Qualitative research on the other hand is described variously as an

> Inquiry process of understanding a social or human problem, based on building a complex holistic picture, formed with words, reporting detailed views of informants, and conducted in a natural setting (Leedy, 1997:165)

and

> Akin to the understanding gained from an art rather than that from a science (Labuschagne, 1996:2).

MacMillan and Schumacher (Leedy, 1997:165) define qualitative research as

> Primarily an inductive process of organising data into categories and identifying patterns (relationships) among categories.

Each of these understandings of qualitative methodology substantiates the use of this approach within competency-based research which deals with building a holistic picture and organisinig and identifying patterns within data. In addition they highlight the difference between the quantitative and the qualitative.

In addition, qualitative research analysis does not follow linear procedures as statistical analysis does. In fact, the pattern is cyclical in nature making it difficult and lengthy to document (Leedy, 1997). The presentation of results within this dissertation is, is a testimony to this aspect of qualitative research. In sum then, I would argue that qualitative methods have much to add to competency studies. However, this does not exclude the contribution which quantitative methods can make. In fact these two aspects of research methodology complement each other very well. This is illustrated within the results, where a quantitative approach is used to present organisational demographics.

Qualitative methodology is not without problems however. To overcome problems such as the cyclical nature of this approach as well as the lengthy reporting required for the results, (Leedy, 1997) a careful description of the particular qualitative processes used follows within the description of the research design. Every attempt has been made to describe logically the processes utilised within this text and its origins in the section on research design as well throughout this chapter on methodology. This detailed description is necessary in order to ensure that underpinning knowledge, which I have employed, is made explicit. There is always a strong possibility that the researcher working within the qualitative framework may lose themselves in their study, and lose the study (Chenail, 1997). Part of the problem experienced with this study was that the richness of the data and the number of possibilities for its application tended to cloud the original research question. Complexity is a natural and necessary part of the qualitative research process and ensures that rich data is not excluded outright through a bias towards a "tidy" dissertation. It is essential, however that the original research purpose is not lost.

(Chenail, 1997). To ensure that it is not lost the process of creating a theoretical plumb-line as outlined by Chenail (1997) was implemented. This process entails the continual return to the original research questions ensuring that the researcher does not move beyond the scope of their original proposal.

In conclusion, due to its nature qualitative methodology requires careful description when utilised in social research. The researcher needs not only to decide upon whether the best tool is qualitative or quantitative, but a decision also needs to be made about which specific tool will be utilised from within the broader approach. It is important therefore given that this research has been conducted within the broader field of qualitative methodology, to outline the choice of grounded theory.

3.3.2 Grounded Theory

Grounded theory is the approach from within which competency-based studies are conducted. (Spencer and Spencer, 1993). Grounded theory studies processes and begins with a broad rather than a narrow research question. According to Leedy (1997) this allows the flexibility to explore the phenomenon in-depth. Research questions in grounded theory tend to be action and process orientated and evolve through the data gathering process. I would argue that this process allows for the development and identification of further research studies and is therefore important.

The impact of this evolutionary process is that the thoughts and preconceived ideas, which existed at the outset of this dissertation, have altered or been refined in a positive

manner, creating a number of other "areas of curiosity" (Chenail, 1997) which could be examined in further research studies. The use of competencies for the measurement of return of investment, would be an example of an "area of curiosity".

A further characteristic of grounded theory is the use of multiple stages of data collection (Leedy, 1997). This contributes firstly to the identification of causal relationships commonalities among phenomena, and secondly to the rigor (Sekaran, 1992) of the study. The multiple methods of data collection utilised in this research are detailed below in the discussion of competency methodology and of the research process.

3.3.3 Validity and Reliability

Validity is often seen as a problem for qualitative researchers. However, there are a number of methods, which can be utilised. Altheide and Johnson (1994) discuss four types of " interpretative validity" that can be used to ensure the qualitative research is valid. They are listed as usefulness, contextual completeness, research positioning and reporting style. Usefulness in this case refers to whether others who read the report are enlightened or moved to action by the contents of the report. Contextual completeness pertains to whether an extensive view of the context is provided. In this case contextual completeness is provided through a demographic and educational background of the participant grouping and a description of the work context. Research positioning refers to the researcher's awareness of her own influence on the investigation. The final element discussed is that of reporting style: this refers to the researcher's documentation of

participant views. In this case that documentation in provided through the final outcomes of the research, the competency menu and the terminal performance objectives.

Decker (1998) enlarges this list of concepts of validity in qualitative research by adding to them the following: reflexivity or staying open to the participants' experience through the use of the researcher's personality and empathy. This concept was utilised within the expert group setting to obtain data from participants who were reluctant to share their perspectives in front of their direct supervisors or because they were concerned that their knowledge of the job was incorrect. Credibility, or in Leedy's (1997) terms member checking, refers to cross checking with participants the correctness of the data and findings. At each stage of the research results were taken back to participants either singly or within a group context and comments were invited as to the validity of the outcomes. There were also formal group meetings during which the correctness of the data was discussed and comments made. Many participants provided additional data outside of these meetings, in which case these comments were noted and discussed in follow-up validation workshops.

Transferability within the context of this research was established through the focus of the research upon organisational and national standards development. In addition to this the focus of the research was upon generic competencies, which by inference are transferable to similar contexts. Audibility is the fourth mechanism to ensure validity discussed by Decker. The focus in this dissertation was, as previously mentioned in the discussion on qualitative methodology, to ensure audibility through documenting the

decision process of the author with reference to why particular methods were applied instead of others. It is hoped that through the application of the above confirmation will have been established.

Labuschagne (1996) states that the reliability criterion for qualitative research focuses on identifying and documenting homogenous or heterogeneous features as patterns, themes, worldviews and phenomena. In the case of this research the patterns identified were homogeneous rather than heterogeneous, although some of the competencies could be considered to be differentiating.

A final method of ensuring reliability in a study such as this is to utilise triangulation (Leedy, 1997; Chenail, 1997). This means that the researcher uses different types of data collection and analysis to study one phenomenon. Within this study a number of methods of data collection have been applied. Triangulation locates the phenomenon being studied within the context of a variety of data collection and analysis methods. In summary a number of methods have been applied throughout this research to ensure that it is valid, in accordance with Leedy (1997), who notes that the more methods applied to ensure reliability and validity, the more conclusive the results.

3.4 THE RESEARCH DESIGN

3.4.1 Preparatory Work

A large amount of preparatory work was done within this study in order to ensure not only reliability and validity but also that the output was of value to the participants. The first step in this preparatory work was to identify the jobs to be studied. This was done through an initial meeting with managers within the business and through the gathering of job descriptions (Appendix D). Further interviews were conducted with the managers to examine jobs which had a high value in relation to the organisation's strategic plans and structure and reviewing business plans. This input was then utilised to decide upon which departments within the business would be studied

Competency Research Model utilised within this study:

The research was designed utilising a modified version of Spencer and Spencer's (1993) classic approach which is based upon the extensive work done by McClelland and McBer, as well as Blank's (1986) approach to the design of competency-based training methodology. This combination of approaches was selected because it offered flexibility in the data collection. The problem of reliability and validity of data was overcome through the use of multiple methods of data collection and small groups of job experts. The details of which validity and reliability checks were used are provided above.

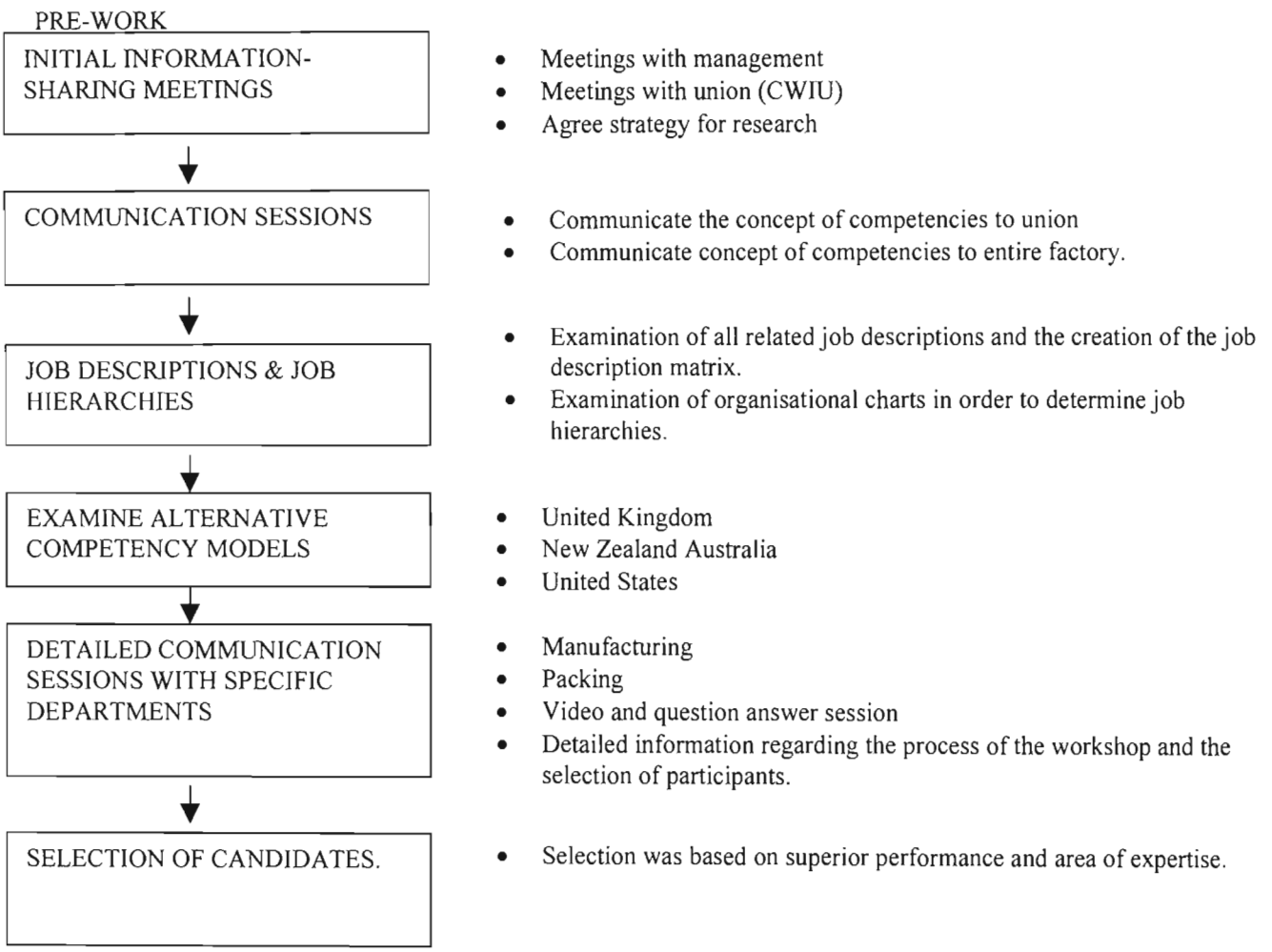
3.4.2 Process

3.4.2.1 Phase One Pre-Work

The simplest manner in which to describe the process utilised is a flow chart, given the usual complexity of qualitative research, and its circular nature. Figure four provides a simple comparison with the initial phases of the classic approach provided above. Due to the fact that BEI was not utilised because of the cost of lost working time, the actual research process and the evaluation of data was more complex. The pre-work phase consists of six steps:

- initial information-sharing meetings
- communication sessions
- examination of job descriptions and job hierarchies
- examination of alternative competency models
- detailed communication sessions with specific departments
- the selection of candidates.

FIGURE 5: RESEARCH DESIGN PHASE 1 PRE-WORK



Step one of the pre-work was an information-sharing session with both management and the union in two separate meetings to discuss the aim of the research, the process and the participation of employees. A brief examination of the process and of the strategy was agreed with both groupings. This step also involved the education of shop stewards and information-sharing around the strategy for the research project. Two separate meetings were held, one with site management and one with union representatives. It was agreed at these meetings to implement a communication strategy for the whole factory to ensure that all employees had the opportunity to understand the role of competencies within their workscope. This was done in order to overcome one of the potential problems associated with competency systems identified by Adams (1998), that employees may find difficulty in understanding complex and technical competency systems. In fact many of the participants did find it difficult to understand the concept of competencies and how they would be applied not only in their working context but also within the context of South Africa. However the opportunity to gain recognition for skills they had acquired over a period of years within the job context was viewed very positively.

Step two was the organisation of a large-scale communication session with all employees in the factory to explain the purpose of the research as well as the context of competencies. The communication sessions ran for two hours per group of twenty and all two hundred and sixty employees attended over the period of a week. Time was provided during the sessions for questions and answers around the topic.

Step three of the pre-work phase of research involved the gathering of all job descriptions available and the examination of organisational charts for the two key areas being researched. A decision was made at this phase of the research process not to include any sections in the factory beyond the manufacturing and packing areas. These two areas were identified, in accordance with Spencer and Spencer's (1993) methodology, as the two critical areas of production. The results of step one are detailed in the chapter below, within the job description matrix and the organisational charts.

Step four of the pre-work process was the gathering of alternative competency models from various recognised qualification frameworks and organisations, world-wide. The four main data gathering points were the National Vocational Qualifications United Kingdom, New Zealand Qualifications Authority, the Australian Qualifications Framework and various America government projects. These models were then examined for relevance and specific competencies identified for possible future use.

Step five of the pre-work phase was implementation of detailed communication sessions with the specific departments which were directly involved. During these sessions a video on the NVQ system was shown and questions around the system and its impact on individual employees were dealt with. The process of selection of participants was then discussed along with the actual process of the workshops.

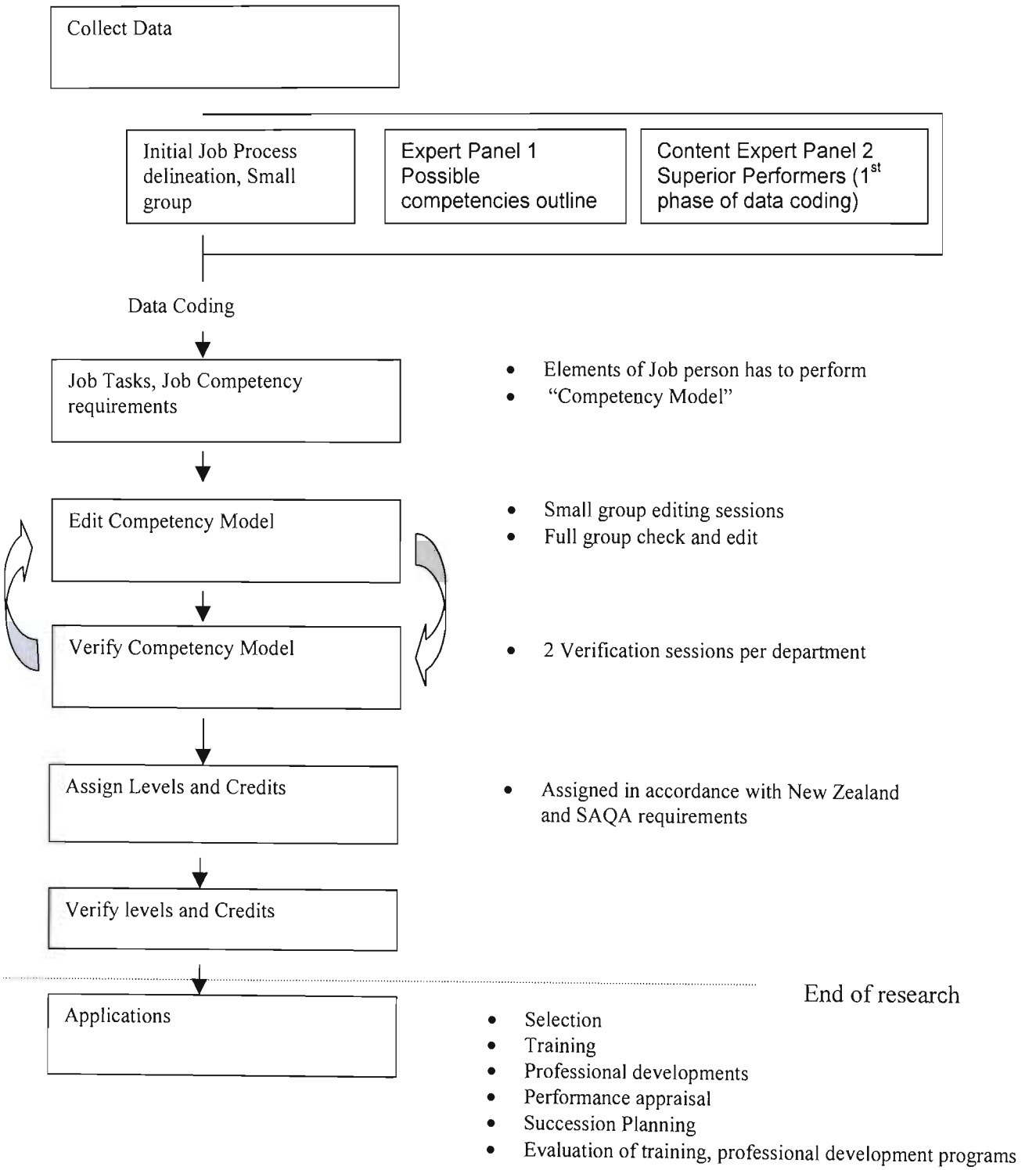
The final stage of the pre-work phase was the selection of candidates. Selection was based on a purposive sample and on the needs of the study. This is in line with the BEI

and with Spencer and Spencer's (1993) methodology of gathering data from a criterion sample. Participants were selected from the following areas for each content expert grouping: quality, engineering, supervisory, managerial, electrical artisans, mechanical artisans, control systems and the relevant production area. Participants with expertise in a number of roles in the production areas were selected where possible, as this had a lesser impact on production.

3.4.2.2 Phase Two Data-Gathering

The second and most complex phase of this research was that of data-gathering. A number of adaptations were made to traditional competency data-gathering techniques in order to meet the organisational constraints. Two main constraints were time and expertise. As states previously, it was not possible to implement the BEI as these interviews take one and a half working days each. Given that there were one hundred and forty-three employees directly involved and another fifty who were indirectly involved, it would have taken over a year to gather the required data through BEI. Data-gathering therefore involved a lot of group work and continual verification. The diagram below details how the data-gathering process was implemented. Techniques were utilised from McClelland, McBer (Spencer and Spencer 1993) and Blank's (1986) suggested methodologies. The variety of methodologies employed during the research is illustrated in figure five.

FIGURE 6: RESEARCH PROCESS PHASE 2



Further detail is added to the data-gathering process, in figure six, which illustrates the methodology, of content expert panels in addition the various data collection methods which define an eclectic approach are outlined in figure seven.

The initial Job/ Process delineation:

A small group of subject experts came together for one day to describe the basic process of manufacturing. The group consisted of the factory manager, the process manager, the refining manager, the engineering manager, the author and the human resources manager.

The second phase of data-gathering consisted of a small expert panel, which outlined the possible competencies and some of the requirements for best practice or superior performance. The small expert panel consisted of the same group mentioned above. In both cases the sampling was purposive. All panellists met the basic criteria of having had practical processing experience as well as knowing the broad strategic requirements of the company. This is an important factor in the design of competencies as they have to be current descriptors of superior performance. Frequently skills become outdated. A clear example of this problem is the computer industry, which updates its standards and competencies every six months.

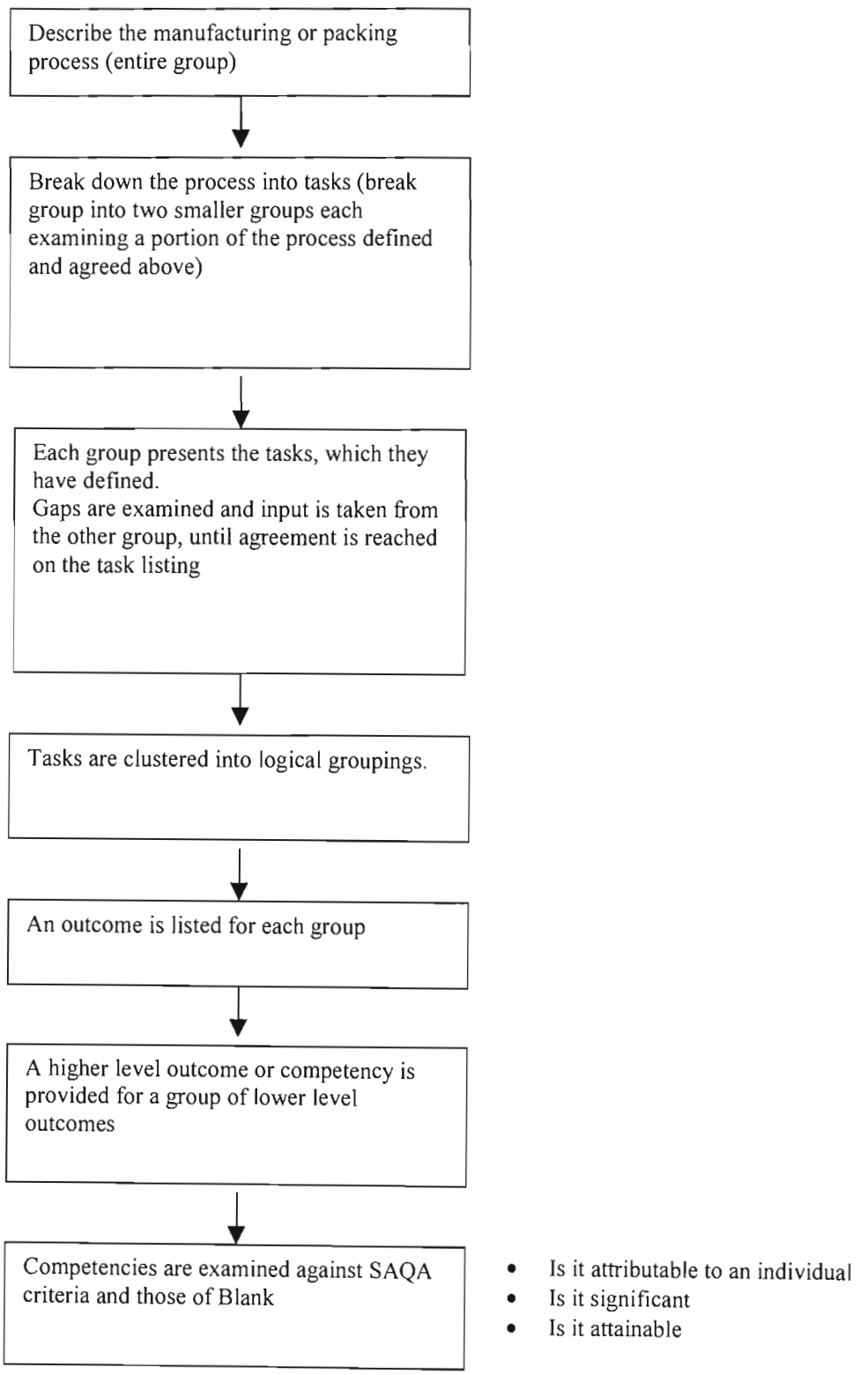
The final and most complex phase of the main data-gathering process was the content expert panel. The content expert panel was also drawn on the basis of a purposive sample. A wide range of skill areas was included: operators, quality, engineering, supervisory, managerial, electrical artisans, mechanical artisans, control systems. Each of these individuals provided input into the description of the production process as well as

the tasks and skill areas required. The selection of a mixed grouping ensured that superior performance was delineated by ensuring that all possible competencies were examined. For example, some traditional engineering and quality skills were eventually included within the competencies for operators. This ensured that each process operator was equipped with the skills for superior performance and would no longer rely on artisans or analysts to perform maintenance on their machines or to take and analyse basic samples. Two expert panel sessions were run, one for the manufacturing area and one for the packing area. Each session was two days long.

FIGURE 7: DATA COLLECTION METHODS

Theoretical context Data collection method	Blank W	McClelland / McBer	Spencer & Spencer	Own / (Coding)
Examination of alternative competency models.		X		
Identification and description of specific occupations (roles) (job descriptions) (planning models)	X	X		
Initial examination of job processes (small expert panel)				X
Expert panel 1 (supervisors)		X	X	
Superior performer combined panel. form of expert panel. (expert panel 2) - analyse key processes and transformations				X
- Analyse tasks	X	X		
- Add knowledge tasks	X			
- Identify competency groupings				X
- Group tasks within broad competency categories				X
- Verify competency Categories	X	X	X	
- Identification of best practice (superior performance)				X

FIGURE 8: PROCESS USED IN CONTENT EXPERT PANELS



At the end of the panel session all raw data was taken which had been coded through an open-coding method was re-categorised using axial-coding. This approach to the analysis of raw data is based on methods recommended for use within grounded theory (Leedy, 1997). Grounded theory provides an analytical methodology which I believe adds validity to the study. Techniques such as open-coding, axial-coding and selective-coding as outlined by Leedy (1997) have been applied to the analysis of data gathered through expert panels. Open-coding is defined as the process of

> Breaking down, examining, comparing, conceptualising and categorising data (Strauss and Corbin, 1990:61)

Axial-coding refers to re-categorising of data after open-coding (Leedy, 1993). The process of axial-coding was utilised within the content expert groups to re-categorise data into competency groupings. The final form of coding, selective-coding, pertains to

> The process of selecting the core category, systematically relating it to other categories, validating those relationships, and filling in categories that need further refinement and development (Strauss & Corbin, 1990:116).

Selective-coding of the relationships between competency areas was utilised during content group analysis and categorised during axial-coding. Some of these categories had distinctive relationships with others. Core categories were selected and in come cases previously separate competencies were redefined as one joint category. Participants from various areas and of different grades frequently felt that what they did differed from others in their group. After careful analysis it was noted that the similarities in categories

were often greater than the differences. In these cases information was grouped under one competency title, the end result being three levels of competency grouped within each broad area, the broad statement, (unit standard title), outcome statement (narrower definition of the competency) and finally assessment criteria (outcome based description of the original tasks). This information was referred to small group editing sessions. Small groups were utilised initially in order to avoid large numbers of people from having to leave their workplace for extended periods of time. The small group consisted of the factory trainer, the production and manufacturing managers, the author and two expert operators. Once this editing was completed, the results were taken to the original grouping for verification. In both areas two verification sessions took place. In the first session gaps were analysed and further areas for editing were identified. The outcomes were also analysed for consistency, so that similar outcomes or performance measurements within different competency groupings were worded in the same way. A second editing session then took place and the results were returned to the verification panel for final verification.

The final stage of the research process was panel sessions with the original expert panels for each area, with the addition of the factory trainer. During these sessions the level descriptors (Appendix C) were utilised to determine the level of the competencies within the NQF and the nominal hours of learning which would be required for each area of competency. These levels and credits were then taken to the verification panels for finalisation, each of these sessions taking half a day.

3.5 CONCLUSION

In this chapter I have demonstrated that the choices I have made in terms of methodology and research design are the most appropriate for an eclectic approach and for addressing the problem of skills shortages. Qualitative research methodology provides the broad paradigm and grounded theory the detail. I have shown that this method supports an eclectic approach and provides the foundation for the use of an adapted classic competency study design. The research process has been explained in detail to illustrate how the results are achieved. Finally, the method used to achieve the results described below is specifically designed to ensure the validity and reliability of these results and to encompass stakeholder participation. The contents of this chapter address two of the questions posed at the outset of the study. Namely, how should the competencies be formulated and formatted to reflect the eclectic approach, and which methodology best suits stakeholder participation.

Chapter Four

Results and Discussion

4.1 INTRODUCTION

In this chapter I will demonstrate the value of the eclectic approach as a tool for answering the research problem. The problem of how an organisation can overcome its skills gaps whilst ensuring national and international recognition of those skills and contributing to an increase of skills nationally is addressed through three broad aims and a number of specific research questions, each of which is dealt with in this chapter. Firstly, I will use the demographic profile of the target population, to illustrates the suitability of the organisation. The demographics also show current educational levels and career progression which form the starting point for the creation of new learning pathways and competency clusters.

Secondly, the competencies formulated through the use of Spencer and Spencer's (1993) adapted classic model lend further support to my argument for the use of an eclectic approach. I will show through the results that the combination of behavioral and vocational elements within a competency provides greater flexibility for the creation of competency clusters and learning pathways. In addition, I will show that this approach lends itself to competencies being used as foundations for more strategic levels of development, as they contain elements of competencies, both technical and managerial, required at higher levels within the organisation. In conclusion I will show that the characteristic of these competencies and the existence of meta-competencies provide a solution within both the organisational and national contexts to the problem of skills shortage.

4.2 THE ORGANISATION

4.2.1 Business Context

The organisation in which this study was conducted operates within the province of KwaZulu-Natal and is a subsidiary of a large international, fast-moving consumer goods manufacturer. The factory focuses on the refining and blending of oils and the manufacture of yellow fats. Work is done on a continuous shift system from Monday to Friday. The company is currently undergoing a drive to improve standards, training systems and ultimately performance within the workplace. There are a number of key focus areas within the training department which have been designed to assist in the development of human resources and which underpin these initiatives. The first of these is adult basic education and training (ABET). This program has been in place since 1994 and exams are written by students biannually. To date it has successfully educated a large number of people within the factory. The aim of this program is to provide individuals not only with life skills but also with a foundation for further study and integration into the national system of vocational skills once it is fully operational. Additional support for continuous learning is provided through programs within the company designed to assist employees financially with their studies.

The second focus area is safety and safety training. Programs are run throughout the year and each individual is required to participate in a basic safety course. Safety has also been incorporated into the competencies which were formulated in this study. The third area of focus is on quality which is also included in the competencies and will be incorporated into learning materials for operators within the factory. All of these focus areas ensure an organisational climate and culture in which the development of knowledge and skill is fostered, and contributes

towards the suitability of the organisation for this research. The most important contributor though, is the drive within the business to support continuous learning and to develop the skills of workers. This has ensured that time and resources were made available whenever they were required. In addition, the outcomes of the research will be used within the organisation to ensure development both in terms of education and careers of workers. The educational profile of the target population shows the importance of the selection of this plant for the research. Firstly, because it is the result of an existing plan to provide workers with the necessary training and education to qualify for level one on the NQF (Figure Three). Secondly, because through strategic focus upon training over a number of years the company has created a climate which is receptive to new developments within training and to the commitment of time and resources which these developments require.

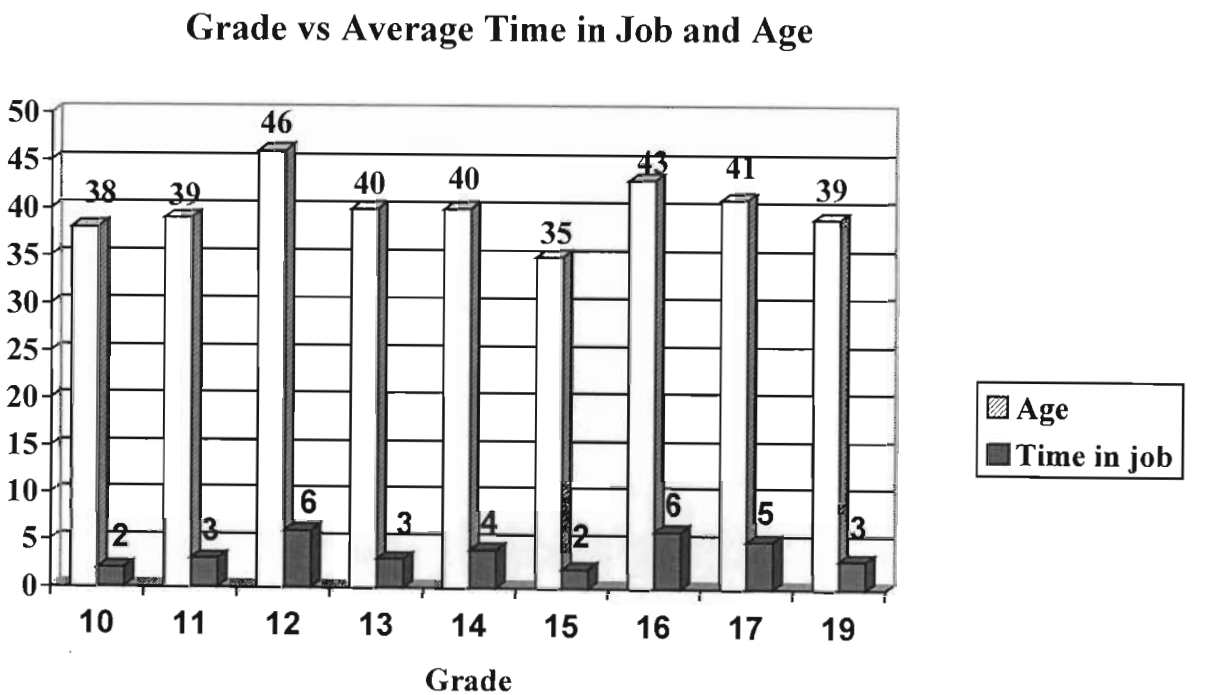
4.2.2 The Target Population

The target population consists of male, mainly Zulu-speaking shift workers. Of the total work complement at the site one hundred and eighty one are members of a union interest group, the Chemical Workers Industrial Union (CWIU), the remaining eighty-one office staff are not. The total site complement is two hundred and sixty two, the majority of whom are male factory workers. Within the Patterson grading structure the target population of this study lies within the lower bands, grades ten to sixteen. Many of the members of the target population have a history of long service with the company, usually between fifteen and twenty-five years. This ensures that the participants in the expert panels have on average, four years of experience in their current jobs and thirteen years of experience with the company.

4.2.2.1 Demographics

The target group falls into the general category of factory workers. Graph One illustrates the grading system utilised within the company, a variation of Patterson banding, the breakdown of average age and time in the job (TIJ) indicates an older population. In the lower grades there are short periods of service and longer service in the higher grade positions. The graph also illustrates that career progression does occur within the general worker grouping. However some bottle-necking occurs at grades twelve and sixteen. One of the aims of this study is the creation of learning pathways; this will further structure movement through grades and career progression.

GRAPH 1: GRADE VERSUS AVERAGE TIME IN JOB AND AGE

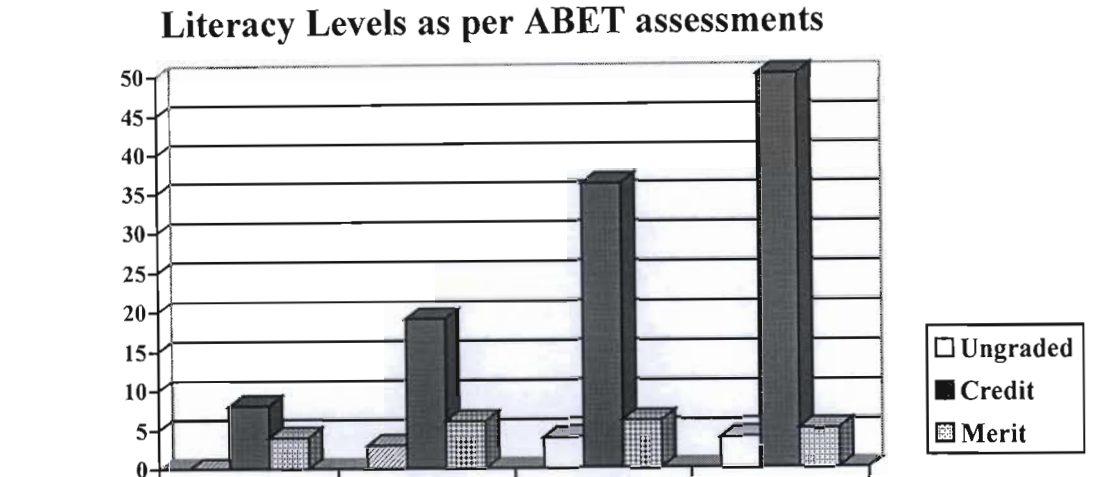


4.2.2.2 Educational Background

The educational background of the target population contributed towards the formulation of competencies, and ensured that all panel members were able to participate freely within the workshops. As training based on standards is conducted in English, the ABET program provides learners with a gateway to a higher level on the national framework. The strong focus over a four year period, on the development of numeracy, literacy and life skills amongst the target population, with the aim of preparing employees for outcomes-based training, is currently beginning to show results. Assessments conducted within company and the results of IEB (Independent Examination Board) exams are displayed in graphs two, three and four. The assessments also allowed for the recognition of prior learning for those participants who had little or no formal education. This gave them the opportunity to achieve the ABET levels needed for full participation in the NQF and in organisational training which is based upon competencies graded according to the NQF.

The adult education program grades literacy and numeracy into four levels which have been aligned with the national qualifications system (See chapter three) (SAQA, 1998). Graphs two, three and four are divided into these four levels and the reference within the legend refers to the grading system utilised by the IEB. Those papers which are ungraded do not meet the required competency levels, a credit equates to competency, and a merit is a result above eighty percent.

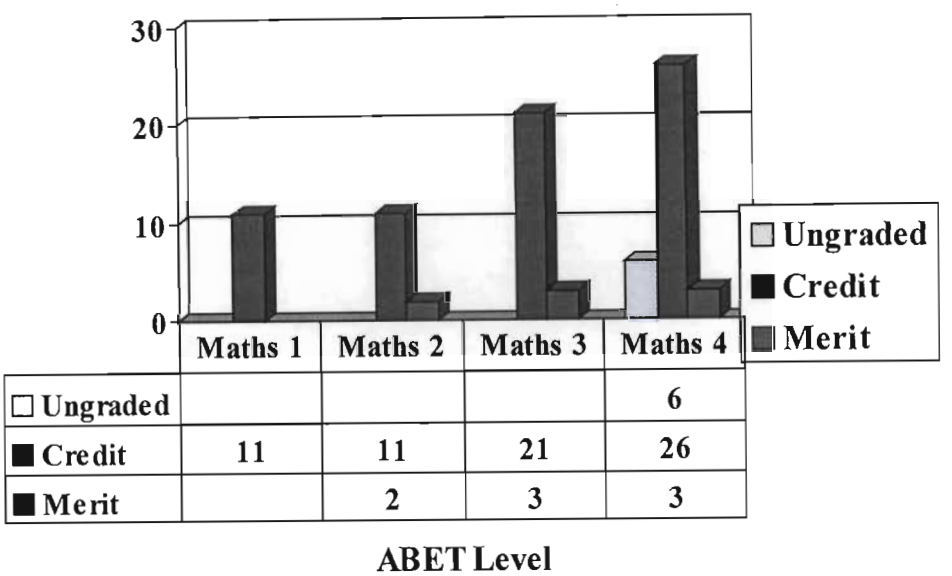
GRAPH2: LITERACY LEVELS WITHIN THE COMPANY 1998



	ABET LEVEL 1	ABET LEVEL2	ABET LEVEL 3	ABET LEVEL 4
Ungraded	0	3	4	4
Credit	8	19	36	50
Merit	4	6	6	5

Graph two shows the results of assessments within the four levels of English offered by the IEB. Overall fifty five learners have achieved ABET level four, which is the last step within adult education prior to entry onto the NQF at level two. ABET level three has been attained by forty two learners, level two by twenty five and level one by twelve learners. As a whole the graph indicates that the majority of learners have achieved literacy levels three or four and that fifty four percent of the total population meet the requirements for participation in training programs within the company. These learners are prepared not only for organisational training but also for competency-based training, as the ABET program is based upon the use of competencies. The graph also demonstrates the existence of a culture of learning, as the program is voluntary and requires attendance of classes after hours and yet seventy four percent of the target population have completed one or more levels.

GRAPH 3: NUMERACY LEVELS WITHIN THE COMPANY 1998



	Maths 1	Maths 2	Maths 3	Maths 4
Ungraded				6
Credit	11	11	21	26
Merit		2	3	3

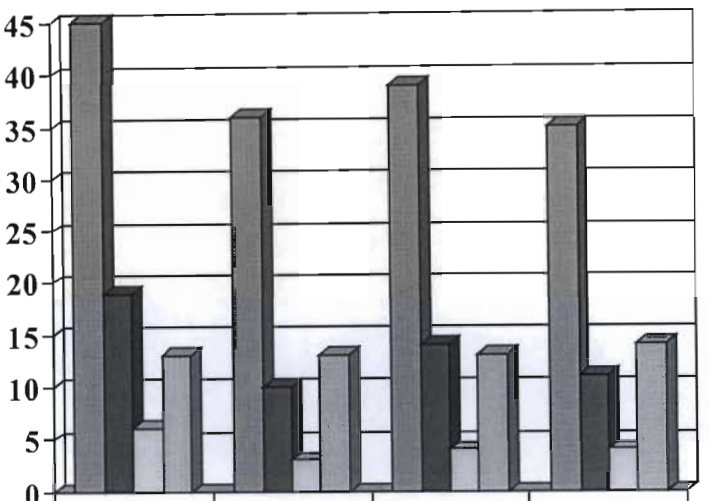
ABET Level

Graph three indicates the results of maths or numeracy assessments and forty-three percent of workers have been assessed. Of these twenty-nine individuals have achieved level four and twenty-four level three. These results show that participants were less willing to be assessed in this area and may possibly indicate a lower level of numeric education, however, further ABET assessments would have to be conducted to verify this. To ensure that learners are able to reach NQF level two numeracy levels will have to be improved and learners will have to be counselled on the impact of their numeracy levels upon possible career opportunities.

Graph four shows a cross-correlation between educational level and the age, service, TIJ and grade of the target population. This profile shows that older members of the population have higher levels of service and a higher average TIJ. Learners at ABET level one also have a higher average age than those at level four. This is positive for the company as it indicates that younger

workers, who will be with the company for a longer period of time, have a higher level of education which offers more flexibility in terms of training.

GRAPH 4: DEOMOGRAPHIC PROFILE OF ABET PARTICIPANTS



	1	2	3	4
AGE	45	36	39	35
SERVICE	19	10	14	11
T.I.J.	6	3	4	4
GRADE	13	13	13	14

ABET LEVEL

In conclusion, firstly, education levels, especially literacy levels, facilitate participation within the workshops and communication sessions, as there are fewer language barriers. Secondly, the use of ABET assessments means that participants are already familiar with the process of RPL. Thirdly, the company supports career development within all grades and its climate and culture are supportive of continuous learning, a key principle of the NQF and the application of competencies. Fourthly, education and training are well integrated and are included in the

companies strategic plans, emphasising the importance which is placed by the business on the development of individuals and on overcoming skills gaps.

4.3 FORMULATED COMPETENCIES

The formulation of competencies is the first aim of the study, and the first step to addressing the research problem, which is how an organisation can overcome its skills gaps whilst ensuring national and international recognition of those skills and contributing to an increase of skills nationally. A number of research questions are linked to the aim of formulating competencies and creating a competency matrix. These are addressed within the discussion below.

The first question posed in the introduction to this study is, what competencies exist within the target group? Through the use of an adaptation of Spencer and Spencer's (1993) classic model, a total of thirty-four competencies were formulated. The competencies resulted from the input of the expert panels and the process of verification. Competencies which are found in both the packing and manufacturing areas have been grouped together as generic competencies. All of the competencies can be found in detailed tabular format in the sections which follow. Eighteen generic competencies were verified by the participants. They focus on health and safety, quality, problem solving, training, communication and machine maintenance. In the packing department nine competencies were identified and formulated, these competencies are: start up and shut down ancillary services in a margarine, fats and oils, finishing and packing line; prepare oils and fats for packing; clean-in-place food and related product production equipment using automated cleaning systems; bulk-fill oil and fat products on a semi-automated packing line; sample and check for quality on an edible oils and fats finishing and packing process. These competencies however, are

specialised and are unique to the company and to the department their application within the broader national context would be limited. In the manufacturing area, seven specialised competencies were formulated. These competencies are: start up and shut down a batch process; Start up and shut down a continuous process in manufacturing; check and implement a production sequence, convert oils to fats in a hardening plant; blend components to remove unwanted impurities in an edible oils manufacturing process; neutralise and modify fats and oils and sample and check for quality in a manufacturing process. These competencies focus on the production process and are operational in nature. The use of specialised and generic competencies, which are listed above, creates a holistic picture of the knowledge and skill required for learners in each department.

The second and third questions which I posed were:

How can the two main approaches to competency, behavioral and vocational, be integrated in order to exploit the benefits of both?

How can competencies be formatted and formulated to reflect this model?

The answer to the first of these questions has been discussed in chapter one, the result being an eclectic approach, which has been applied throughout this study. The eclectic approach also address part of question two, as it was used to select a research method and design which are reflected in the formulation of the competencies. I have detailed this design in chapter three. Although these questions are addressed in chapters one and three they are the foundations for the format of the competencies which are shown in this chapter. The last component of these questions is addressed through a combination of elements from the behavioral and vocational formats.

All of the competencies have been written in outcomes terminology, following the guidelines provided by SAQA (1998). SAQA requirements have been briefly discussed in chapter one and are included in full in appendices A and B. However, it is not the objective of this research to create unit standards, but rather to formulate competencies which reflect the eclectic approach, therefor only those aspects of SAQA formatting which impact upon the development of competency clusters and learning pathways, have been included. The titles given to each grouping are competency titles, they are vocational and technical in nature. They are not, however, merely task areas. They provide a brief description of the overall contents of the competency area and reflect the capability required. In terms of Boyatzis's (Adams,1996) definition of competency, the overall competency area specified within the tables below includes all of the basic components required. Specifically these are the effective performance of specific results or outcomes, whilst maintaining the policies, procedures and conditions required within the organisational environment.

The behavioral component of the competencies is reflected in the use of three levels of description for each competency as with Spencer and Spencer's (1993) competencies. Secondly, although they have been written in outcomes terminology, these outcomes are based on behaviors and on underlying characteristics. Thirdly, the competencies are a combination of strategic and operational levels of performance. The strategic elements are more prevalent in the generic competencies, for example, 'communicate in teams' is a competency which is strategic and generic in nature and can be used as the foundation for managerial development whilst 'prepare oils and fats for packing' is an operational competency used specifically in the packing area of the organisation.

The workshop results have been coded into detailed competency descriptions falling under broad competency headings. Each competency has been divided into three areas to simplify interpretation - the first column contains the title, the second the specific outcome and the third the assessment criteria. This division facilitates the conversion of these competencies, if required, into unit standards and is based upon the format used for behavioral competencies compiled by Spencer and Spencer (1993) as well as that of SAQA (HSRC, 1995). The benefit of this is that these competencies are flexible and can be used as the foundations for further development within the managerial or technical field as they contain elements of both. The process used to formulate these competencies was described in detail in the methodology outlined in chapter three. Areas of the pre-work which were utilised in the development and formulation of the competencies below are listed in appendix D. Finally, the competencies have been organised into the three broad categories of generic, packing and manufacturing.

The fourth research question asks how the formulated competencies can be linked to developments within South Africa to ensure skills transfer and portability: This question has been addressed above through the use of the eclectic approach and the inclusion of SAQA requirements in the format. Other components, which are important for answering this question fully are the existence of meta-competencies and the creation of learning pathways, which are linked to the second and third aims of this study. These components will be examined more fully through the use of a competency matrix and competency clusters, which follow the presentation of the formulated competencies.

4.3.1 Generic Competencies

The competencies presented in this section, reveal the generic nature of a number of roles or elements of roles within the organisation. Although the key competencies within each process area are different, there are a number of value-adding competencies which occur within both departments and, in terms of the original definition, are meta-competencies. In addition to the existence of broad areas of shared competency there are also generic elements within the assessment criteria of each competency. These similarities were revealed by the participants rather than added into the competencies after coding and created much debate within the expert panels. Those within specific jobs were reluctant to admit similarities with others. This revealed a job rather than process focus within the target group, each individual seeing the importance of their area alone, rather than its contribution towards the overall process.

Competency	Specific outcome	Assessment criteria
Receive and store hazardous materials **Level : 2** **Credit : 2**	Receive hazardous chemicals for production against planned orders	Receiving checks the integrity of packaging, and matches chemical condition against specifications, matches the quantities to the orders to meet production requirements. Transfers chemicals to the correct storage tanks at the required flow rate, in accordance with prescribed safety requirements for the tank park. Receiving of chemicals is completed by the specified time, and in accordance with receipt procedures outlined in organisational policies, procedures and legislation. Correct chemical handling techniques are used to prevent injury to driver and operator, and these follow standard operating procedures. Chemical handling equipment is available and fit for purpose. Safety equipment and accessories are operational and available during the period of chemical handling. *Range*: Fire extinguishers, warning notices, wheel chokes, earthing connections, goggles, and gloves.
	Store hazardous chemicals for production requirements	Chemicals are stored in the specified location in accordance with organisational procedures. Storage of chemicals is in line with safety procedures and standard operation procedures. Stored chemicals are clearly labelled and have accurate date coding. Chemical storage space is used in accordance with company stock-holding policies.

	Supply up-to-date information on chemicals available for production	Documentation related to chemical storage is accurate and complete in accordance with standard operating procedures. Stock-take reconciles stock data entered in the information system with materials on hand. Documentation is stored in accordance with company policy, procedures and legislation, and is readily accessible to authorised users. Communication of updated stock information to specified personnel is timeous and promotes efficient operation and good working relations.

The level referred to in this competency and all of the remaining competencies presented below is the NQF level determined through the use of the level descriptors (see appendix C) set out by SAQA (1998), which are based upon those of the New Zealand Qualifications Authority (NZQA, 1998) and therefore allows for some comparison with international frameworks. The credit referred to within the competency is the number of notional hours of learning required for the achievement of competency, and is multiplied by ten to indicate the hours. The competency 'Receive and store hazardous materials' therefore is situated at level two of the NQF and require 20 hours of learning for an average learner to complete. The credits and level were verified a number of times, by the participants to ensure that there was consistency and that the results correlated with current training duration.

The use within the assessment criteria of terms such as 'specified time' allow for the inclusion of required of time limits. If, for example, chemicals must be received within twenty four hours, this would be included to insure that the competency is measurable. Where there is no specified time this term refers to a negotiated time requirement. The accurate completion of documentation is a generic criterion and is used in all of the competencies where it is relevant, for the purposes of consistency and to ensure BOP. Other examples of such criteria and of the inclusion of quality and safety within the competencies are:

- Good housekeeping practices are applied and the work environment is clean and free from hazards

- Personal protective clothing is worn in a manner that protects personnel and product and complies with organisational policy and legislation.
- Actions comply with best practice.
- Equipment is clean and free from contamination.

Finally, the purpose of the specific outcomes and the assessment criteria is to provide clarity, especially for those who will be assessed or trained. Although unambiguous they are not tasks but outcomes; detailed steps required for training are provided in operating procedures and machine manuals which are available to all workers. The assessment criteria and specific outcomes equate with behavioural levels and level definitions used be Spencer and Spencer (1993).

Competency	Specific outcome	Assessment criteria
Pack and palletise products manually **Level : 1 Credit : 1**	Pack products manually	Correct containers and packing materials are available in sufficient quantity for scheduled and anticipated production. Packing ensures that correct product is packed into correct corrugates, by the agreed time. Corrugates conform to organization's packaging quality specifications. Variations in product container, packaging and corrugates are identified and corrective action is taken in a timeframe that optimises performance. Product wastage due to packing products manually is minimised, and opportunities to rework non-conforming product are maximised. Correct personal protective clothing is worn in a manner that protects personnel and product and complies with organisational policy and legislation. Packing ensures that good housekeeping practices are applied consistently throughout the shift, and that the work environment is clean and free from hazards.
	Palletise packed products manually	Quality checks establish integrity of the product before despatch. Palletising conforms to organisation's palletising specifications. Manual palletising rate meets agreed production line requirements. Palletising products manually complies with organisational policies, procedures and legislation. Lifting and handling techniques used during manual palletising of products minimise risk of injury to self and others. Correct personal protective clothing is worn in a manner that protects personnel and product and complies with organisational policy and legislation. Palletising ensures that good housekeeping practices are applied, and that the work environment is clean and free from hazards. Documentation related to product is accurate and complete in accordance with standard operating procedures.

Competency	Specific outcome	Assessment criteria
Clean and prepare equipment for production or maintenance **Level : 2** **Credit : 2**	Prepare to clean and sanitise equipment	Preparation to clean and sanitise production equipment complies with organisational policies and procedures, and statutory health, safety and environmental standards. Preparation establishes the status of the equipment from hand-over documents and work permits, and ensures that start-up plans are consistent with equipment status. Preparation isolates specified equipment and removes residual materials safely by the agreed time. Preparation ensures that the correct cleaning equipment is available and operational prior to scheduled cleaning. Preparation checks that the correct cleaning and sanitising agents are available in correct quantity. Personal protective clothing is worn in a manner that protects personnel and product, and complies with organisational policy and legislation.
	Clean and sanitise equipment manually	Cleaning verifies that cleaning agents and manual cleaning and/or sanitation methods are appropriate to the particular equipment being cleaned. Cleaning verifies that production equipment is clean and free from contamination, as specified in the standard operating procedures. Cleaning applies the cleaning and sanitising agents in a manner that conforms to product specifications and optimises safety of equipment, product, and the safety of self and others. Cleaning and sanitising equipment is clean, stored in correct place and available for next user. Manual cleaning of equipment complies with organisational policies, procedures and legislation. Production downtime caused by manual cleaning of production equipment is minimised. Personal protective clothing is worn in a manner that protects personnel and product and complies with organisational policy and legislation. Cleaning ensures that good housekeeping practices are applied consistently throughout the process, and that the work environment is clean and free from hazards. Documentation related to cleaning is accurate and complete in accordance with standard operating procedures *Range*: *documentation:* correct authorisation, lockout procedures, work permits

Competency	Specific outcome	Assessment criteria
Hand-over responsibility for a production shift **Level : 2** **Credit : 2**	Complete necessary documentation for the responsibility handed over	Hand-over documentation is completed and accurate and complies with the detail and format requirements of the standard operating procedures. Additional documentation, arising from incidents during the shift, is assembled and passed on to the incoming operator as specified in standard operating procedures. Any missing or incomplete documentation, which would prevent the hand-over being carried out fully, is brought to the attention of the incoming operator and/or appropriate authority.
	Hand over responsibility to the incoming operator	Hand-over gives the incoming operators all the information needed to take over the responsibility. Hand-over occurs at the time and place specified by organisational and standard operating procedures. Hand-over maintains the safe and effective operation of the plant, equipment and process whilst the hand-over takes place. Hand-over information with respect to the current status of the plant and difficulties encountered during the shift is clear and complete, and explanations are provided as required.
	Accept and confirm responsibility taken over.	Confirmation checks the information received during hand-over against actual situation on the plant. Confirmation clarifies any concerns and misunderstandings with the outgoing operator or with the appropriate authority. Acceptance of responsibility is logged as specified by standard operating procedures.

Competency	Specific outcome	Assessment criteria
Solve basic production problems in a manufacturing environment **Level : 4** **Credit : 5**	Identify and gather information on production problems	Identification notes and confirms deviations from the expected norm promptly so as to minimise product waste.
	Diagnose causes and select solutions to production problems	Diagnosis is consistent with approved problem-solving techniques that consider all relevant information, and identify possible causes in a logical manner. Diagnosis checks the input gathered through consultation on the possible causes of faults for consistency with available facts. Diagnostic checks and tests are consistent with the nature of the problem, and establish the causes of faults timerously. Possible solutions are fully and objectively assessed by means of established site investigative procedures. The selected solution is consistent with the nature of the problem as well as organisational constraints and parameters. *Range*: constraints and parameters: safety, quality, cost and time.
	Implement solutions to limit the consequences of production problems, and evaluate chosen solution	Criteria for the evaluation of performance improvement are clearly described and are consistent with the nature of the identified performance problem. Implementation is prompt so as to minimise loss of product, production time and/or damage to machinery and equipment. Implementation actions taken are within the limits of the candidate's authority, and with the approval of supervising authority. Implementation of the solutions minimises disruption to production, without compromising quality and safety. Implementation updates records to reflect accurately the actions taken and the criteria for evaluation. Evaluation monitors the effectiveness of solution at agreed intervals, and communicates results to appropriate personnel.

Competency	Specific outcome	Assessment criteria
Provide on the job training in the workplace **Level : 3** **Credit : 5**	Confirm learner's training requirements Range: supplied training schedule; observed work performance; negotiated with learner; auditing; monitoring; training needs analyses; incidence reports	The specific training needs are identified and compared with previously identified training needs. The specific training outcomes are confirmed with learners and those who authorised the training.
	Plan and prepare learning opportunities for learners	The plan describes clear, relevant and realistic training objectives and checks that planned activities are sufficient to enable candidates to meet the objectives. Planned learning opportunities are matched to the work application of the skill or job being taught. Planned learning opportunities are matched to the confirmed training outcomes. Preparation designs training activities to maximise learning opportunities and minimise disruption to production. Preparation organises the availability of resources, locations, and personnel to provide planned learning opportunities. Preparation checks that the correct materials, tools and equipment required for on-the-job training are available and fit for purpose. Preparation selects a methodology most appropriate to the particular learning experience. *Range*: methodologies: include but not restricted to: direct instruction, observation, problem-solving, supervised practice, Preparation determines the criteria for successful performance, assessment methodology and most appropriate manner of feedback. The training environment meets organisation policy and procedures and legislation for safety and accessibility.
	Conduct on-the-job training sessions for learners	Training objectives are communicated so as to give trainees a clear understanding of the training objectives, sequence of training activities, job applicability, and the assessment process, as well as deadlines for completion of activities. Trainees are encouraged to ask questions, seek clarification and share ideas and views at all stages of training/coaching. The instruction process incorporates explanation, demonstration, practices and review, and meets the learning outcomes. Training is presented in manner, style, and pace appropriate to the needs and capabilities of trainees. Training provides opportunities for clarification, practice and consolidation of concepts and new learning according to the specific learning situation and the established training outcomes.

	Confirm and / or assess progress of trainees during training, and record learner performance	Evidence of performance by the learner is collected in accordance with the training outcomes and recorded according to standard operating procedures. Assessment of progress identifies the obstacles to growth and describes possible solutions and new learning objectives, or refers candidate for specialist assistance outside the particular function. Identifies trainee errors as they occur and feedback suggests corrections; trainee's developing skills is based on sufficient, current, reliable and relevant evidence. Feedback is delivered in a manner which promotes learner confidence and further learning. Assessment of progress identifies trainees who have potential for further development, and describes possible developmental activities. The learner's readiness for assessment is monitored against the training outcomes. Learner and relevant personnel are advised that the learner has met the required standard of performance.
	Review on-the-job training for learners	The learner's reaction to the training is sought and discussed. *Range*: delivery, content, location, interaction, practice Adjustments are considered and are incorporated into practice. The specific training outcomes are compared to the agreed outcomes negotiated at the beginning of the training.

Competency	Specific outcome	Assessment criteria
Clean-in-place product production equipment using automated cleaning systems **Level : 2** **Credit : 3**	Prepare to operate clean-in-place systems	Preparation ensures that production equipment for cleaning is free from product and ready for cleaning by the agreed time. Preparation verifies that the correct cleaning solution is available in sufficient quantity and at the correct strength and temperature for cleaning, in accordance with cleaning specifications. Preparation verifies that the set-up of the automated cleaning system is correct for scheduled cleaning. Communication with personnel affected by preparation to clean-in-place equipment, allows planning to optimise performance and promotes goodwill. Preparation to operate clean-in-pace system complies with organisational policies, procedures and legislation.
	Operate clean-in-place systems	Operation cleans the production equipment and frees it from contamination by the agreed time. Identify any variations in the technical performance of the clean-in-place system and implements solutions within jurisdiction, or reports variations so as to minimise production downtime. Correct clothing is worn in a manner that protects personnel and product and complies with organisational policy and legislation. Wastage of cleaning solution due to operation is minimised, and cleaning solution is reclaimed and stored for future use. Production equipment is reassembled and ready for the next user by the agreed time.

Competency	Specific outcome	Assessment criteria
Comply with plant emergency procedures **Level : 2** **Credit : 2**	Raise alarm on discovering an emergency Range: emergencies include: fire, spillage of hazardous materials, explosion, injured personnel	The manner and degree of urgency in raising the alarm is appropriate to the particular emergency discovered. The alarm-raising alerts the personnel affected by the emergency and/or relevant to the solution of the problem with the necessary degree of urgency but without causing panic. The alarm-raising alerts medical centre personnel in the event of accidents to people, and provides clear and coherent descriptions of the extent of injury. The alarm-raising provides available information to assisting personnel in a manner that facilitates rescue and/or support actions.
	Take action to deal with the emergency	Actions taken comply with best practice for emergencies, and minimise panic in others. Actions provide information and support to injured people in a manner, which offers comfort and reassurance. Action addresses emergencies within personal scope of competency, using appropriate equipment, only where doing so does not increase risk to individual or others. *Range: emergencies:* containable fires put out; spillage of hazardous chemicals cleared; injured individuals treated; explosion damage cleared and/or leaks contained Actions to contain the emergency and limit the negative effect on the environment are prompt and consistent with environmental policy and best practice. *emergency:* spillage; release; fire Actions minimise the loss of materials and damage to plant and equipment, without further endangering the safety of self and others. Documentation of any incident to which the individual was party or witness is completed timeously after its occurrence, and is complete, accurate and in the required formats.

Competency	Specific outcome	Assessment criteria
Maintain raw material, intermediate and finished product supplies to facilitate production **Level: 1** **Credit: 1**	Prepare to supply material for production line use	Preparation ensures that the production schedule is current and available prior to scheduled production. Preparation verifies that the correct materials are available in sufficient quantity for scheduled and anticipated production. Preparation checks that equipment used to transfer material to production lines is operational and fit for purpose in line with organisational policies, procedures and legislation.
	Maintain material supply to production lines	Materials are loaded, unloaded and transferred safely without damage to the materials, individual, plant and equipment. Material supply to production line is maintained in a manner that optimizes performance of personnel and equipment, and minimises downtime. Material supplied to production lines conforms to production requirements for type, quantity and quality. Maintenance of material supply to production line complies with organisational policies, procedures, and legislation. Supply ensures that good housekeeping practices are applied consistently throughout the process, and that the work environment is left clean and free from hazards.
	Remove finished product, waste and unused materials from processing areas	Removal transfers clearly identified finished products away from the process area to storage in a manner that promotes personal and product safety. Removal disposes of waste in a manner and timeframe consistent with organisational policies, environmental standards and legislation. Removal transfers accurately and correctly labelled unused materials safely, without damage or waste, to designated area for reprocessing, storage or disposal. Documentation of all materials movement is complete and accurate according to standard operating procedures.

Competency	Specific outcome	Assessment criteria
Implement quality practices in a production environment **Level : 3 Credit: 2.**	Demonstrate knowledge of quality control practices	Demonstration selects and implements tests consistent with the requirements of quality control practices for a particular product and production line. Demonstration of knowledge identifies and counters factors affecting test result accuracy in a manner which promotes test accuracy and product quality, describes and explains the purpose of in-house quality status indicators without reference to information sources. Correctly identifies and operates equipment required for applying quality control practices to production line. Demonstration is consistent with the requirements of current legislation, procedures and documented best practice and the implications of these for product and process quality is explained. Describes and explains the documentation requirements and formats for production quality control practices.
	Integrate quality control practices into work on the line	Integration of quality control practices into production line operation occurs in a timeframe and manner that optimises productivity and minimises the need for rework. Integration controls quality at source through adjustments to production parameters to maintain product quality within spec. Integration ensures that the quality status of production line inputs and outputs is identified and status is indicated on products Quality control results are accurate, complete and need to retest is identified. Equipment used in quality control of production line operation is clean and operational for next user. Quality control factors affecting production line are identified and action is taken in a timeframe that optimises performance. Housekeeping principles are applied consistently throughout the shift, and the work environment is clean and free from hazards. Integration of quality control practices into production line operation complies with organisational policies, procedures, legislation and documented best practice.
	Monitor quality on a packing line	Monitoring notes non-conforming wrapping and reports sub-standard packing materials to the appropriate authority

4.3.2 Manufacturing Competencies

The following competencies are specific to the manufacturing area of the company and are operational in nature and specialised. They are linked to those roles which in the job description matrix (appendix D) are listed as manufacturing jobs, such as the 'manufacturing services operator'. Generic elements are however included in the assessment criteria. Issues of safety, quality and communication are re-iterated within the competencies. Assessment criteria include for example 'Results are communicated to internal and external customers according to company procedures.' and 'The start-up safety checks establish that the system is sound.'

Competency	Specific outcome	Assessment criteria
Start up and shut down a batch process **Level : 3** **Credit : 5**	Start up production services	Start-up follows the correct sequence and proceeds according to standard operating procedures for a batch process. Start-up opens steam, water and compressed air valves in accordance with standard operating procedures so that these are available in sufficient quantities for production. Start-up results in service pumps and/or fans running at the pressures defined in the standard operating procedures. The starts up safety checks establish that the system is sound
	Charge vessels at the beginning of the production process	The appropriate product vessels are clean and fit for purpose and available in time for production. Stock is available in sufficient quantities and quality to meet the production plan and specifications Production priorities are established from the hand-over reports, the production plan and stock levels. Equipment used for transferring components is operational and available. Regulation clothing is worn in a manner that protects the personnel and product, and complies with company policies, procedures and legislation.
	Prepare components for processing	Preparation heats components and/or applies the vacuum to the system in accordance with standard operating procedures. Preparation of the catalyst slurry is completed according to particular product specifications. Chemicals and components essential to the production process are available for use in accordance with product specifications. Equipment for conversion is available, operational and fit for purpose at the specified time. Preparation complies with all company policies, procedures and legislation requirements.

	Complete and stop a batch process	Water and/or stripping steam is closed at the completion of the batch process, according to standard operating procedures Results are communicated to internal and external customers according to company procedures. Preparation to transfer product complies with company policies and safety procedures. Equipment used for transferring product to storage is operational and available. Storage space is available for transfer and shut-down.
	Shut down plant	Equipment is shut-down in the correct sequence as prescribed in the standard operating procedure, and at the specified time. Shutdown is effected when the drop tanks are empty, where applicable, and the vessels charged. Shut-down complies with company policies, procedures and legislation. Documentation relating to the shut-down and cleaning of equipment is accurate and complete, in accordance with standard operating procedures.
	Shut down production services	Shut-down follows the correct sequence and proceeds according to standard operating procedures for a batch process. Shut-down results in service pumps and/or fans standing inactive. The shut-down safety checks, establish that the system is sound. Or report system faults to the shift supervisor.

Competency	Specific outcome	Assessment criteria
Start up and shut down a continuous process in manufacturing **Level: 3** **Credit: 8**	Start up the production services	Start-up proceeds according to standard operating procedures for a continuous process. Start-up results in service pumps and/or fans running at the pressures defined in the standard operating procedures. Opens steam, water and compressed air valves so that these are available in sufficient quantities for production. for purpose at the specified time. Start-up safety checks establish that the system is sound, or reports system faults to the shift supervisor.
	Prepare plant for continuous process	The correct plant is clean, fit for purpose and available in time for production. Stock is available in sufficient quantities and quality to meet the production plan. Production priorities are established from the hand-over reports, the production plan and stock levels. Processing information is keyed into the system in accordance with system prompts. The routing and destination of components from storage tanks to continuous plant is set in accordance with the production plan. The work environment is clean and free from hazards. Regulation clothing is worn in a manner that protects the personnel and product, and complies with organisational policies, procedures and legislation.
	Prepare components for processing	Preparation heats components and applies the vacuum to the system in accordance with standard operating procedures. Chemicals and components essential to the production process are available for use in accordance with product specifications. Equipment for conversion is available, operational and fit for purpose at the specified time. Preparation complies with all company policies, procedures and legislation requirements.
	Complete and stop a continuous process and shut down the plant	Stripping steam is closed at the completion of the process, according to standard operating procedures. Closing test sample results are accurate and are recorded according to standard operating procedures. Preparation to transfer product to storage or internal recycle complies with company policies and safety procedures. Equipment used for transferring product to storage is operational and available. Storage space is available for transfer of product during shut-down. The transfer of product to specified storage vessels or to internal recycle is achieved at the optimum rate. Shutdown is effected when the product work tanks and the plant are empty. Instruments are switched off or set to standby mode as specified in the standard operating procedures.

Competency	Specific outcome	Assessment criteria
Check and Implement a production Sequence **Level : 2** **Credit : 2**	Check tank capacity and stock	Components required for a particular production run are established from the production plan and recipe [or formulation]. Check establishes the stock levels available for production in the tanks. Check establishes product and component compatibility for respective zones.
	Check available vessels and plant	The appropriate product vessels and plant are available, clean and fit for purpose in time for production priorities. Production priorities are established from the hand-over reports, the production plan and stock levels. The routing and destination of components from storage tanks to Manufacturing vessels is set in accordance with the production plan. Preparation to transfer components complies with company policies and safety procedures.
	Order components for runs according to production schedule	Documentation related to the ordering of components for runs is accurate and complete in accordance with standard operating procedures. Orders are communicated according to company procedures. Orders reflect the current production plan requirements.

Competency	Specific outcome	Assessment criteria
Convert Oils to Fats in a Hardening Plant **Level : 3** **Credit : 4**	Check the system for operational readiness	Check establishes that production services are available, operational and fit for purpose at the specified time. Check establishes that equipment for converting oils to fat is available, operational and fit for purpose at the specified time. Water is drained off so that components are free from contamination and foreign matter. Components are in the required condition for reaction.Check establishes that routes have been set.
	Start the reaction process	Catalyst is available in sufficient quantity to maintain scheduled and anticipated production. Gas is available in sufficient quantity for application to the reaction as required by the production schedule. Safety equipment is available, operational and fit for purpose at the specified time, and safe working practices for hydrogen are applied.
	Monitor the reaction to end-point	The required flow of components is maintained through the conversion equipment and blockages are minimised. Quality checks determine whether product meets specifications and adjustments are made as required. Product wastage caused by the operation of conversion equipment is minimised, and opportunities to rework non-conforming product are maximised. Vessels are cooled and gas purged at the termination of the reaction, according to standard operating procedures.
	Filter the oil, remove and recover catalysts	Filter presses are available, operational and fit for purpose at the specified time and in the appropriate zone. Post-filtration quality checks determine whether the product meets product specifications for clarity, and opportunities for reworking non-conforming product are maximised. Catalyst re-use frequency is monitored and recorded to ensure that the reaction process continues to meet production specifications
	Perform quality checks	Continuous sampling during reaction is accurate, monitors key variables, and is actioned according to standard operating procedures.

Competency	Specific outcome	Assessment criteria
Blend components and remove unwanted impurities in an edible oils manufacturing process **Level : 3** **Credit : 6.5**	Prepare to blend components	Equipment for blending is clean and free of contamination. Selection and setting of routing lines for blending conforms to product specifications and protects against contamination. Components to be blended are available in sufficient quantities for scheduled production. Components for blending meet quality specifications.
	Blend Components	Oils are blended in the required quantity by the specified time as per formulation. The blended oil is matched against product specifications and non-conforming product is adjusted by the addition of oil or fat. Documentation related to quality control is accurate and complete according to company policies. Blending equipment is operated in a manner that optimises operator safety and product conformance to specification.
	Remove impurities from the edible oils	The equipment is available, operational and fit for purpose at the specified time. Filters are clear and free from contamination and filter bags are installed. Oil is purified for the specified time. Purified oil is free of unwanted impurities and meets the product specifications.
	Perform quality checks on the blended oils	The product is tested, quality assessed and the acceptability determined within an agreed timeframe. Deviations from an agreed process are identified and investigated quickly to minimise production downtime. The method of investigation into production or process non-conformance complies with organisational policies, procedures and legislation.

Competency	Specific outcome	Assessment criteria
Neutralise and Modify Fats and Oils **Level : 3** **Credit : 8**	Perform initial and final quality checks for the neutralisation and modification of edible oils	Partly refined and blended oil is tested before reaction, quality assured and acceptability for production determined within a specified time. Variances in crude oil quality are identified and operators take action to adjust quality timeously so as to optimise production. Neutralised oil is tested after the reaction is terminated and non-conforming product is adjusted and/or recycled.
	Start the reaction process	The equipment is available, operational and fit for purpose at the specified time. The routing and destination of blended oils from storage tanks to Manufacturing vessels is set in accordance with the production plan, particular product and availability of destination tanks. Processing information keyed into the system is accurate and consistent with the reaction process.
	Monitor the reaction process	Monitoring verifies that quantities of caustic and dilution water are correct for the reaction process. Monitoring maintains the reaction within parameters defined in the standards operating procedures for each oil type, and adjustments to the reaction are consistent with these procedures. The reaction is concluded at the appropriate stage and product allowed to settle before transfer, in accordance with standard operating procedures.

Competency	Specific outcome	Assessment criteria
Implement Health, Hygiene and Safety Practices **Level : 2** **Credit : 1**	Handle and use chemicals and ingredients safely Range : Nitric acid, phosphoric acid, sulphuric acid, caustic soda, nickel catalyst, hydrogen, sodium metholate, citric acid, bleaching earth	Authorised chemicals for the particular process are (rendered) available in required concentration, on time and in accordance with the production schedule. Labels on chemical containers are complete and clear to read and unlabelled containers are rejected. Regulation clothing is worn in a manner that protects personnel and product and complies with organisational policy and safety legislation. Equipment for use in handling chemicals is operational and fit for purpose. Personnel affected by the preparation and handling of chemicals are notified in time to promote workplace and team safety. Knowledge of first aid and safety procedures is demonstrated before chemical handling begins.
	Implement good housekeeping practices	Work environment is clean and free from hazards. Necessary equipment is in its place and there is no unallocated equipment. In-house personal hygiene requirements are described and demonstrated without reference to information sources.
	Describe safety systems, practices, procedures and clothing, and discuss and/or demonstrate their purpose	Safe systems and practices in the workplace are described and demonstrated without reference to information sources. Safe practices in working with production equipment are described and demonstrated without reference to information sources. Legislation related to safe work practices is described and demonstrated where appropriate. Organisational requirements for safety clothing are described, and their use is demonstrated. In-house product safety requirements are described and demonstrated without reference to information sources. The reporting structure and line responsibility relating to safe working practices is described without reference to information sources.
	Integrate safe practices into operations	Operation of product processing equipment optimises the safety of the operator and team. Lifting and handling techniques used minimise the risk of injury to self and others. Hazards to product are identified and personnel authorised to act are notified quickly so as to minimise product waste. Personal and team member work practices are safe in compliance with organisational policies, procedures and legislation. In-house personal hygiene requirements are integrated into work practice.

Competency	Specific outcome	Assessment criteria
Sample and check for quality in a manufacturing process **Level : 2** **Credit : 2**	Check for quality in a factory	Testing equipment is available, operational and fit for purpose at the specified times. The check implements a range of tests for quality at specified times for particular products. Each product and/or component is tested, quality assessed, and profile determined by a specified time.
	Analyse for quality in process and finished product	Analysis implements a range of tests for quality at specified times for particular products and/or components, in accordance with standard operating procedures. Underlying causes of product non-conformance is identified quickly to minimise production downtime and product wastage. The systems for collecting the analysis data are appropriate for the type of non-conformance, and are correctly implemented. The decision on the cause of non-conformance is recorded in a specified format.

4.3.3 Packing Competencies

The packing competencies, as with the manufacturing competencies, are operational in nature and specialised. Generic elements which reflect the meta-competencies are found in the assessment criteria, for example safety is re-inforced through the criterion 'The start up safety checks verify the integrity of the plant.' which is included in the competency below. There are nine packing competencies, all of which fall into levels two, three and four of the NQF (Figure Three.) the packing competencies are: start up and shut down ancillary services in a margarine, fats and oils, finishing an packing line; prepare oils and fats for packing; prepare the aqueous phase for packing; clean in place food and related product production equipment using automated cleaning systems; bulk-fill oil and fat products on a semi-automated packing line; pack oil products on an automated packing line; process and pack products on a semi-automated packing line; sample and check for quality on an edible oils and fats finishing and packing line and sample and check for quality in an edible oils and fats finishing and packing process.

Competency	Specific outcome	Assessment criteria
Start up And Shut Down Ancillary Services In A Margarine, Fats And Oils Finishing And Packing Line **Level: 2** **Credit: 3**	Start up production services	Start-up follows the correct sequence and proceeds according to standard operating procedures for a packing process. Start-up opens steam, chilled water, ammonia and compressed air valves in accordance with standard operating procedures so that these are available in sufficient quantities for production. The start-up safety checks verify the integrity of the plant, repairs faults within jurisdiction, and/or reports system faults to the appropriate discipline, as per standard operating procedures.
	Shut down ancillary services	Shut-down follows the correct sequence and proceeds according to the shut-down checklist and standard operating procedures for a finishing and packing process. Shut-down closes steam, water, ammonia and compressed air valves in accordance with standard operating procedures. Shut-down results in service pumps and/or fans standing inactive. Shut-down safety checks, as per standard operating procedures, establish that the system is sound, repair faults within jurisdiction, and/or report system faults to the appropriate discipline

Competency	Specific outcome	Assessment criteria
Prepare Oils and Fats for Packing **Level: 2** **Credit: 3**	Receive oil and fats for packing of planned orders	Oils and fats requirements for production are established from current stock information and production plans, and shortages followed up timeously to minimise impact on production. Oil condition is matched against specifications before transfer is confirmed, and authorisation is secured for transfer. The transfer of correct oils and fats to specified storage tanks is achieved within the agreed timeframe. Documentation relating to batch number, type and weight of fat is accurate and completed according to standard operating procedures. Receipt of oil for production complies with organisational policies, procedures and legislation.
	Weigh ingredients and check quality of oil	Equipment used for weighing chemicals is operational and available at the correct time. Weighing of oils and ingredients is accurate, uses the correct method and complies with recipe requirements and standard operating procedures. Samples are matched with specifications and non-conforming product is adjusted, or rejected, as required by the result guidelines. Non-conforming oil is identified and isolated, and corrective action is taken in time to minimise the impact on production.
	Prepare mixing equipment and mix ingredients into oil and fats	Preparation establishes the status of the equipment from hand-over documents and work permits, and ensures that start-up plans are consistent with equipment status. Mixing equipment is operational and fit for purpose at specified time. Mixing transfers ingredients in the required sequence as specified in the standard operating procedures for a particular batch, and the process is signed off as required.

Competency	Specific outcome	Assessment criteria
Prepare the Aqueous Phase For Packing **Level: 2** **Credit: 3**	Prepare for pasteurisation.	Preparation establishes the status of the equipment from hand-over documents and work permits, and ensures that start-up plans are consistent with equipment status, verifies the integrity of the plant, repairs faults within jurisdiction, or reports system faults to the appropriate discipline, as per standard operating procedures. Preparation ensures that production equipment is clean and free from contamination by the agreed time. Preparation establishes ingredient requirements for production from the packing and production plans, and ensures that the supply is sufficient and available in the milk blending area by the agreed time.
	Pasteurise the whey solution	The Pasteuriser is clean, available and fit for purpose at the agreed time, and pasteurisation proceeds according to standard operating procedures and health regulations. Pasteurisation compares process parameters to production specifications at agreed intervals, and any adjustments comply with guidelines for corrective action, stipulated procedures and product improvement.
	Prepare brine solution	Preparation ensures that the water levels in the brine storage tank are sufficient for brine preparation, and meet the requirements of standard operating procedures. Brine concentration meets the requirements of standard operating procedures, the packing line and production and is available in sufficient quantities and at the correct times for packing and production.
	Mix ingredients for liquid phase preparation	Production equipment is clean and free from contamination by the agreed time. Ingredients required for a particular recipe [fat blend] are available in the right quantities, within specifications, and on time in accordance with production requirements. Stock of ingredients is sufficient for production requirements and shortages are replenished timeously to minimise the chances for production delays. Mixing gathers data for the performance management of essential variables and displays the data in the agreed place and manner, at agreed time intervals.
	Sample and test for quality in the aqueous phase	Sampling equipment is available, operational and fit for purpose at specified times. *Range*: sampling cup, sampling bottles, labels Sampling methodology complies with standard operating procedures. Range of samples meets the quality requirements of the edible fats packing line, and product quality is adjusted in the light of test results or rejected, as required by the result guidelines, in time to minimise the impact on production.

Competency	Specific outcome	Assessment criteria
Clean-In-Place Food And Related Product Production Equipment Using Automated Cleaning Systems **Level: 2 Credit: 3**	Prepare to operate clean-in-place systems	Preparation ensures that production equipment for cleaning is free from product and ready for cleaning by the agreed time. Preparation verifies that the correct cleaning solution is available in sufficient quantity and at the correct strength and temperature for cleaning, in accordance with cleaning specifications. Preparation verifies that the set-up of the automated cleaning system is correct for scheduled cleaning.
	Operate clean-in-place systems	Operation of the clean-in-place system optimises the safety of self and team, and complies with organisational policies, procedures and legislation. Operation identifies any variations in the technical performance of the clean-in-place system and implements solutions within jurisdiction, or reports variations so as to minimise production downtime. Operation cleans the production equipment and frees it from contamination by the agreed time.

Competency	Specific outcome	Assessment criteria
Bulk-Fill Oil And Fat Products On A Semi-Automated Packing Line **Level: 2** **Credit: 4**	Prepare plant and machinery for filling	Preparation establishes the status of the plant from hand-over documents and work permits, and start-up actions are consistent with plant status. Services for equipment are connected and available. Preparation establishes that product, packing materials and sealers which conform to specifications are available in sufficient quantities for scheduled and anticipated production. Filling heads and lines are free from contamination and ready for use, Preparation for filling ensures that rework is bled off preventing contamination with incompatible products. Preparation ensures that equipment is operational, available and set up according to standard operating procedures to meet production schedule requirements.
	Operate filling equipment	Preparation for filling ensures that tanks are heated and filled in accordance with standard operating procedures. Production throughput is correct as per standard operating procedures and production specifications. Filled containers and packages are leak-free and conform to production specifications. Production wastage and downtime due to operation of equipment is minimised and opportunities to rework non-conforming product are maximised. Variations in specified technical performance of equipment are identified and correct action is taken in a timeframe that optimises performance. Personal protective clothing is worn in a manner that protects the personnel and product and complies with organisational policies, procedures and legislation.
	Shut down a semi-automated filling line	Preparation for shut-down ensures timeous communication about the intended shut-down to all relevant personnel. Shut-down ensures that flows are terminated and flushing out procedures are applied, equipment switched off and plant restored to fail-safe conditions, according to standard operating procedures *Range*: *equipment:* heating; chilling; air blowing Preparation adjusts the production parameters at shut-down, in accordance with standard operating procedures for safe and effective shut-down. All electrical equipment is isolated, stored, switched off or set to standby mode, according to standard operating procedures Shut-down ensures that good health, hygiene and housekeeping practices are applied consistently throughout, and that the plant is clean in preparation for the next process, according to documented best practice and standard operating procedures Unused packaging material is stored in the correct place and under correct protective covering, as required by standard operating procedures. Shut-down complies with organisational policies and procedures.

Competency	Specific outcome	Assessment criteria
Portion-Pack Products On An Automated Packing Line **Level : 2** **Credit : 4**	Prepare plant and machinery for packing	Preparation establishes the status of the plant from hand-over documents and work permits, and start-up actions are consistent with plant status. Services for equipment are connected and available. Product and packing materials that conform to specifications are available in sufficient quantities for scheduled and anticipated production. Production equipment is reassembled and ready for the next user by the agreed time.
	Operate and monitor filing and packing equipment	Operation verifies that production throughput is correct as per standard operating procedures and production specifications, or makes adjustments as required. Filled containers and packages are leak-free and conform to production specifications. Production wastage and downtime due to operating equipment is minimised and opportunities to rework non-conforming product are maximised. Variations in specified technical performance of equipment are identified and correct action is taken in a timeframe that optimises performance.

Competency	Specific outcome	Assessment criteria
Process And Pack Products On A Semi-Automated Packing Line **Level: 3** **Credit: 6**	Prepare plant and machinery for packing	Preparation establishes the status of the plant from hand-over documents and work permits, and start-up actions are consistent with plant status. Preparation ensures that services for equipment are connected and available. Preparation verifies the integrity of the plant, repairs faults within jurisdiction, or reports system faults to the appropriate discipline, Preparation for packing readies line for C-I-P, where applicable, and ensures that chemicals for C-I-P are added to the Equipment is operational, available and set-up according to standard operating procedures to meet production schedule requirements.
	Process fats and margarine for packaging	Equipment for transferring fats and margarine from storage tanks to the packing lines is clean, operational and available. *Range: operational:* storage tank selected, lines set The heat exchange system is available, operational and fit for purpose at the required time. Fat and margarine is heated to the required temperatures at the specified rate, in accordance with standard operating procedures. Processed product conforms to specifications and non-conforming product is adjusted in accordance with guidelines.
	Operate filling and packing equipment	Preparation for packing ensures that tanks are heated and filled in accordance with standard operating procedures. Operation sets weights correctly and optimises packing speed according to specifications for efficient machine performance, specified temperature profile and maximum pack/wrap quality. Operation fills the container with correct, in-spec product by the agreed time. Filled and/or wrapped containers and packages are correctly wrapped, leak free and conform to production specifications. Production wastage and downtime due to operating equipment is minimised and opportunities to avoid wastage by reworking non-conforming product are maximised.
	Sample and test for quality on a packing line	Sampling equipment is available, operational and fit for purpose at specified times. Range: sampling cup, sampling bottles, labels Sampling methodology complies with standard operating procedures. Range of samples meets the quality requirements of the edible fats packing line and product quality is adjusted in the light of test results.
	Shut down a semi-automated processing and packing line.	Preparation for shut-down ensures timeous communication about the intended shut-down to all relevant personnel. *Range:* shift foreman; artisans; packing operators Preparation adjusts the production parameters at shut-down, in accordance with standard operating procedures. Preparation for shut-down ensures that flows are terminated and flushing out procedures are applied, equipment switched off and plant restored to fail-safe conditions, according to standard operating procedures. All electrical equipment is isolated, stored, switched off or set to standby mode, according to standard operating procedures. Shut-down is effected when the processing equipment is empty and cleaned out in preparation for next process. Unused packaging material is stored in the correct place and under correct protective covering, as required by standard operating procedures.

Competency	Specific outcome	Assessment criteria
Sample And Check For Quality On An Edible Oils And Fats Finishing And Packing Line **Level: 2 Credit: 3**	Demonstrate knowledge of quality control practices	Demonstration selects and implements tests consistent with the requirements of quality control practices for a particular product and production line. Demonstration of knowledge identifies and counters factors affecting test result accuracy in a manner, which promotes test accuracy and product quality. Demonstration describes and explains the purpose of in-house quality status indicators without reference to information sources. Demonstration correctly identifies and operates equipment required for applying quality control practices to production line. Demonstration is consistent with the requirements of current legislation, procedures and documented best practice and the implications of these for product and process quality is explained. Demonstration describes and explains the documentation requirements and formats for production quality control practices.
	Check for quality in a packing hall	Agreed quality goals in the value chain are clearly described, understood, and available on the line, and performance in terms of goals is measured and recorded for future reference. The check implements a range of tests for product quality at specified times for particular products. The check implements a range of tests for packaging material quality at specified times for particular materials.
	Check and record, palletise packed products	Quality checks establish integrity of the product before despatch. Palletisation conforms to organisation's Palletising specifications. Palletising rate meets production line requirements. Palletising products complies with organisational policies, procedures and legislation. Lifting and handling techniques used during manual Palletising of products minimise risk of injury to self and others.

Competency	Specific outcome	Assessment criteria
Sample And Check For Quality In An Edible Oils And Fats Finishing And Packing Process **Level: 4** **Credit: 6**	Demonstrate knowledge of quality control practices	Demonstration selects and implements tests consistent with the requirements of quality control practices for a particular product and production line. Demonstration of knowledge identifies and counters factors affecting test result accuracy in a manner, which promotes test accuracy and product quality. Demonstration describes and explains the purpose of in-house quality status indicators without reference to information sources. Correctly identifies and operates equipment required for applying quality control practices to production line. Demonstration is consistent with the requirements of current legislation, procedures and documented best practice and the implications of these for product and process quality is explained. Demonstration describes and explains the documentation requirements and formats for production quality control practices.
	Check for quality in a packing hall	Agreed quality goals in the value chain are clearly described, understood, and available on the line, and performance in terms of goals is measured and recorded for future reference. Testing equipment is available, operational and fit for purpose at the specified times. The check implements a range of tests for product quality at specified times for particular products. The check implements a range of tests for packaging material quality at specified times for particular materials. Checking tests each product and/or packing material for quality and acceptability against specifications in the agreed manner, and a quality profile determined by a specified time.
	Analyse for quality in process and finished product, record and report results	Analysis implements a range of tests for quality at specified times for particular products and/or components, in accordance with standard operating procedures. Analysis tests products and/or materials, assesses quality and acceptability, and determines the product profile on request or according to organisational requirements, by a specified time. Analysis identifies the underlying causes of product non-conformance quickly so as to minimise production downtime and product wastage.

Competency	Specific outcome	Assessment criteria
Implement Health, Hygiene And Safety Practices **Level: 2** **Credit: 2**	Handle and use chemicals and ingredients safely Range: chemicals:[may include] Propane/butane, alcohol/spirit, perfumes, hydrochloric acid, citric acid, sulphuric acid, crysillic acid, sodium hydroxide, sodium sulphate, potassium hydroxide, sodium fluoride, powders, liquid ammonia, nitrogen	Authorised chemicals for the particular process are available in the required concentration, on time, and in accordance with the production schedule. Labels on chemical containers correctly identify the ingredients, and are complete, clear and easy to read. Correct personal protective clothing is worn in a manner that protects personnel and product and complies with organisational policy and safety legislation. *Range: equipment:* acid spill apron, safety goggles, face mask, PVC gloves, safety shoes, ear plugs, anti-static clothing, breathing apparatus. Chemical handling procedures are complete and prominently displayed on the line. Knowledge of first aid and safety procedures is demonstrated before chemical handling begins. Handling of chemicals maximises operator and product safety, and complies with organisational policies, procedures and legislation. Safety equipment is operational and available during the period of chemical handling. *Range: safety equipment:* spillage kit, eye sprinkler, shower
	Implement good hygiene and housekeeping practices	Implementation is consistent with clearly described and displayed criteria for the measurement of agreed housekeeping standards. Work environment is clean and free from dust, acid fumes and hazards and sources of dirt and/or contamination are identified and removed. Responsibilities with respect to housekeeping are clearly understood and team members agree that opportunities to offer assistance are identified and actioned in a way that promotes goodwill. Spillage's are removed where possible in accordance with spillage procedures, or reported without delay to enable safe response. All equipment is allocated in designated areas when not in immediate use, and items are easy to find and return. Waste materials are disposed of in a manner consistent with environmental policies and standard operating procedures.
	Describe safety systems and discuss and/or demonstrate without reference to information sources	Safe systems and practices in the workplace are described and/or demonstrated without reference to information sources. *Range: systems:* work permits, lock out procedures, evacuation procedures, safety alarms, safety interlock systems, handling: liquid nitrogen/ammonia The description lists and explains the purpose and operation of the available safety equipment without reference to information sources, and demonstration is consistent with best practice. *Range: equipment:* fire extinguishers, fire hydrants, hoses, sprinkler, eye wash bottles, fire alarms, gas and evacuation alarms. The description of safe work practices for production equipment is accurate without reference to information sources, and demonstration is consistent with best practice, and complies with organisational policies, procedures and legislation. The description and demonstration of the implications of legislation for safe work practices is accurate and complete.
	Integrate safe practices into operations	Operation of production equipment optimises the safety of the operator and team. Lifting and handling techniques minimise the risk of injury to self and others. Hazards to product are identified and removed promptly (if within the operator's jurisdiction), or personnel authorised to act are notified quickly so as to minimise product waste. Personal work practices are safe in compliance with organisational policies, procedure and legislation, and unsafe practices of team members are discussed during team meetings.

4.3 4 Competency Matrix

The construction of a competency matrix addresses two of the aims of this study. Firstly, the formulation of competencies and the creation of a matrix and secondly it provides a mechanism for the identification of meta-competencies. This is achieved through the categorising of the competencies into the various areas studied, manufacturing, packing and those competencies which were generic to both areas. The existence of the generic category indicates meta-competencies were found within the sample and suggests that competencies existing within the target population can be used to link organisational competencies to the national framework. The existence of meta-competencies is verified by examining competencies formulated in alternative national contexts, in this case the New Zealand Qualifications Authority (1998), the Australian framework (EdNa, 1998) and the United Kingdom's vocational qualifications (GNVQ, 1998). Those competencies which have been identified as generic are found in all of these contexts, although the titles vary slightly.

The existence of meta-competencies provides a link not only with the national framework but through it, international frameworks. Meta-competencies provide portability and the transfer of learning, because they are generic to many situations and contexts. They allow employers to speak a 'common language' and identify potential employees who have the particular competencies which the organisation requires. The final matrix was developed after data collection, coding and verification was complete. It is a tool for the creation of learning pathways and of competency clustering and through these processes allows for the business to strategically plan the development of workers, to achieve the highest impact on the skills shortage in the organisation and the nation. Figure eight shows that there are eighteen generic/meta-competencies which constitutes fifty-three percent of the total number of competencies for the two areas. This

demonstrates that the greater proportion of each employee's role is generic. It is possible, therefore, for a worker to build up a core of generic competencies and to move between roles and departments requiring shorter training periods. There are a number of implications of these generic/meta-competencies aside from this one. It will be possible once competencies are recognised on a national basis for workers to move from company to company nationally or internationally, based on their competencies and the value of these competencies in terms of their life cycles. Workers who obtain recognised emerging competencies will have the opportunity to find employment globally, as is the case with those in the information technology field (Gates, 1998). This helps to address skills shortages on a national and global basis.

It is important to highlight that two separate workshops were conducted for each department and from these workshops a set of competencies for the area were developed. These competencies were then verified by the separate groupings. Those competencies which appeared to be generic were presented to the groups. In some instances competencies were not initially identified within a particular group or were not defined in the same way. Each group made the decision as to which of the possibly generic titles they had not initially identified applied to their area. Through this process a final model was agreed and is presented in the matrix.

FIGURE 9: COMPETENCY MATRIX

Area / Competency	Manufacturing	Packing	Generic/Meta-competencies
Start up and shut down ancillary services in a margarine , fats and oils, finishing an packing line			
Prepare oils and fats for packing.			
Prepare the aqueous phase for packing			
Clean in place food and related product Production equipment using automated cleaning systems.			
Bulk-fill oil and fat products on a semi-automated packing line.			
Pack oil products on an automated packing line.			
Process and pack products on a semi-automated packing line			
Sample and check for quality on an edible oils and fats finishing and packing line.			
Sample and check for quality in an edible oils and fats finishing and packing process			
Implement health hygiene and safety practices			
Start up and shut down a Batch Process			
Start up and shut down a continuous process in a manufacturing			
Check and implement a production sequence			
Convert oils to facts in a hardening plant			
Blend components and remove unwanted impurities in an edible oils manufacturing process			
Neutralise and modify fats and oils			
Sample and check for quality in a manufacturing process.			
Receive and store hazardous materials			
Pack and palletise products manually			
Clean and prepare equipment for production or maintenance			
Hand over responsibility for a production shift			
Solve basic production problems in a manufacturing environment			
Provide on-the-job training in the workplace			
Clean-in-place product production equipment using automated cleaning systems			
Comply with plant emergency procedures			
Maintain raw material, intermediate and finished product supplies to facilitate production			
Implement quality practices in a production environment			
Identify diagnose and correct faults on machinery			
Remove inspect and /or repair, replace and test components and units			
Shift loads using lifting equipment			
Align machinery and equipment			
Monitor the condition of machinery and equipment			
Monitor the condition of machinery and equipment visually			
Communicate in teams			

4.3.5 Competency Clustering

The final aim of this study is to utilise the competency matrix to create competency clusters and learning pathways. This addresses the final three research questions which are:

- How can competencies be sequenced for structured learning and development?
- Does this sequencing reflect the NQF and validate the use of levels and credits?
- What do the levels and credits show regarding progression in the Learning Pathways?

The competency clustering provides an overview of the competencies and allows for the strategic utilisation and planning. As can be seen in figure ten, the manufacturing area has a higher total allocation of credits, one hundred and ten, which equates to one thousand one hundred and ten hours or one hundred and thirty-eight working days. This indicates a higher level of complexity within this area and a longer learning period. The foundations for both departments are generic, movement between them is therefore possible without the requirement of retraining those moving out of manufacturing and into packing though would require an average of twenty days less training. The packing area on the other hand has a total of ninety-seven credits, nine hundred and seventy hours of learning or one hundred and twenty-one working days. The main area of difference being phase three which has thirty-three credits compared to manufacturing's forty-six.

The levels assigned to each competency link to those of the NQF (Figure Three) and demonstrate the general level at each phase. Phase one, equates with level two of the NQF (Figure Three), phase two equates with level three although it has some competencies which are at a level four, and phase three links to level four. This indicates that more specialised learning takes place at an intermediate level, that is at level two, while the learners focus upon generic competencies, once again within the final phase of the clustering, these generic skills are more complex, as indicated

by both the levels and the credits allocated to them. They provide the learner with competencies, which aim to be a foundation for managerial or more specialised technical positions. Competencies, which provide this foundation are:

Receive and store hazardous materials; pack and palletise products manually; clean and prepare equipment for production or maintenance; hand-over responsibility for a production shift; solve basic production problems in a manufacturing environment; provide on-the-job training in the workplace; clean-in-place product production equipment using automated cleaning systems; comply with plant emergency procedures; maintain raw material, intermediate and finished product supplies to facilitate production; implement quality practices in a production environment; identify diagnose and correct faults on machinery; remove inspect and /or repair, replace and test components and units; shift loads using lifting equipment; align machinery and equipment; monitor the condition of machinery and equipment; monitor the condition of machinery and equipment visually and communicate in teams. Some of these competencies provide background for learners who wish to move into more specialised technical areas for example identify diagnose and correct faults on machinery and other such as communicate in teams provide background for managerial development.

These competencies allow for the development of learners through all levels of the company and providing all employees with the opportunity to access a number of career pathways, such as shift management or technical specialist, which move beyond the operational level. The learning pathways discussed below provide a more detailed breakdown of these paths.

FIGURE 10: COMPETENCY CLUSTERING

Phase 3

Packing	L	C	Manufacturing	L	C
♦ (Gen) Identify, diagnose and correct faults on machinery	4	10	♦ (Manu) Start up + shut down continuous	3	8
♦ (Gen) Remove, inspect, repair replace and test components			♦ (Gen) Solve basic production problems	4	5
♦ (Gen.) Provide on-the-job training	3	10	♦ (Gen) Provide on-the-job training	3	5
♦ (Gen) Use computer literacy skills to operate information systems	3	5	♦ (Manu) Convert oils to fats – hardening	3	8
♦ (Gen) Solve basic production problems	2	3	♦ (Gen) Identify, diagnose and correct faults on machinery	4	10
	4	5	♦ (Gen) Remove, inspect, repair replace and test components	3	10
		33			46

Phase 2

Packing	L	C	Manufacturing	L	C
♦ Pack) Prepare aqueous phase]	2	4	♦ (Manu) Neutralise and modify	3	8
♦ (Pack) Bulk fill oil + fat – semi-auto]	2	3	♦ (Manu) Blend components + remove impurities	3	10
♦ (Pack) Portion-pack products – auto or]	2	4	♦ (Manu) Check + implement production seq.	2	2
♦ (Pack) Process + pack product – semi-auto]	3	6	♦ (Manu) Start up + shut down batch	3	8
♦ (Pack) Prepare oils + fats for packing	2	4	♦ (Manu) Sample and check for quality in a manufacturing environment.	2	3
♦ (Pack) Start up and shut down ancillary services	2	2	♦ (Gen) Clean-in-place food and related product production equipment using automated cleaning systems.	2	3
♦ (Pack) Sample + check for quality edible oils	4	6	♦ (Gen)Align Machinery and equipment	4	8
♦ (Gen)Clean in place food and related product production equipment using automated cleaning systems.	2	3	♦ (Gen) Monitor the condition of machinery and equipment	4	4
♦ (Gen) shift loads using lifting equipment	3	4			
♦ (Gen) Align Machinery and equipment	4	8			
♦ (Gen) Monitor the condition of machinery and equipment	4	4			
		43			43

Phase 1

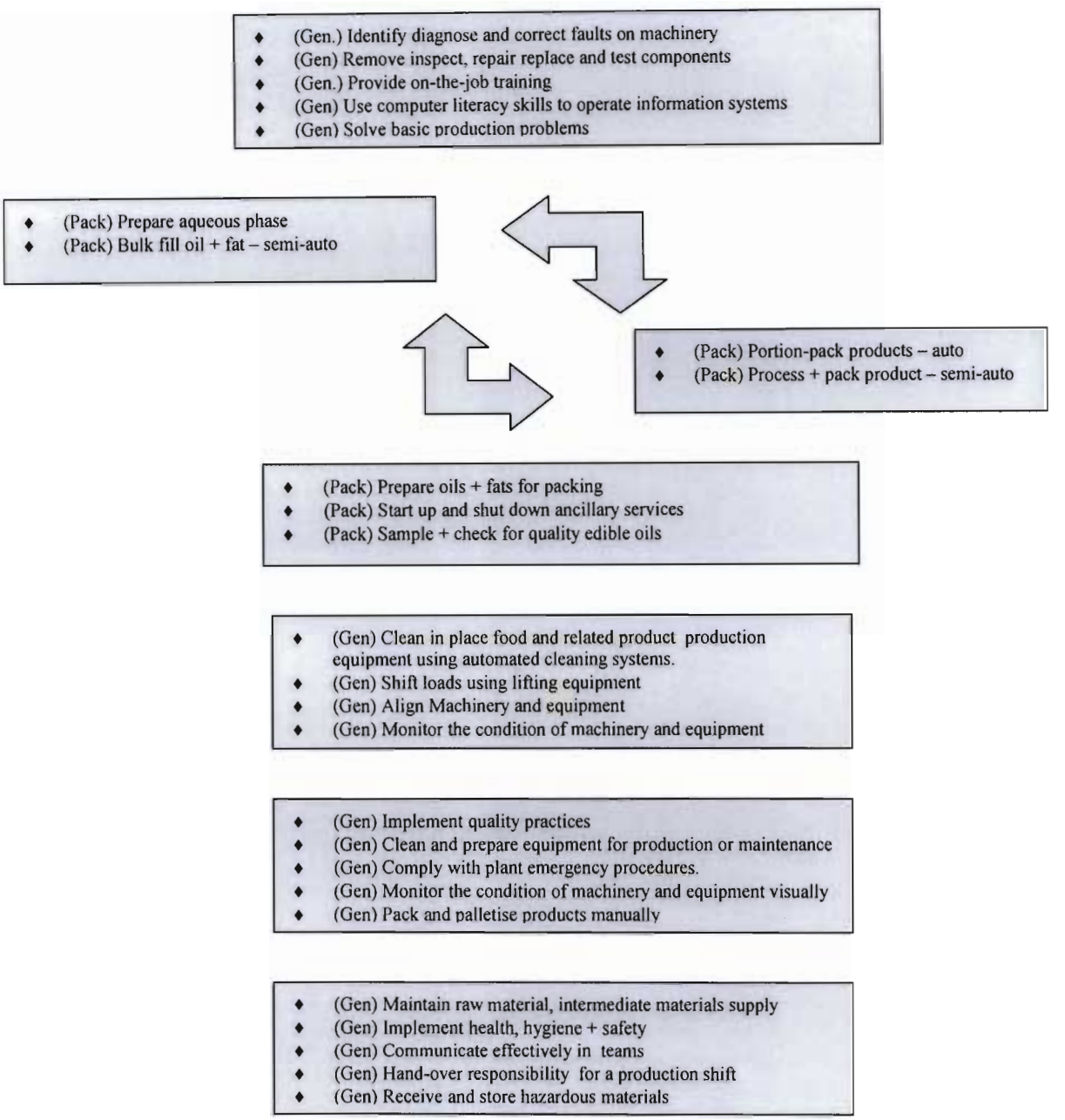
Packing	L	C	Manufacturing	L	C
♦ (Gen) Maintain raw material, intermediate materials supply y	1	1	♦ (Gen) Maintain raw material, intermediate materials supply	1	1
♦ (Gen) Implement health, hygiene + safety	2	2	♦ (Gen) Implement health, hygiene + safety	2	2
♦ (Gen) Communicate effectively in Teams	2	4	♦ (Gen) Communicate effectively in teams	2	4
♦ (Gen) Hand-over responsibility for a production shift	2	2	♦ (Gen) Hand-over responsibility for a production shift	2	2
♦ (Gen) Receive and store hazardous materials	2	2	♦ (Gen) Receive and store hazardous materials	2	2
♦ (Gen) Implement quality practices	2	4	♦ (Gen) Implement quality practices	2	4
♦ (Gen) Clean and prepare equipment for production or maintenance	2	2	♦ (Gen) Clean and prepare equipment for production or maintenance	2	2
♦ (Gen) Comply with plant emergency procedures	2	2	♦ (Gen) Comply with emergency procedures	2	2
♦ (Gen) Monitor the condition of machinery and equipment visually	1	1	♦ (Gen) Monitor the condition of machinery and equipment visually	1	1
♦ (Gen) Pack and palletise products manually	1	1			
		21			21

Within Figure 10, L indicates level on the NQF and C indicates credits allocated to the competency.

4.3.6 Learning Pathways

Figures eleven and twelve show the learning pathways which were agreed with all stakeholders, for the packing and manufacturing departments. These pathways comply with the SAQA (1998) level descriptors for learning pathways (Appendix C) to reinforce the ties with the national system, levels and credits were allocated according to SAQA (Appendix C, Tables One to Four). Each phase in the competency cluster is divide into two steps in the learning pathway to facilitate structured learning and to integrate current grading structures. The first level of learning within the packing pathway, consists of competencies required for an entry employee at grade ten within the current structures. Health, hygiene and safety and the handling of hazardous materials are the most important of all of these. Those who are not yet competent in these areas present a danger both to themselves and to others within the working environment. The competencies within the first two steps are interchangeable, in the packing area, however, they are structured differently from manufacturing, which contains no specialist knowledge within the first phase. Once learners have completed the initial competency phase they are then offered the choice of two routes to the final stage of learning within this department. However ultimately both options need to have been completed in order to ensure that the learner has an understanding of the entire process. Knowledge of the process in its entirety and the implications of actions is a important outcome of the process of learning within this context. The fifth, sixth and seventh stages of this learning process contain the required process and operational competencies built on the previous more generic knowledge acquired during the initial phases of learning. The generic competencies common to both the manufacturing and packing areas of the company verify the existence of meta-competency within the target grouping. In addition they form the foundation of competency in both areas.

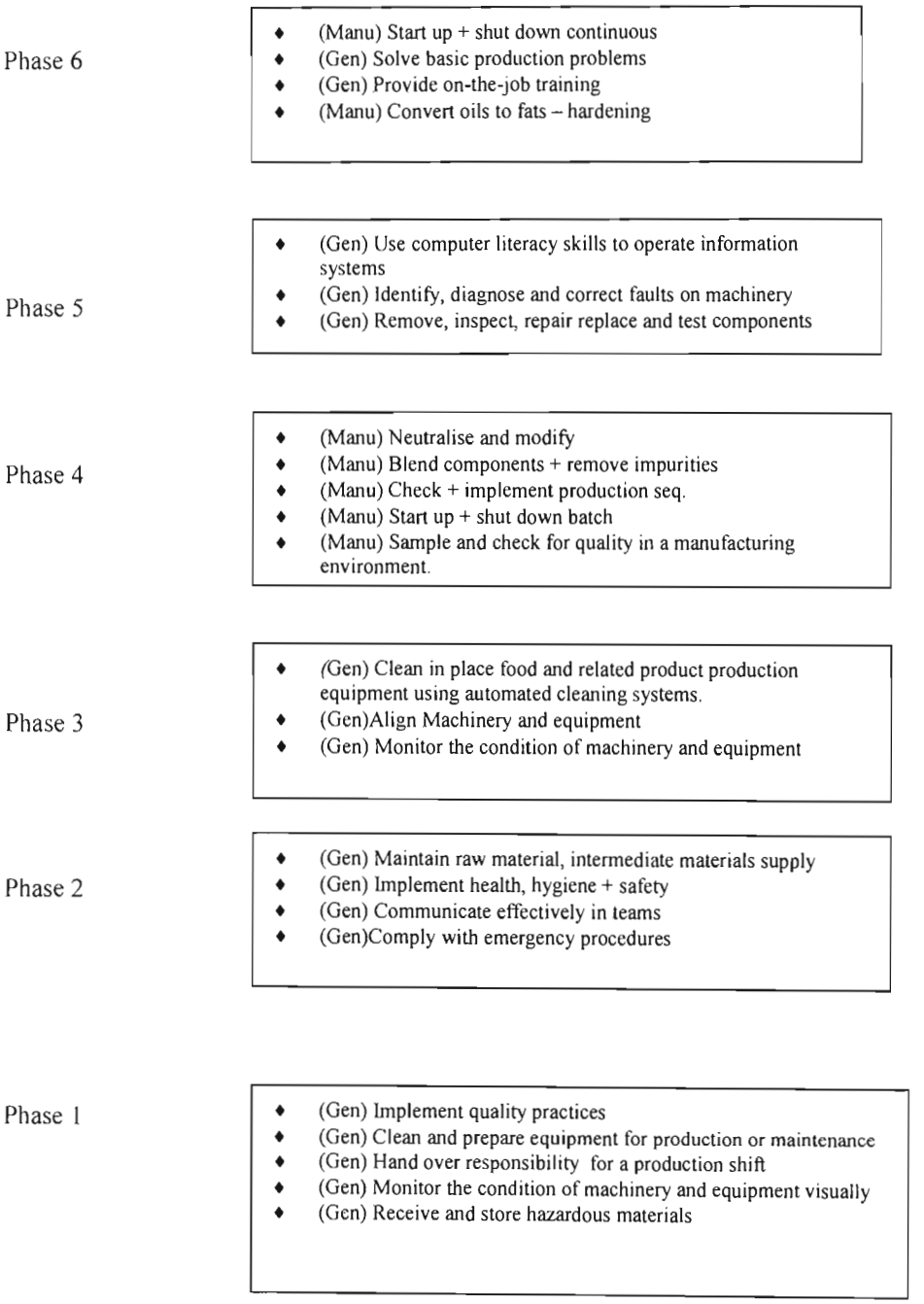
FIGURE 11: PACKING LEARNING PATHWAY



The learning pathway for the manufacturing department (figure twelve) follows the same trends as those displayed above within the packing department. However, there is a higher level of complexity within the manufacturing environment, and this is verified through the higher overall credit level within this area. The various levels of learning equate loosely with the NQF levels of the competencies, with some exceptions. The initial steps within manufacturing pathway consist entirely of generic standards, once gain beginning with a focus upon health and safety. Phase four of this pathway consists entirely of specialised manufacturing standards. This means that any employee who wishes to transfer between departments will need to begin their learning at phase four of the manufacturing program due to its specialised nature, irrespective of their learning achievements within an area such as packing. However prior learning would be recognised and taken into account, in order to prevent duplication and in adherence with the basic principle of transportability of competency.

The learning pathways are important tools for the structuring of learning and for the purposes of career progression, internally and externally, within South Africa. They provide the equivalent of a national framework within the organisation, and create transparency across the various factories within the company, resolving internal skills shortages.

FIGURE 12: MANUFACTURING LEARNING AND CAREER PATHWAY



In summary, the primary objective of this research was to formulate competencies and a competency matrix specific to the target group, namely, factory workers, within international consumer goods manufacturing company. Thirty-four competencies have resulted from the workshops and verification sessions which were held. These competencies have been validated by the participants and are seen to be a reliable method of assessing competency within the target population. Levels and credits have been incorporated within these competencies in order to allow for integration with the South African Qualifications Authority (Gunthorp and Elliott, 1998 and Isaacman, 1996) and ensure future relevance and the possibility of linkages to the National Qualifications Framework. It is important to note that the use of an eclectic approach has added much value to this research, the research design and formulation of competencies and the mixture of formats for the presentation of competencies provided structure and portability. In addition to the use of NQF levels and credits, the eclectic format has made use of specific outcomes and assessment criteria, creating a shared frame of reference with vocational structures and systems.

The second aim of this study was to utilise the finalised competency menu to demonstrate, across departments, and a variety of roles, the existence of generic and meta-competencies. It is important to note that further research within this area would be recommended as the possibilities for the existence of further meta-competencies within this organisation and others should be explored and further research will add to the validity of the meta-competencies already identified. The competencies have been placed within a competency matrix. The matrix illustrated that, although a number of the competencies were unique to the departments, half were generic or meta-competencies and were applicable to both departments. Indications within literature from alternative national frameworks, (NVQ, 1998;NZQA, 1998) are that some of these competencies exist outside of the confines of this particular organisation. Examples of this are: hand over responsibility for a production shift and communicate in teams, which are found within both of the aforementioned frameworks.

The matrix was structured into competency clusters which revealed the basic learning profiles of each of the areas. This was then refined to create learning pathways for the target group. The learning pathways detail the learning steps linked to an individuals vocational role or career progression and allow for human resource professionals to track and plan individual and group career progression. Although they are merely one outcome of this study they have numerous applications within the organisation.

Finally, the competencies formulated within this study generally require elements of underpinning knowledge within the fields of physics, chemistry and maths which are generally not found within the target group. Although results of the assessments lay mainly within levels three and four of the ABET levels these levels do not equate with the requirements within the company for matric levels of maths and science, although they do provide the foundations for further study. It is recommended therefore that further work be done to establish key areas of underpinning knowledge that should be developed, as a substructure for the completion of the competencies formulated above.

Conclusion

Changing global dynamics, the inclusion of South Africa in the global economy and the historic shortcomings of our divided education and training systems have led to an increasing skill shortage within South Africa. Given this context the overarching problem which this study aimed to address was how an organisation could overcome its skills gaps whilst ensuring national and international recognition of those skills and contributing to an increase of skills nationally. Three research aims were identified in order to address this question.

- The first aim was to formulate competencies for the target population and to create a competency matrix.
- The second, to determine the existence of meta-competencies within the target group.
- The third, to utilise the competency matrix to create learning pathways.

The research questions posed at the outset of this study provide a series of steps, which work towards achieving the overall aim. To demonstrate the outcomes of this research, I will discuss the solutions which the results of the study present in relation to each question. The first of these questions was what competencies exist within the target population? In order address this question I developed an eclectic approach, this model incorporated the two main approaches to competency, the behavioral and the vocational. The integration of these two approaches produced a number of benefits. The first of these benefits is the integration of the principles of a behavioral approach with those of the vocational approach.

Within the eclectic approach I have utilised the principles of the vocational approach noted by Blank (1985: 12 - 16) which were discussed in chapter one:

- Any student in any training program can master almost any task at a high level of mastery if provided with high-quality instruction and sufficient time.
- A student's ability for learning a task need not predict how well the student learns the task.
- Individual student differences in levels of mastery of a task are caused primarily by errors in the training environment, not by characteristics of the students.
- We should focus more on the differences in learning and less on the differences in learners.
- What is worth teaching is worth learning.
- The most important element in the teaching-learning process is the kind and quality of instruction experienced by the student.

These principles are combined with behavioral principles of superior performance, underlying characteristics and the use of carefully validated and structured research methods. In my opinion these principles form a strong foundation for the approach and for its application within the South African context. They deliver an approach which supports excellence whilst allowing for differing requirements in the individual learner.

The second benefit of the Eclectic approach is the research methods, which have been ustilised over a period of twenty years in a variety of contexts to establish their validity and reliability. Data collection methods, detailed in figure seven, combine the positive aspects and tools of Blank (1985), McClelland (1976), McBer, and Spencer and Spencer (1993) without compromising practicality. This has enabled the research to adhere to the constraints of the manufacturing environment and deliver reliable, valid data.

The adapted classic model combines elements of all three of the research methods used by Spencer and Spencer (1993) into a research design which allows for the formulation of competencies containing elements of both broad approaches; and hence are both operational and strategic in nature. The strength of the eclectic approach is that the competencies developed can be used as the foundations for an individual development beyond the level of a general worker and beyond the confines of a single organisation. Leadership and communication skills developed during the initial phases of a learners career, within a manufacturing environment, can be applied at a later point at a management level in any organisation. Formal recognition of these competencies, through SAQA provides portability and skills transfer, nationally and internationally.

To enable recognition, whilst providing a format which reflects an eclectic approach the competencies resulting from this research were formatted using SAQA requirements such as levels and credits and behavioral standards, which require three levels of definition. This format ensures that the competencies can be incorporated into the national framework and have access to the benefits of portability it provides, whilst providing descriptors which retain their links to the behavioral approach and provide depth. The use of SAQA levels and credits, the inclusion of operational and strategic elements in the competencies, the competency matrix and the identification of meta-competencies, ensured that the outcomes of this research are linked to developments in South Africa, and that they are portable and can provide skills transference, which addresses the fourth research question.

The fifth research question was, which methodology best-suited stakeholder participation? This was dealt with through the application of the research methodology of the eclectic approach. The

principles of grounded theory and the use of an adaptation of classic competency studies for the research design are dependent upon stakeholder participation and provide a methodology reinforces it. The outcome of having dealt with each of the research questions, are the thirty-four competencies which were formulated for the target group, and placed within a competency matrix. These competencies revealed the nature and structure of work in the organisation. They have led to creation of learning pathways, illustrated in figure ten, and the provision of relevant training in the workplace, closing individual and organisational the skills gaps. Stakeholder participation has created an environment where changes created by the application of the research are widely accepted within the organisation. In order for these changes to have application beyond a single organisational context the existence of meta-competencies had to be proven.

This is addressed through the second research aim, which is to determine the existence of meta-competencies in the target group. To facilitate this aim research questions that were asked were: do meta-competencies exist in the group and can they be used to link the organisational and national contexts? The competency matrix illustrated that eighteen generic competencies exist in the target group. These competencies were compared with those of the New Zealand Qualifications Authority (NZQA, 1998), the United Kingdom (GNVQ, 1998) the Australian Qualification Network (Edna, 1998) and the American Chemical Society (1994). This comparison revealed the existence of these competencies in all of these frameworks, and thereby demonstrated that meta-competencies and that they can link the organisation not only to the national but also to the international context.

National frameworks use meta-competencies to identify areas of skill shortage and to address these shortages by providing learners with competencies that are recognised in a number of

organisations, and a number of different countries. Gates (1999), Phillips (1996) and Paton (1997) highlight the importance of skill transference, in the organisational and the national and international contexts. Without skills transference general workers are unable to move between companies, countries and even levels within the organisation. The meta-competencies identified are not merely generic amongst this sample but be applied in other factories. Indications from the examination of work done by the American Chemical Society (1994) and standards from within the NZQA and NVQ support this assumption (NZQA, 1998; NVQ, 1998). In application this has allowed for the benchmarking of processes in the business and the sharing of learning material globally. Learning tools such as videos, manuals and CD ROM's are assessed for relevance through an analysis of the competencies at which they are aimed, they are then applied throughout the business this has positive outcomes in terms of access for learners and cost savings for the company. To further amplify the effects of learning tools; learning within the oragnsation needs to be channeled so as to ensure that learners are developing competencies which address not only individual needs but organisational skill gaps. The only way to effectively channel learning and development, in my opinion, is to utilise learning pathways.

The creation of learning pathways forms the final research aim, which is to use the competency matrix to create competency clusters and learning pathways. The competency cluster (Figure Ten) broadly grouped the competencies into three phases and demonstrated the importance of the inclusion of SAQA levels and credits. The levels and credits, in conjunction with existing grades and learning progression provided structured and sequenced learning, which was refined through the learning pathways. The learning pathways and the competency clustering showed that progression was linked to NQF levels and therefore complexity, and that learning hours or credits tended to increase from the entry level at phase one to the final level at phase three. The exception to this is phase two in the packing area. The three research questions dealt with in the discussion

were; how can competencies be sequenced for structured learning and development, does the structure reflect the NQF and validate the use of levels and credits and what do the levels and credits show about progression in the learning pathways? These questions have been answered within the results, but need to be re-emphasized at this point to illustrate the multiple applications of competencies. The learning pathways and competency clustering are manipulations of the formulated competencies, which create clear representations for the oraganisation of the development pathways and skill requirements at various levels. In essence, once both the individual and the organisation are able to express the application of knowledge and skills through the language of competencies they are equipped with the tools with which to address a number of HRD issues. In the organisation in which this study was conducted competencies are now in use across all functional groupings and levels. Competencies are utilised to define roles, to identify skill gaps, develop learning interventions, assess learning, provide vocational counseling, to measure performance and to support the strategic direction of the business. They provide a foundation for learners to build upon as they develop within the organisation and through their links to international meta-competencies ensure that competencies within the organisation have currency in the global environment and retain their relevance within the constraints of their life cycles.

The eclectic approach has allowed for the formulation of competencies for general workers and the integration of meta-competencies within the staff and management groupings. Providing access to career paths and allowing for equitable progression through the various levels within the company. The application of the eclectic approach within this organisation demonstrates its power as a tool for the measurement and development of competencies within the South African environment. Without it organisations are left with an either or choice which increases the gaps between work levels and enhances current inadequacies.

In conclusion, the problem which this research has focused on is how an organisation can overcome its skills gaps whilst ensuring national and international recognition of those skills and contribute to an increase of skills nationally. This has been clearly demonstrated through this research show that through the use of an eclectic approach and the adaptation of classic competency studies, organisations can formulate competencies which are of use within the organisation and within the national framework. The incorporation of behavioral and vocational principles into the competencies which have been formulated in this study have ensured that the results can be strategically implemented within the organisation and that workers can move from operational to strategic levels in the company building on their initial competencies. This helps to address skill shortages, nationally and has the potential to affect global markets. However in the current national context this type of development will take a number of years. The requirements for skills are very important, however the investment required to overcome skills shortages, from the private sector will be greater than the one percent of the payroll which has been legislated by SAQA, (1998). The approach of the South African NQF and that of those within other countries, namely unit standards and competencies, requires a great deal of time and resources both for the development of individual competencies and the integration of these competencies onto a national framework. This research has focused on a portion of the company, in a specific factory, which alone required over a year of formulation and verification. The same process needs to occur in organisations across South Africa. The competencies developed in these organisations would then have to be carefully re-examined for integration into a national framework.

The formulation of competencies, however, is the first step in a far larger process of implementation which will require, not only the full co-operation of human resource practitioners

within the company, but also a large amount of negotiation with trade unions. In spite of this, the approach advocated within South Africa to overcome the skill shortage is both thorough and I would argue value-adding. If both government and the private sector are prepared to commit to this approach and ensure that the results suit their needs, the skills shortages which currently exist will be addressed and the potential for economic growth through the development of human resources can be accomplished.

Appendices

APPENDIX A

SAQA Criteria for Unit Standards

1. Title of the unit standard – Which is both brief and unique.

2. Logo

3. Unit standard number – a unique registration number for the standard allocated by the Authority, which will be used as a cross reference.

4. Unit standard level - This is the level on the NQF to which the standard relates. It includes consideration of learning and outcomes requirements in relation to the particular pathway.

5. Credit attached to the unit standard - Expressed in notional hours of learning. Notional hours of learning is the calculation of the average amount of learning time required to acquire proficiency in the standard at the relevant level.

6. Field and sub field within which the unit standard applies - this relates to the categories defined by SAQA to which the unit standard applies for example 06 Manufacturing, Engineering and technology.

7. Issue date – Refers to the date of registration on the NQF.

8. Review date – Refers to the duration for which the standard will be operational, after which it must be reviewed and re–registered.

9. Purpose of the unit standard – Is the concise description of the purpose of the standard, it's usage and what it is intended to achieve for the individual, the field or sub field and for social and economic transformation. In essence the purpose provides a summary of what the learner will know and be able to do on the completion of the unit standard.

10. Learning assumed to be in place – Essentially this category provides information relating to the learning pathway into which the unit standard falls and the competencies which are assumed to be in place and which support the achievement of the unit standard under consideration.

11. Specific outcomes – provide the Skeleton of the standard. Specific outcomes are required to reflect the purpose of the unit standard in a detailed and contextualised manner, in ways which are

measurable and verifiable. Specific outcome are also required to be structured or phrased in a specific manner.

12. Assessment criteria – provide the body of the unit standard, they are a set of statements that guide the learner and the assessor, through describing the required outcomes and performance criteria for the standard.

13. Range statements – serve as a guide for the scope, context and level of the standard. They essentially describe the situation and circumstance in which competence must be demonstrated.

(Gunthorp & Elliot, 1998; HSRC, 1995; Phillips, 1996;)

APPENDIX B

Principles of the NQF

A number of principles underpin the development and application of the framework (HSRC, 1995; Phillips, 1996; RSA, 1995)

Relevance - Learning should be appropriate and responsive to national, organisational and individual needs.

Credibility – Learning should have national and international value and acceptance.

Coherence – there needs to be a coherent national framework of principles and certification.

Flexibility – there need to be a variety of learning pathways and approaches to the same learning goal.

Standards – Training and education should be expressed in terms of a nationally agreed framework and internationally recognised outcomes.

Legitimacy – All stakeholder should be included and participate in the planning and formulation of standards and qualifications.

Access – the system must provide maximum opportunity for entry to appropriate levels of learning and qualification for all learners in a way that facilitates progression.

Articulation – the system must ensure that successful completion at one level provides access to the next level of the framework.

Progression – Learners must be able to pursue a personal learning pathway in a manner which suits them.

Portability – Credits and qualifications must be transferable from one organisation or institution to another.

Recognition of Prior Learning (RPL) is the final principle of the framework and uses competency based assessments to determine whether an individual has developed their competencies through experience, credit is then given for any areas where the learner is competent.

APPENDIX C

South African Qualifications Authority Tables of Level descriptors

TABLE 1: SOUTH AFRICAN QUALIFICATIONS AUTHORITY TABLES OF LEVEL DESCRIPTORS. NATURE OF PROCESSES.

Level	Skills	Procedures	Contexts
1	Limited in range	Repetitive and familiar	Closely defined
2	Moderate in range	Established and familiar	Routine and familiar
3	Well developed range	Significant choice	Range of familiar
4	Wide – ranging, scholastic or technical	Considerable choice	Variety of familiar and unfamiliar
5	Wide – ranging, specialised scholastic or technical	Wide choice, standard and non-standard	Variety of routine and non routine
6	Wide – ranging, specialised scholastic or technical, and basic research, across a major discipline	Wide choice, standard and non-standard, often in non-standard combinations, in a major discipline	Highly valuable routine and non-routine
7	Highly specialised scholastic or technical, and advanced research across a major discipline	Full range, advanced, in a major discipline	Complex variable and highly specialised
8	Expert, highly specialised, and advanced technical or research, both across a major discipline and interdisciplinary	Complex and highly advanced	Highly specialised, unpredictable

TABLE 2: SOUTH AFRICAN QUALIFICATIONS AUTHORITY TABLES OF LEVEL DESCRIPTORS SCOPE OF LEARNING

Level	Knowledge	Information Processing	Problem solving
1	Narrow –ranging	Recall	
2	Basic operational	Basic processing of readily available information	Known solutions familiar problems
3	Some relevant theoretical	Interpretation of available information	A range of known responses to familiar problems, based on limited discretion and judgement
4	Broad knowledge base incorporating some theoretical concepts	Basic analytical interpretation of information	A range of sometimes innovative responses to concrete but often unfamiliar problems, based on informed judgement
5	Broad knowledge base with substantial depth in some areas	Analytical interpretation of a wide range of data	The determination of appropriate methods and procedures in response to a range of concrete problems with some theoretical elements
6	Knowledge of a major discipline with depth in more than one area	The analysis, reformatting and evaluation of a wide range of information	The formulation of appropriate responses to resolve both concrete and abstract problems
7	Specialised knowledge of a major discipline	The analysis, transformation,, and evaluation of abstract data and concepts	The creation of appropriate responses to resolve contextual abstract problems
8	In-depth knowledge in a complex and specialised area	The generation, evaluation, and synthesis of information and concepts at highly abstract levels	The creation of responses to abstract problems that expand or redefine existing knowledge

TABLE 3: SOUTH AFRICAN QUALIFICATIONS AUTHORITY TABLES OF LEVEL DESCRIPTORS RESPONSIBILITY

Level	**Orientation of activity**	**Application of responsibility**	**Orientation and scope of responsibility**
1	Directed	Under close supervision	No responsibility for the work or learning of others
2	Directed	Under general supervision and quality control	Some responsibility for quantity and quality, and possible responsibility for the output of others
3	Directed with some autonomy	Under general supervision and quality checking	Some responsibility for quantity and quality, and possible responsibility for the output of others
4	Self-directed	Under broad guidance and evaluation	Complete responsibility for quantity and quality of output, and possible responsibility for the quantity and quality of the output of others
5	Self – directed and sometimes directive	Within broad parameters for largely defined activities	Full responsibility for the nature , quantity, and quality of output , and possible responsibility for the achievement of group output
6	Managing processes	Within broad parameters for largely defined activities	Completed accountability for achieving personal and/or group output
7	Planning rescuing and managing processes	Within broad parameters and functions	Complete accountability for determining, achieving and evaluating personal and or group output
8	Planning, resourcing, managing, and optimising all aspects of process engaged in	Within complex and unpredictable contexts	Complete accountability for determining, achieving, evaluating, and applying all personal and/or group output

TABLE 4: SOUTH AFRICAN QUALIFICATIONS AUTHORITY TABLES OF LEVEL DESCRIPTORS LEARNING PATHWAY

Level	**Education Pathway**	**Training pathway**
1	Entry to senior secondary education	Entry to career based training
2	Senior secondary study beyond entry level	Training towards certification in sub-crafts and sub-trades
3	Continuing secondary study	Training towards certification in skilled occupations, crafts trades
4	Entry to undergraduate or equivalent education	Training towards certification in advanced trade and technical occupations
5	Continuing undergraduate or equivalent higher education	Training towards certification in technological or para-professional occupations
6	Completion of undergraduate or equivalent higher education and entry to honours, masters or equivalent higher education	Subsequent completion of professional certification, and entry to professional practice and/or managerial occupations.
7	Entry to Doctoral and further research education, and to research- based occupations	Professional practice and/or senior managerial occupations.
8	Academic leadership, advanced research, and/or research based occupations.	Professional practice and/or senior managerial occupations

APPENDIX D

Job Description Matrix

TABLE 5: JOB DESCRIPTION MATRIX

Job Title	Grade	Area	Description
Shift foreman	17		• Manages Subordinates • Subordinates include, Tank operators, soap splitting, hydrogen compressor and catalyst plant operators
Hydrogen compressor operator	13		• Supervise hydrogen tanks • compress gas
Bulk oils storage	13		• Receive transfer store crude oils from ship
Forklift driver	12	Packing	• Reports to storeman • Run forklift
Alma Press operator	12 or 13	Packing	• Melt rework • Transfer rework to Manufacturing bleachers • Reports to foreman then to production manager
Assistant drum / tin filler	11	Packing	• Relieves drum / tin filler
Drum/ tin filler	12	Packing	• Efficient operation of Drum / tin filler • Reports to production foreman
Technical information assistant	14	Packing	• Reports to production manager • Provides / presents data for management
Production transfer storage controller	14	Packing	• Receives transfer & store products from the Manufacturing in the appropriate tanks • Reports to shift foreman
Assistant storage / product controller	11	Packing	• Production transfer
Transit bay controller	13	Packing	• Operation of Auto palletiser • Identification of pallets • Transfer of pallets • Use computer
Sampler / Mixer	12	Packing	• Works in packing section • Adds fats to correct storage tanks • Takes samples
Process line controller	16	Packing	• To fill and extrude bulk fats
Rework melter	11	Packing	• Melt and pump rework
Former packer sealer	10	Packing	• Works on margarine line • Forms containers
General margarine relief	11	Packing	• Relieves margarine line
Margarine checker	10	Packing	• Checks quality • Relieves Operator
Machine operator	12	Packing	• Operates margarine and Holsum high speed, case packer and sealer
Semi Auto Case packer	11	Packing	• Fills cases packs margarine or fat into cartons
Dairy operator	13	Packing	• Pasteurise milk

Dairy assistant	11	Packing	• Reports to dairy operator
Hygiene supervisor	14	Packing	• Maintains hygiene in factory
Vending Machine replenisher	11	Packing	• Cleans vending machines
Production co-ordinator		Packing	• Factory Scheduling • Oversees clerks • Oversees entire factory • Reports to factory manager
Effluent plant operator	13	Manu.	• Treatment of effluent water
Palletiser		Manu.	• Pack margarine portions into cases according to weights • Palletise packed cases • Works with case sealer, packer. case packer operator and general margarine relief.
Packed stock checker/ remover	12	Manu.	• Check transported palletised materials using forklift
Laboratory general Hand		Manu.	• General Cleaner helper in Lab
CRL plant operator	16	Manu.	• Refines crude oil
Press cleaner / assistant operator	12	Manu.	• Cleans filter presses
Campro operator	16	Manu.	• continuous deodoriser
Deoderise process operator	14	Manu.	• Batch Deodorising
Manufacturing services operator	13	Manu.	• Lead the cleaning team
Departmental Clerk	14	Manu.	• Carry out clerical duties for edible Manufacturing
Tanker filling operator	14	Manu.	• Fills tankers • Works with tins/ drum filler and senior cleaner

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