OPTIMISING THE MATERIAL DISTRIBUTION PROCESS
FOR THE
SOUTHERN REGION OF TELKOM SA

By

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Submitted in partial fulfilment of the requirements for the
Magister in Business Administration at the NMMU Business
School.

Promoter: Professor Koot Pieterse

November 2005
DECLARATION

“I, Kosalin Ganasen Naicker, hereby declare that:

- The work in this paper is my own original work;
- All sources used or referred to have been documented and recognised; and
- This dissertation has not been previously submitted in full or partial fulfilment of the requirements for an equivalent or higher qualification at any other recognised educational institution.”

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Kosalin Ganasen Naicker                                           November 2005
ACKNOWLEDGEMENTS

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- Annabel Inman for editing the dissertation

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- My colleagues at Telkom SA for their support, especially Claude Classen
Most government owned telecommunication operators across the world have to deal with a number of regulatory, technology and service challenges, as the industry is liberalised in co-ordination with worldwide trends. Telkom SA will be facing a number of strategic challenges that will test its ability to survive as a telecommunications company over the next number of years. To remain competitive, Telkom must develop strategies to assure survival in a competitive environment. To assure the long-term survival of Telkom SA when moving into a competitive environment, the organisation must build a sustainable competitive advantage.

In the face of increasingly fierce competition, the adoption of collaborative alliances between firms is becoming more and more common and the adoption of a world-class supply chain will be an ideal scenario for Telkom SA. A world-class supply chain goes beyond the scope of the internal operations of an organisation, therefore the material distribution process was chosen for this study, which involved the internal operations in the organisation. The study included the availability of material up to the transportation of the material to the staging areas.

The aim of this research was to identify the inefficiencies of the material distribution process of the Southern Region of Telkom SA to become world-class. A quantitative technique was used to identify the inefficiencies. It was found that the availability and transportation of material were the inefficient categories, preventing the customer to receive the product or service on time. Communication, inaccurate forecasting and inefficient transportation of material were some of the reasons for not delivering material on time.

Some of the recommendations included developing a model that could overcome the current inefficiencies in transportation, improving the communication channels, training and the development of employees at all levels.
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LIST OF COMMONLY USED ACRONYMS

**ASRS**: Automatic, storage and retrieval systems

**BMC**: Build Management Centre

**BOM**: Bill of Materials

**JIT**: Just-in-Time

**MC**: Material Centre

**MRP**: Material Requirement Planning

**NDC**: National Distribution Centre

**SOD**: Service on Demand

**SLA**: Service Level Agreement

**VTP**: Vital to Production

**WCSM**: World-class Supply Management

**WCLM**: World-class Logistics Management

**WCDM**: World-class Demand Management
CHAPTER 1

INTRODUCTION TO THE MAIN PROBLEM

1.1 INTRODUCTION
Telkom SA is currently the only licensed service provider of fixed line communications services in South Africa. Telkom SA also owns a 50 per cent equity stake in Vodacom. The launching of the Initial Public Offering still left the government as the major shareholder.

Most government owned telecommunication operators across the world have to deal with a number of regulatory, technology and service challenges, as the industry is liberalised in co-ordination with worldwide trends. Telkom SA will be facing a number of strategic challenges that will test its ability to survive as a telecommunications company over the next number of years. To remain competitive, Telkom must develop strategies to assure survival in a competitive environment.

This thesis deals with an efficient supply chain in its broadest text. An efficient supply chain means a smaller number of non-value added activities. Consequently, an efficient supply chain means shorter lead times, reduced costs, increased reliability and therefore competitive advantage. Telkom SA, moving from a monopolistic environment to a competitive environment will require an efficient supply chain to build a sustainable competitive advantage.

According to Govender (2003), “Telkom SA’s vision is to become a world-class supply chain enabling organisation, as well as a Telkom-wide point of excellence supporting the achievement of Telkom SA’s strategic business goals through delivery of excellent products and services at optimised costs.”
As Huges, Ralf and Michels (1998: 99) investigated by the mid 1980’s, there was a growing acceptance that Material Requirement Planning (MRP) and Just in Time (JIT), as separate processes, could co-exist. MRP became recognised for what it was designed to be a priority scheduling system which eliminated time, waste and materials from the manufacturing environment. Thinking lean, getting lean and staying lean became a preoccupation as companies moved into the late 1980’s recession. Essentially lean was a timely challenge.

However, the emphasis is now shifting from one of eliminating waste within individual entities to eliminating inefficiency from complete supply chains. The focus is increasingly in how companies can most effectively meet the needs of their demanding customers. This calls for development of the responsive supply chain and distribution process.

Material handling is a branch of engineering and deals with the short distance movement of the material between two or more points. As a supply chain is linked together, one of the concerns of those involved with logistics is the physical transfer of the product from one party to another: How will it be handled? In what form will it be? In what quantities? What kind of equipment is needed to handle or to store it? Materials handling processes generally receive little public attention (Johnson, Wood, Wardlow & Murphy, 1999:161).

To assure the long-term survival of Telkom SA, moving into a competitive environment, the organisation must build a sustainable competitive advantage. Many industrial managers and management research claim that time is one of the most important factors to achieve competitive advantage. Customers choose suppliers that can deliver high quality products faster than their competitors. To obtain shorter lead times, non-value added, time-consuming activities must be reduced.
1.2 MAIN PROBLEM

Telkom SA in the Southern Region needs to optimise its material distribution process to efficiently compete in a world-class environment.

Hugo, Badenhorst-Weiss and Van Biljon (2004:8) state that efficient logistics processes will ensure lowest overall logistics cost in the supply chain while conforming to or exceeding customer requirements. The implication is that all logistics activities such as inventory, transportation, distribution systems including warehousing and order processing and delivery, should be synchronised with demand and integrated with all other processes of the supply chain. In a global business environment superbly efficient logistics processes are major contributors to the competitive advantage that may be gained through integrated Supply Chain Management (SCM).

According to Bowersox and Closs (1996:75) an integrated management strategy defines the policies and processes used to determine where to place inventory, when to initiate replenishment activities and how much to allocate. This strategy should also address issues as the following:

- Who will be the materials or component supplier?
- Where will the inventory be held and by whom?
- What is the “best” (optimum) quantity to hold?
- Where, how and with whom will orders be placed and will an intermediary be used?
- How will the orders be delivered and what roles will the intermediaries and dedicated service companies play in this process?

The aim of this research is therefore to identify the inefficiencies of the material distribution process of the Southern region of Telkom SA to become world-class.
1.3 SUB-PROBLEMS
In order to develop a research strategy to deal with and solve the main problem, the following sub-problems have been identified:

- What does the literature reveal about world-class supply chain efficiencies?
- What inefficiencies currently exist in the material distribution process of the Southern Region of Telkom SA?
- How can the two above be integrated to develop an efficient material distribution process for the Southern Region of Telkom SA to become world-class?

1.4 DEFINITION OF KEY CONCEPTS

1.4.1 World-class supply management
Todd (1995: 3) describes world-class simply as being the best in your field in the world. To be able to compete on the world markets, an organisation must have the necessary practices in place to ensure survival in this intensely competitive environment.

Burt, Dobler and Starling (2003: 634) state that:

World-Class Supply Management Philosophy reflects those actions and values responsible for continuous improvement of the design, development, and management processes of an organisation’s supply system, with the objective of improving its profitability and ensuring its survival, as well as the profitability and survival of its customers and suppliers. The term “world-class” recognizes that companies compete in an existing or impeding global environment. As a philosophy, World-Class Supply Management spans functional boundaries and company borders.
The philosophy of World-Class Supply Management requires change driven by upper management to shift decision-making processes from an internal department or single company focus toward optimization of the supply chain. Through continuous improvement, World-Class Supply Management is an ever-moving target that focuses on supply chain process improvement.

1.4.2 Logistics
Logistics management deals with the handling, movement, and storage activities within the supply chain, beginning with suppliers and ending with the customer. Logistics is the part of the supply chain process that plans, implements, and controls the efficient, effective flow and storage of goods, services, and related information from point of origin to point of consumption for the purpose of conforming to customer requirements (Burt et al, 2003: 634). Slack, Chambers, Harland, Harrison and Johnston (1995: 511), refer to logistics management as the management of materials and information flow from a business, down through a distribution channel, to the end customer.

1.4.3 Efficiency
Efficiency means that activities are performed correctly. Activities such as purchasing of supplies and deliveries must also be done efficiently in order to keep the cost low and so maintain competitive prices. Efficiency therefore refers directly to productivity or the relationship between outputs and inputs (Marx, Van Rooyen, Bosch and Reynders, 1998: 349). Hellriegel, Jackson and Slocum, (1999: 190) say that efficiency is achieved by both minimizing inputs (e.g., labour, land, and capital) and maximizing productive outputs.

1.4.5 Lean Supply
Lean supply is a customer and supplier relationship, which moves beyond a simple relationship. In the partnership relationships, the supplier is still the junior partner, in lean supply the supplier and customers are equal partners (Slack, Chambers & Johnston, 2001: 432).
1.4.6 Competitiveness
Companies must be competitive to sell their goods in the market place. Competitiveness is an important factor in determining whether a company prospers, barely gets by, or fails. Business organizations compete with one another in a variety of ways. Key among them is price, quality, product or service differentiation, flexibility and time to perform certain activities (Stevenson, 1999: 43).

1.4.7 Competitive advantage
Kotler and Armstrong (1996: 256) define competitive advantage as an advantage over competitors, gained by offering consumers greater value, either through lower prices or by providing more benefits that justify higher prices. Porter (1990: 19) adds that competitive advantage is created and sustained through differences in structures, values, culture, institutions, and histories that have significant impact on competitive success.

1.4.8 Supply chain management
Supply chain management can be described as the management of all activities, information, knowledge and financial resources associated with the flow and transformation of goods and services up from the raw materials suppliers, component suppliers and other suppliers in such a way that the expectations of the end users of the company are being met or surpassed. Supply chain management of relationships is not only with first tier suppliers but also with lower tier suppliers (Van Weele, 2000: 17).

1.5 DELIMITATION OF THE RESEARCH
Delimiting the research makes the research topic manageable. The research is limited to a specific area, that of the Southern Region of Telkom SA.

1.5.1 The organisation.
The research will be conducted in the logistics division of Telkom SA, Southern Region.
1.5.2 Geographic delimitation
The Southern Region of Telkom SA consists of the following four sub-regions:
Border: East London and the former Transkei and Ciskei.
Midlands: Grahamstown, Graff-Reinet and Queenstown.
Port Elizabeth: Port Elizabeth and Uitenhage.
Southern Cape: Plettenberg Bay, Knysna, George and Mossel Bay

1.6 RESEARCH DESIGN
This section will outline the broad methodology that will be followed in this study:

1.6.1 Research methodology
In order to solve the main and sub-problems the following procedure will be used:

1.6.2 Literature survey
There will be a literature survey to reveal the previous research that has been done in this field. This will assist the researcher in understanding the supply chain and the material distribution processes in a world-class environment. An analysis of Telkom SA’s operations will be conducted.

1.6.3 Empirical study
A quantitative analysis will be conducted on the existing material distribution process at Telkom SA, Southern Region. The data will be analysed and interpreted.

1.6.4 Gap analysis
After the results are complied and analysed, the inefficiencies in the material distribution process at Telkom SA of the Southern Region will be identified.

1.7 ASSUMPTIONS
1.7.1 Assuming Telkom SA wants to become world-class.
1.7.2 Assume that optimising the material distribution process will financially benefit Telkom SA.
1.7.3 It is assumed that Telkom SA’s management will want to implement an efficient material distribution process.

1.8 THE SIGNIFICANCE OF THE RESEARCH

According to a report from Telkom SA’s balance sheet, inventory is ranked second to operational costs. Excess inventory can be costly, but planning and giving this priority had taken a back seat.

Telkom SA’s vision, is to become a “World-class supply chain” enabling organisation, as well as a Telkom-Wide point of excellence supporting the achievement of Telkom's strategic business goals through delivery of excellent products and services at optimised costs (www.Telkom.co.za. accessed on 4 September 2005).

Effectively integrating the information and material flows within the demand and supply process is what material management is all about. In most companies, however, two major and very interdependent issues must be simultaneously addressed. The first deals with delivering products with customer-acceptable quality, with very short lead times, at a customer-acceptable cost – while keeping inventories throughout the supply chain at a minimum. The second issue, which tends to be less understood and accepted, is the need for high quality, relevant and timely information that is provided when it needs to be known (Huges et al, 1980: 190).

A long-term vision, from which shorter-term strategies for revising transport logistics will emerge, will be one key to companies drives to slash inventories in the logistics distribution and supply pipeline radically. Depending on the size of the transport vehicles now in use and the frequency of trips between supplier and customer, revised transport logistics has the potential to reduce pipeline inventory by as much as 90 percent (Harmon, 1993: 14).
Hutchinson continues with the mission of logistics as the development of a logistic system that meets the desired logistic performance objectives at the lowest possible price. The challenge of logistics is to establish a balance between performance and cost that optimizes the goals of the enterprise (Hutchinson, 1987: 11).

1.9 TEXT LAYOUT
The study is laid out as follows:

Chapter 1. An explanation of the concepts used in the study is provided. A problem statement, the significance of the research, delimitation of the research and the definition of key concepts follow.

Chapter 2. This chapter examines the components of a world-class supply chain and material distribution processes. It explains value in a supply chain and the competitive advantage it could give an organisation.

Chapter 3. This chapter discusses the internal operations of the Build Management Centre in the Southern Region of Telkom SA and highlights the material distribution process.

Chapter 4. The researcher had to choose among various approaches to conduct the empirical study. A brief theoretical explanation is given to justify the methodologies used to conduct the research.

Chapter 5. In this chapter the results of the empirical study are presented and interpreted in order to draw conclusions in terms of the theoretical paradigm set out in chapters two, three and four. A gap analysis will be developed to portray the inefficiencies in the Southern Region of Telkom SA.

Chapter 6. The aim of the research was to optimise the material distribution process of the Southern Region of Telkom SA. The final chapter includes a brief summary of the investigation and makes recommendations for areas of further research.
CHAPTER 2

SUPPLY CHAIN MANAGEMENT AND MATERIAL DISTRIBUTION PROCESSES

2.1 INTRODUCTION

In this chapter the components of world-class supply chain management and material distribution processes will be discussed. The aim is to extract key components recommended by a variety of authors and use them as a theoretical base. The key is to look at the fundamental importance of these components in the supply chain. The definition, characteristics, importance and the value of the supply chain is discussed in detail. Thereafter the components to the supply chain will discussed and the importance of adding value to the supply chain will be identified.

Ballou (1978: 29) believes that logistics is a vital subject. It is an economic fact of life that the resources and the consumers of these resources are widely dispersed geographically. Provision must be made for bridging the gap between supply and demand so that consumers can have goods and services when they want them, where they want them, and in the condition they want them. This is a logistics problem. In a free enterprise economy, it is the responsibility of business to provide logistical services, and it has met this responsibility with a remarkable degree of efficiency and effectiveness.

Huges et al (1998: 97) say that successful operational strategy calls for the development of a helicopter quality: the ability to view entire supply chain processes and structures at a glance and drill down on to what works and what needs improvement.

Burt et al (2003: 622) stated that world-class supply chain management (WCSCM) consist of three critical components: World-Class Supply Management (WCSM); world-class logistics management (WCLM), and world-class demand management (WCDM).
It is easy to focus only on day-to-day operations and remain immersed in the detail of processing, requisitions, expediting material and managing crises. The goal is to achieve a step change in customer response, cost reduction and a dramatic conversion of under-utilised assets back into cash. Inventory is the second most cost, as mentioned in Chapter 1, and with this and the drive for Telkom SA to become world-class, a value adding supply chain is of fundamental importance to stay competitive.

2.2 DEFINITION OF SUPPLY CHAIN

Many influencing factors contributed to the development of the modern concepts of the supply chain management, so it is not surprising that to formulate an acceptable definition is difficult.

Supply chain encompasses all activities associated with the flow and transformation of goods from the raw material stage (extraction), through to the end user, as well as the associated information flows. Material and information flow both up and down the supply chain (Handfield and Nichols, 1999: 2).

Hugo, Badenhorst-Weiss and Van Rooyen (2002: 29) state that supply chain management (SCM), is a management philosophy aimed at integrating a network (or a web) of upstream linkages (sources of supply), internal linkages inside the organisation and downstream linkages (distribution and ultimate customers) in performing specific processes and activities that will ultimately create and optimise value for the customer in the form of products and services which are specifically aimed at satisfying customer demands.

Burt et al (2003: 6) define World-Class Supply Chain Management as those actions and values responsible for continuous improvement of the design, development, and management processes of an organisation’s supply system, with the object of improving its profitability and ensuring its survival, as well as the profitability and survival of its customers and suppliers.
It includes the process of planning, implementing and controlling the efficient, cost effective flow and storage of raw material, in-process inventory, finished goods and related information from point of final consumption for the purpose of conforming to customer requirements (Taylor, 1997: 35).

2.2.1 Characteristics of the supply chain
Creating value is one the most common characteristic in a supply chain. However, owing to the complexity of supply chain management it is difficult to provide a comprehensive view of all the characteristics. The following characteristics listed by Hugo, Badenhorst and Van Biljon, (2004: 12) will form a basis for the study and the details will be discussed in the literature to follow.

- SCM is a philosophy for conducting business. It is a philosophy for sharing risks, benefits and rewards, for long-term cooperation and trust between partners and for joint planning and mutual exchange of information across all the nodes of the supply chain.

- SCM implies optimised performance from all supply chain members across all processes and activities and ultimately the development of customer-driven performance measures aimed at ensuring the continued improvement of the supply chain as a whole.

- SCM is the integration of multiple layers of companies striving as a team to optimise the shared supply chain processes in support of the strategic objectives of the supply chain of the principal firm and of individual participants in the chain. Team efforts occur across organisational boundaries, across management levels and across internal functional boundaries.
• SCM is the management of a network of organisations, which may be involved in multiple supply chains of many organisations. The supply network of any particular organisation is a partial involvement at any particular moment in time that is likely to change even over the short term. It is therefore a partial network, which requires constant management intervention to ensure that the focus remains on customer value creation.

• SCM is the management of all links and interfaces in the supply. However, all of these links and interfaces are not of equal importance and therefore the management task of various nodes or interfaces in the supply chain will differ according to the potential impact on the relevant supply chain processes on the creation and delivery of customer value.

• SCM is made possible by information sharing throughout the whole chain. This means that data interchange and data capturing occurs across all interfaces of the supply channel. It also means that access to data is open on an inter-organisational basis and that transfer is immediate to all channel members in the supply channel. The implication is that management decisions across all links in the chain are based on the same information, which is available to all channel members at the same time.

• SCM is based on a shared vision of what customer value is and therefore compatible corporate philosophies are essential in achieving the necessary levels of planning and coordination. In particular this characteristic implies that top management of all channel members must be committed to the supply chain philosophy and must understand the mutual benefits and risks inherent in the implementation of this approach.
2.2.2 Importance of a supply chain

According to Slack, Chambers, Harland, Harrison & Johnston (1995: 195) no operation or part of an operation can exist in isolation; every operation is part of a larger interconnected network of operations. The major resources of this network are suppliers and customers. This also includes supplier’s suppliers and customer’s customers and so on. It is important for organisations to understand their position in this network and to develop new strategies and improve current strategies to be competitive in the global market. These strategies will help organisations in determining to what extent they need to vertically integrate with other organisations in the network, the location of each organisation within the network and the capacity of each part of the network.

It is important to position the organisation in the context of all the other organizations it interacts with of which some are its suppliers and some of which are its customers. Materials, parts, assemblies and ideas all flow through a network of customers-supplier relationships within all of these organizations. On the supply side an organization has customers (Slack, Chambers, Harland, Harrison & Johnston, 1995: 196).

Slack, Chambers, Harland, Harrison and Johnston (1995: 511) identified the importance of viewing the supply as a whole. They compare the supply chain with the flow of water in a river, organizations closer to the original source of supply are described as being ‘upstream’ while those located closer to the end customer are ‘downstream’. Purchasing, supply and physical distribution relate to only one part of the whole supply chain, upstream and downstream respectively. Logistics and material management includes larger parts of the supply chain management includes the whole chain.
Heizer and Render (1996: 416) realised the strategic importance of the supply chain, as organizations strive to increase their competitiveness via product customization, high quality, cost reduction and speed to the market, they need to place added emphasis of the supply chain. The key to effective supply chain management is to make suppliers ‘partners’ of the organization’s strategy to satisfy an ever-changing marketplace. Strategies of low cost or rapid response demand different actions from the supply chain. These strategies can be defined as strategies of differentiation. Heizer and Render (1999: 416) found the importance of achieving integration of its selected strategies up and down the supply chain. As more and more companies enter global markets expanding their supply chain becomes a strategic challenge.

According to Christopher (1992: 184) higher levels of turbulence in the business environment has led to organizations being much more customer focused than ever before. Traditional organizations have grown heavy with layer of management and bureaucracy, such organisations has little chance of remaining competitive in the new global marketplace. Removing these layers of management and forming flatter organizational structures is not sufficient. It must be accompanied by changing the networks and systems that deliver service to the customer. Christopher (1992: 185) continues with the process of developing a shared supplier-customer vision and the purpose of this vision is to clearly indicate the basis whereby the business intends to build a position of advantage through closer customer relationships. It is evident throughout the supply chain that the development of customer-supplier relationships up and down the stream is important for survival in an increasing global market.

Christopher (1992: 204) describes the benefits of managing a supply chain effectively by using the basic philosophy of co-makership. Through co-makership the supplier is considered an extension of the customer’s factory with the emphasis on continuity and a ‘seamless’ end-to-end pipeline. Christopher (1992: 205) continues with listing the benefits of co-makership in a supply chain:

- Shorter delivery lead times
- Reliable delivery promises
- Less schedule disruptions
• Lower stock levels
• Faster implementation of design changes
• Fewer quality problems
• Stable, competitive prices
• Orders given high priority

2.3 THE VALUE CHAIN
A company’s competitive edge is usually grounded in its skills and capabilities relative to rivals and, more specifically, in the scope and depth of its ability to perform competitively on critical activities along the value chain better than its rivals (Thompson and Strickland, 1996: 107). Johnson and Scholes (1993: 157) state that the separated activities along the chain need to be identified and the value added at each activity noted. This is called value analysis.

Johnson and Scholes (1993: 157) content that an integrated supply chain is often called a value delivery system. In order to explain the supply chain more clearly it is essential to clarify the concept of value and explore how the supply chain may contribute to the customer value. Michael Porter’s concept of the value chain in the 1980s and 1990s clearly creates a link between value creation and the supply chain.

A statement by Lamming (1996: 3), states that in the supply chain, the value of the product or service has to be commercially advantageous to the organisation.

A broad approach to customer value is maintained by Simchi-Levi, Kaminsky and Simchi-Levi, (2000: 200) who state that the customers perception of value is determined by the entire offering, not just the products and services but also the many intangibles that are associated with the delivery of the customer value. Clearly value is also based on perceptions and intangible elements, which also emphasise the importance of the relationship-building element that is so core to the concept of SCM.
2.3.1 The value chain as a key to build core competence

Johnson and Scholes (2002: 156) define core competence as activities or processes that critically underpin an organisation’s competitive advantage. They create and sustain the ability to meet the critical success factors of particular customer groups better than other providers in ways that are difficult to imitate.

According to Thompson and Strickland (1996: 97-107), the value chain can both form a basis for competitive cost analysis and serve as a key to building valuable core competences and leveraging this into sustainable competitive advantage. For strategic cost analysis purposes the value chain is used to identify the activities, functions and business processes that have to be performed in designing, producing, marketing, delivering and supporting a product or service. The chain starts with raw materials supply and continues on through parts and components production, manufacturing and assembly, wholesale distribution and retailing to the ultimate end-user of the product or service.

By controlling all operations in the value chain into strategically relevant activities and business processes, it becomes possible to better understand the firm’s cost structure and to see where the major cost elements are. Understanding a firm’s cost structure in turn means understanding whether it is trying to achieve a competitive advantage based on either lower costs or differentiating the product or service. A better understanding is also achieved of the value chain and how the costs of one activity spill over to affect the costs of other activities. It also enables the analyst to determine whether the linkages among activities in the firm’s value chain present opportunities for cost reduction.
2.3.2 Value chain to build competitive advantage

Dobson, Starkey & Richards, (2004: 10) state that it was “Gary Hamel and CK Prahalad who popularised the concept of competence within the field of strategic management”. Strategic management is quintessentially concerned with sources of firm’s competitive advantage. According to Dobson et al (2004: 10), “Hamel and Prahalad argued that one of the most powerful sources of competitive advantage is core competence and they defined core competences as the collective learning in the organisation especially how to co-ordinate diverse production skills and integrate multiple streams and technologies”. Competence has emerged as the most important current concept in strategy and furthermore it focuses strongly on how to think about competitive advantage and raises issues of change through learning and uniqueness.

Dobson et al (2004: 10) state that the interest in competence is strategy refocusing attention on sources of competitive advantage internal to the organisation rather than the external focus on product, markets and competitive environments. This marked a gradual change in thinking about strategy with the shift away from the emphasis on market selection and positioning to a focus on the internal sources of competitiveness in internal capabilities. The interest in competence has a long history in strategy, which has led to what is now called the resource based view of the firm. This view argues that competitive advantage arises from firm specific resources.

2.3.3 Total quality management in the supply chain

Total quality management (TQM) is defined by Dobler and Burt (1996: 452) as a management approach to an organisation centred on quality, based on the participation of all its members and aiming at the long-term success through customer satisfaction, and benefits the members of the organisation and society. Davis, Aquilano and Chase (1999: 140) state that the importance of managing all elements of quality because of the ultimate impact on costs and the efficiency and profitability of the organisation, was first emphasised by leaders such as Deming, Juran, Crosby, Taguchi and Ishikawa.
Hugo, Badenhorst-Weiss and Van Rooyen (2002: 89) explains that one of the main elements of the philosophy of TQM is that the attitude of every employee must be directed towards a continuous striving for improvement across all activities of a firm and across the organisations and functions involved in the supply chain, TQM therefore stresses that all individuals and teams working towards working customer satisfaction should endeavour to provide fault-free products and services. It is important that “customers” in this context mean all departments within the organisation (internal customers) and the ultimate customer in the market place. Hugo, Badenhorst-Weiss and Van Rooyen (2002: 89) continues with the concepts of “do it right the first time” and quality free”, which were the corner stones of the original philosophy of TQM, and still prevail in organisations today. TQM is therefore more than a concept or a procedure – it is a way of life for every individual in the organisation. Workers and their inputs are necessary to build total quality awareness and it is essential to empower the workforce to control and reduce variation. TQM is also the basis for the success of materials supply concepts such as MRP and kanban.

TQM has an enormous impact on purchasing and material management and this is clearly summarised by Hugo, Badenhorst-Weiss and Van Rooyen (2002: 90),

- **Customer focus**: purchasing is a prime example of a customer and a supplier and purchasing management therefore needs to be aware of the needs of two customer groups: internal customers and external customers. Internal customers demand timely processing of the demand signal, on-time delivery and excellent quality of service and products provided by the external suppliers. On the other hand, external customers (end users of the organisation’s products) demand reliable suppliers in order to ensure product quality, availability and quick response time to demands.

- **Process mapping**: process mapping is aimed at ensuring that all internal processes in the supply department are performed in such a manner that quality of service is continually improved and measured against pre-set quality standards.
• Performance measurement: as previously indicated, the TQM approach demands that improvement and performance measurement should be part of the management of the supplier base. For purchasing and material management, the implication is that supplier performance measurement, and in particular quality improvement, must be part of the relationships with suppliers. In addition, measurement of the quality of the service rendered to user departments should not be aimed at “inspecting quality into the product or service” but an overall enhancement of the quality of service.

• Employee involvement: involving all employees in the supply chain in quality management procedures enhances the problem-solving capacity of the whole supply chain.

2.4 LOGISTICS
Logistics refers to the movement of materials within a production facility and to incoming and outgoing shipments of goods and material. Materials include all of the physical items used in the production process. In addition to raw material, there are support items such as fuels, equipment, parts, tools, lubricants, office supplies and more (Stevenson 1999: 706).

2.4.1 Roles of logistics
Burt et al (2003: 634) list some of the roles of logistics, which is discussed in detail further in the chapter.

• Traffic and transportation
• Warehousing and storage
• Industrial packaging
• Materials handling
• Inventory control
• Order fulfilment
• Demand forecasting
• Site location analysis
• Returned goods handling
• Parts and service support
• Field service and maintenance
• Value-added services
• Salvage and scrap disposal

2.4.2 Transportation
A major focus in logistics is upon the physical movement or flow of goods or upon the network that moves the product. This network is composed of transportation agencies that provide the service for the firm (Coyle, Bardi and Langley, 2003: 49).

Hugo, Badenhorst-Weis and Van Rooyen (2003: 202), state that the management of transport is important, because it ensures that the products or materials are received on time at the place where they are required, and in a usable condition. Another reason for the significance of managing incoming transport efficiently is the large costs involved. Transport costs constitute a significant part of the purchasing cost of the enterprises.

According to Monczka, Trent and Handfield (1998: 610), transport costs constitute 10 per cent of the total cost of a product. Furthermore, transportation is a key component of supply chain management. Transportation can play a key integrative role in supply chain structures, since carriers may be in an ideal position to integrate and coordinate flows throughout the supply chain. Successful supply chain management requires good transportation resources because the transportation system becomes the warehouse, with orders consolidated by the computer and carriers coordinated for JIT deliveries.

2.4.3 Transport modes
The purchasing and supply function makes an important contribution to the decision on transport modes. Various factors should be taken into consideration when the buyer has to choose a suitable mode of transport. The delivery date required, the cost of the mode, reliability and service quality, the size of the consignment, time in transit, possibility of damage, availability of the mode or infrastructure and flexibility are the principal factors to be considered.
2.4.4 Rail transport
Spoornet is the main rail transport operator. Spoornet’s goods services entail the handling and transportation of goods, as well as supplementary and supportive goods services by means of multi-modal transport methods on a door-to-door basis. Although rail transport is particularly suited to long-distance mass transport, it caters for every possible transport need by means of a wide variety of services, such as speed freight and containerisation. Rail transport has a cost advantage over other forms of transport, but is bound to outlets in terms of infrastructure (Hugo, Badenhorst-Weis and Van Rooyen, 2003: 204).

2.4.5 Road transport
Road transport is a commonly used mode of transport in South Africa, especially for technology based items for example, computers and telecommunication equipment. These items are small in size but have a very high value. Hugo, Badenhorst-Weis and Van Rooyen (2003: 205), lists the important characteristics of road transport for purchasing and supply management:

- Road transport is relatively fast.
- Road transport is more expensive than rail transport.
- The risks are greater in terms of road accidents and hijackings.
- There are still strict legal requirements that have to be met.
- The transportation of extra-heavy freight is difficult in terms of the availability of carriers and the suitability of the infrastructure.

2.4.6 Shipping
As South Africa is in many instances far from its main trading partners, import and export trades rely mainly on shipping. However, it is also possible to ship goods between the various ports in South Africa.
Owing to the nature of shipping, it is possible to transport large quantities (mass) of goods. Although it is a relatively slow method of transport, the risk of damage is generally smaller, except for corrodible materials. In addition, transport costs are also lower than those road and rail transport (Hugo, Badenhorst-Weis and Van Rooyen 2003: 205).

2.4.7 Airfreight

According to Hugo, Badenhorst-Weis and Van Rooyen (2003: 205), the use of airfreight has increased dramatically in the past few years despite the relatively high tariffs. In this type of transport, goods are normally limited to those with a small mass and high value. The principal advantage of airfreight is that it is useful for transporting A-category goods (inventory items that represent 10 per cent of the total number of items, but is about 70 per cent of the value) that require a fairly high investment in supply. As lead times are shorter, it is unnecessary to keep large quantities of goods in stock, which reduces the requirements for working capital. On the whole, in spite of relatively long distances and restrictive topographical factors, South Africa has well-developed transport system. Well-developed harbours and transport facilities are available for importing and exporting material and products.

Hugo, Badenhorst-Weis and Van Rooyen (2003: 205) report that with courier services, mini-containers and parcel post are becoming increasingly popular, particularly to transport small consignments by means of rail, road, air and sea freight. Often a combination of the above modes is used, depending on the topography and available infrastructure in South Africa. Using specific carriers forms an important part of the supply chain. It binds the members of the supply chain through the physical movement of materials from the one partner in the supply chain to the other.
2.5 Storage

Storage involves two separate but closely related activities: inventory management and warehousing. A direct relationship exists between transportation and the level of inventory and number of warehouses required. If firms use a relatively slow means of transport, they usually have to keep higher inventory levels and usually have more warehousing space for this inventory. They may examine the possibility of using faster transport to eliminate some of these warehouses and the inventory stored there in (Coyle et al, 2003: 49).

Jenkins (1990: 2-8) lists and explains the trends that have affected a change in modern warehouse management.

- New technology. In modern warehouses, speed and efficiency are primary consideration and require automation, computerisation and new methods of communication.

- Less-inventory. Owing to the high cost of inventory holding (tying up capital and other inventory-holding costs), keeping large amounts of inventory is regarded as poor management. Keeping smaller inventory shifts the emphasis in warehouse management from storage to the smooth flow through of materials. The use of systems such as just-in-time and materials requirement planning, where inventory holding is kept to an absolute minimum and the emphasis is placed on materials flow, has brought about dramatic technological changes in warehousing, such as computerisation, computer-to-computer communication, electronic mail and bar coding.

- Higher quality. Since inventory levels should be kept as low as possible, high quality is of crucial importance for the efficiency of the warehouses. (There is not enough inventories to provide for the production process in the time it will take to send unacceptable items back). The quality of the warehouse’s service, therefore, will depend directly on the quality of the products.
Better service. Better customer service can be rendered by means of a more responsive service. This can be done by ensuring that material or products are available timeously at the selling point or in the production process, according to expectation. Service can also be improved by treating suppliers, the public and employees from other departments courteously and professionally.

High-velocity inventory. Modern storage is in the evolutionary process of change from “dormant to moving inventory”. The just-in-time system, which is based on the flowthrough of materials, has four important consequences for warehousing: smaller and more regular orders, high freightage, more pool distribution and the need for greater accuracy.

Better equipment and facilities. Computerisation, automatic storage and retrieval systems (ASRS) and tall buildings are modern trends to save storage and warehouse costs.

Bar coding. Without bar coding, the automation and computerisation of warehouses are out of the question. Bar coding eliminates paperwork and makes the timeous provision of valuable information on inventory and work-scheduling possible, which promotes effective decision-making.

Improved communication. Improved communication is necessary, because it directly influences the efficiency of warehouses and the quality of their activities and service.

2.5.1 Packaging
The type of transportation selected affects packaging requirements both for moving the finished product to the market and for the inbound materials. Rail and water transportation usually requires additional packaging expenditures because of the greater possibility of damage (Coyle et al, 2003: 49).
South Africa has recently gone through a process of new regulations with regards to packaging. Copacino (1997:186) states that new regulations, pressures to become more environment friendly and escalating disposal costs compel organisations to rethink their packaging design in terms of reusable packaging, reusable containers, primary and secondary packaging with lower disposal volume, and collapsible racking that dramatically reduces packaging requirements.

Burt et al (2003: 61) highlight that recycling of packaging material is of particular importance and there is a hierarchy for such recycling:

Primary or closed loop recycling calls for packaging material to be recycled into its original material or container form. It is a viable option, provided that all health and other regulatory requirements are fully met. Recycling into some other package form – secondary recycling – is also a desirable option. Recycling into a product other than a package or a packaging material – tertiary recycling – may be the only available option for some materials.

2.5.2 Materials Handling

Material handling is important to efficient warehouse operation. Material managers are concerned with the movement of goods into a warehouse, placement of goods in a warehouse, and the movement of goods from storage to order-picking areas and eventually to dock areas for transportation out of the warehouse (Coyle et al, 2003: 49).

Materials handling is a fairly costly element and it makes no contribution to the value of the product. Since it cannot be avoided, it should be kept to the bare minimum. Hugo, Badenhorst-Weis and Van Rooyen (2003: 208), continues with the reasons for effective materials handling in an enterprise:

- The flowthrough of materials is necessary for the continuation of the production process and the continuous provision of final products to the enterprise’s customers.
- The health and safety of employees depend on the materials-handling system and the training of operators.
• Material-handling is a great cost factor in terms of expensive equipment, time and labour cost.
• Material-handling is directly related to damage inflicted on supplies being moved, which may cost the enterprise dearly.

Another objective of a material handling system is to limit as far as possible the number of times goods have to be handled. Unnecessary handling will necessarily increase costs. An effort should be made to ensure a smooth flowthrough of goods and materials.

2.6 INVENTORY CONTROL

The control of inventory is a task controlled by inventory management that monitors and evaluates inventory activities in such a manner that these activities are performed according to accepted criteria and standards to achieve the set objectives. There are various reasons for stringent inventory control, the more common justifications of inventory control is listed by Hugo, Badenhorst-Weis and Van Rooyen (2003: 193):

• Reconciling the conflicting policy goals of various departments regarding inventory
• Determining when to order and how much to order
• Reducing overall operating costs
• Providing protection against unpredictable demands

Many organisations subject all items either purchased or produced, irrespective of their value, usage or quantity, to be same type in the stock control procedure. Such an approach can be a waste of time and effort. The ABC analysis is primarily aimed at providing management with information on the importance of the different inventory items in terms of money value. Dobler and Burt, (1996: 520) states that ABC analysis can only be attempted after a thorough investigation has been carried out on aspects such as price, demand for different inventory items, delivery times and the particular problems related to the purchasing of different inventory items.
The Pareto can be used in this context (see figure 2.1 below). It helps show that a small proportion of the stock items account for a large proportion of inventory cost or value. Their relationship is often referred to as the 80/20 ‘law’, i.e. up to 80 per cent of the firm’s total inventory cost or value is accounted for by 20 per cent of items. This relationship encourages us to categorize inventory items into three classes, A, B and C. Category A would be those relatively few types of items which account for a relatively large proportion of total inventory cost or value, category B would be the slightly larger number of items which account for a very small proportion of total cost. Category A items should be closely controlled: category B items should be subject to less control: and for category C a simple control procedure is probably sufficient.

**Figure 2.1: ABC chart**

![ABC chart](image)

2.7 DEMAND FORECASTING

Accurate forecasting of inventory requirements and materials and spares is essential to effective inventory control. This is particularly true in companies using a just-in-time (JIT) or material requirement planning (MRP) approach to control inventory. Logistics personnel should develop forecasts in those situations to ensure accuracy and effective control. Too frequently, forecast developed by marketing staff reflect sales objectives rather than inventory requirements (Coyle et al, 2003: 49).

Coyle et al (2003: 49) say that production planning is closely related to forecasting in terms of effective inventory control. Once a forecast is developed and the current inventory on hand and usage rate is assessed, production managers can determine the number of units necessary to ensure adequate market coverage. The integration of production planning into logistics is becoming increasingly common in large corporations.

Hellriegel et al (1999: 293) state that all forecasting aids need to be supported by a healthy dose of creativity. Creativity is the ability to visualize, foresee, generate, and implement new ideas. Creativity thinking increases the quality of solutions to many types of problems, helps stimulate innovation, revitalizes motivation and commitment by challenging individual competencies, and serves as a catalyst for effective team performance. For organizations creativity is no longer optional – it is imperative.

For an organisation to have a strong supply chain it is important that the forecast is as accurate as possible to the demand of products or services. Failure to produce the products or render the services could determine the profitability of the organisation.

Burt et al (2003: 630), explain the two categories of forecasts, namely: Quantitative and qualitative.
• Qualitative methods require mathematical analysis of historical data. Common mathematical approaches based on historical data are regression analysis, moving averages, and exponential smoothing. An often-favoured forecasting method by managers that have little knowledge of forecasting techniques is the naïve method, where the last period’s historical values become the forecast for the next period. However, historical data may not be complete or available.

• Qualitative forecasts are created subjectively, using estimates from sources, such as market surveys, in-dept interviews, and experts. When historical data are available, qualitative forecasting is usually used to verify or adjust quantitative forecasting methods. In some cases, when historical data are not available, qualitative forecasting is the only alternative.

2.7.1 Forecasting Techniques
Forecasting techniques using historical data are mainly regression analysis, time series analysis, moving averages and exponential smoothing. From the point of view of inventory management, the most important components of these techniques are average inventory consumption per period of time, trends, seasonal fluctuations and cyclical movement in the demand for requirements. Purchasing and supply management may use this information to compile an inventory budget (for inclusion in the purchasing budget); for the efficient employment of purchasing and inventory staff; and for efficient coordination with the supplier system, in particular, and the production function (Hugo, Badehorst-Weiss and Van Rooyen 2004: 176).

There are various commonly used words in forecasting, e.g. time series, trend, seasonality, cycle, irregular variation and random variations, the definitions of these words is discussed briefly below:

• Time series is a time ordered sequence of observations taken at regular intervals over a period of time, e.g., hourly, daily, weekly, monthly, quarterly or annually.
• Trend refers to a gradual, long-term upward or downward movement in the data e.g., population shifts, changing incomes and cultural changes often account for such movements.

• Seasonality refers to short term, fairly regular variations generally related to factors such as weather, holidays and vacations for e.g., restaurants, supermarkets and theatres experience weekly and even daily variations.

• Cycles are wavelike variations of more than one year’ duration. These are often related to a variety of economic and political conditions.

• Irregular variations are due to usual circumstances such as severe weather conditions, strikes or a major change in the product or service. They do not reflect typical behaviour and inclusion in the series can distort the overall picture. Whenever possible, these should be identified and removed from the data.

• Random variations are residual variations that remain after all other behaviours have been accounted for.

With the wide variety of forecasting techniques used, they are quite different from each other. Nevertheless, certain features are common to all forecasts and it important to recognise and identify them. Stevenson (1999: 89) highlights the common features and discusses them briefly.

• Forecasting techniques generally assume that the same underlying causal system that exists in the past will continue in the future. A manager cannot simply delegate forecasting to models or computers and then forget about it, because unplanned occurrences can wreak havoc with forecasts. For instance, weather related events, tax increases or decreases, and changes in features or prices of competing products or services can have a major impact on demand. Consequently, a manager must be alert to such occurrences and be ready to override forecasts, which assume a stable causal system.
• Forecasts are rarely perfect; actual results usually differ from predicted values. No one can predict precisely how often large number of related factors will impinge upon the variable in question; this, and the presence of randomness, preclude a perfect forecast. Allowances should be made for inaccuracies.

• Forecasts for groups of items tend to be more accurate than forecasts for individual items because forecasting errors among items in a group usually have a cancelling effect. Opportunities for grouping may arise if parts or raw materials are used for multiple products or if a product or service is demanded by a number of independent sources.

• Forecast accuracy decreases as the time period covered by the forecast – the time horizon – increases. Generally speaking, short-range forecasts must contend with fewer uncertainties than longer-range forecasts, so they tend to be more accurate. An important consequence of the last point is that flexible business organisations - those that can respond quickly to changes in demand - require a shorter forecasting horizon and hence benefit from more accurate short range forecasts than competitors who are less flexible and who must therefore use longer forecast horizons.

2.7.2 Elements of forecasts

A properly prepared forecast should fulfil certain requirements (Stevenson, 1994: 93), briefly explains these requirements.

• The forecast should be timely. Usually, a certain amount of time is needed to respond to the information contained in a forecast. For example, capacity cannot be expanded overnight, nor can inventory levels be changed immediately. Hence the forecasting horizon must cover the time necessary to implement possible changes.

• The forecast should be accurate and the degree of accuracy should be stated. This will enable users to plan for possible errors and will provide a basis for comparing alternative forecasts.
• The forecast should be reliable; it should work consistently. A technique that sometimes provides a good forecast and sometimes a poor one will leave users with the uneasy feeling that they may get burned every time a new forecast is issued.

• The forecast should be expressed in meaningful units. Financial planners need to know how many dollars will be needed, production planners need to know how many units will be needed, and schedulers need to know what machines and skills will be required. The choice of units depends on user needs.

• The forecast should be in writing. Although this will not guarantee that all concerned are using the same information, it will least increase the likelihood of it. In addition, a written forecast will permit an objective basis for evaluating the forecast once actual results are in.

• The forecasting technique should be simple to understand and use. Users often lack confidence in forecasts based on sophisticated techniques; they do not understand either the circumstances in which the techniques are appropriate or the limitations of the techniques. Misuse of techniques is an obvious consequence. Not surprisingly, fairly crude forecasting techniques enjoy widespread popularity because users are more comfortable working with them.

2.7.3 Failure of technology forecasts
Telkom SA is a technology driven organisation, it can be a daunting task to forecast and hence the forecast has to be done. Stevenson (1994: 93) concludes with reasons why technology forecasts often fail.

Potential uses
All of the potential uses of new technologies are not known at the time of their development; thus, often the success of a new technology is dependent on the unknown, even though several other uses have been anticipated.
Complementary Innovations
The success of a new technology is often dependent on the emergence of a complementary technology. For example, the inventor of the laser at Bell Laboratories did not recognize its telecommunications importance because fibre optics had not yet been developed.

Systems Integration
Some new technologies do not yield spectacular breakthroughs quickly because the system uses does not exist. Consider that cellular radio was developed in the 60’s but it did not become a market success until the microelectronics and telecommunications revolutions provided a cost effective systems integration.

Problem-Solving Myopia
Inventions are often solutions to more problems than those that stimulated the discovery. Thus, developers often overlook other applications of new inventions. For example, the steam engine was invented in the 18th century to pump water out of mines, not to power locomotives or ocean liners.

Passing the “Needle Test”
A new technology must not only be technologically better but also economically so. If the new technology is not economical, then it would not become widespread. Unfortunately, changes in social customs are very difficult to predict; thus, new technologies can fail for many socioeconomic reasons.

Competing with the Past
The invention of a new way of doing something often stimulates improvements in the old technology, which may delay the adoption of the new technology.


2.8 SITE LOCATION

Another discipline that is important to logistics is plant and warehouse site location. A location change could alter time and place relationships between plants and markets or between supply points and plants. Such changes will affect transportation rates and service, customer service, inventory requirements, and possibly other areas. Transportation cost is frequently a very important factor in deciding a location (Coyle et al, 2003: 49).

Coyle et al (2003: 49) have found that the basic rationale for including purchasing in logistics is that transportation costs relates directly to the geographic location (distance) of raw materials. In terms of transportation and inventory costs, the quantities purchased would also affect logistics cost. Including purchasing within the logistics area is primarily a matter of whether this more effectively coordinates to lower costs for the firm.

Various location techniques can be used to assist organisations in determining the choice of alternate locations. An evaluation of all options has to be considered when making the decision. According to Slack, Chambers and Johnston (2001: 166) the most commonly used techniques is the Weighted-score method and centre-of-gravity method. For the purpose of the study, the centre of gravity method will be discussed in detail.

2.8.2 The centre-of-gravity method

The centre–of-gravity method is used to find a location that minimizes transportation costs. It is based on the idea that all possible locations have a ‘value’, which is the sum of all transportation costs to and from that location. The best location, the one which minimizes costs, is represented by what in a physical analogy would be the weighted centre of gravity of all points to and from which goods are transported. So, for example, in figure 2.2, two suppliers, each sending 20 tonnes of parts per month to a factory are located at points A and B. The factory must then assemble these parts and send them to one customer located at point C. Since point C receives twice as many tonnes as
points A and B (transportation cost is assumed to be directly related to the tonnes of goods shipped) then it has twice the weighting of points A or B. The lowest transportation cost location for the factory is at the centre of gravity of a (weightless) board where the two suppliers’ and one customer’s locations are represented to scale and have weights equivalent to the weightings of the number of tonnes they send or receive.

**Figure 2.2: The centre-of-gravity method**

2.8.2 Double handling

Carter and Price (1994:196) highlight the problem of double handling, this is probably the main management problem to be overcome. It refers to the situation where material are being handled more times than is necessary, mainly because of inefficiency within the whole supply chain management system. When material are delivered to the store they should in theory make only a limited number of journeys in relation to materials flow, for example:
(a) delivery vehicle to the place of storage
(b) selection from the place of storage
(c) delivery to and through the process of production

In many organisations this simple flow is not maintained and material are often handled a great number of times. The real cost of handling, in terms of fuel, plant, labour etc. is therefore increased, which eventually escalates the cost of the goods or services.

Causes of double handling stated by Carter and Price (1994: 196), is usually caused by one or more of the following:

- Lack of a good stores location system. This means that material is often stored in the wrong area and has to be moved again later.
- Lack of good communications between materials handling and other departments involved, e.g. production. It is vital that material is only supplied to production as and when they can accommodate them, otherwise the factory floor becomes clogged with materials.
- Use of the wrong material handling device for the job. For example, a small capacity truck will need to make several journeys to unload a vehicle with very heavy units, whereas a large device could perform the task in one movement.
- Lack of space. This is the most common cause, especially in organizations that have developed and grown over a period of time. Because of this lack of space and the need to unload vehicles as quickly as possible, materials tend to be placed in the nearest space as a temporary measure.
2.9 REVERSE LOGISTICS

Waller (2001: 35) defines reverse logistics as the term most often used to refer to the role of logistics in product returns, source reduction, recycling, materials substitution, reuse of materials, waste disposal and refurbishing, repair and manufacturing.

Reverse logistics is in essence a value-added element to normal logistics activities. Reverse logistics may add a further dimension of value to customer service, which differentiate the product and result in a competitive advantage. Waller (2001: 47) provides some very valuable guidelines for developing reverse logistics programmes:

- The most successful reverse logistics solutions emerge forward and reverse flows into one process.
- Reverse logistics programmes should be developed primarily for “uncontrollable returns” and not all returns.
- Shorter product life cycles emphasise the importance of faster reverse logistics processes.

Most distribution facilities are not designed to handle reverse product flows and staffs is not trained to make decisions; the result is often major inefficiencies. The more efficient logistics programmes are, the less need there is for reverse logistics. According to Hugo, Badenhorst-Weiss and Van Biljon (2004: 225), “the best return is no return.” Optimal reverse logistics programmes are developed only for those return products that need them.

In a distribution channel, materials flow from the original source to the manufacture to the end consumer, information on consumer demand and payment moves in the opposite direction to materials through the distribution channel. In reverse logistics provision is made for materials also to flow in the opposite direction. The reverse logistics channel is clearly indicated in Figure 2.3.
Figure 2.3: The reverse logistics channel

2.10 JUST IN TIME (JIT)

Hugo, Badenhorst-Weiss and Van Biljon (2004: 157) explain that JIT is a product-oriented management philosophy perfected by Japanese industrialists (although the British claim the idea originated in Britain) to eliminate all forms of waste – whether of time, labour, raw materials or materials. This is achieved with a relatively simple information system (kanban), thereby ensuring that products of the correct quantities and at the precise time – during manufacturing as well as delivery to the consumer market.
Hugo, Badenhorst-Weis and Van Rooyen (2003: 193) continue by classifying the purposes of inventory into three main categories or dimensions. Firstly, from the point of view of financial management, it remains import to know the value of the inventory. Secondly, from the point of view of inventory management, it is necessary to control inventory in such a manner that continuous availability is assured. Thirdly, it is purchasing and supply management’s task to control prices.

2.10.1 Advantages of JIT
Hugo, Badenhorst-Weis and Van Biljon (2004: 158), explain the advantages of JIT:

- Lower inventory levels are achieved as a result of the large number of small deliveries demanded by JIT. The speed of inventory turnover is increased considerably, resulting in lower working capital needs and a higher cash flow. Inventory turnover rates of between 42 and 63 have been achieved by Toyota in Japan, compared with typical annual turnover rates of under 10 in South Africa.

- Smaller buffer stocks are achieved by JIT’s demand for short and reliable lead times. Theoretically, the system operates without buffer stocks, but in South Africa manufactures who use the JIT system are obliged to keep some stock, owing to the nature of the supply market.

- Short and reliable lead times improve the adaptability of the production schedules. Figure 2.4 illustrates the lead times of the components of both the traditional and the JIT approach. It should be noted that the lead time for each of the JIT purchasing steps is reduced. In reality, step 1 of the conventional process should fall away completely when JIT is implemented because of the use of kanban and step 5 will have a much reduced lead time because of the elimination of quality control procedures in JIT. The reduced lead time is a direct contribution to a competitive advantage in time-based competition. In addition, acquisition costs are lowered because of the elimination of some of the activities.
• Quality improvement. The higher quality of products purchased translates into an improved quality of products produced. JIT purchasing has the added side-effect of increased quality awareness among workers. This in turn influences the firm’s quality assurance programme.

• Cost savings. Apart from the savings already mentioned, the long-term business relationships between purchasing firms and suppliers resulting from JIT greatly encourage suppliers to reduce costs. Example include improve designs and less expensive alternative material, as well as research and development that could lead to technological breakthroughs and excellent cost advantages for purchasing firms.

Figure 2.4: Lead time comparison: conventional and JIT systems

1 Consecutive steps in conventional purchasing

1 Description of the need – lead time
2 Ordering lead time
3 Supplier’s lead time
4 Logistics lead time
5 Receiving and quality control

2 Consecutive steps in JIT purchasing

1 Kanban changes
2 Supplies
3 Logistics
4 Receiving

Competitive Advantage

Time-based competition

Start

Finish

Total lead time

Source: Hugo, Badenhorst-Weiss and Van Biljon (2004: 159)
2.10.2 Kanban

Schonberger (1982: 86) defines Kanban as a Japanese word meaning “visible record,” and in the kanban system a manually prepared card, or kanban, is the visible record that triggers an order for more parts.

Hugo, Badenhorst-Weis and Van Biljon (2004: 159) continue with the most important characteristics of kanban systems,

- All materials, subcomponents and products move through the plant in standard containers. To which the kanbans are attached. For every container there is one $m$ kanban (movement) and one $p$ kanban (production). Every container contains precisely the specified quantity.
- Every production process or workstation has a storage area where full and empty containers may be stored.
- No activity, whether movement or production, takes place without the authorisation of the relevant kanban.

Hugo, Badenhorst-Weis and Van Biljon (2004: 159) compare the terms JIT and kanban. The terms “JIT” and “kanban” have become so integrated in Western literature that the term “kanban system” is often used when JIT system is intended. In fact, kanban is merely the information system perfected by Toyota in Japan to operate the JIT system. Kanban means “cards” or “visible sign” and refers to the card information system by means of which kanban functions.

Burt, Dobler and Starling (2003:335) discuss the benefits JIT has in a lean supply chain. Flexibility is achieved through methods encapsulated in the just-in-time philosophy. Also known as lean strategy. According to a 10-year forecast for the 2000s, “Lean supply chains will be a competitive strategy.” When properly implemented, a just-in-time (JIT) system results in the following supply chain benefits: reduced inventory, increased, quality, reduced lead time,
reduce scrap and rework, and reduce equipment downtime. JIT requires a high degree of integration of the customer and supplier’s operations. The inevitable changes in the customer’s production plans and schedules affect the supplier’s schedules. Experience has demonstrated that dependable, single-source collaborative relationships are virtually essential if the required level of integration is to result.

A firm that is considering the adoption of JIT manufacturing must focus on its supplier’s abilities and willingness to meet the stringent quality and schedule demands imposed by the system. The sourcing team must carefully investigate a potential supplier’s capability as a JIT manufacture.

2.10.3 Lean Supply

The development of lean supply is to eliminate duplication, waste and any activity that does not add value. Lean supply is a key characteristic of the Japanese lean supply. Lean supply also extends these features to all activities in the supply chain. Schonberger RJ, (2004, 20) states that lean is many things, but inventory is a highly visible measure of it, know how to operate with little and you’re lean, hold lots and you’re fat.

Hugo, Badenhorst-Weiss and Van Biljon (2004: 160) discuss the features of lean supply as a related concept in inventory management.
• **The relationship as a quasi firm**, lean supply means that purchasing has the task of holding together a complex organisation that consists of a central core, which is the own firm, and an elaborate external organisation consisting of all role players in the supply chain. It is collaborative network of customers and suppliers all working together to achieve the central aim of eliminating all unnecessary costs. From an inventory management perspective the JIT approach as implemented in South Africa often means that the burden of inventory holding is merely shifted from the buying organisations to the supplier. Lean supply implies managing the collaborative effort between supplier and customer (and all intermediaries) to fundamentally address the problem of costs associated with inventories and to minimise this cost in the supply channel as a whole

• **Cost transparency**, in lean supply the customer is willing to share data on internal processes (the value chain) with the supplier. Similarly, the supplier shares with the customer detailed data process cost structures. The two way exchange of data is aimed at pursuing the essential logic of lean supply – the removal of duplications. From an inventory perspective genuine sharing of data implies a mutual search for ways to reduce not only inventory in the supplier’s and the buyers organisations but also all other inventories in the pipeline. This can only be achieved through joint planning and cost tradeoffs in the supply channel.

• **Research and technology**, lean supply requires the exploitation of new technologies, and the collaborative roles within the lean supply to develop the need for a shared research environment aimed at discovering new technology. This implies, for example, that the supplier is effectively an intrinsic part of the intelligence-gathering network of the customer. From an inventory perspective new technology in field such as EDI, coding and transportation is easier to discover and implement, resulting in cost reductions in the supply pipeline in general.
- **Relationship assessment**, since the relationship is jointly managed, it obviates the need from the customer’s perspective to evaluate vendors. In fact, supplier evaluation becomes inappropriate and should be eliminated since it is costly and does not add value. Within the principles of lean supply both partners, customer and supplier, should develop joint approaches to assessing the relationship itself. If inventory management is again taken as the example, relationship assessment implies that the management of inventories in the relationship should be evaluate, and not the inventory performance of any one of the partners. Lean supply is a management philosophy that is being implemented increasingly in addressing the complicated supply management environment of the global marketplace. This brief discussion of this complex approach serves mainly to emphasise the contrast between contemporary supply management and the more traditional inventory-control procedures. Efficient inventory planning pursues optimal inventory holding. However, control is an essential component of good inventory management.

### 2.11 SUPPLIER INVOLVEMENT

In the face of increasingly fierce competition, the adoption of collaborative alliances between firms is becoming more and more common. World-class supplier development requires a commitment to collaboration between customer and supplier. The commitment must be approached with mutual benefit in mind. Effective supplier development is more than getting cost reductions for a particular part, it means helping suppliers remove wasteful costs from their processes. The strategic intent will be to create a win-win situation where both the buyer and the supplier gain.

Burt *et al* (2003:517), for collaboration in supplier development to be successful, the collaboration must have commitment, communication, measurement and trust.
• Collaboration Requires Commitment. A supplier development initiative may require supply managers to spend weeks or months in the supplier’s facility working with the supplying firm’s management and operating personnel. Commitment may require the buying firm to provide financial assistance for needed equipment and/or training. Commitment requires that the savings from supplier development projects be shared in an equitable way. Effective supplier development looks at all of a supplier’s processes with the objective of eliminating waste and gaining improvements in quality, delivery, cycle time and costs. Such action requires: supplier involvement at the earliest stages of new product development; shared information, resources, and savings; and resources dedicated to identifying and closing performance gaps. In other words, it requires the buying firm’s personnel to treat suppliers as if they were a department within the buying company.

• Collaboration Requires Communication. It is one thing to have a well-designed supplier development program; it is another thing to assure that the program is well communicated and understood by the suppliers. Proactive collaboration in establishing the priorities, motives and methods underlying the administration of the supplier development program requires the highest levels of communication.

• Collaboration Requires Measurement. World-class firms want all members of their supply chain to be strong and profitable. However, they must be sure that suppliers are charging the rights fees for their purchasing, processing and conversion work. This requires both parties to open their financial records to one another. To many supply professionals the sharing of financial records and cost data may seem like an insurmountable obstacle. If collaboration efforts are to succeed, sharing accurate costs is a policy and cultural change that must occur.
• Collaboration Requires Trust. When undertaking supplier development projects, a tremendous amount of information must pass through both companies to enable the necessary improvement efforts. In many cases, this information has never been revealed outside of the company. Trust between the two organizations and the involved personnel must be present before the necessary information sharing can or will take place.

2.11.1 Customer service
Customer service is a group of activities and processes in the supply chain that ensures customer satisfaction with the supplier’s product or service offerings. Logistics management is one of the activities that is involved in the supply chain process aimed at delivering customer service. Stock, Douglas and Lambert (2001:98) describes customer service as a process that takes place between buyer, seller and third party. The process results in a value added to the product or service exchange. This value added in the exchange process might be short term as in a single transaction or longer term as in a contractual relationship. The value added is also shared, in that each of the parties to the transaction or contract is better off at the completion of the transaction than they were before the transaction took place. Thus, in a process view: Customer service is a process for providing significant value-added benefits to the supply chain in a cost effective way.

Stevenson (1999: 561) states that inventory management has two main concerns. One is the level of customer service, that is, to have the right goods, in sufficient quantities, in the right place, at the right time. The other is the costs of ordering and carrying inventories. Customer service is a complex topic and one that concerns other functional company areas. Customer service levels in many ways glue together other logistics areas.
Decisions about inventory, transportation and warehousing relate to customer service requirements. While customarily the logistics area does not completely control customer service decisions, logistics plays an extremely important role in ensuring that the customer gets the right product at the right place and time. Logistics decisions about product availability and inventory lead time are critical to customer service (Coyle, Bardi and Langley 2003: 49).

2.12 BILL OF MATERIAL

Hugo, Badenhorst-Weis and Van Rooyen (2003: 186) explain that the bill of material (BOM) is a list of the contents of the final product, with specifications of all the components, parts and materials required for the final product – the so-called “explosion”. It also provides the sequence in which the items are incorporated into the product, as well as the quantity of each item. This information is available in the product's design documents, flow diagrams of manufacturing and other engineering documents.

By exploding a final product into all its components, the product is divided into a component structure. The components are then divided into parts and materials. The number of final products determines the quantity of parts and materials required. The master production schedule may then be used to determine when, in terms of sequence; the parts or materials will be required. Whereas standard quantities of materials serve as the basis, provision should be made for essential (i.e. economically unavoidable) scrap.

2.12.1 Order Fulfilment

Order fulfilment generally consists of activities involved with completing customer orders. One important physical distribution factor is the time elapsing from the time when a customer decides to place an order for a product until the time those goods are actually delivered in a satisfactory condition, that is, the lead time (Coyle et al, 2003: 49).
According to Hugo, Badenhorst-Weiss and Van Rooyen (2003:20), issuing an official order for the supply of goods and services is a legally binding step. It is therefore essential that the authority and responsibility for placing orders are vested in only one department – the purchasing department. Since the official order creates a legally binding contract with the supplier, the purchasing department has to ensure that it is completed in detail. It should provide comprehensive information on quantities, prices, delivery dates, point of delivery, quality and discounts.

The order should also indicate whether any specification lists or other appropriate documents are attached, forming part of the agreement between buyer and seller. Where applicable, the purchase order should also indicate inspection procedures, as well as the basis to be used for quality control sampling. The fundamental requirement for the purchase order is that it should contain enough information so that it leaves no possibility for misinterpretation by all parties concerned.

2.13 BENCHMARKING TECHNIQUES

Bhote (1987) says benchmarking can be defined as a continuous management process of measuring a company's product, process, service or technology against its toughest competitor or a non-competing company that is a world leader in the function being measured. Without benchmarking, a company's strategies are blind guesses. With it, a standard of excellence is determined and quantified, and intensive measures can be instituted to close the gap between the benchmarked company and itself. Benchmarking attempts to assess the gap in overall market and financial performance, or in cost performance, or in differentiation (Schonberger, 2004: 20).

Stevenson (1999: 493) describe competitive benchmarking as identifying companies or other organizations that are the best at something and studying how they do it to learn how to improve your operation. The company need not be in the same line of business as yours.
According to Buddress and Raedels, (1994:33) there are two large categories of benchmarks:

- Internal benchmarking. Measuring the performance of internal processes against goals established by the organisation itself.
- External benchmarking. Competitive benchmarking aimed specifically at gaining a competitive advantage; industry benchmarking aimed at establishing objectives in a particular industry; and best in class, which implies measuring performance against similar industries that may be world-class.

2.14 SUMMARY

Organisations need to understand the functioning of the supply chain and what benefits an efficient supply chain can have for the organisation. A world-class distribution process can only function effectively if the organisations understand where they fit into the supply chain and what value added contribution they create for the organisation.

Organisations must understand the requirements of the upstream customers and need to set standards for their downstream suppliers that will ensure product quality and the timely delivery of products. World-class supplier development requires a commitment to collaboration between customer and supplier. Accurate forecasting of inventory requirements and materials and parts is essential to effective inventory control.

In the next chapter, the analysis of Telkom’s SA’s, Southern Region material distribution process will be discussed.
CHAPTER 3

ANALYSIS OF TELKOM SA’S, SOUTHERN REGION MATERIAL DISTRIBUTION PROCESS

3.1 INTRODUCTION
The components of the supply chain was discussed in Chapter 2. This will assist the researcher in analysing the internal operations in the Build Management Centre in the Southern Region of Telkom SA and help to form categories that will be used in the empirical study of Chapter 4.

3.2 THE INTERNAL OPERATION OF THE BUILD MANAGEMENT CENTRE (BMC) IN TELKOM SA’S SOUTHERN REGION
The Build Management Centre (BMC) is a business unit in Telkom SA that consists of numerous functions. Figure 3.1 is a flow diagram that shows the operations in the BMC.

Figure 3.1: Operations of the BMC

![Diagram of BMC operations]

The functions of the BMC will be briefly discussed as follows:
a) Engineering: the Sales Department receives the request from the customer, the request is logged onto the system with a reference number attached to it. The date of the service requested by the customer and the type of service required, determines the level of priority set for this service. The engineers plan the scope of work and a project number is allocated to the reference number. The planning consists of the following, namely, detail plans, scope of the work, the breakdown of the costs and the bill of materials required for completing the project.

b) Capital Budget: The Capital Budget Division controls the budget for new infrastructure and authorises funding for projects. The project is funded and the request for material is sent to the Material Management Division. At the same time, a request is sent to the Project Management Division for taking control of the project and to meet the customer required date.

c) Project Management: accountability for the completion of the project lies in this division. Customer satisfaction is a strategic drive in Telkom SA, it is also essential criteria to have for survival in a competitive environment. Therefore, it is a necessary requirement to meet the customer’s requested date.

d) Material Management: the loading of the BOM, sourcing, tracking and tracing the delivery of the material into the staging areas is the full responsibility and accountability of this division. Material forecasting and the distribution of material is some of the critical responsibilities of Material Management Division. This research mostly affects the operation of this division; therefore, it is of great importance that the reader takes note of the responsibilities and accountabilities thereof. Failure to meet both the customer request date and deliver excellent service has affected this division in the past few years.
e) CMAC: the majority of the construction work in Telkom SA is outsourced to outside contractors. The appointment of the contractor and the quotation and payments for the services, is the responsibility of this division.

f) Construction Services: this division has Internal Liaison Officers (ILO) who are responsible for the contractors on site. Telkom SA’s image is of great importance for brand building and this division has huge accountability in keeping up to the high standards set by Head Office.

3.3 AN ANALYSIS OF TELKOM SA’S MATERIAL DISTRIBUTION PROCESS IN THE SOUTHERN REGION

The distribution process will be considered from the availability of material at the National Distribution Centre to the delivery of material at the staging areas as shown in Figure 3.2. The area within brackets is considered to be the material distribution process. The National Distribution Centre (NDC) and the Material Centres (MC) are part of the procurement business unit of Telkom SA. The delivery of material to the staging area is part of the Build Management Centre (BMC).

Figure 3.2: Material distribution process

3.3.1 Material

On a monthly basis, the engineering division forecasts for material requirements. This is completed by the first five working days in the month. Each item has its own lead time and this determines the month for which this item can be forecasted. The total of the regional forecasts forms the national forecast, which is given to the Procurement Division for purchasing.
All material is received at the National Distribution Centre (NDC) in Boksburg, even the technology-based item that is sourced from abroad. The material is categorised into VTP and normal items. Normal items are considered to be everything other than VTP. All material is distributed by road to the various Material Centres (MC) as explained in the chapter below.

3.3.2 Vital to Production
Vital to production items are used on Service on Demand (SOD) projects. The SOD programme is funded by means of retained funds controlled by Head Office. SOD projects are customer initiated and in most cases governed by a Service Level Agreement (SLA) between Telkom SA and the customer. The time span to provide service for SOD projects is very short and material availability is therefore of vital importance. With the lead times of the different types of material varying from four to twelve weeks, it is impossible for Telkom SA to meet this obligation with regards to SOD projects, with normal stock holding.

Cawood (2004: 5) lists the minimum criteria for a VTP material item in Telkom SA:

- It is a material item that is most often used in an option/technology/package.
- It is a material item for which funding (business case) for the particular technology has been approved.
- It is a material item that has an unpredictable scale of customer demand, (customer needs, marketing drives, etcetera).
- It is a material item that has supply chain constraints such as long lead times.
- It is a material item that is difficult to forecast, with unpredictable trends.
- It is a material item for which there are no equivalent or alternative solutions available.
- It is a material item that has a volumetric turnover of more than five units per month.
3.3.3 Transportation of the material

The Southern region covers a vast geographic area as explained in Chapter 1. Almost all the material is received from the National Distribution Centre (NDC) situated in Boksburg. Technology based items that are imported from overseas is also delivered directly to Boksburg and thereafter redistributed to the various Material Centres (MC) situated in the Regions. From the MCs the material has to be further distributed to the staging areas, which are located in three cities; namely, Port Elizabeth, East London and George. The distance of the staging area from the MC is as follows and Figure 3.3 shows a geographic location of the MCs in the Southern Region.

- The staging area in Port Elizabeth is five kilometres away from the MC. The MC is in Deal Party and the staging area is in Sydenham.
- The staging area in East London is situated in the same premises as the MC.
- The staging area in George is 150 metres away from the MC, but office blocks barricade excess to the staging area from the MC, so the use of external transport has to be utilised.
Figure 3.3: Transport routes of the Southern Region in Telkom SA

- The black arrow ( → ) route is material that is delivered directly from NDC to Port Elizabeth via East London and the other route is direct from Boksburg to George.
- The red arrow ( ← ) route is a return route from George to Port Elizabeth.
• The green arrow (→) route is a return route from Port Elizabeth to East London via Grahamstown

The distances between the NDC and MCs and also MC to MC, is shown in Table 3.1

Table 3.1: Distance table

<table>
<thead>
<tr>
<th></th>
<th>Boksburg</th>
<th>East London</th>
<th>Port Elizabeth</th>
<th>George</th>
</tr>
</thead>
<tbody>
<tr>
<td>East London</td>
<td>920km</td>
<td>0</td>
<td>310km</td>
<td>660km</td>
</tr>
<tr>
<td>Port Elizabeth</td>
<td>1050km</td>
<td>310km</td>
<td>0</td>
<td>350km</td>
</tr>
<tr>
<td>George</td>
<td>1075km</td>
<td>660km</td>
<td>350km</td>
<td>0</td>
</tr>
</tbody>
</table>

The number of trips to the various destinations, the day of departure and all trips returned to original location of departure is listed below:

• Boksburg to Port Elizabeth via East London:
  Twice a week, Monday and Wednesday

• Boksburg to George
  Once a week, Thursday

• George to Port Elizabeth
  Once a week, Friday

• Port Elizabeth to George
  Once a week, Tuesday

• Port Elizabeth to East London
  Twice a week, Monday and Thursday
The local routes are delivery that takes place within the city as shown in table 3.2 below:

**Table 3.2: Local deliveries**

<table>
<thead>
<tr>
<th>MC</th>
<th>Staging</th>
<th>Distance</th>
<th>Day of delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port Elizabeth</td>
<td>Deal Party</td>
<td>Sydenham</td>
<td>5km</td>
</tr>
<tr>
<td>George</td>
<td>Industria</td>
<td>Industria</td>
<td>700m</td>
</tr>
</tbody>
</table>

**3.4 SUMMARY**

The material distribution was discussed; which will give the reader a reasonable understanding of the operation in the BMC. Material management in the BMC is mainly responsible for the distribution of material to the staging areas for the contractor install. Inefficiencies in the operation within the BMC have a negative affect on meeting the customer’s required date. The next chapter will discuss the research design and methodology to be used in the empirical study.
CHAPTER 4

RESEARCH DESIGN AND METHODOLOGY

4.1 INTRODUCTION

“What is research design? It is planning. It is the visualization of the data and the problems associated with the employment of those data in the entire research project. Research design is common sense and the clear thinking necessary of the management of the entire research endeavour – the complete strategy of attack on the central research problem” (Leedy, 1997: 93).

Leedy and Omrod (2001: 143) state that some authors follow a more philosophical approach to research design, while others follow a pragmatic approach. The importance of including both schools of thought in a study of social science research is increasingly emphasised by contemporary social scientists.

The object focus of this chapter is to establish an appropriate research design for the given problem.

4.2 WHAT IS THE MEANING OF RESEARCH DESIGN?

The term research design is made up of two distinct elements, namely research and design. A brief definition of each will be discussed.

4.2.1 Definition of research

Various definitions can be given of the concept research. Some of the descriptions give a broad and generic view of research while others refer specifically to social science research.

Allison, Owen, Rice, Rothwell and Saunders (1996: 18) define research as a collaborative human activity in which social reality is studied objectively, with the aim of gaining a valid understanding of it. The Oxford Dictionary (1998: 1309) defines research as a “systematic investigation to establish facts or principles or to collect information on a subject”.

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Finally, Leedy (1997: 3) defines research as the systematic process of collecting and analysing information (data) in order to increase our understanding of the phenomenon with which we are concerned or interested.

4.2.2 Definition of design
It is easier to define or describe the concept of design than the concept research. The Oxford Dictionary (1995: 1169) states “design is a preliminary plan, concept or purpose”. Yin (1994: 200) defines design as the preparation of the working plan aimed at systematically assembling, organising and integrating data, in order to solve the research problem. Finally, Leedy and Ormond (2001: 91) state that “research design includes the planning, visualisation of data and the problems associated with the employment of the data in the entire research project”.

4.3 VALIDITY AND RELIABILITY
The research must satisfy certain tests of validity and reliability. Leedy (1997: 32) states that validity and reliability are two words that you will encounter repeatedly in research methodology. They are used primarily in connection with measurement instruments. The integrity of your research may well stand or fall on the basis of how well you understand their meaning and how carefully you obey their demands. They govern the acquisition of data and the skilfulness with which you design the research structure and create the instruments of measurements as an integral part of it.

4.3.1 Validity
Leedy (1997: 32) states that “validity is concerned with the soundness, the effectiveness, of the measuring instrument. In a standard test, for instance, validity would raise such questions as: What does the test measure? Does it, in fact, measure what it is supposed to measure? How well, how comprehensively, how accurately does it measure it”?

There are several types of validity. According to Leedy and Ormond (2001: 103) they are:
• Face validity – is concerned with the subjective judgement of the researcher.
• Content validity – is the accuracy with which an instrument measures the representative sample, factors or situations under study.
• Criterion-related validity – employs two measures of validity, the second assessment instrument as a criterion check against the accurate correlation of first related measure.
• Construct validity – is any concept such as honesty that cannot be directly observed or isolated.
• Internal Validity – is the freedom from bias in forming accurate conclusions about cause–and effect and other relationships within the data.
• External validity – is concerned with the generality of the conclusions reached from a sample to other cases.

Credibility is an important aspect to consider in this research project, as the objective was to identify the inefficiencies in the material distribution process. To confirm the findings in the quantitative study, the questions in the qualitative study were directly related as a validity process.

4.3.2 Reliability
The Oxford Dictionary (1998: 1301) defines “reliability as able to be trusted; predictable or dependable”. According to Leedy and Ormond (2001: 31), it is the extent to which, on repeated measures, the indicators yield similar results. Jackson (1995: 338) states that reliability in quantitative research projects can be assessed by repeating a question in a question schedule or by repeating an experiment. It is, however, more difficult to perform replication in qualitative projects, because the circumstances and individuals can never be the same at a later stage. Reliability in qualitative projects can be assured by using, amongst others, multiple researchers as well as peer examination and mechanical recording devices.
4.4 QUANTITATIVE VERSUS QUALITATIVE RESEARCH

It is best to visualise the distinction between quantitative and qualitative research as a continuum. All research methods could be placed somewhere between the extremes of pure quantitative and pure qualitative research (Jackson, 1995: 13).

According to Van Biljon (1999: 37) it is, however, necessary to indicate whether a research project has a more qualitative or more quantitative nature. This in turn would play an important role in decisions on processes to follow and measuring instruments to select. A summary of the main differences between qualitative and quantitative research are stated in Table 4.1. This Table shows how quantitative and qualitative research differs in terms of hypotheses, concepts, measures, data, theory, research procedures and analyses.
Table 4.1: Differences between qualitative and quantitative research

<table>
<thead>
<tr>
<th>Quantitative</th>
<th>Qualitative</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Test hypothesis that the researcher begins with. Hypotheses are stated</td>
<td>• Capture and discover meaning once the researcher becomes immersed in data. Hypotheses are frequently</td>
</tr>
<tr>
<td>explicitly and are formulated beforehand</td>
<td>undeclared or merely stated in the form of a research goal</td>
</tr>
<tr>
<td>• Concepts are in the form of distinct variables. Concepts have an</td>
<td>• Concepts are in the form of themes, motifs, generalizations, taxonomies. Concepts can be interpreted</td>
</tr>
<tr>
<td>unambiguous meaning</td>
<td>in a number of ways</td>
</tr>
<tr>
<td>• Measures are systematically created before data collection and are</td>
<td>• Measures are created in an ad hoc manner and are often specific to the individual setting or</td>
</tr>
<tr>
<td>standardized. The researcher remains largely aloof</td>
<td>researcher. The researcher is involved with the phenomena/ events</td>
</tr>
<tr>
<td>• Data are in the form of numbers from precise measurement</td>
<td>• Data are in the form of words from documents, observations, transcripts</td>
</tr>
<tr>
<td>• Theory is largely causal and is deductive</td>
<td>• Theory can be causal or non-causal and is often inductive</td>
</tr>
<tr>
<td>• Procedures are standard, and replication is assumed</td>
<td>• Research procedures are particular, and replication is very rare</td>
</tr>
<tr>
<td>• Analysis proceeds by using statistics, tables or charts and discussing</td>
<td>• Analysis proceeds by extracting themes or generalizations from evidence and organizing data to</td>
</tr>
<tr>
<td>how what they show relates to hypotheses</td>
<td>present a coherent, consistent picture</td>
</tr>
</tbody>
</table>

Source: Van Biljon (1999:38)
4.4.1 Quantitative research

Mouton and Marais (1992: 159) define quantitative research as more highly formalized as well as more explicitly controlled, with a range that is more exactly defined, and which, in terms of the methods used, is relatively close to the physical sciences.

Leedy and Ormond (2001: 101) reinforce this definition by defining quantitative research as more highly formalised as well as more explicitly controlled, with a range that is more exactly defined, and which, in terms of methods used, is relatively close to the physical sciences.

Quantitative research seeks to quantify human behaviour, through numbers and observations. The emphasis is on precise measurement, the testing of hypotheses based on a sample of observations, and statistical analysis of the data. Relationships among variables are described mathematically, and the subject matter is, as in the physical sciences, treated as an object (Jackson, 1995: 13).

4.4.2 Qualitative research

Yin (1994: 68) states that human behaviour is significantly influenced by the setting in which it occurs; thus one must study that behaviour in situations. The physical setting for example, schedules, space, pay and rewards and the internalised notions of norms, traditions, roles and values are crucial contextual variables. One cannot understand human behaviour without understanding the framework within which subjects interpret their thoughts, feelings and actions. The aim of qualitative research is to study individuals and phenomena in their natural settings in order to gain a better understanding of them. It is also evident that qualitative research does not follow a fixed set of procedures.

Mouton and Marais (1992: 155) define qualitative research projects as “those projects in which the procedures are not as strictly formalized, while the scope is more likely to be under defined, and a more philosophical mode of operation is adopted".
4.5 CHOOSING THE MOST APPROPRIATE RESEARCH METHOD

In many research studies it would be beneficial and appropriate to use a combination of both qualitative and quantitative methods. Time, resources or expertise may be the constraint in most cases, to combine both research approaches.

Therefore Leedy (1977: 109) advises that one should choose one approach for the overall design of your first few studies. Furthermore, he advises against making this choice on the basis of what you want to avoid, rather than on what fits your research interests and skills. Thus, avoiding statistics or disliking mathematics is not a good reason for choosing qualitative study. Before choosing to design and conduct either type of study, consider the particular demands of the specific research approach, reflect on your individual strengths and weaknesses as a researcher and determine whether you have the characteristics/attributes that will allow you to be successful with that approach.

Leedy (1997: 109) continues by designing a table to guide you in the selection of an appropriate research approach. By listing many critical components that should be considered, Table 4.2 can help you in making a well-informed decision. Keep in mind, however, that the items in Table 4.2 are not ordered from most to least important. Time will weigh heavily into the research decision. Even if every item but one seems to “fit” the qualitative approach, you still may not be able to choose that approach; (for example, if your audience would not accept such an approach). Consider each component carefully before making your final decision.
Table 4.2: Which approach should I use?

<table>
<thead>
<tr>
<th>Use this approach if:</th>
<th>Quantitative</th>
<th>Qualitative</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. You believe that:</td>
<td>There is an objective reality that can be measured</td>
<td>There are multiple constructed realities</td>
</tr>
<tr>
<td>2. Your audience is:</td>
<td>Familiar with/supportive of quantitative studies</td>
<td>Familiar with/supportive of qualitative studies</td>
</tr>
<tr>
<td>3. Your research question is:</td>
<td>Confirmatory, predictive</td>
<td>Exploratory, interpretive</td>
</tr>
<tr>
<td>4. The available literature is:</td>
<td>Relatively large</td>
<td>Limited or missing</td>
</tr>
<tr>
<td>5. Your research focus:</td>
<td>Covers a lot of breadth</td>
<td>Involves in-depth study</td>
</tr>
<tr>
<td>6. Your time available is:</td>
<td>Relatively short</td>
<td>Relatively long</td>
</tr>
<tr>
<td>7. Your ability/desire to work with people</td>
<td>Medium to low</td>
<td>High</td>
</tr>
<tr>
<td>8. Your desire for structure is:</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>9. You have skills in the area(s) of:</td>
<td>Statistics and deductive reasoning</td>
<td>Attention to reasoning and inductive reasoning</td>
</tr>
<tr>
<td>10. Your writing skills is strong in the area of:</td>
<td>Technical, scientific writing.</td>
<td>Literary, narrative writing</td>
</tr>
</tbody>
</table>

Source: Leedy (1997: 109)

4.6 RESEARCH GOAL

Mouton and Marais (1992: 42) state that research goal provides a broad indication of what researchers wish to attain in their research. Is the aim of the project to describe, to explain, or to predict, or is the aim exploratory? Is it to evaluate some practice or programme?
In order to achieve the primary objective of the research project, data has to be gathered and analysed on the inefficiencies in the material distribution process. For this purpose, a data collection instrument that will meet the requirements of validity and reliability will be developed and a methodological approach in analysing the data will be conducted.

4.6.1 Exploratory projects
As clearly indicated in the term, the goal which is pursued in exploratory studies is the exploration of a relatively unknown research area. The aims of such studies may vary quite considerably. Van Biljon (1999: 53) states the objectives of such a project.

- Gain new insights into the phenomenon by becoming familiar with the facts, people, and concerns involved;
- Undertake a preliminary investigation and determine feasibility before a more structured study of the phenomenon;
- Generate many ideas and develop tentative theories and conjectures;
- Determine priorities and develop techniques for future research; and
- Develop new hypotheses about an existing phenomenon

Mouton and Marais (1992: 43) state that exploratory projects usually lead to insight and comprehension rather than the collection of accurate and replicable data. The methods frequently used in exploratory projects include, in-dept interviews, the analysis of case studies and the use of informants.

4.6.2 Descriptive projects
The primary aim of descriptive projects is to portray accurately the characteristics of a particular individual, group, situation, organisation, tribe, sub-culture, interaction, or social object (Mouton & Marais, 1992: 155).

Van Biljon (1999: 54) states the aim of descriptive projects:

- Provide an accurate profile of a group;
- Describe a process, mechanism, or relationship;
- Give a verbal or numerical picture;
• Find information to stimulate new explanations;
• Present basic background information or a context;
• Create a set of categories or classify types;
• Clarify a sequence, set of stages, or steps; and
• Document information that contradicts prior beliefs about a subject.

Mouton and Marais (1992: 44) state that the single common element in all of these types of research is the researcher’s goal, which is to describe that which exists as accurately as possible. The description of some phenomena may range from a narrative type of description (as historical analysis) to a highly structured statistical analysis.

4.6.3 Explanatory projects
Explanatory projects are built on exploratory and descriptive projects and go on to identify the reason something occurs. The primary aim of explanatory projects is to test a hypothesis of a cause and effect relationship between the variables.

Van Biljon (1999: 55) identifies the aims of explanatory projects.
• Determine the accuracy of a principle or theory
• Find out which competing explanation is better
• Advance knowledge about an underlying process
• Link different issues or topics under a common general statement
• Build and elaborate a theory so it becomes more complete
• Extend a theory or principle into new areas or issues
• Provide evidence to support or refute an explanation.

4.7 CATEGORIES TO BE USE IN THE QUANTITATIVE STUDY
With the key components discussed in Chapter 2, the researcher has developed three categories to evaluate the distribution process in Telkom SA. Some of the key components are grouped together to form the three categories, which are used to evaluate the inefficiencies in Telkom SA.
The three categories are briefly discussed below and shown in figure 4.1:

- The first category was called no stock because it was considered to be the beginning of the distribution process. The availability of material will determine if there is stock or no stock. If the material was not available nationally (in Telkom SA), it is noted as no stock. This information is further broken down into Vital to Production (VTP) and normal items.

- The second category was called transport because it was considered to be the second leg of the distribution process. If the material was available, it was transported to an applicable staging area in the Southern Region. If transport delayed the delivery of material to the storage location to meet the customer request date, then it is noted as a barrier to meeting the deadline.

- The third category was called quality. It was considered to be the final step in the distribution process. Once the material was transported to the storage location, it could be either used for a project or rejected because of a quality issue. If the material could not be used, then it is noted as a quality issue.

**Figure 4.1: The three categories in the distribution process**

According to Leedy and Ormond (2001: 103), criterion–related validity employs two measures of validity, the second assessment instrument as a criterion check against the accurate correlation of first related measure. To test the validity of the findings a second assessment validity measure will be used.
To create a validity check on the no stock items, the material ordered for project in the Southern Region was categorised into Vital to Production (VTP) and normal items. A percentage for each category will be calculated. This result is checked against the information obtained from the Southern Region Procurement Division of Telkom SA, the information supplied will be broken down into no stock of the VTP and normal items.

4.7 SUMMARY
The key component that creates value in a supply chain was discussed in Chapter 2. In Chapter 4 the components were grouped together to form three categories, namely, no stock, transport and quality. This will be used to determine the inefficiencies in the material distribution process of the Southern Region of Telkom SA. The intention of the thesis was to optimise the material distribution process and is done by identifying the inefficiencies in the material distribution process (which is the second sub-problem). Chapter 5 is the results and analysis of the empirical study, the inefficiencies in the Material Distribution process of the Southern Region in Telkom SA will be highlighted.
CHAPTER 5

RESULTS AND ANALYSIS OF THE EMPIRICAL STUDY

5.1 INTRODUCTION

In Chapter 4 the research methodology was discussed. In Chapter 1 the main problem to the research was for Telkom SA in the Southern Region, to optimise its distribution process to efficiently compete in a world-class environment. To effectively solve the main problem a quantitative approach was used to determine the inefficiencies.

The aim of this chapter is to analyse and interpret the results of the empirical study. The outcome of each category will be presented, followed by an interpretation relating to the theoretical framework outlined in Chapter 2.

5.2 HOW WAS THE INFORMATION FOR THE QUANTITATIVE STUDY OBTAINED?

Projects that were executed in the Southern Region from the 12 September 2005 to the 3 October 2005 were monitored. The monitoring of these projects was done on an existing Excel spreadsheet which was utilised in the Southern Region of Telkom SA to monitor the delivery of material. Five columns were added to this spreadsheet to draw information for the quantitative study. The columns were namely; total items, VTP, transport, no stock and quality (see Annexure 4.1). The results were analysed with the assistance of Dr Pietersen of the Statistics Department in the Nelson Mandela Metropolitan University.

5.3 RESULT OF THE QUANTITATIVE STUDY

The Southern region is divided into four sub regions as described in Chapter 1. Two sub regions were combined to form a turf, with the Border and Midlands forming turf one, Southern Cape and Port Elizabeth forming turf two. Two Project Administrators source, track and trace material in the Southern Region; therefore it was easier to collect the data in that format.
5.3.1 Results of Border and Midlands

Table 5.1: Result of Border and Midlands

<table>
<thead>
<tr>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projects</td>
<td>126</td>
</tr>
<tr>
<td>Total Items</td>
<td>390</td>
</tr>
<tr>
<td>No Stock</td>
<td>114</td>
</tr>
<tr>
<td>Transport</td>
<td>90</td>
</tr>
<tr>
<td>Quality</td>
<td>10</td>
</tr>
<tr>
<td>Delivered on Time</td>
<td>176</td>
</tr>
</tbody>
</table>

In Border and Midlands 126 projects was executed with a demand of 390 items. Out of 390 items, 114 were no stock, 90 were delayed due to transport and 10 could not be used due to quality. The balance of 176 was delivered on time. Table 5.1 shows the percentage breakdown. Figure 5.1 clearly indicates that 45.13 per cent of the material ordered for projects has been delivered on time to meet customer required date.

Figure 5.1: Result of Border and Midlands
Table 5.2: Border and Midlands no stock, VTP versus normal

<table>
<thead>
<tr>
<th>Items</th>
<th>114</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>VTP</td>
<td>69</td>
<td>61.53</td>
</tr>
<tr>
<td>Normal</td>
<td>45</td>
<td>39.47</td>
</tr>
</tbody>
</table>

The 114 no stock items for the Border and Midlands is further broken down into 69 VTP and 45 normal items. Table 5.2 and figure 5.2 show that 61.53 per cent of the no stock material ordered for projects was VTP items.

Figure 5.2: No stock for Border and Midlands
5.3.2 Results of Southern Cape and Port Elizabeth

Table 5.3: Results of Southern Cape and Port Elizabeth

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projects</td>
<td>98</td>
<td></td>
</tr>
<tr>
<td>Total Items</td>
<td>252</td>
<td>100</td>
</tr>
<tr>
<td>No Stock</td>
<td>61</td>
<td>24.21</td>
</tr>
<tr>
<td>Transport</td>
<td>90</td>
<td>35.71</td>
</tr>
<tr>
<td>Quality</td>
<td>6</td>
<td>2.38</td>
</tr>
<tr>
<td>Delivered on Time</td>
<td>95</td>
<td>37.70</td>
</tr>
</tbody>
</table>

In Southern Cape and Port Elizabeth 98 projects was executed with a demand of 252 items. Out of 252 items, 61 was no stock, 90 were delayed due to transport and 6 could not be used due to quality. The balance of 95 was delivered on time. Table 5.3 and figure 5.3 clearly indicates that the material delivered on time for projects is worse than Border and Midlands. Transport being the worst category with 35.71 per cent inefficiency.

Figure 5.3: Result of Southern Cape and Port Elizabeth
Table 5.4: Southern Cape and Port Elizabeth no stock, VTP versus normal

<table>
<thead>
<tr>
<th>Items</th>
<th>61</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>VTP</td>
<td>36</td>
<td>59.02</td>
</tr>
<tr>
<td>Normal</td>
<td>25</td>
<td>40.98</td>
</tr>
</tbody>
</table>

The 61 no stock items for the Southern Cape and Port Elizabeth is further broken down into 36 VTP and 25 normal items. Table 5.4 and figure 5.4 shows that 59.02 per cent of the no stock material ordered, was VTP.

Figure 5.4: Southern Cape and Port Elizabeth no stock, VTP versus Normal

5.3.3 Results of the Southern Region

The combination of the two turfs form the information for the Southern Region. Table 5.5 indicates a total of 642 items was required for 224 projects. Figure 5.5 shows that transport was the most inefficient category in the material distribution process.
Table 5.5: Results of the Southern Region

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projects</td>
<td>224</td>
<td></td>
</tr>
<tr>
<td>Total Items</td>
<td>642</td>
<td>100</td>
</tr>
<tr>
<td>No Stock</td>
<td>175</td>
<td>27.21</td>
</tr>
<tr>
<td>Transport</td>
<td>180</td>
<td>28.04</td>
</tr>
<tr>
<td>Quality</td>
<td>16</td>
<td>2.49</td>
</tr>
<tr>
<td>Delivered on Time</td>
<td>271</td>
<td>42.21</td>
</tr>
</tbody>
</table>

In the Southern Region of Telkom SA, 224 projects were executed with a demand of 642 items. Out of 642 items, 175 were no stock, 180 were delayed due to transport and 16 could not be used due to quality. The balance of 271 was delivered on time. Table 5.5 and figure 5.5 shows that 42.21 of the material ordered for projects were not delivered on time, which far below any standard.

Figure 5.5: Results of the Southern Region
Table 5.6: Southern Region no stock, VTP versus normal

<table>
<thead>
<tr>
<th>Items</th>
<th>175</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>VTP</td>
<td>104</td>
<td>59.43</td>
</tr>
<tr>
<td>Normal</td>
<td>71</td>
<td>40.57</td>
</tr>
</tbody>
</table>

The 175 no stock items for the Southern Region are further broken down into 104 VTP and 71 normal items. Table and figure 5.6 clearly indicates that 59.43 percent of the no stock was VTP items and the balance was normal items.

Figure 5.6: Southern Region no stock, VTP versus normal

5.4 Validity check

In Chapter 4 it was explained that the no stock category will be validated with information received from the Southern Region Procurement Division of Telkom SA. The details of the source is discussed below.

Mr C. Claasen is an Operational Manager in the Southern Region Procurement division of Telkom SA. He supplied the following information on the 4 October 2005. Some of the duties under Mr Classen involve sourcing and the distribution of material for the Southern Region. The figures below are no stock, for VTP and normal items as at the 4 October 2005.
Table 5.7: National VTP no stock

<table>
<thead>
<tr>
<th>Total</th>
<th>102</th>
</tr>
</thead>
<tbody>
<tr>
<td>No stock</td>
<td>17</td>
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<tr>
<td>Percentage</td>
<td>16.67</td>
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There is a total of 102 VTP items, 17 items is no stock therefore 16.67 per cent of the VTP items is no stock.

Table 5.8: National normal no stock

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<th>Total</th>
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<tr>
<td>No stock</td>
<td>1515</td>
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<td>Percentage</td>
<td>45.12</td>
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</table>

There is a total of 3358 normal items, 1515 items is no stock therefore 45.12 per cent of the normal items is no stock. Figure 5.7 show the percentage of no stock and normal items.

Figure 5.7: National no stock, VTP versus normal
From the information gathered above, the researcher has developed a no stock decision tree as shown in Figure 5.8.

From figure 5.1, no stock will be the total outcome of outputs B and C.

\[ B = 0.5943 \times 0.1667 = 9.907\% \]

\[ C = 0.4057 \times 0.4511 = 18.301\% \]

Therefore, the total outcome of outputs B and C is:

\[ 9.907\% + 18.301\% = 28.208\% \]

**Figure 5.8: No stock decision tree**

![No stock decision tree diagram]

From Figure 5.8, no stock will be the total outcome of outputs B and C.

\[ B = 0.5943 \times 0.1667 = 9.907\% \]

\[ C = 0.4057 \times 0.4511 = 18.301\% \]

Therefore, the total outcome of outputs B and C is:

\[ 9.907\% + 18.301\% = 28.208\% \]
From the information for no stock in this decision tree (28.208 per cent) and comparing with the outcome in the empirical study (27.26 per cent) it could be concluded that these two figures is relatively close and the results from the empirical study could be regarded as relatively valid. On the other hand, the findings for transport and quality can be regarded as relatively reliable.

5.5 ANALYSIS OF THE DISTRIBUTION PROCESS IN SOUTHERN REGION

Three categories was used in the distribution of the Southern Region, as mentioned in Chapter 4, namely, no stock, transport and quality. The highest failure is transport with 28.04 per cent, followed by no stock with 27.26 per cent and the least being quality with 2.49 per cent. The results of each category are discussed below:

5.5.1 No stock

A total of 27.26 per cent of the items ordered for projects was not available in Telkom SA nationally, in other words there was no stock. A detailed analysis of the no stock shows that the current demand in Telkom SA has far exceeded the forecasted figures. Refer to Annexure 5.1 for the forecast accuracy. The forecast accuracy is measured by comparing the demanded figure for the month with the forecasted figure for that month. Some suppliers could not meet the sudden high demand and the item became a national stock out (no stock).

In Chapter 2, Stevenson (1994: 93) gave reasons why technology forecasts often fail. In the situation of Telkom SA, the aggressive marketing strategies to maximise its customer base and the extremely high competition between the cellular operators has caused a high demand for material.
According to the engineering manager of the Southern Region, M. Hunt (personal communication, 23 November 2005), the customer demand is only known when it appears on the system to be engineered. There is a lack of communication between the business units, especially when Telkom SA advertises specials on services, it is not known to the engineering division and there is no formal communication that takes place. He confirmed that the cellular providers do give a six-month forecast but the accuracy of the actual demand has not been verified. He added that we are currently experiencing problems in meeting the customer required date because of the material shortages. He concluded by highlighting that the engineering division is responsible for the forecast but the information is not communicated in time for the forecasted figures to be amended.

According to Operational Manager of Procurement in the Southern Region, C. Claasen (personal communication, 23 November 2005), there is very little or no communication between the business units in Telkom SA. New programs have been added onto the existing supply base and the material for the new programs have not been included in the forecasted which is causing the current no stocks that Procurement is experiencing. He concluded by saying that, “not every employee is committed”.

Furthermore, to have a lean supply chain in place there has to be a customer and supplier relationship, which moves beyond a simple relationship. In the partnership relationships, the supplier is still the junior partner, while in lean supply the supplier and customers are equal partners (Slack, Chambers & Johnston, 2001: 432). Did Telkom SA build relationships with the suppliers? The answer to this is very subjective. Telkom SA has also built a confidentiality band around the organisation because of future competition.
5.5.2 Transport
A total of 28.04 per cent of the items ordered for projects was delayed due to transport. An analysis of the transportation from the George MC to the staging area which is less than a kilometre away, delayed projects in the Southern Cape. The same finding was for the delivery of material in Port Elizabeth. Delivering material to the staging area that is five kilometres away caused a delay in the projects for Port Elizabeth and Midlands. In almost all cases the customer required date could not be met.

To be world-class the unnecessary movement of material should definitely be avoided, according to Monczka et al. (1998: 610), transport costs constitute 10 per cent of the total cost of a product. Furthermore, Carter and Price (1994:196) highlighted the problem of double handling, it refers to the situation where material is being handled more times than is necessary, mainly because of inefficiency within the whole supply chain management system.

When material is delivered to the store, transporters should in theory make only a limited number of journeys in relation to materials flow. In the case of Telkom SA, it is clearly evident that the location of the staging areas in Port Elizabeth and George caused delay in projects, because of that extra journey from the MC to the staging areas.

5.5.3 Quality
A total of 2.49 per cent of the items ordered for projects was delayed due to quality. Damage was caused to cables by forklifts and incomplete street distribution cabinets delivered from the supplier via the NDC. The incomplete street boxes were merely a misunderstanding on the part of the supplier. If this did not occur, the 2.49 per cent of the material rejected because of quality would have been very much lower. Some of the items are so large that unnecessary handling should be eliminated; this can have an adverse impact on the quality of the material delivered to the staging areas.
5.6 SUMMARY

From the results of the empirical study it could be concluded that no stock and transport are major inefficiencies in the material distribution process of the Southern Region. The first category of the material distribution process being no stock and a failure of 27.26 per cent immediately diminishes the distribution process to 72.74 per cent efficiency. A further loss by 28.04 per cent to transport decreases the distribution process even further to 44.70 per cent. This percentage is far from world-class standards. Bottlenecks of no stock and transport at the beginning of the material distribution immediately make this part of the chain 55.3 per cent inefficient. If these bottlenecks are overcome, then the material distribution process can perform at approximately 97 per cent efficiency. The next chapter will conclude this paper and suggest recommendations for further study.
CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

6.1 INTRODUCTION
In the previous chapter, the results of the empirical survey of this study were discussed. In this chapter, the results will be used to make conclusions and recommendations, which will be presented with reference to the main research problem, namely: that Telkom SA in the Southern Region needs to optimise its material distribution process to efficiently compete in a world-class environment. The problems encountered in the research process, as well as shortcomings of the study will be highlighted. Opportunities for further research related to this study will be identified and finally, concluding remarks will be made.

6.2 RESOLUTION OF THE FIRST SUB-PROBLEM
What does the literature reveal about world-class supply chain efficiencies? A comprehensive literature survey was carried out in an effort to resolve this sub-problem. Available definitions and guidelines were studied and the core components extracted to identify a world-class supply chain. From the core components, three categories were formulated to conduct the empirical study of the research.

6.3 RESOLUTION OF THE SECOND SUB-PROBLEM
What inefficiencies currently exist in the material distribution process of the Southern Region of Telkom SA? In Chapter 2 the core components of the supply chain was discussed. This was followed by an analysis of the internal operation of the BMC in Chapter 3 and the material distribution process in the Southern Region of Telkom SA was discussed. In Chapter 4 three categories was formulated to determine the inefficiencies in the material distribution process of the Southern Region.
The three categories were used in the empirical study that was conducted to determine the inefficiencies in the material distribution process. The breakdown of the results was discussed in Chapter 5, which clearly identified that no stock and transport are the inefficient categories of the material distribution process of the Southern Region.

6.4 RESOLUTION OF THE THIRD SUB PROBLEM
How can the two above be integrated to develop an efficient material distribution process for the Southern Region of Telkom SA to become world-class? With a thorough understanding of a world-class distribution process and the value it adds to the supply chain, the inefficiencies were identified in Chapter 5 as no stock and transport. Reference was made to the literature study in Chapter 2 that identified some of the key components as causes of the inefficiencies. These inefficiencies may seem to be insignificant or minor, but it is the foundation for any organisation to become world-class, which has a great impact on the service or product an organisation such as Telkom SA will deliver to its customers.

6.5 RESOLUTION OF THE MAIN PROBLEM
Telkom SA in the Southern Region needs to optimise its material distribution process to efficiently compete in a world-class environment. By solving the sub problems, the main problem was solved and by analysing the data gathered in the literature study and the empirical study conducted, the researcher has identified that Telkom SA is far from world-class standards in distributing material in the Southern Region. With this in mind the researcher will suggest recommendations for further study.

6.6 METHODOLOGY, EMPIRICAL STUDY AND RESULTS
The empirical research comprised a quantitative study, in which the material distribution process was placed into three categories, namely, quality, transport and quality. Projects in the BMC were evaluated over a period of time. The results of the study clearly indicated that transport and no stock has the greatest impact in creating inefficiencies in the material distribution process of the Southern Region.
6.7 CONCLUSION

In today’s competitive environment, international borders are no longer a guarantee of protection from global competitors. Many companies have already experienced dramatic losses of market share, although in some cases they have rallied back to regain their customers. In industries such as telecommunications, increasing deregulation of closed markets has brought about the realisation that global competition must be faced head on.

As domestic markets become saturated, organisations are exploring new and emerging markets that promise long term growth. When an organisation creates a world-class distribution process for its services or product, it also creates a competitive advantage in terms of cost, quality, delivery and technology. An organisation may face many barriers when deploying a world-class distribution process initiative. In order to be competitive and remain in business, it is of utmost importance to build and retain a world-class distribution process.

According to Pieterse (2005: 115), “people from certain South African cultures tend to prefer working on their own and to perform individually, whilst others are used to working in groups.” In a world-class organisation it is of vital importance to communicate and work together to build a strong supply chain. The proverb, “a chain is as strong as it’s weakest link” illustrates this point.

It is ironic to note that a communication company like Telkom SA has a lack of communication within its internal divisions and business units. Adding to this, it could also be said that if there is a lack of internal communications within the organisation, there could also be an underlying communication gap that has caused some of the no stocks in material. World-class supplier development requires a commitment to collaboration between customer and supplier.
According to Shevel, (2005: 1), telecommunications companies, which have enjoyed rocketing earnings on the back of a strong economy and flush consumers, appear to be resting on their laurels. Market researcher Synovate’s SA Satisfaction Index, which rates customer satisfaction, recorded a fall in the ratings of all four SA companies in the telecoms industry. The biggest fall was at fixed-line monopoly Telkom, whose levels fell below those recorded in 2001. The report says waning satisfaction among Telkom customers is likely to encourage migration to the Second Network Operator. This will create an expensive problem for Telkom….Telkom needs to work on improving several aspects: staff motivation and attitude, staff efficiency and the quality of product information.

From the study it has been identified that Telkom SA is far from being world-class in distributing material to the Southern Region. It is a very high possibility that the other regions in Telkom SA are experiencing this or even worse problems than the Southern Region. To be competitive and stay in business a world-class distribution process will assist Telkom SA to deliver a world-class service and product to its customers.

6.9 FURTHER RESEARCH PROJECTS SUGGESTED

- It is proposed that a study be done on the efficiency of Telkom SA’s (national) material distribution process. This will include all regions of Telkom SA.
- It is proposed that a study be conducted on the (national) supply chain of Telkom SA, which will go beyond the boundaries of the material distribution process, because world-class organisations will have to backward integrate into their supplier base to achieve world-class status.
- It is proposed that further research be conducted in Telkom SA to identify the lack of communication and to develop strategies to improve the channels of communication. This will benefit the organisation in forecasting more accurately.
• It is proposed that research be conducted in promoting team effectiveness within Telkom SA. It is in the interests of every organisation to support work teams through the creation of an environment conducive to the team achieving the synergy needed to become effective.

• It is proposed that research be conducted into the employee moral of the organisation. This may be a very subjective topic but a world-class organisation will require a world-class work force.

6.9 RECOMMENDATIONS

• It has been proposed that Telkom SA takes serious note of improving its commitment to customer satisfaction.

• It is recommended that Telkom SA looks into the current situation of the staging areas and develop a model that could overcome the current inefficiencies in transportation.

• It is proposed that Telkom SA look into its communication channels between divisions and business units.

• It is proposed that training and development of its employees at all levels may be the foundation for getting that drive into world-class.
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Annexure 4.1: Excel spreadsheet for track and trace material

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94
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