

SUPPLY CHAIN MANAGEMENT APPLICABLE TO THE SOUTH AFRICAN ARMY  
CAMOUFLAGE CLOTHING COMMODITY

by

Nelmarie Wessels

Thesis presented in partial fulfilment of the requirements for the degree of Master of  
Military Science at the University of Stellenbosch



Supervisor: Dr J.F. la Grange

Stellenbosch

March 2007

**Declaration**

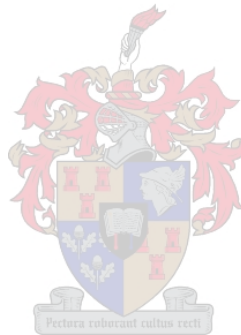
Hereby I, Nelmarie Jacolien Wessels, declare that the work contained in this thesis is my own original work and that all sources have been accurately reported and acknowledged, and that I have not previously in its entirety or in part submitted it at any university in order to obtain an academic qualification.

.....

N.J. WESSELS

.....

Date



**Abstract****SUPPLY CHAIN MANAGEMENT APPLICABLE TO THE SOUTH AFRICAN ARMY  
CAMOUFLAGE CLOTHING COMMODITY**

There are many reasons for the popularity of the supply chain or the supply chain management concept. Through globalisation, entities are forced to look for more effective ways to coordinate the flow of goods and material between facilities, into and out of the business. Customers are consistently demanding products that are delivered faster, exactly on time, and with no damage. Supply chain management is the systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular entity and across businesses within the supply chain, for the purpose of improving the long-term performance of the individual entities and the supply chain as a whole.

One key objective of supply chain management is to lower the costs required to provide the necessary level of customer service, in order to gain a competitive advantage within a market segment. To be fully effective in today's competitive environment, entities must expand their integrated behaviour to incorporate customers and suppliers. Low cost and differentiated service help build a competitive advantage for the supply chain. When entities take up a supply chain management philosophy, they must determine and establish management practices that permit them to operate and behave consistent with this philosophy. Performance measurement provides the necessary assistance for performance improvement in pursuit of supply chain excellence. The efficient and effective management of this supply chain with performance measurement and internal controls establishes a solid base for competitive advantage.

The SA Army camouflage clothing logistics reveals elements of improvement, as compared to supply chain management principles. Camouflage clothing forms an important element of the total supplies of a soldier in sustaining military and warfare capabilities. Camouflage clothing logistics in the SA Army is a complex mix of physical entities, processes and rules that is governed by mostly conceptual concepts and principles. The SA Army lacks an integrated supply chain philosophy

and clear supply chain management principles. Supply chain management can enhance camouflage clothing logistics in the SA Army, if the principles are properly applied.

The SA Army is a military institution with peacekeeping operations as their core function. The manufacturing and distribution of clothing is not a core function of the SA Army and can therefore be outsourced to address most of the concerns raised under the present system. Although it would be difficult and cumbersome to implement an integrated supply chain, with supply chain management philosophy and practices, the principle will enhance efficiency and effectiveness in today's economic environment.

The level of outsourcing and the effectiveness of control will determine the degree of success the SA Army will achieve.



## Opsomming

### **AANVOERKETINGBESTUUR VAN TOEPASSING OP DIE SUID-AFRIKAANSE LEËR KAMOEFLEERDRAG KOMMODITEIT**

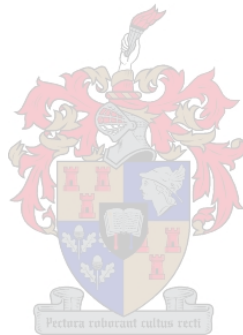
Daar is verskeie redes vir die populariteit van die aanvoerketting of die aanvoerkettingbestuurskonsep. Globalisasie het entiteite gedwing om ondersoek in te stel na meer effektiewe maniere om die vloei van goedere en materiaal, tussen fasiliteite, asook in en uit die entiteit te koördineer. Kliënte eis gereeld produkte wat vinniger, presies op tyd en met geen skade afgelewer word. Aanvoerkettingbestuur is die sistemiese, strategiese koördinasie van al die tradisionele besigheidsfunksies, asook taktieke oor hierdie besigheidsfunksies, binne 'n entiteit en oor besighede binne die aanvoerketting, met die doel om die langtermyn prestasie van die individuele entiteite en die aanvoerketting as geheel te verbeter.

Een sleuteldoel van aanvoerkettingbestuur is om kostes te verminder. Hierdie kostes word geassosieer met 'n sekere vlak van kliëntediens, wat voorsien moet word om 'n kompeterende voordeel in die marksegment te verkry. Om in vandag se kompeterende omgewing ten volle effektief te wees moet entiteite hul geïntegreerde gedrag uitbrei om kliënte en verskaffers in te sluit. Lae koste en gedifferensieerde diens help om kompeterende voordeel binne die aanvoerketting te bou. Sodra entiteite 'n aanvoerkettingfilosofie aanneem, moet hulle bestuurspraktyke bepaal en vastel hoe om in lyn met dié filosofie op te tree en te funksioneer. Prestasiemeting voorsien die nodige riglyn vir prestasieverbetering in die stree na aanvoerketting uitnemendheid.

Kamoefleerdrag vorm 'n belangrike element in die uitrusting van die soldaat wanneer militêre- en oorlogsvermoë hanteer moet word. Kamoeleerdraglogistiek in die SA Leër is 'n komplekse mengsel van fisiese entiteite, prosesse and reëls wat meestal deur konseptuele beginsels geregeer word. Die SA Leër kamoeleerdrag logistiek reflekteer elemente van verbetering, wanneer vergelyk word met aanvoerkettingbestuursbeginsels. Die SA Leër kort 'n geïntegreerde aanvoerketting-filosofie, asook duidelike aanvoerkettingbestuursbeginsels. Aanvoerkettingbestuur kan die kamoeleerdrag logistiek in die SA Leër verbeter, as die beginsels reg

toegepas word.

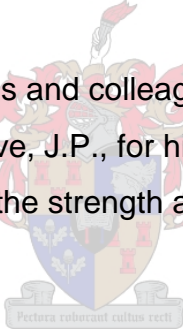
Die SA Leër is 'n militêre instelling met vredesoperasies as primêre funksie. Die vervaardiging en verspreiding van klerasie is nie die SA Lëer se primêre funksie nie en kan daarom geprivatiseer word. Dit sal primêr die probleme wat onder die huidige stelsel voorkom, aanspreek. Al word dit voorsien dat dit moeilik en omslagtig sal wees om 'n geïntegreerde aanvoerkettingfilosofie en -beginsel in die SA Leër te implimenteer, dit die doeltreffendheid en doelmatigheid van die huidige stelsel in vandag se ekonomie sal verbeter.



## **Acknowledgements**

I would like to convey my sincere thanks and appreciation to the following institutions and persons without whom this thesis would not have been completed:

- The Lord, who gave me the strength, motivation and patience.
- My mother, Marieta Wessels, who kept me motivated and supported me till the end.
- Colonel Butch Weber, Senior Staff Officer Logistics, Special Forces Headquarters, who supported and motivated me to complete this thesis, no matter how difficult my work circumstances.
- The Military Academy, which gave me the opportunity to grow academically.
- Dr Freddie La Grange, who guided me through this academic qualification.
- All my family, friends and colleagues for their interest and support.
- And lastly, to my love, J.P., for his dedication, inspiration, love and support, giving me the strength and motivation to successfully complete this thesis.



**TABLE OF CONTENTS**

	<b>Page</b>
Declaration	ii
Abstract	iii
Opsomming	v
Acknowledgements	vii
List of tables	xii
List of Figures	xiii

**CHAPTER 1**  
**RESEARCH PROBLEM**

1.1	Title	1
1.2	Aim	1
1.3	Theoretical Framework	1
1.4	Rationale	3
1.5	Research Problem and Objectives	9
1.6	Hypothesis	9
1.7	Chapter Layout	9
1.8	Research Design and Methodology	11
1.9	Most Common Definitions and Descriptions	12
1.10	Most Common Abbreviations	14
1.11	Summary	15



**CHAPTER 2**  
**INTRODUCTION TO SUPPLY CHAIN MANAGEMENT**

2.1	Introduction	16
2.2	Defining the Supply Chain	17
2.3	Defining Supply Chain Management	19
	2.3.1 Supply Chain Management as a Management Philosophy	20



2.3.2	Supply Chain Management as a Set of Activities to Implement a Management Philosophy	22
2.3.3	Supply Chain Management as a Set of Management Processes	27
2.4	Supply Chain Management versus Supply Chain Orientation	28
2.5	Antecedents and Consequences	29
2.5.1	Antecedents to Supply Chain Orientation and Supply Chain Management	30
2.5.2	Consequences of Supply Chain Management and Supply Chain Orientation	33
2.6	Scope of Supply Chain Management	34
2.6.1	Functional Scope of Supply Chain Management	34
2.6.2	Organisational Scope of Supply Chain Management	35
2.7	Defining Supply Chain Management	36
2.8	Critical Success Factors in Agile Supply Chain Management	37
2.9	Outsourcing	40
2.9.1	Advantages of Outsourcing	41
2.9.2	Disadvantage of Outsourcing	41
2.10	Performance Measurement and Control in Supply Chain Management	42
2.10.1	Appropriate Performance Measures	44
2.10.2	Critical Dimensions of Performance Measurement	46
2.10.3	Criteria for Performance Measurement Design	47
2.11	Control in Supply Chain Management	48
2.11.1	Steps in the Control Process	49
2.11.2	Effective Controls	50
2.11.3	Organisation Control Systems	52
2.12	Summary	53

### CHAPTER 3

#### SUPPLY CHAIN MANAGEMENT THEORY

3.1	Introduction	56
3.2	Lambert and Stock	57

3.3	Lambert, Stock and Ellram	59
3.4	Kemppainen and Vepsäläinen	60
3.4.1	The Emergent Supply Chain	61
3.4.2	The Extended Supply Chain	62
3.4.3	Supply Networks	63
3.5	Christopher and Towill	66
3.6	Gilmour	69
3.7	Competitive Advantage of Supply Chain Management	72
3.8	Summary	73

## CHAPTER FOUR

### ARMY LOGISTICS AND SUPPLY CHAIN MANAGEMENT

4.1	Introduction	75
4.2	Defining Logistics in a Military Context	75
4.3	The Purpose of Logistics in the Army	76
4.4	Logistics in the Modern Military Context	77
4.5	South African Army Camouflage Clothing Supply Chain	80
4.5.1	Level 1: Supplier's Supplier	80
4.5.2	Level 2: Supplier	90
4.5.3	Level 3: Organisation/Entity	94
4.5.4	Level 4: Client	100
4.5.5	Level 5: Client's Client	101
4.6	Apprehensive Issues in SA Army Supply Chain Management	102
4.7	Summary	105

## CHAPTER 5

### SUPPLY CHAIN MANAGEMENT APPLICABLE TO THE SOUTH AFRICAN ARMY CAMOUFLAGE CLOTHING COMMODITY

5.1	Introduction	107
5.2	SA Army Camouflage Clothing Supply Chain	107
5.3	Supply Chain Management	108
5.4	Supply Chain Management versus Supply Chain Orientation	115

5.5	Antecedents to Supply Chain Management	116
5.6	Performance Measurement and Control in Supply Chain Management	118
5.7	Camouflage Clothing Service Delivery in the SA Army	121
5.8	Conclusion	123

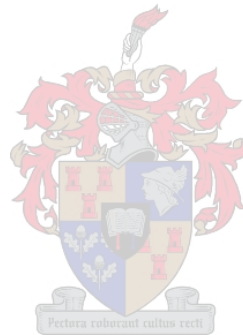
## **CHAPTER SIX SUMMARY**

6.1	Research Problem	125
6.2	Introduction to Supply Chain Management	125
6.3	Supply Chain Management Theory	127
6.4	SA Army Camouflage Clothing Supply Chain	129
6.5	Research Results, Recommendations and Conclusions	130
	<b>List of Sources</b>	<b>134</b>



**LIST OF TABLES**

<b>Table</b>	<b>Title</b>	<b>Page</b>
4.1	Textile Manufacturing Process	82
4.2	“Cut/Make/Trim” Process	87
4.3	Receipts and Issue Process at DoD Mobilisation Centre	91
4.4	Support Bases and their Clients within the SANDF	94
4.5	Process for Maintenance of Camouflage Clothing on Organisational Level	98
4.6	Process for Maintenance of Camouflage Clothing for the Client	100
4.7	Process for Maintenance of Camouflage Clothing for the Soldier	101



**LIST OF FIGURES**

<b>Figure</b>	<b>Title</b>	<b>Page</b>
1.1	The Integrated Supply Chain Model	4
1.2	Channel of Distribution	5
1.3	Current Supply Chain For SA Army Camouflage Clothing	7
2.1	Types of Channel Relationships	18
2.2	Supply Chain Management Antecedents and Consequences	30
2.3	A Model of Supply Chain Management	37
2.4	The Value Chain of Business Functions	45
3.1	Channel of Distribution	57
3.2	Supply Chain Management	59
3.3	How Supply Chains were First Perceived in the Early 1990s - The Emergent Supply Chain	61
3.4	The Extended Supply Chain	63
3.5	An Integrated Model for Enabling the Agile Supply Chain	68
3.6	The Integrated Supply Chain Model	70
4.1	Role Players, Textile Manufacturing Process	81
4.2	Role Players, "Cut/Make/Trim" Process	87

## **CHAPTER 1: RESEARCH PROBLEM**

### **1.1 TITLE**

Supply chain management applicable to the South African Army Camouflage Clothing Commodity.

### **1.2 AIM**

The aim of this study is to conduct comprehensive research on the supply chain of the camouflage clothing commodity of the South African Army (SA Army). The intention is to conduct an extensive literature review on the current research on supply chain management, as well as assess the SA Army supply chain in practice. This theory and practice of supply chain management will then be compared to each other and the service delivery to the members of the SA Army assessed.

### **1.3 THEORETICAL FRAMEWORK**

The proposed study will focus on the supply chain and the role of supply chain management within the logistical sphere of an entity. Johnson, Wood, Wardlow and Murphy Jr (1998: 5) describe logistics as the entire process of materials and products moving into, through, and out of a firm. Recently, the focus of logistics has shifted from operational areas to an ability to add customer value (Johnson, *et al* 1998: 5). Gilmour (1999: 357) uses an integrated supply chain model to examine and evaluate the logistics operations of an entity.

Supply chain management is a somewhat broader concept than logistics, because it deals with managing both the flow of materials and the relationships among channel intermediaries from the point of origin of raw materials through to the final customer. Perry and Sohal (2000: 627) define supply chain management as the integration of business processes from the end user through original suppliers that provide products, services and information that add value for customers.

Tracey and Tan (2001: 174) emphasises that supply chain management can provide a sustainable competitive advantage by providing customer satisfaction. Although this is important, it is also important that each entity customises its supply chain to fit its particular unique circumstances. This is achieved while accepting value creation through teamwork, selecting and effectively utilising the appropriate information technology, enhancing individual effectiveness and generating flexibility (Gilmour 1999b: 283).

Lau, Pang and Wong (2002: 271) indicated that supply chain management could provide a sustainable competitive advantage by:

- Enabling the entity to please customers,
- by improving product offerings and services,
- while simultaneously reducing cost.

It is quite evident that the aim of supply chain management is to attain high levels of customer satisfaction while reducing costs to the entity. To effectively manage these improvements to the entity, the support of an effective performance measurement system is needed. Traditionally, measuring logistics performance has focused on an entity's operational areas. More recently, entities are becoming more customer orientated by reducing response time to customer requests, improving quality, placing more emphasis on teamwork, and managing for the long term. This has shifted the focus for logistic performance from the operational area of the entity to an ability to add customer value. (Lau, Pang & Wong, 2002: 271; Gilmour, 1999a: 355).

The supply chain management philosophy was originally developed through entities in the private sector. It was found that in the private sector, management uses strategy and supply chain management to obtain a competitive advantage over rivals. Research done by Deloitte and Touche (2002: 271) indicates that 98% of respondents agree that logistics and supply chain management is either 'critical' or 'very important' when looking at saving costs for the entity. This, yet again, emphasises its importance for an entity contributing to gaining a competitive advantage with supply chain management.

Departments in the public sector are not competing against other rivals, but still bear the responsibility for cost-efficient management of their resources. They apply these principles in gaining a 'competitive advantage' (thus actually increasing performance) within the department by adding value to customers, reducing costs, and increasing customer satisfaction (Lau, Pang & Wong, 2002: 271). This also applies to the Department of Defence (DOD). The SA Army can use supply chain management efficiently and effectively, externally and internally to the supply chain in order to save costs for the DOD, and in turn add value to services rendered to clients. Externally they can include all suppliers, while applying it in the internal workings of the logistic system to improve efficiency and effectiveness.

#### **1.4 RATIONALE**

From the start of the transformation process in 1994 within the DOD (Logistic Guidelines, 1999: O-2), the concept of a centralised Logistics Agency (with Logistic Division and Logistical Support Formation) was developed and structured under command of Chief Joint Support. The concept was based on support formations (i.e. Army Support Formation) and general support bases, which provide common support to all DOD activities while unique support (i.e. external operational support) is to be rendered by various capabilities within the Arms of Services. This however does not include accounting thereof due to the fact that the accounting function is a common function and Chief Logistics renders this service. The logistics support function of the DOD consists of logistical support entities for internal operations and exercises, logistical support for external operations and exercises, as well as support for domestic logistical demands within the DOD, called supply support (Log Guidelines, 1999: O-2).

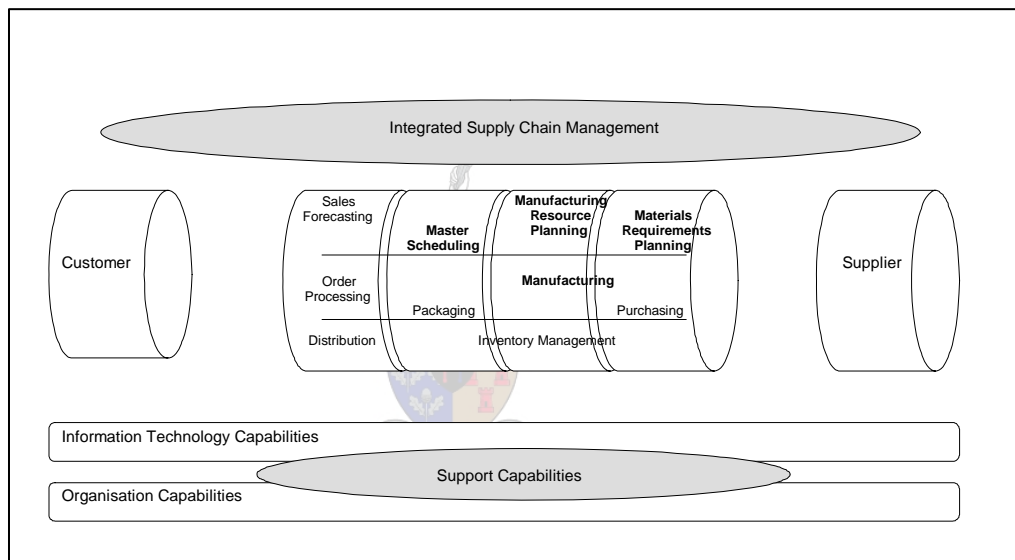
According to Witbooi (2004) and Du Toit (2005), a shortage of popular size SA Army camouflage clothing (sizes medium, large and extra-large) exists at Army units and at their Support Bases. This results in members of the SA Army not receiving the necessary clothing they demand for regular uniform maintenance, resulting in the majority of the SA Army having clothing that is either too big or too small, or part-worn. This research paper will focus on the internal domestic logistic supply chain and supply chain management. It will assess the current SA Army's supply chain



system with regards to camouflage clothing, and will compare it to the contemporary supply chain management theory.

Relevant theories of, amongst others, Gilmour (1999: 357) and Lambert and Stock (1999: 106) will be compared with the current DOD supply chain with regards to the SA Army camouflage clothing commodity.

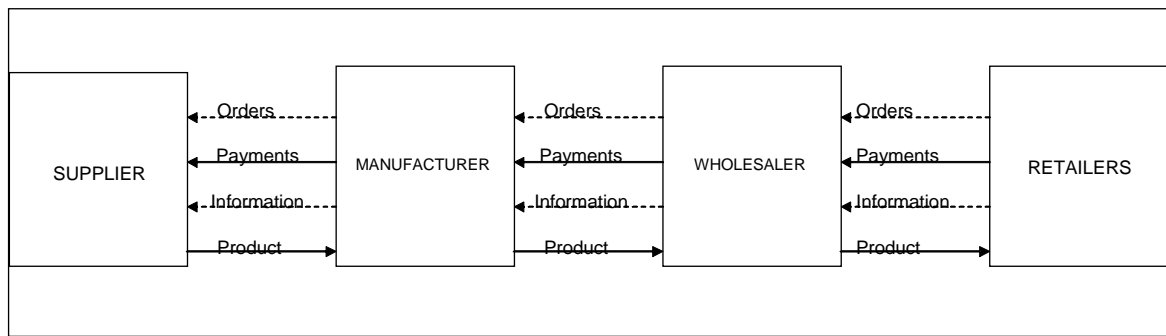
Gilmour (1999a: 355-356) illustrates the integrated supply chain model as comprising of functional process capabilities with organisational characteristics as well as information technology as support. Gilmour's integrated model emphasises the important and applicable components of a customer-driven supply chain model.



**Figure 1.1: The integrated supply chain model**

Source: As adapted from Gilmour (1999: 357)

The channel of distribution theory (Lambert & Stock 1999: 106) is used to compare with the customer driven supply chain management theory. This indicates the major flows of material in a channel of distribution. Product flows only take place after information flows are initiated. In addition to product and information flows, payments for the merchandise and promotional materials also move through the system. Types of information continually flow between channel members and include the quantity of inventory at each point in the channel, future production runs, service requirements, and delivery schedules (Lambert & Stock, 1999: 82-84).



**Figure 1.2: Channel of Distribution**

Source: Lambert and Stock (1999: 106)

Through strategy and supply chain management an entity can obtain a competitive advantage. Research done by Lay, Pang and Wong (2002: 271) has shown that logistics and supply chain management is either 'critical' or 'very important' when looking at saving costs. Departments in the public sector are not competing with entities for a competitive advantage, but it can still use private sector examples in gaining a 'competitive advantage' through providing a higher value customer service to the client at a lower cost.

The Public Finance Management Act (PFMA), Act 1 of 1999, Framework for Supply Chain Management (1999: 2), directs departments within the public sector to utilise supply chain management. This publication instructs all departments in the public sector to implement supply chain management efficiently and effectively and must provide for, at least, the following:

- Demand management;
- Acquisition management;
- Logistics management;
- Disposal management;
- Risk management and
- Regular assessment of supply chain performance.

The United States Department of Defence (USDOD, 1999: i) has indicated that one

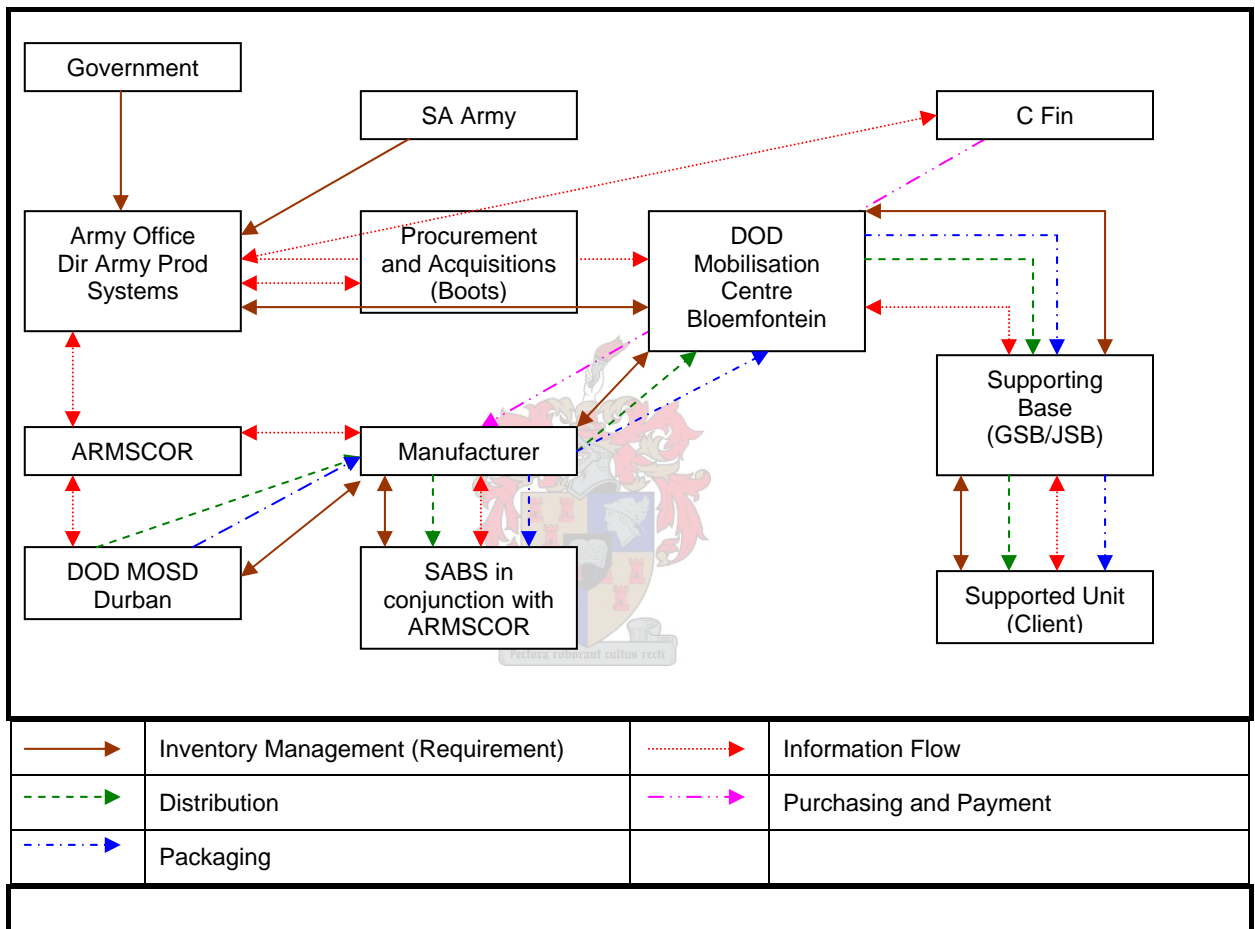
of their top three acquisition priorities, along with implementation of the revolution in military affairs and the revolution in business affairs, is the requirement to modernise their logistics systems. This will cut costs, reduce infrastructure and cycle times, and, most importantly, improve support to their 21<sup>st</sup> century War fighters (their clients).

In their financial year (FY) 2000 USDOD Logistics Strategic Plan, they indicated that by FY2006, the USDOD logistics process would possess defining characteristics in some focus areas. The most important ones applicable include: (USDOD, 1999: 11-12)

- Integrated supply chain. The USDOD logistics process will operate as a fully integrated supply chain that ensures that products and services efficiently meet the needs of a joint war fighting force. The logistics process becomes a continuous and integrated operation from the supplier of materiel to the ultimate customer. Logistics performance measures are based primarily on satisfying customer requirements at the point of need.
- Streamlined business processes. Large investments in inventories and personnel are replaced with significantly improved reliability, shortened processing cycles, agile manufacturing, flexible maintenance, and time-definite delivery of products and services. Organisational echelons are limited to those that demonstrate a value-added contribution to the war fighting mission.
- 'Best value' products and services. The USDOD obtains products, services, and suppliers competitively. War fighting requirements are satisfied directly by using 'best value' logistics providers. The logistics process selects the method of support from organic and commercial providers that assures the correct quantities, proper product and service quality, and timely delivery of products and services.
- Information access. Widespread access to information permits tailoring support to mission needs rapidly as scenarios and conditions evolve. Compressed times for responding to requirements are facilitated through common information interfaces. These interfaces enable timely and unambiguous communications among the participating services,

agencies, and joint commands as well as private-sector activities and allies.

In Figure 1.3 the current supply chain with regard to SA Army camouflage clothing commodity is illustrated. The purpose of this research is to assess this system through the use of the supply chain management theoretical principles with the aim of comparing it to the existing supply chain theory.



**Figure 1.3: Current supply chain for SA Army Camouflage Clothing**

Sources: Lt Col A. du Toit, Senior Staff Officer Class 1: In/Outbound Logistics, DOD Logistical Support Formation.

Maj M.J. Bester, Senior Staff Officer Class 2: Clothing, Army Product Systems Management.

Various stakeholders and processes have been identified as important to the functioning of supply chain management and will form part of the research process:

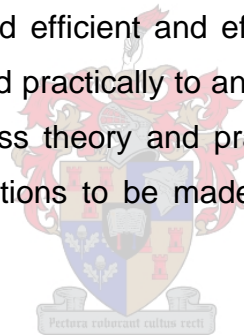
- Stakeholders:
  - Internal to DOD:
    - Army Office (Product System Managers SA Army Clothing, Army Support Formation).
    - Director Acquisitions and Procurement Department (with specific reference to the tender process as well as the procurement of combat footwear).
    - C Fin.
    - Depots Officers Commanding (OCs) and Log Officers.
    - Supporting Units OCs and Log Officers (Army Support Bases).
    - Supported Units OCs and Log Officers (Force Structure Elements).
    - Armaments Corporation of South Africa Ltd (ARMSCOR) (with specific reference to the combat support clothing commodity).
  - External to DOD:
    - Suppliers.
    - Broad Public (Public Finance Management Act).
  
- Processes:
  - Budgeting.
  - Medium and Long Term Business Planning (coupled to financial years).
  - Order Processing.
  - Information Processing.
  - Procurement/Acquisitions.
  - Packaging.
  - Distribution.
  - Inventory Management.

## 1.5 RESEARCH PROBLEM AND OBJECTIVES

The objective of this research is to examine current supply chain management theory and compare it to the supply chain management process of the SA Army camouflage clothing commodity. The current theory on supply chains and supply chain management will be studied, as well as research on the current supply chain of the SA Army with regards to the camouflage clothing commodity. The procurement and maintenance of uniforms within the public sector will be investigated. After studying all the relevant theory on supply chains and supply chain management, a comparison of the supply chain management of the SA Army and supply chain management theory will be done and certain recommendations made.

## **1.6 HYPOTHESIS**

By adding value through efficient and effective supply chain management, an entity can provide itself with a significant competitive advantage within the market place. It is important that theory around efficient and effective supply chain management is studied intensively, and applied practically to an entity's work within the organisation. This is done in order to assess theory and practice supply chain management, to allow for certain recommendations to be made in order to improve on the current situation.



The DOD, through the SA Army, can apply the theory on supply chain management within the organisation to improve on the current situation with regards to its' distribution of camouflage clothing, in order to improve the efficiency and effectiveness thereof.

## **1.7 CHAPTER LAYOUT**

### **1.7.1 CHAPTER 1: RESEARCH DESIGN**

The necessity and aim of the research project is explained in this chapter. The existence of a need to examine the supply chain management theory and practice with regards to the SA Army camouflage clothing commodity is explained. Methods of attempting this research are highlighted, with the most common definitions and descriptions clarified for better reference to the reader.

### **1.7.2 CHAPTER 2: INTRODUCTION TO SUPPLY CHAIN MANAGEMENT**

In Chapter 2 the relevant definitions of the supply chain and supply chain management are investigated and evaluated. The difference between the supply chain and supply chain management are highlighted. The importance of integration of all business processes for efficient and effective management of the supply chain is emphasised. The importance of performance measurement and control within an entity's supply chain is argued.

### **1.7.3 CHAPTER 3: SUPPLY CHAIN MANAGEMENT THEORY**

In this chapter the accredited theories of supply chain management are investigated and compared in the form of a literature review.

### **1.7.4 CHAPTER 4: ARMY LOGISTICS AND SUPPLY CHAIN MANAGEMENT**

The current supply chain and supply chain management with regards to the SA Army camouflage clothing commodity is explained and assessed.



### **1.7.5 CHAPTER 5: SUPPLY CHAIN MANAGEMENT APPLICABLE TO THE SOUTH AFRICAN ARMY CAMOUFLAGE CLOTHING COMMODITY**

The existing supply chain management theory and the current SA Army camouflage clothing supply chain are compared and discussed. From this comparison and discussion, certain deductions are made and recommendations for improvement suggested.

### **1.7.6 CHAPTER 6: SUMMARY**

In this chapter all previous chapters will be summarised in an executive summary. The main findings that were obtained will, again, be discussed in order to collate together the results from all the previous chapters. The results and conclusions will be related to the literature review and theory to illustrate the connections between

results obtained and theory investigated.

## 1.8 RESEARCH DESIGN AND METHODOLOGY

The research design of this study will be presented in fairly broad terms. Firstly, a literature study investigating current literature on the subject of supply chain and supply chain management will be conducted. This will consist mainly of the analysis of existing or secondary data. Documentation such as journal articles, books, magazine articles and information available on the Internet and DOD Intranet will be collected and integrated with data obtained. Personal and telephonic interviews will be conducted with various role players to assist in the collection of data.

The research will be addressed in the following manner:

- By investigating the supply chain of the SA Army camouflage clothing commodity and supply chain management within the SA Army.
- With specific reference to supply chain management from the supplier to the client's depot, and then to the client:
  - By doing an extensive literature review on supply chain management in determining what is critical to successful supply chain management and a supply chain, what the ideal supply chain look like and what is needed to ensure your supply chain operates optimally to meet the entity's specific needs.
  - By investigating Policy and Procedure documents of the DOD with regards to this topic and related topics on the supply chain management processes,
  - By interviewing relevant stakeholders.
- Analysing and interpreting all information and data.
- Making recommendations.



## 1.9 MOST COMMON DEFINITIONS AND DESCRIPTIONS

**Arms of Service.** Four Arms of Services exist within the SANDF. They comprise the SA Army, SA Navy, SA Air Force and SA Medical Health Services.

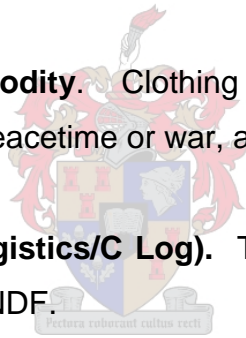
**ARSMCOR.** The Armaments Corporation of South Africa Ltd. The company that is responsible for the designing, testing and procuring of several defence-related objects for the exclusive use of the SANDF.

**Army Support Base.** This is the General Support Base of all SA Army units within the SANDF. The Army Support Base supports Army units logistically.

**Army Support Formation.** The next higher headquarters of all the Army Support Bases in the SANDF.

**Camouflage clothing commodity.** Clothing designed for the exclusive use of members of the SA Army, in peacetime or war, also known as camouflage clothing.

**Chief of Logistics (Chief Logistics/C Log).** The highest logistical authority for all Arms of Service within the SANDF.



**Department of Defence (DOD).** Refers to the office of the Secretary of Defence, the Chief of the South African National Defence Force (C SANDF), the Chiefs of the Corporate Divisions and their respective staffs (SA Defence Review, 1998: 3)

**Depot.** The place where the suppliers deliver all procured goods, before it is issued to supply units.

**Domestic.** Internally to a Depot, Support Base or unit.

**Entity.** A company or organisation.

**Effectiveness.** To have the desired effect.

**Efficiency.** Being able to work well without wasting time and resources.

**External operations and exercises.** All operations and exercises conducted by members of the SANDF outside the borders of the RSA.

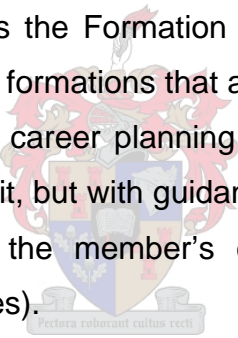
**Force Structure Element (FSE).** A unit within the SA Army.

**Internal operations and exercises.** All operations and exercises conducted by members of the SANDF within the borders of the RSA.

**Level 0 Component.** The Minister of Defence.

**Level 1 Component.** The Chief of the South African National Defence Force.

**Level 2 Components.** This is the Formation component. All services and corps within the SANDF have various formations that are responsible for everyday planning and budgeting of funds, ie the career planning of a logistical member is within the personnel department of the unit, but with guidance and final authorization from Army Support Formation, which is the member's corps Formation (Arms of Service components and Joint Structures).



**Level 3 Components.** This is the Headquarters Component within the SANDF. Units receive guidelines from their Headquarters with regards to everyday planning, ie Special Forces Headquarters is the Level 3 Component of 4 Special Forces Regiment in Langebaan, 5 Special Forces Regiment in Phalaborwa, Special Forces School in Wallmannsthal, Special Forces Supply Unit in Wallmannsthal and Special Forces Headquarters Unit at Swartkop Park Nature Reserve in Pretoria.

**Level 4 Components.** This includes all units within the SANDF.

**Logistics.** The organising of supplies and services for someone or something.

**Ordnance.** Includes all equipment and supplies (Joint Military Dictionary, 1983: 386).

**Ordnance Depot.** Depot which holds military stores (Joint Military Dictionary, 1983: 386).

**Private Sector.** The part of the economy that is not under direct control of the government or state.

**Public Sector.** The part of the economy or industry that is controlled by government or the state.

**Supply Support.** The logistic provision of goods and services internal to a unit.

**Supplier.** A person or company that provides goods or services to someone else after a contract has been agreed upon by all the parties involved.

#### 1.10 MOST COMMON ABBREVIATIONS

**ARMSCOR.** Armaments Corporation of South Africa Ltd.

**CALMIS.** Computer Aided Logistics Management Information System.

**C Fin.** Chief of Finances.

**C SANDF.** Chief of the South African National Defence Force.

**DIMS.** Depot Information Management System.

**Dir PSM.** Director Product System Manager.

**DOD.** Department of Defence.

**EDI.** Electronic Data Interchange.

**FSE.** Force Structure Element (or unit)

**FY.** Financial Year.

**OC.** Officer Commanding.

**PFMA.** Public Finance Management Act, Act 1 of 1999.

**PSM CC.** Product System Manager Camouflage Clothing.

**SA Army.** South African Army.

**SANDF.** South African National Defence Force.

**UIMS.** Unit Information Management System.

**USDOD.** United States of America Department of Defense.

## **1.11 SUMMARY**

In this chapter the aim and nature of the research study was identified. The theoretical framework provided background on why the study should have been conducted. The rationale of the study was explained with the research problem, objectives and hypothesis identified in order to support this rationale. The research design and methodology of the study explained in detail the manner in which that study was conducted, and a summary of the most common definitions and descriptions were provided to clarify the reading material.

## CHAPTER 2: INTRODUCTION TO SUPPLY CHAIN MANAGEMENT

### 2.1 INTRODUCTION

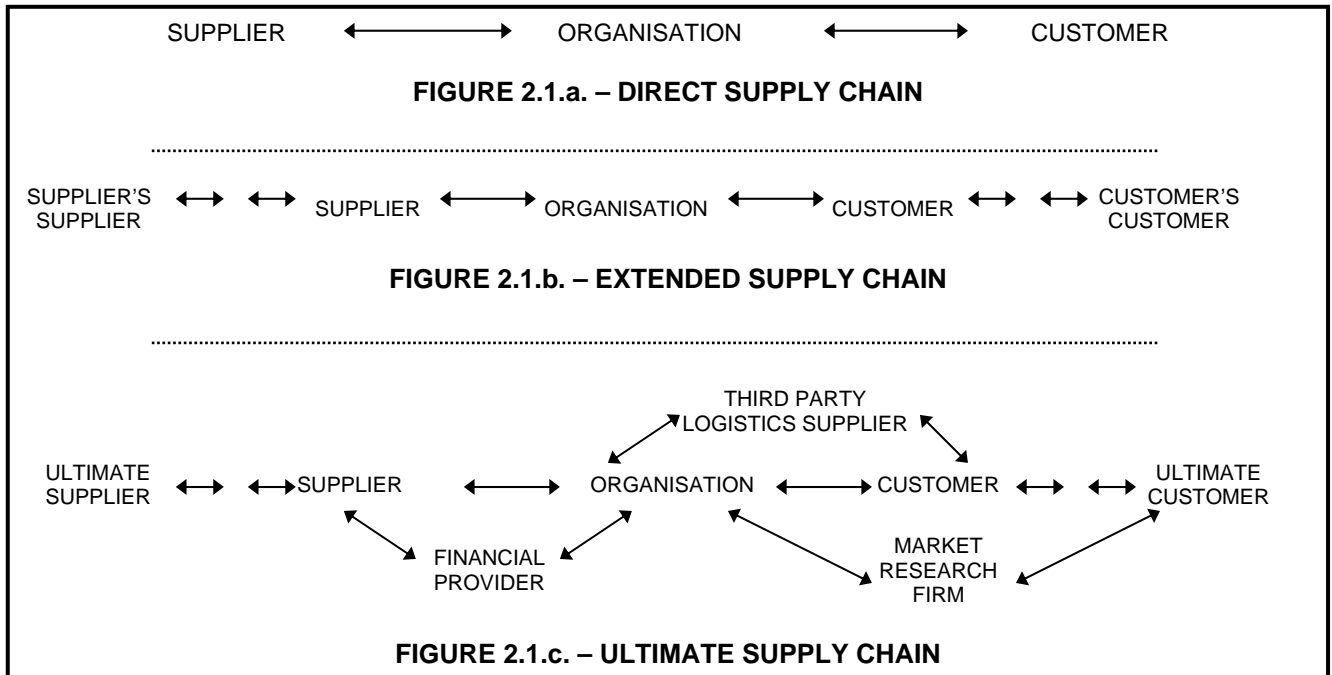
There are many reasons for the popularity of the supply chain or the supply chain management concept. The globalisation of the economy is exposing buyers and suppliers to a countless number of opportunities for potential trading relationships. Potgieter (quoted in Magnus, 2005) says that there is an increase in companies who tend to compete as an integrated supply chain, rather than a collection of single organisations. For this reason, the ability of the total supply chain to compete globally becomes crucial and to have ongoing visibility on requirements and performance throughout the supply chain becomes essential (Magnus, 2005; Mentzer, *et al.*, 2001: 1).

Through globalisation, entities are forced to look for more effective ways to coordinate the flow of materials between facilities, into and out of the business. Key to this concept is an orientation toward closer relationships with their suppliers and clients. Mentzer, *et al.*, (2001: 1) stated that entities using supply chains compete on the basis of time and quality. Customers are consistently demanding that products be delivered faster, exactly on time, and with no damage. This necessitates a closer coordination with suppliers and distributors. A more coordinated planning approach reduces costs in the supply chain while maintaining satisfactory customer service levels. This global orientation and increased performance-based competition are combined with rapidly changing technology and economic conditions, all contributing to marketplace uncertainty (Akkermans, Bogerd & Vos, 1999: 565; Mentzer, *et al.*, 2001: 2). This uncertainty requires a greater flexibility on the part of individual entities and supply chains, which in turn demands more flexibility in their supply chain relationships. According to Mcpherson and Wilson (Jones and Tilley (ed), 2003: 202) the intensification of competition over the last two decades has resulted in a focus on supply chain management as a potential source of competitive advantage. Ultimately, managers should take a holistic view of the supply chain (Power, 2005: 252).

## 2.2 DEFINING THE SUPPLY CHAIN

Taylor and Brunt (2001: 110) define a supply chain as a system of two basic flows, demand and supply, with decision and stocking points at which these flows are altered. Mentzer, *et al.*, (2001: 3) utilises various authors' definitions to explain the supply chain as a set of three or more entities (organisations or individuals), directly involved in the upstream and downstream flow of products, services, finances, and/or information from a source to a customer, whereas supply chain management is the integration of business processes (Perry & Sohal, 2000: 627). Power, Sohal and Rahman (2001: 247) state that the supply chain encompasses all activities associated with the flow and transformation of goods from the raw materials stage (extraction), through to the end user as well as all information flows involved in this process. Apparent in these definitions are the importance of entities, the up- and downstream flow and transformation of goods, and the important role information plays in these goods reaching the end user. Management of this supply chain is essentially the management of the relationships and activities among the member entities within this chain (Golicic, *et al.*, 2002: 851).

Mentzer, *et al.*, (2001: 4) has identified three forms (or degrees) of supply chain intricacy: a "direct supply chain," an "extended supply chain," and an "ultimate supply chain." The difference between these supply chains are illustrated in Figure 2.1:



**Figure 2.1: Types of Channel Relationships**

Source: Mentzer, *et al.*, (2001: 4)

- Direct supply chain. This chain consists of an entity, a supplier, and a customer involved in the upstream and/or downstream flows of products, services, finances, and/or information.
- Extended supply chain. This chain includes suppliers of the immediate supplier and customers of the immediate customer, all involved in the upstream and/or downstream flows of products, services, finances, and/or information.
- Ultimate supply chain. This includes all the entities involved in the up- and downstream flows of products, services, finances and information from the ultimate supplier to the ultimate customer. This supply chain can become very complicated when third party financial providers become involved in the supply chain. This is accomplished by assuming some of the risk, whilst also offering financial advice. A third party logistics provider is performing the logistics activity between two of the companies; while a market research firm is providing information about the ultimate customer to a company well back in the supply

chain. Mentzer, *et al.*, (2001: 4) illustrates with this the multiple functions that complex supply chains can and do perform.

Mentzer, *et al.*, (2001: 4) emphasises that supply chains exist whether they are managed or not. Should none of the entities in Figure 2.1 actively implement any of the concepts of supply chain to manage it, the supply chain – as a phenomenon of business – still exists. Thus, Mentzer, *et al.*, (2001: 4) draws a clear and definite distinction between supply chains as phenomena that exist in business, and the management of those supply chains. Supply chains are simply something that exists (also called distribution channels), while supply chain management requires a concerted and dedicated management effort within the supply chain. (Mentzer, *et al.*, 2001: 4).

### **2.3 DEFINING SUPPLY CHAIN MANAGEMENT**

Johnson, Wood, Wardlow and Murphy Jr (1998: 5) describe logistics as the entire process of materials and products moving into, through, and out of a firm. Perry and Sohal (2000: 627) define supply chain management as the integration of business processes from end user through original suppliers that provide products, services and information that add value for customers. Cooper, *et al.*, (1997) in Mentzer, *et al.*, (2001: 6) defines supply chain management as an integrative philosophy to manage the total flow of a distribution channel from supplier to the ultimate user.

Van der Vorst and Beulens (2002: 410) define supply chain management as the integrated planning, coordination and control of all business processes and activities in the supply chain, to deliver superior consumer value at minimum cost to the end-consumer, while satisfying requirements of other stakeholders. Mcpherson and Wilson (Jones and Tilley (ed), 2003: 202) agree in that they state that supply chain management is concerned with the drive for greater efficiency and effectiveness through creating more integrated business systems to manage the customer-supplier relationship. It provides the opportunity for businesses with unique products and services to work with larger organisations for mutual competitive advantage.



Perry and Sohal (2000: 629) suggest that supply chain management is a somewhat larger concept than logistics, as it deals with managing both the flow of materials and the relationships among channel intermediaries from the point of origin of raw materials through to the final customer. There is a need for coordination of activities and logistical processes, as well as other business processes within and between entities in the supply chain (Van der Vorst & Beulens, 2002: 410).

Supply chain management aims to integrate the various structures and processes of the supply chain, viewing the supply chain as a single process where responsibility for the various segments in the chain is not split and transferred to functional areas such as manufacturing, purchasing, distribution, and sales. Supply chain management calls for strategic decision-making. 'Supply' is a shared objective of functions in the chain and is of particular strategic significance because of its impact on overall costs and market share, facilitating and coordinating the flow of goods and services and the flow of information necessary to provide the value that customers demand. A new systems approach is required – integration rather than interfacing (Sridharan, Caines & Patterson, 2005: 313; Mentzer, *et al.*, 2001: 6).

Mentzer, *et al.* (2001: 5) categorises the management of the supply chain into three classifications: firstly a management philosophy, secondly the implementation of a management philosophy, and lastly a set of management processes.

### **2.3.1 SUPPLY CHAIN MANAGEMENT AS A MANAGEMENT PHILOSOPHY**

As a philosophy, supply chain management takes a systems approach to viewing the supply chain. Here the supply chain is seen as a single entity, rather than a set of separate parts, each performing its functions on its own. The philosophy of supply chain management broadens the concept of partnerships into a multi-firm effort. The inter-dependence of participants in the supply chain are highlighted where the multi-firm effort entails the management of the total flow of goods from the supplier to the ultimate customer. This forms a set of beliefs that each entity in the supply chain, directly and indirectly, affects the performance of all the other members of the supply chain, as well as the overall supply chain performance. One goal of supply chain management is for member entities to work together in close, long-term relationships

to increase the competitive advantage of the supply chain as a whole (Power, 2005: 252; Power, *et al.*, 2001: 247; Golicic, *et al.*, 2002: 851; Mentzer, *et al.*, 2001: 7).

Supply chain management, as a management philosophy, seeks coordination and the unification of intra- and inter-firm operational and strategic capabilities. As entities seek to develop partnerships and more effective information links with trading partners, internal processes become interlinked and span the traditional boundaries of firms (Power, 2005: 252). Mcpherson and Wilson (Jones and Tilley (ed), 2003: 203) state that it is apparent that the premise of supply chain management is to seek cost reductions and competitive advantage through the development of integrated supply networks, creating a more competitive whole. This suggests that the focus of supply chain management theory should be on the development and control of inter-organisational interactions.

As an integrative philosophy, it directs supply chain members to focus on developing innovative solutions to create unique, individualised sources of customer value. Langley and Holcomb (1992: 1) suggest that the objective of supply chain management should be the synchronisation of all supply chain activities to create customer value. This suggests that supply chain management boundaries not only include logistics, but also encompasses all other functions within a firm and within a supply chain to create customer value and ultimate customer satisfaction. In this context, understanding customers' values and requirements is essential. Customer value can be created through product availability, timeliness and consistency of delivery and ease of placing orders, and other elements of customer service. This philosophy drives members in the supply chain to assume a customer driven orientation (Power, *et al.*, 2001: 248; Lau, Pang & Wong, 2002: 272).

Mentzer, *et al.*, (2001: 7) summarises by proposing that supply chain management as philosophy shows the following characteristics:

- A systems approach to viewing the supply chain as a whole, and to manage the total flow of goods inventory from the supplier to the ultimate customer;

- a strategic orientation towards cooperative efforts to synchronise and converge intra-firm and inter-firm operational and strategic capabilities into a unified whole; and
- a customer focus to create unique and individualised sources of customer value, leading to customer satisfaction.

### **2.3.2 SUPPLY CHAIN MANAGEMENT AS A SET OF ACTIVITIES TO IMPLEMENT A MANAGEMENT PHILOSOPHY**

When entities assume a supply chain management philosophy, they must determine and establish management practices that permit them to operate or behave consistently with this philosophy. Mentzer, *et al.*, (2001: 7) identifies various activities necessary to successfully implement a supply chain management philosophy:

- Integrated behaviour.
- Mutually sharing information.
- Mutually sharing risks and rewards.
- Cooperation.
- The same goal and the same focus on serving customers.
- Integration of processes.
- Partners to build and maintain long-term relationships.

To be fully effective in today's competitive environment, firms must expand their integrated behaviour to incorporate customer and suppliers. Many once-central operational corporate activities – product design and development, services and facilities management, logistics and manufacturing – have been taken over by suppliers. There has been an ever-increasing focus on managing the external relations from source to consumer. This extension of integrated behaviours, through external integrations, is referred to as supply chain management (Brewer, Button & Hensher, 2001: 81; La Londe & Masters, 1994: 39).

Fawcett and Magnan (2002: 344) identified four primary types of integration often described as supply chain management:

- Internal, cross-functional process integration identified as the core of supply chain initiatives.
- ‘Backward integration with valued first-tier suppliers’ was identified as the most common form of supply chain integration. A natural extension of this form of integration involves more extended efforts that involve second-tier suppliers (suppliers’ suppliers).
- ‘Forward integration with valued first-tier customers’ was also identified as supply chain integration. Discussions revealed little tendency toward integration to the customers’ customers.
- Complete forward and backward integration was also associated with supply chain management. This notion was expressed as integration from the “suppliers’ supplier to the customers’ customer”.

In this context, the philosophy of supply chain management modifies into the implementation of supply chain management; the development of a set of activities that carries out the philosophy. This set of activities is a coordinated effort called supply chain management between the supply chain partners, such as suppliers, carriers, and manufacturers, to dynamically respond to the needs of the end customer (Mentzer, *et al.*, 2001: 8).

To implement a supply chain management philosophy, especially for planning and monitoring processes, it is required to mutually share information among supply chain members. Cooper, Lambert, and Pagh (1997: 1) emphasised frequent information updating among the chain members for effective supply chain management. Handfield and Nichols (1999: 5) describe the management of information and the information revolution as one of the main drivers of integration in the supply chain. Openly sharing information such as inventory levels, forecasts, sales promotion strategies, and marketing strategies reduces the uncertainty between supply partners and results in enhanced performance (Barrat, 2004: 36). Gattorna and Walters (1996: 4-5) state that towards the end of the 1980’s information had become a means by which competitive advantage might be established. An

early development in the broadest application of information technology to physical distribution management was electronic data interchange (EDI), which transfers files from one computer to another by telephone. It is important to note that the increased application of EDI has effectively created a supply chain that makes supply chain management effective (Gattorna & Walters, 1996: 4-5; La Londe & Masters, 1994: 44).

Effective supply chain management also requires mutually sharing risks and rewards that yield a competitive advantage. Uncertainty spreads throughout the supply chain and may lead to inefficient processing and non-value adding activities. This uncertainty is expressed in questions such as: what will customers order, how many products should be in stock, and will the supplier deliver the requested goods on time and according to the demanded specifications? Persson (1995: 13) stated that “the more uncertainty related to a process, the more waste there will be in the process.” The presence of uncertainty stimulates the decision maker to create safety buffers in time, capacity or inventory to prevent a bad chain performance. These buffers will restrict operational performance and suspend competitive advantage. Partnerships with key suppliers and customers may reduce uncertainty and complexity in an ever-changing global environment and minimise risk while maintaining flexibility. Risk and reward sharing should happen over the long term. Risk and reward sharing is important for long-term focus and cooperation among the supply chain members (Van der Vorst & Beulens, 2002: 413; Mentzer, *et al.*, 2002: 8).

Collaboration is a very broad and encompassing term. Many authors cite mutuality of benefit, rewards and risk sharing with the exchange of information as the foundation of such cooperation. Successful cooperation can provide an entity with integrated demand and supply, delivering significantly improved performance. This can lead to entities benefiting from closer relationships that in themselves foster more opportunities for greater improvement. Cooperation among the supply chain members is required for effective supply chain management. It refers to similar or complementary, coordinated activities performed by firms in a business relationship to produce superior mutual outcomes or singular outcomes that are mutually expected over time. Cooperation is not limited to the needs of the current transaction and occurs at several management levels (e.g., both top and operational

managers), involving cross-functional coordination across the supply chain members (Barratt, 2004: 30-31; Mentzer, *et al.*, 2001: 9).

Cooperation commences with joint planning and culminates with joint control activities to evaluate performance of the supply chain members, as well as the supply chain as a whole. In addition to planning and control, cooperation is needed to reduce supply chain inventories and pursue supply chain-wide cost efficiencies. These improvement initiatives could be interpreted as the redistribution of costs and inventory both up and down the supply chain. There are a variety of forms of potential supply chain collaboration or cooperation, which can be divided into two main categories: firstly, vertical: which could include collaboration with customers, internally (across functions) and with suppliers; and secondly, horizontal: which could include collaboration with competitors, internally and with non-competitors, e.g. sharing manufacturing capacity (Barratt, 2004: 31-32; Mentzer, *et al.*, 2001: 9).

La Londe and Masters (1994: 39) proposed that a supply chain may succeed if all the members of the supply chain have the same goal and the same focus on serving customers. Establishing the same goal and the same focus among supply chain members is a form of policy integration. Lassar and Zinn (1995: 81) suggested that successful relationships aim to integrate supply chain policy to avoid redundancy and overlap, while seeking a level of cooperation that allows participants to be more effective at lower cost levels. Policy integration is possible if there are compatible cultures and management techniques among the supply chain members. Supply chain partnerships are also a long-term and important decision that requires commitment from the parties and therefore it is important to form partnerships with those who have similar interests (Lau, *et al.*, 2002: 272).

The implementation of supply chain management requires the integration of processes from sourcing to manufacturing, and to distribution across the supply chain. Integration can be accomplished through cross-functional teams, in-plant supplier personnel, and third party service providers. According to Daugherty, Ellinger and Gustin (1996: 25), successful integration should result in more efficient logistics operations. Integrated logistics has been credited with achieving cost reductions while increasing efficiency and productivity. Stevens (1989) in Mentzer, *et*

*al.*, (2001: 9) identified four stages of supply chain integration with the planning and operating implications of each stage:

- Stage 1. This represents a base line case. The supply chain is a function of fragmented operations within the individual company and is characterised by staged inventories, independent and incompatible control systems and procedures, and functional segregation.
- Stage 2. Begins to focus internal integration, characterised by an emphasis on cost reduction rather than performance improvement, buffer inventory, initial evaluations of internal trade-offs, and reactive customer service.
- Stage 3. Reaches toward internal corporate integration and characterised by full visibility of purchasing through distribution, medium-term planning, tactical rather than strategic focus, emphasis on efficiency, extended use of electronics support for linkages, and a continued reactive approach to customers.
- Stage 4. Achieves supply chain integration by extending the scope of integration outside the company to embrace suppliers and customers.

Effective supply chain management is made up of a series of partnerships and, thus, requires partners to build and maintain long-term relationships. Tate (1996: 7) argues that an increasing number of entities are entering into long-term relationships with carefully selected third-party logistics providers. It is not unusual that all of the primary activities in a chain – inbound and outbound logistics, operations, marketing, sales, and service – will be performed by any one firm to maximise customer value.

Entities should consider the outsourcing decision, and the strategic merits of closer relationships with suppliers (Mcpherson & Wilson, 2003: 204). Forming strategic alliances with supply chain partners such as suppliers, customers, or intermediaries (e.g. transportation and/or warehousing services) provides competitive advantage through creating customer value. Cottrill (1997: 52) states that the evolution of the concept of integration has evolved over time to one in which the supply chain operates as a corporate entity, spans a virtual enterprise without reference to traditional company boundaries, and can be driven directly by consumer demand via

access to electronic storefronts. Cottrill emphasises that this trend will create major changes in many entities, eventually leading to greater use of outsourced services. Cottrill also believes that the key to implementation lies in focusing initially on introducing changes within the entity, and then extending the process to include suppliers and customers (Cottrill, 1997: 52).

As the business environment becomes more complex, organisations recognise that many benefits can be obtained from closer, long-term relationships. These long-term relationships are among the most durable of advantages because of their inherent barriers to competition. The goal of supply chain management is for member organisations to work together in close, long-term relationships to increase the competitive advantage of the supply chain as a whole (Golicic, *et al.*, 2002: 851-852).

### **2.3.3 SUPPLY CHAIN MANAGEMENT AS A SET OF MANAGEMENT PROCESSES**

As opposed to a focus on the activities that constitute supply chain management, other authors have focused on management processes. Davenport (1993) in Mentzer, *et al.*, (2001: 10) defines processes as a structured and measured set of activities designed to produce specific outputs for a particular customer or market. Ross in Mentzer, *et al.* (2001: 10) defines supply chain process as the actual physical business functions, institutions, and operations that characterise the way a particular supply chain moves goods and services to market through the supply pipeline. It is a specific ordering of work activities across time and place, with a beginning and end, clearly identified inputs and outputs, and a structure for action.

Lambert, Stock and Ellram (1998: 504) propose that, to successfully apply supply chain management, all firms within a supply chain must overcome their own functional silos and adopt a process approach. All the functions within a supply chain are reorganised as key processes. The critical differences between the traditional functions and the process approach are that the focus of every process is on meeting the customer's requirements and that the firm is organised around these processes. Lockamy III and Kevin (2004: 273) suggest that firms can enhance their overall performance by adopting a "process view" of the entity. It is suggested that the key



processes typically include customer relationship management, customer service management, demand management, order fulfilment, manufacturing flow management, procurement, and products development and commercialisation (Mentzer, *et al.*, 2001: 10-11).

## 2.4 SUPPLY CHAIN MANAGEMENT VERSUS SUPPLY CHAIN ORIENTATION

When examining these perspectives of Mentzer, *et al.*, (2001: 11) on defining supply chain management, it indicates that their literature is actually trying to define two concepts with one term, i.e. supply chain management. The idea of viewing the coordination of a supply chain from an overall system perspective, with each of the tactical activities of distribution flows seen within a broader strategic context (as seen in supply chain management as a management philosophy) is more accurately called a supply chain orientation. According to Mentzer, *et al.*, (2001: 11), the actual implementation of this orientation, across various companies in the supply chain, is more appropriately called supply chain management.

Supply chain orientation is defined as the recognition by an entity of the systematic, strategic implication of the tactical activities involved in managing the various flows in a supply chain. An entity can possess this orientation if its management can identify the implications of managing the up- and downstream flows of products, services, finances, and information across their suppliers and their customers. From this definition, an entity does not have a supply chain orientation if it only sees the systemic, strategic implications in one direction. An example can be seen in Figure 2.1(1.a) where the entity in the middle of the direct supply chain may have a supply chain orientation, but the two companies on the ends do not (because the supplier is only focusing down the supply chain – a historical “channels” orientation – and the customer is only focused up the supply chain – a historical “procurement” orientation (Mentzer, *et al.*, 2001: 11).

It is important to note that this does not mean that the entity with the supply chain orientation can implement it. Such implementation requires a supply chain orientation across several entities directly connected in the supply chain. The entity with the supply chain orientation may implement individual, disjointed supply chain

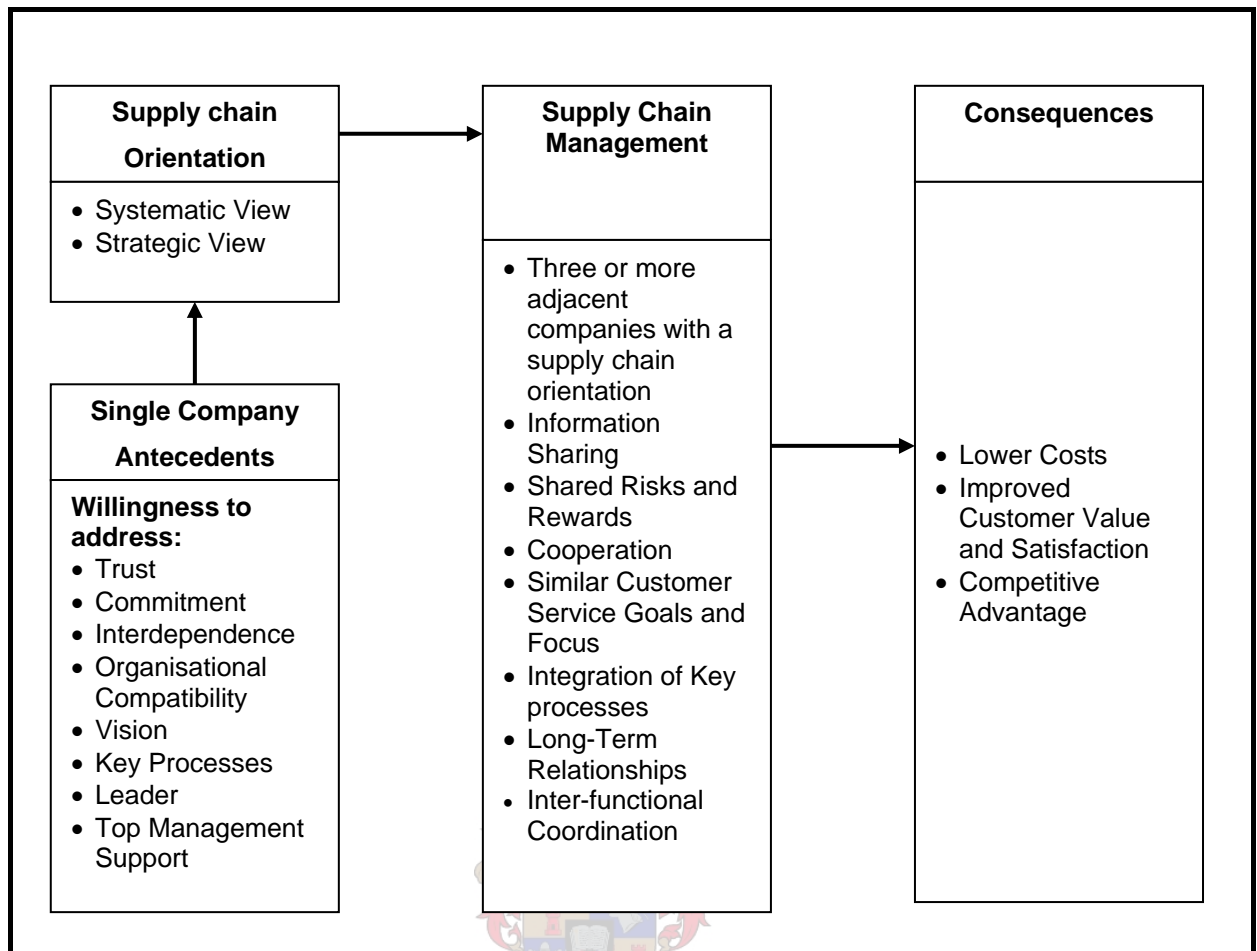
tactics (such as Just-in-Time delivery, or EDI with suppliers and customers), but this is not supply chain management unless they are coordinated (a strategic orientation over the supply chain in a systematic orientation) (Mentzer, *et al.*, 2001: 11).

The implementation of a supply chain orientation requires several entities in the supply chain to utilise the processes previously mentioned to realise the supply chain management activities. Supply chain management is the implementation of a supply chain orientation across suppliers and customers. According to Mentzer, *et al.*, (2001: 11) entities implementing supply chain management must first have a supply chain orientation. As an example it can be seen that the entities involved in an extended supply chain (Figure 2.1.b) have a supply chain orientation, except for the first supplier and the last customer. Since the first supplier only focuses on its customer and the last customer only on its supplier, neither can be said to have an upstream and downstream orientation.

A supply chain orientation is a management philosophy, and supply chain management is the sum total of all the clear management actions undertaken to realise that philosophy. This leads to a closer understanding and definition of supply chain management. Before this can be fully accomplished, the antecedents, consequences, and scope of supply chain management must be studied (Mentzer, *et al.*, 2001: 11)

## **2.5 ANTECEDENTS AND CONSEQUENCES**

Supply chain relationships are typically long-term and require substantial strategic coordination. To understand this to its full extent, the antecedents and consequences of supply chain management at strategic level must be examined (Mentzer, *et al.*, 2001: 12).



**Figure 2.2: Supply Chain Management Antecedents and Consequences**

Source: Mentzer, *et al.*, (2001: 12)

### 2.5.1 ANTECEDENTS TO SUPPLY CHAIN ORIENTATION AND SUPPLY CHAIN MANAGEMENT

Antecedents to supply chain management are factors that enhance or impede the implementation of a supply chain orientation philosophy. These include:

- Trust.
- Commitment.
- Interdependence.
- Organisational Compatibility.
- Vision.

- Key Processes.
- Leader.
- Top Management.

Moorman, Deshpande, and Zaltman (1993: 81) define trust as a willingness to rely on an exchange partner in whom one has confidence. Though both trust and commitment are crucial to make cooperation work, trust is a major determinant of relationship commitment. The role of trust is emphasised to overcome mutual difficulties such as low profitability, conflict, and power. It may even have an effect on the sharing of risks and rewards. Commitment is an essential ingredient for the successful long-term relationships that are a component of the implementation of supply chain management.

Morgan and Hunt (1994: 20) states that commitment and trust are 'key' because they encourage entities to firstly work at preserving relationship investments by cooperating with exchange partners, secondly to resist attractive short-term alternatives in favour of the expected long-term benefits of staying with existing partners, and lastly view potentially high-risk actions as prudent because of the belief that their partners will not act opportunistically. Trust and commitment leads directly to cooperative behaviours in the implementation of a supply chain orientation across several entities to achieve supply chain management. Daugherty, *et al.*, (1996: 25) identified that corporate-wide commitment/attitudes change as the factor contributing most to successful implementation of integrated logistics. Employees must be made aware of the advantages associated with integration and encouraged to "buy-in" to a new approach.

The interdependence of an entity on a partner refers to the entity's need to maintain a relationship with the partner to achieve its goals. This dependence is what motivates willingness to negotiate functional transfer, share key information, and participate in joint operational planning (Lau, *et al.*, 2002: 273; Mentzer, *et al.*, 2001: 13).

Corporate philosophy or culture and the management techniques of each entity in a supply chain should be compatible for successful supply chain management.

Organisational compatibility is defined as complementary goals and objectives, as well as similarity in operating philosophies and corporate culture. It is argued that the importance of corporate culture and its compatibility across supply chain members cannot be underestimated. Given the earlier definition of a supply chain orientation, organisational compatibility in a supply chain means that entities must all have a supply chain orientation to achieve supply chain management (Mentzer, *et al.*, 2001: 13; Golicic, *et al.*, 2002: 851-852).

There should be an agreement on supply chain management vision and key processes. The creation and communication of a market-winning competitive supply chain management vision shared not just by individual entities but also by the whole supply chain, is essential before any supply chain management project can begin, i.e., its existence precedes supply chain management. This provides entities with specific goals and strategies on how they plan to identify and realise the opportunities they expect to find in the marketplace (Mentzer, *et al.*, 2001: 13-14).

In terms of power and leadership structure of a supply chain, there needs to be a firm that assumes the leader role. Supply chains need leaders as much as individual entities do. The supply chain leader plays a key role in coordinating and overseeing the whole supply chain. It may happen that a specific firm may function as a supply chain leader as a result of their size, economic power, customer patronage, comprehensive trade franchise, or the initiation of the inter-firm relationships. Research has confirmed that the success of supply chain management is directly correlated to the presence of constructive leadership capable of stimulating cooperative behaviour between participating firms. (Cox, 1999: 172; Mentzer, *et al.*, 2001: 14).

Top management support plays a critical role in shaping an entity's values, orientation, and direction. Top-level managers have a considerable bearing on the performance of an entity. Lambert, Stock, and Ellram in Mentzer, *et al.* (2001: 14) suggest top management support, leadership, and commitment to change are important factors for the implementation of supply chain management. When neighbouring entities in a supply chain each achieve a supply chain orientation, they can begin the implementation process to realise supply chain management. Supply

chain orientation becomes a willingness by one entity to address the issues listed in Figure 2.2 from a strategic, systemic perspective (Mentzer, *et al.*, 2001: 14).

## 2.5.2 CONSEQUENCES OF SUPPLY CHAIN MANAGEMENT AND SUPPLY CHAIN ORIENTATION

Two types of competitive advantage are defined: cost leadership and differentiation. Improving a firm's competitive advantage and profitability through supply chain management can be accomplished by enhancing overall customer satisfaction. It is proposed that supply chain management aims at delivering enhanced customer service and economic value through synchronised management of the flow of physical goods and associated information (Tracey & Tan, 2001: 174). According to Porter (1985), competitive advantage grows fundamentally out of the customer value an entity creates, and aims to establish a profitable and sustainable position against the forces that determine industry competition. It is thus proposed that the implementation of supply chain management enhances customer value and satisfaction, which in turn leads to enhanced competitive advantage for the supply chain, as well as each member entity. This improves the profitability of the supply chain and its members (Mentzer, *et al.*, 2001: 15).



Mentzer, *et al.*, (2001: 15) suggests specific objectives to improve profitability, competitive advantage, and customer value/satisfaction of a supply chain, as well as its participants. One key objective of supply chain management is to lower the costs required to provide the necessary level of customer service to a specific segment. Another key objective is to improve customer service through increased stock availability and reduced order cycle time. Customer service objectives are also accomplished through a customer-enriching supply system focused on developing innovative solutions and synchronising the flow of products, services, and information to create unique, individualised sources of customer service value. Finally, low cost and differentiated service help build a competitive advantage for the supply chain.

Mentzer, *et al.* (2001: 15) states that supply chain management is concerned with improving both efficiency (i.e., cost reduction) and effectiveness (i.e., customer service) in a strategic context (i.e., creating customer value and satisfaction through

integrated supply chain management) to obtain competitive advantage that ultimately brings profitability. The truly strategic nature of supply chain management thus becomes apparent for participating companies, with successful implementation becoming a source of competitive advantage (Power, 2005: 252). In conclusion, the consequences of supply chain management are lower costs and improved customer value and satisfaction to achieve competitive advantage.

## **2.6 SCOPE OF SUPPLY CHAIN MANAGEMENT**

The scope of supply chain management encompasses two categories: functional and organisational. The functional scope refers to which traditional business functions are included or excluded in the implementation and the process of supply chain management. The organisational scope of supply chain management concerns what kind of inter-firm relationships are relevant to the participating firms in the implementation and the process of supply chain management (Mentzer, *et al.*, 2001: 16).

### **2.6.1 FUNCTIONAL SCOPE OF SUPPLY CHAIN MANAGEMENT**

Since the term 'process' refers to the combination of a particular set of functions to achieve a specific output, all of the traditional business functions should be included in the process of supply chain management. The concept of a supply chain has originated within the logistics literature, and logistics has continued to have an important impact on the supply chain management concept. The Council of Logistics Management's states that logistics is that part of the supply chain process that plans, implements, and controls the efficient flow and storage of goods, services, and related information from the point of origin to the point of consumption in order to meet customers' requirements. The Council distinguishes between logistics and supply chain management, in that logistics is one of the functions contained within supply chain management (Mentzer, *et al.*, 2001: 16).

Tyndall (1998) proposes that "supply chain management logistics" is the art of managing the flow of materials and products from source to user. Supply chain management - the logistics system – includes the total flow of materials, from the

acquisition of raw materials to delivery of finished products to the ultimate users, as well as the related counter-flows of information that both control and record material movement (Fawcett & Magnan, 2002: 347; Mentzer, *et al.*, 2001: 16).

Supply chain management is more comprehensive than logistics, in that supply chain management entails the management of multiple business processes, including logistics processes. A fundamental shift must be made away from managing individual functional processes, to managing integrated chains of processes. Marketing research, promotion, sales, information gathering, research and development, product design, new product development, and total systems/values analysis should also be included. The functional scope of supply chain management encompasses all the traditional intra-business functions. The extent of integration can begin with product design, and incorporate all steps leading to the ultimate sale of the item (Gattorna, 1996: 85-85; Mentzer, *et al.*, 2001: 17; Power, 2005: 252). The integration of supply chain processes can provide an effective means by which costs can be reduced and customer service levels improved (Cottrill, 1997: 52).

### **2.6.2 ORGANISATIONAL SCOPE OF SUPPLY CHAIN MANAGEMENT**

Leading-edge entities have realised that the real competition within an industry is not necessarily entity against entity, but rather supply chain against supply chain. A supply chain as a whole may have its own identity and function like an independent firm. To accomplish this ultimate supply chain however, all entities in the supply chain must have a supply chain orientation. The result is a fully managed supply chain.

Effective supply chain management is made up of strategic partnerships or alliances where the emphasis is on cooperation and partnership between the parties, not competition and conflict. This forms the basis upon which a joint competitive advantage is developed. Mutually sharing of information, risks, and rewards helps to yield this competitive advantage (Gattorna, 1996: 189). They also contend that the successful supply chain relies on the formation of strategic partnerships with long-term orientations. A network of entities, through upstream and downstream linkages,



is known as the organisation for supply chain management (Mentzer, *et al.*, 2001: 17).

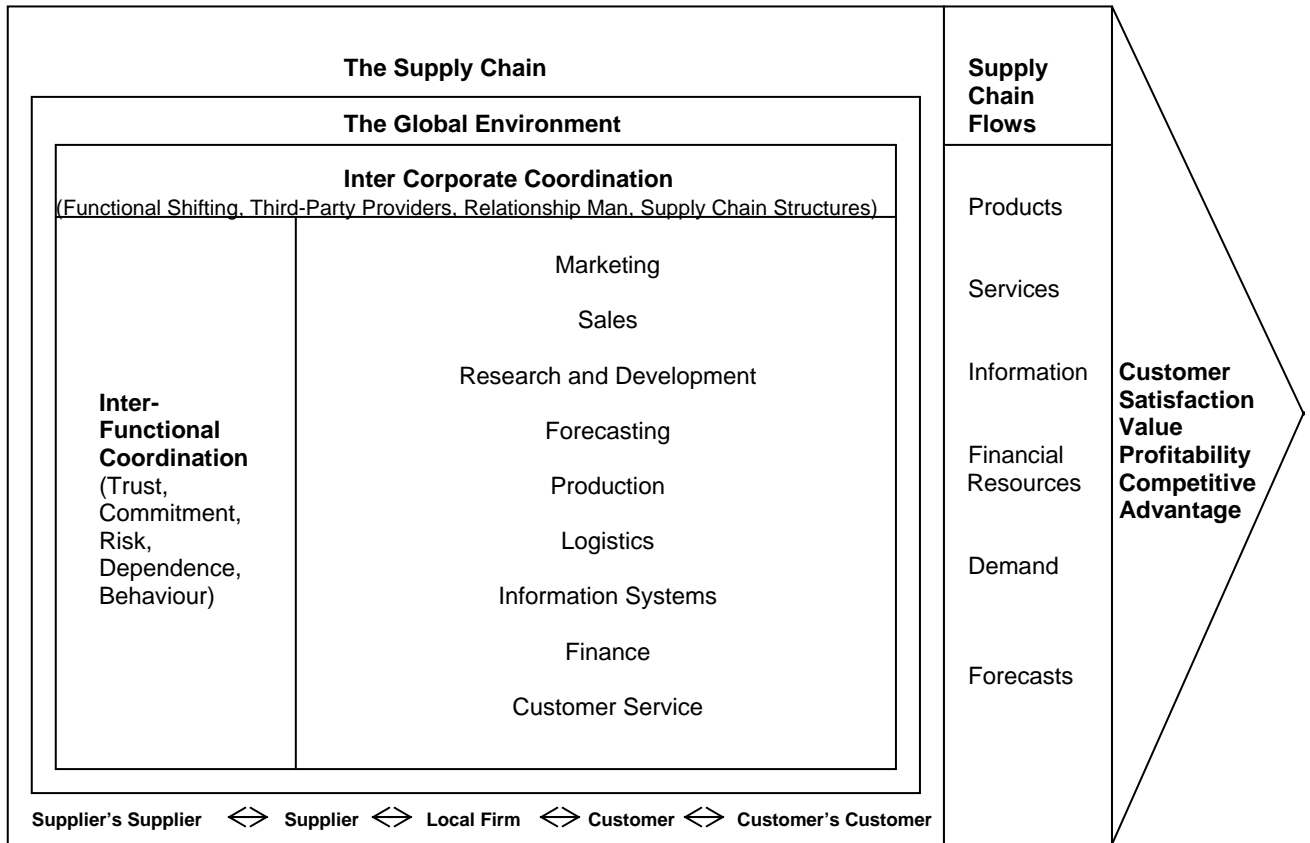
Networks are the complex, multifaceted organisational structures that result from multiple strategic alliances (sets of supply chains). Mentzer, *et al.* (2001: 17) proposes that a network is a well-recognised organisation for supply chain management. The basic characteristic of a network organisation is an amalgamation – a loose and flexible coalition guided from a core where the key functions include development and management of the alliances themselves, coordination of financial resources and technology, definition and management of core competencies and strategies, development of relationships with customers, and management of information resources that bind the network. It is proposed that networks compete with networks, rather than firms with firms (Lamming, Johnsen, Zheng & Harland, 2000: 676; Mentzer, *et al.*, 2001: 17).

## 2.7 DEFINING SUPPLY CHAIN MANAGEMENT

As previously seen, supply chain management involves multiple firms, multiple business activities, and the coordination of activities across functions and across entities in the supply chain. Mentzer, *et al.* (2001: 18) uses these aspects to define supply chain management as the systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular entity and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual entities and the supply chain as a whole.

This definition implies much more about the management of a supply chain, and led to the development of the conceptual model illustrated in Figure 2.3. This supply chain can be illustrated as a pipeline, with Figure 2.3 illustrating a view of the pipeline from the side. This illustration shows directional supply chain flows that include products, services, financial resources, the information associated with these flows, and the informational flows of demand and forecasts. The traditional business functions of marketing, sales, research and development, forecasting, production, procurement, logistics, information technology, finance, and customer service manage and accomplish these flows from the supplier's suppliers through the

customer's customer to ultimately provide value and satisfaction to the customer. This also indicates the critical role of customer value and satisfaction to achieve competitive advantage and profitability for the individual companies in the global environment and the supply chain as a whole (Mentzer, *et al.*, 2001: 18).



**Figure 2.3: A Model of Supply Chain Management**

Source: Mentzer, *et al.*, (2001: 18)

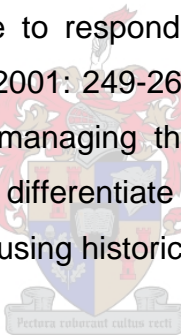
## 2.8 CRITICAL SUCCESS FACTORS IN AGILE SUPPLY CHAIN MANAGEMENT

The need for entities to become more responsive to the needs of customers, the changing conditions of competition and increasing levels of environmental instability, is the driving interest in the concept of “agility”. Christopher (2000: 37) makes a clear distinction between speed (meeting customer demand in the context of shortened delivery lead times), leanness (doing more with less) and agility (responding quickly to changes in demand in terms of both volume and variety). These concepts have

been extended beyond the traditional boundaries of the individual entity to encompass the operations of the supply chain within which the entity operates.

Members of the supply chain will largely determine the effectiveness of an entity's response to rapidly changing market conditions. Should a manufacturer have a key supplier with poor quality and delivery records, he will find it very difficult to provide a high level of customer service, even in a stable business environment. Should this manufacturer be placed in a changing, unstable business environment, it could be eliminated from participation in the competitive game altogether (Power, *et al.*, 2001: 248).

The reliability of supply becomes a critical issue that can best be accomplished with the sharing of accurate, timely information. At the downstream end of the supply chain, this same manufacturer will find it hard to operate in this environment if its distribution channels are unable to respond due to physical or informational flow related issues. Power, *et al.* (2001: 249-263) identifies some of the factors critical for successful agile entities in managing their supply chains. In this study they identified a range of factors that differentiate more agile manufacturing entities from less agile manufacturing entities using historical data:



- Customer satisfaction. A high level of customer focus was interpreted in the more agile entities driven by the use of a combination of management techniques and new technology. Moderately strong and significant relationships were found with supplier relations. This relationship for the more agile entities signifies a link between working closely with suppliers on developing products, improving processes and quality initiatives, and higher levels of customer satisfaction. It is important to note that this provides support for the notion of a supply chain with all players working as a unit focused on the requirements of the ultimate customer.
- Average process changeover time. More agile entities appeared to place a greater emphasis on the importance of continuous improvement methodologies, improvement in technology and resource management, focusing on improving the average process changeover time.

- Productivity. It was found that the more agile entities viewed the optimal application and use of technology as the primary determinant of operational performance (or it could be indicative of the fact that this group has perhaps been early adopters of new technologies).
- Delivery in full on time. Resource management was found to be important in the association with delivery performance, given the nature of manufacturing and its reliance on effective planning and resource allocation. A strong relationship was found between participative management style and the more agile entities. More agile entities see their management processes and systems as impacting ultimately on the organisation's ability to meet customer requirements (i.e. delivery in full, on time). Operational performance and productivity are seen to be a function of ultimately of how successfully customer requirements are met.
- Relative technological competitiveness. The utilisation of technology and the ability to compete was evident in the more agile entities, reporting a stronger relationship in the association with resource management. The focus on the importance of technology was a key difference between more agile and less agile entities. This reinforces the importance of applying new technologies to facilitate agility in the management of the supply chain.
- Competitive advantage through ability to develop new products. The application of technology to provide an ability to compete through the development of new products is consistent with the focus on customer service in more agile entities. More agile entities see the application of technology as enabling them to compete more effectively by offering a wider variety of products.
- Product innovations. More agile entities see innovation to be facilitated by appropriate management processes (e.g. human resources, knowledge management, etc.), and perceive it as an issue distinct from that of actually developing a new product. This is a subtle but important difference, particularly as it indicates a certain degree of sophistication and discretion in the way more agile companies operate.

Analysis of this survey provides some interesting insights into factors differentiating “more agile” entities from “less agile” entities. More agile entities can be characterised as more customer focused, and applying a combination of “soft” and “hard” methodologies in order to meet changing customer requirements. These entities also see the involvement of suppliers in this process as being crucial to their ability to attain high levels of customer satisfaction. More agile entities differentiate between new product development and innovation, understanding that they are two different concepts requiring different application of techniques and organisational resources. In the case of new product development, the important factor is the appropriate utilisation of technology, while innovation is seen to be associated more closely with a participative management style and continuous improvement methodologies. Less agile organisations can be characterised as more internally focused with a bias towards internal operational outcomes. They see the role of suppliers more as support of productivity and process improvement rather than to promote customer satisfaction (Power, *et al.*, 2001: 262-263).

## 2.9 OUTSOURCING

Entities have found it useful to focus more narrowly on certain value chain activities and rely on outsiders to perform the remaining value chain activities, they have begun outsourcing activities formerly performed in-house and concentrating their energies on a narrower portion of the value chain. Thompson and Strickland (2001: 182) state that outsourcing involves withdrawing from certain stages/activities in the value chain system and relying on outside vendors to supply the needed products, support services, or functional activities. Outsourcing pieces of the value chain, formerly performed in-house to narrow the boundaries of a firm’s business, makes strategic sense whenever:

- The activity can be performed better or more cheaply by outside specialists.
- The activity is not crucial to the firm’s ability to achieve sustainable competitive advantage and will not hollow out it’s core competencies, capabilities, or technical know-how.

- It reduces the entity's risk exposure to changing technology and/or changing buyer preferences.
- It streamlines entity operations in ways that improve the entity's flexibility, cut cycle time, speed decision-making, and reduce coordination costs.
- It allows an entity to concentrate on its core business and do what it does best.

### **2.9.1 ADVANTAGES OF OUTSOURCING**

Relying on outside specialists to perform certain activities offers a number of strategic advantages (Thompson & Strickland, 2001: 184):

- Obtaining higher quality and/or cheaper components or services than internal sources can provide.
- Improving the entity's ability to innovate by interacting and allying with "best-in-world" suppliers who have considerable intellectual depth and innovative capabilities of their own.
- Enhancing the entity's strategic flexibility should customer needs and market conditions suddenly shift.
- Increasing the entity's ability to assemble diverse kinds of expertise speedily and efficiently.
- Allowing the firm to concentrate its resources on performing those activities internally that it can perform better than outsiders and/or that it needs to have directly under its own strategic control.

### **2.9.2 DISADVANTAGES OF OUTSOURCING**

According to Thompson and Strickland (2001: 185) the biggest danger of outsourcing is that an entity will farm out too many or the wrong types of activities and hollow out its own capabilities. In such cases an entity loses touch with the very activities and expertise that over the long run contribute to and determine its success.

## 2.10 PERFORMANCE MEASUREMENT AND CONTROL IN SUPPLY CHAIN MANAGEMENT

As an indispensable management tool, performance measurement provides the necessary assistance for performance improvement in pursuit of supply chain excellence. However, there are many critical drawbacks misrepresenting the existing performance measurement systems from making a significant contribution to the development and improvement of supply chain management (Chan and Qi, 2003: 209).

Neely, Gregory and Platts (1995: 80) define performance measurement as the process of quantifying effectiveness and efficiency of action, where measurement is the process of quantification and action leads to performance. From a marketing perspective, entities achieve (thus they perform), by satisfying customers with greater efficiency and effectiveness than their competitors.

According to Horngren, Foster, Datar and Uliana (1999: 244), two attributes of performance are commonly measured:

- Effectiveness: the degree to which a predetermined objective or target is met (i.e. quality and time).
- Efficiency: the relative amount of inputs used to achieve a given level of output (i.e. cost involved).

It is important to transfer the complex reality of performance into a sequence of limited symbols that can be communicated and reported under similar circumstances. Performance measurement has a far more significant role in modern business management. It is much more than just quantification and accounting. Performance measurement provides important feedback information to enable managers to monitor performance, reveal progress, enhance motivation and communication, and diagnose problems (Chan & Qi, 2003: 210).

In supply chain management, performance measurement can facilitate understanding and integration among the supply chain members. The effectiveness

of strategies and the success and potential opportunities are revealed and identified. It helps with decision-making, in particular in re-designing business goals and strategies, and re-engineering processes (Chan & Qi, 2003: 210).

A supply chain is not just a collection of independent, self-centred entities, nor is supply chain management the coordination of interfaces between the fragmented functions of supply chain members. The supply chain should be viewed as an integrated entity, and all the members should be functionally coordinated as an extended enterprise. Chan & Qi (2003: 211) suggests that a holistic system-thinking perspective is employed to suit the real initiatives of supply chain management. The supply chain performances should be measured beyond the organisational boundaries rather than focusing locally. The performance measurement system should span all the business aspects involved in the supply chain.

According to Dekker (2003: 1), interfirm relationships and networks are an indispensable part of business relationships. Recently, more recognition was given to the implications for organisational design and management control within and between entities. Issues addressed by accounting literature are the make-or-buy decisions and outsourcing of activities, inter-organisational cost management, supply chain relationships, alliances and business networks and value chain analysis.

Ramos (2004: 134) suggests that effective management accounting techniques can create considerable value for inter-organizational supply chains by:

- providing timely and accurate information about the activities required for their success (i.e. to support and facilitate decisions throughout the organisation); and
- providing information about the efficiency and quality of tasks performed, and about the performance of managers and operating units (i.e. to ensure that actions are consistent with plans).

Both issues are related to the need for information and sharing information.



Effectiveness refers to the extent to which customer requirements are met, while efficiency is a measure of how economically the firm's resources are utilised when providing any given level of customer satisfactions. Neely, Gregory and Platts (1995: 80) suggest that the level of performance an entity attains is a function of the efficiency and effectiveness of the actions it undertakes:

- Performance measurement can be defined as the process of quantifying the efficiency and effectiveness action.
- A performance measure can be defined as a metric used to quantify the efficiency and/or effectiveness as an action.
- A performance measurement system can be defined as the set of metrics used to quantify both the efficiency and effectiveness of actions.

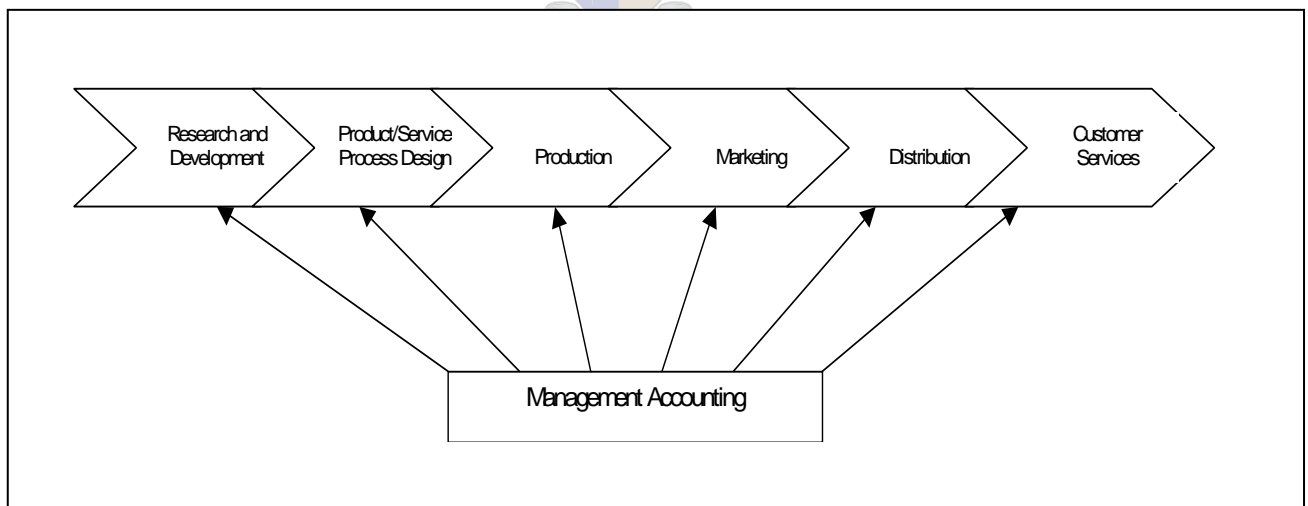
### **2.10.1 APPROPRIATE PERFORMANCE MEASURES**

In order to show a real insight of supply chain performance, the appropriate performance measures that best suit the supply chain context must be used. The measures should indicate the comprehensive performances of supply chains. They should involve relevant non-financial and intangible dimensions of performance. These performances should cover such areas as: those of critical concern to supply chain common goals and strategies; those of inter-influence and of common concern among the supply chain partners; and those concerning both internal partners and external customers (Chan & Qi, 2003: 212).

Manufacturers face an increasing pressure of customers' requirements in product customisation, quality improvement, and demand responsiveness. Chan and Qi (2003: 212) state that the more complex the underlying reality or situation, the more varied and comprehensive the performance measures should be in order to sufficiently capture that reality. Due to varying goals and strategies, each supply chain requires its own appropriate measure that varies from supply chain to supply chain. An as indispensable management toll, performance measurement provides the necessary assistance for performance improvement in pursuit of supply chain excellence.

Performance measures increasingly focus on reducing the total costs of the entity as a whole. Such a focus is central to the total value-chain-analysis theme in the new management approach. According to Horngren, *et al.*, (1999: 3, 245), the value chain is the sequence of business functions in which utility (usefulness) is added to the products or services of an entity. These functions are:

- Research and Development (R&D) – the generation of, and experimentation with, ideas related to new products, services, or processes.
- Design of products, services, or processes – the detailed planning and engineering of products, services, or processes.
- Production – the co-ordination and assembly of resources to produce a product or deliver a service.
- Marketing – the manner in which individuals or groups firstly learn about and value the attributes of products or service, and secondly purchase those products or services.
- Distribution – the mechanism by which products or services are delivered to the customer.



**Figure 2.4: The Value Chain of Business Functions**

Source: Horngren, *et al.*, (1999: 4)

Total value-chain-analysis treats each of the business functions as an essential and valued contributor (See Fig 2.4), integrating and co-ordinating the efforts of all

business functions, in addition to developing the capabilities of each individual business function. This does not imply that managers should proceed sequentially through the value chain. There are important gains to be realised (in terms of cost, quality, and the speed with which new products are developed) from having the individual parts of the value chain work concurrently (Horngren, *et al.*, 1999: 4, 14).

### 2.10.2 CRITICAL DIMENSIONS OF PERFORMANCE MEASUREMENT

Some critical dimensions of performance measures are discussed from the following three areas, i.e. inputs, outputs, and composite measures: (Chan & Qi, 2003: 212-213)

- Input measures. These include popular dimensions such as time and costs. Time is a strategic dimension in assessing the management performance in pursuit of faster responsiveness and lower inventory level. It is of critical concern to both internal and external customers. In particular, some processes such as materials and products delivery always emphasise the performance on operational time, which is closely related to customer satisfaction. Cost dimension relates to consumption of a variety of resources, such as labour, capital, knowledge, facility, etc. Cost also involves the loss and scrap in material management and production. It indicates the effectiveness of business management and production productivity.
- Output measures. From suppliers through manufacturers to distributor and sales, the processes add value to the materials and products or provide services. Tangible outputs include semi-finished products and finished products. At the same time there are a variety of intangible added values that need consideration. These outputs are measured by assessing their functional performance with their missions. There are a variety of popular performance dimensions in supply chain management: delivery reliability in timeliness and error-free, flexibility in manufacturing, customer responsiveness' to demand and new product introduction.

- Composite measures. Productivity, efficiency, and utilisation are composite performance measures widely employed to assess the outputs in comparison with inputs or expectation. Composite measure involves both inputs and outputs, and should be well-defined and normalised in order to address mutual understanding and channel-spanning benchmarking. According to Chan and Qi (2003: 213), this design is valuable because it facilitates a deeper insight of the process performance from inputs and outputs aspects than the financial accounting method does. These “operational” dimensions of process performance feedback provide more visual information about the management effectiveness.

When using a performance measurement method, supply chain managers can easily benchmark the performances of the whole system, and then analyse the effectiveness of their strategies, identifying the potential opportunities. All this feedback information facilitates more objective decision-making and performance improvement in supply chain management (Chan & Qi, 2003: 222).

Chan and Qi (2003: 209) suggest that a holistic system-thinking perspective is employed to suit the real initiatives of supply chain management. The supply chain performances should be measured beyond the organisational boundaries, where performance measurements systems should span all the business aspects involved in the supply chain.

### **2.10.3 CRITERIA FOR PERFORMANCE MEASUREMENT DESIGN**

Rather than proposing frameworks, Neely, *et al.*, (1995: 80) suggests that it is preferable to rather provide criteria for performance measurement design. Globerson (quoted in Neely, *et al.*, 1995: 80) suggests that the following guidelines can be used to select a preferred set of performance criteria:

- Performance criteria must be chosen from the entity’s objectives.
- Performance criteria must make possible the comparison of entities that are in the same business.

- The purpose of each performance criterion must be clear.
- Data collection and methods of calculating the performance criterion must be clearly defined.
- Ratio-based performance criteria are preferred to absolute number.
- Performance criteria should be under control of the evaluated entity.
- Performance criteria should be selected through discussions with the people involved (customers, employees and managers).
- Objective performance criteria are preferable to subjective ones.

Similarly, Maskell (quoted in Neely, *et al.*, 1995: 80) offers seven principles of performance measurement system design:

- The measure should be directly related to the firm's manufacturing strategy.
- Non-financial measures should be adopted.
- It should be recognised that measures vary between locations – one measure is not suitable for all departments or sites.
- It should be acknowledged that measures change as circumstances do.
- The measures should be simple and easy to use.
- The measures should provide fast feedback.
- The measures should be designed so that they stimulate continuous improvement rather than simply monitoring.

Once a performance measurement system has been developed it has to be implemented. This means that the performance measurement system will have to interact with a wider environment than just the entity.

## **2.11 CONTROL IN SUPPLY CHAIN MANAGEMENT**

Robbins and Decenzo (2001: 7) define control as the process of monitoring performance, comparing it with goals, and correcting any significant deviations. A manager must monitor the entity's performance in order to ensure that all goals and objectives are reached after planning is done, and also to ensure that nothing goes

wrong. Managers must be informed and be in control (Robbins & Decenzo, 2001: 7; Schermerhorn, 2004: 102).

The fundamentals of controlling are basic managerial responsibility and an important key to sustained organisational productivity. Controlling is a process of measuring performance and taking action to ensure desired results (Schermerhorn, 2004: 102). Schermerhorn (2004: 103) indicates that the purpose of control is straightforward – to ensure that plans are fulfilled and that actual performance meets or exceed entity objectives.

### **2.11.1 STEPS IN THE CONTROL PROCESS**

Schermerhorn (2004: 103-105) identified four steps in the control process:

- establish objectives and standards;
- measure actual performance;
- compare results with objectives and standards; and
- take corrective action as needed.

The control process begins when performance objectives and standards are set through planning (Robbins & Decenzo, 2001: 415). The objective provides the performance targets and the standards provide the measurement for assessing actual accomplishments. Two types of standards can be used for this purpose (Schermerhorn, 2004: 103):

- Output standards measure results in terms of performance quantity, quality, cost, or time.
- Input standards measure effort in terms of the amount of work completed in task performance.

The second step of the control process is to measure actual performance. The measurement must be accurate enough to spot significant differences between what is really taking place and what was originally planned. A common failure in entities is

a reluctance or inability to rigorously measure performance (Schermerhorn, 2004: 104). Four common sources of information frequently used to measure actual performance are personal observation, statistical reports, oral reports, and written reports. Although each of them has particular strengths and weaknesses, a combination of them increases both the number of input sources and the probability of receiving reliable information (Robbins & Decenzo, 2001: 416).

Step three is to compare measured performance with objectives and standards. This determines whether or not there is a need for corrective action. This can be expressed as the need for action equalling the desired performance minus actual performance (Schermerhorn, 2004: 104). The degree of discrepancy between actual performance and the standard is determined. Some variations in performance can be expected in all activities. It is critical to determine the acceptable range of deviation. Deviation in excess of this range become important and must receive the manager's attention (Robbins & Decenzo, 2001: 418).

The last step in the control process is to take action necessary to correct or improve future performance. Corrective action can restore performance to the desired level (Schermerhorn, 2004: 104). According to Robbins and Decenzo (2001: 419), there are three courses of action managers can take. They can do nothing, they can correct the actual performance, or they can revise the standard. Examples of corrective actions might include changes in strategy, structure, compensation practice, or training programs, the redesign of jobs or the replacement of personnel.

### **2.11.2 EFFECTIVE CONTROLS**

Effective controls in an entity share the following characteristics (Schermerhorn, 2004: 105; Robbins & Decenzo, 2001: 421):

- Controls should be accurate. A control system that generates inaccurate information can result in management's failure to take action when it should or responding to a problem that doesn't exist. An accurate control system is reliable and produces valid data.

- Controls should be strategic and results orientated. They should support strategic plans and focus on significant activities that make a real difference to the entity.
- Controls should be understandable. They should support decision-making by presenting data in understandable terms.
- Controls should encourage self-control. They should allow for mutual trust, good communication, and participation between everyone involved.
- Controls should be timely and exception oriented. They should report deviations quickly, lending insight into why a performance gap exists and what might be done to correct it. Controls must also call management's attention to variations in time to prevent serious infringement on performance.
- Controls should be positive in nature. They should emphasise their contribution to development, change, and improvements.
- Controls should be fair and objective. Everyone should consider them impartial and accurate. Control standards must be reasonable and attainable.
- Controls should be flexible. Controls must be flexible enough to adjust to problems or to take advantage of new opportunities.
- Controls should have multiple criteria. If management controls by using a single measure, effort will be focused only on that standard. Multiple measures of performance widen this narrow focus. They are more difficult to manipulate and can discourage employees' efforts to merely look good.
- Controls measures should suggest corrective action. An effective control system not only indicates when a significant deviation from standard occurs but also suggests what action should be taken to correct the deviation.



### 2.11.3 ORGANISATION CONTROL SYSTEMS

Each component in an entity's control systems should contribute to maintaining predictably high levels of performance. At the same time that internal control is encouraged and supported, external control should be appropriate and rigorous (Schermerhorn, 2004: 108).

The management process itself facilitates control. In planning, control via strategy and objectives occur when work behaviours are initially directed toward the right end results. When performance goals are clearly set and understood, lack of performance because of poor direction in one's work is less likely to occur (Schermerhorn, 2004: 108).

Control via policies and procedures operate in similar ways. Good policies and procedures exist to guide behaviour, and entity's members are more likely to act uniformly on important matters. Control via learning occurs when past experience is systematically considered and incorporated into future strategies, objectives, policies, and procedures (Schermerhorn, 2004: 108).

Good organising also facilitates management control. Control by selection and training occurs when capable people are hired and given the ongoing training needed to perform their jobs at high levels of accomplishment. The closer the match between individual skills and job requirements, the less need there is for external control and the greater the opportunity for internal control. Control via performance appraisal occurs when individual performance is assessed and evaluated to ensure high performance results. This also helps to identify areas where training and development are needed (Schermerhorn, 2004: 108).

Control via job design and work structures operates similarly. It puts people in jobs designed to best fit their talents. When all jobs are well coordinated in workflows and operations, this structures activities and adds substantially to control. Leadership contributes to control through performance modelling. This occurs as leaders set the examples so that workers have good models to follow in their job activities. Control by performance norms occurs when team or group members share commitments to

high performance standards and reinforce one another's efforts to meet them. Control via organisational culture occurs in similar fashion when core values add a shared sense of meaning and add purpose throughout the entity (Schermerhorn, 2004: 108).

Secondly, discipline as a managerial control, must be handled in a fair, consistent and systematic way. Discipline is the act of influencing behaviour through reprimand (Schermerhorn, 2004: 109). Progressive discipline ties reprimands to the severity and frequency of misbehaviour. The goal is to achieve compliance with organisational expectations through the least extreme reprimand possible (Schermerhorn, 2004: 108).

The use of information in the financial analysis of firm or organisational performance is critical. The pressure is ever present today for all organisations to use their resources well and to perform with maximum efficiency. Typically, the financial aspects of performance are assessed using a variety of financial ratios (including liquidity ratios, leverage ratios, asset management ratios, etc.). These ratios can be used to initially set goals and then track actual performance. They can provide for historical comparisons within the firm or in external benchmarking relative to industry performance (Schermerhorn, 2004: 108).

## **2.12 SUMMARY**

The supply chain was defined as a system of basic flows, demand and supply, where three or more entities are involved, directly in the upstream and downstream flow of products, services, finances, and/or information. Supply chain management is the integration of planning, coordination and control of all business processes and activities in the supply chain, in order to efficiently and effectively deliver superior consumer value to the end-consumer, while satisfying all relevant role-players within the supply chain.

Three forms of supply chains exist. Firstly a direct supply chain, secondly an extended supply chain and lastly, the ultimate supply chain, which include all the

entities involved in the up- and downstream flows of products, services, finances and information from the ultimate supplier to the ultimate customer.

Supply chain management can be seen as a management philosophy, the implementation of a management philosophy and lastly as a set of management processes. As a philosophy, supply chain management takes a systems approach to viewing the supply chain. The implementation of a management philosophy requires that a set of activities is coordinated within the supply chain in order to facilitate the entity to operate or behave consistently with this supply chain philosophy.

An entity should recognise the systematic, strategic implication of the tactical activities involved in managing the various flows in a supply chain. It is not to say that entities with a supply chain orientation can implement it – it requires a supply chain orientation across several entities directly connected to the supply chain.

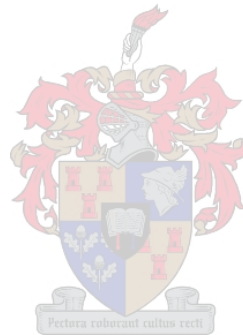
It is recognised that many antecedents and consequences of supply chain management can influence the implementation of supply chain orientation philosophy by either enhancing it or hamper it.

The scope of supply chain management encompasses two categories: functional and organisational. The functional scope refers to that traditional business functions which are included or excluded in the implementation and the process of supply chain management. The organisational scope of supply chain management encompasses what kind of inter-firm relationships are relevant to the participating firms in the implementation and the process of supply chain management.

Critical success factors are important. A range of factors that differentiate more agile manufacturing entities from less agile manufacturing entities were established. Performance measurement and control provide the necessary assistance for performance improvement in pursuit of supply chain excellence. Performance measurement and the importance thereof play a critical role in the entity. The value chain was identified as the sequence of business functions in which utility (usefulness) is added to the products or services of an entity.

Critical dimensions of performance measures exist. These include inputs, outputs, and composite measures. The recognition of an entity of the important criteria for performance measurement design is significant.

Controlling is the process of monitoring performance and taking corrective actions as needed. The four steps in the control process are firstly to establish performance objectives, secondly to measure actual performance, in the third place to compare results with objectives and lastly to take the necessary action to resolve problems or explore opportunities. Effective control measures must have certain characteristics such as flexibility, accuracy, results orientated, etc. Control by using the management process occurs when management functions are implemented well. Discipline is an essential part of control in an entity. Using financial ratios that deal with issues of liquidity, leverage, asset management, and profitability, assists information and financial controls.



## CHAPTER 3: SUPPLY CHAIN MANAGEMENT THEORY

### 3.1 INTRODUCTION

The focus of logistics has recently shifted from operational areas to an ability to add customer value. An integrated supply chain model can be used to examine and evaluate logistics operations of an entity. Tracey and Tan (2001: 174) emphasised that supply chain management can provide a sustainable competitive advantage by providing customer satisfaction. It is important for an entity to customise its supply chain to suite the particular unique circumstances within the industry. This is achieved by accepting value creation through teamwork, selecting and effectively utilising the appropriate information technology, enhancing individual effectiveness and generating flexibility (Gilmour, 1999b: 283).

Supply chain management can provide a sustainable competitive advantage by:

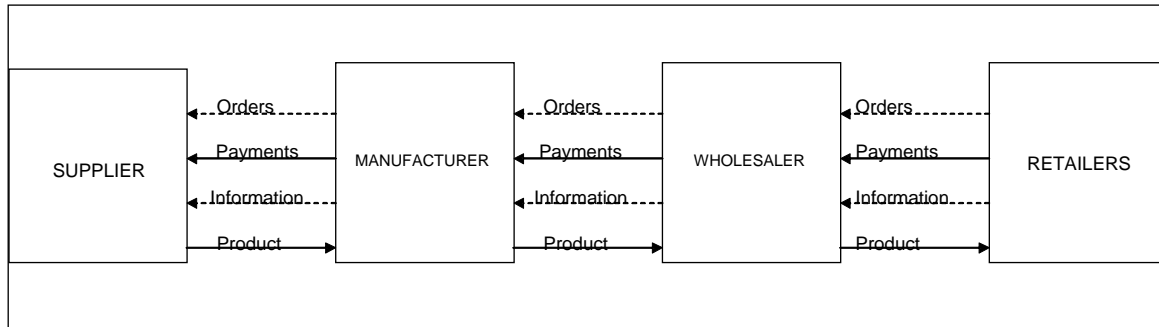
- Enabling the organisation to please customers,
- by improving product offerings and services,
- while simultaneously reducing cost.

The ultimate aim of supply chain management is to attain high levels of customer satisfaction while reducing costs for the entity. Measuring logistics performance has traditionally focused on operational areas. Recently, more entities are becoming customer orientated in reducing response time to customer requests, improving quality, placing more emphasis on teamwork, and managing for the long term. This has shifted the focus for logistic performance to an ability to add customer value. (Lau, Pang and Wong, 2002: 271; Gilmour, 1999a: 355).

The supply chain management theories of Lambert and Stock (1999: 106); Lambert, Stock and Ellram (1998: 505), Kempainen and Vepsäläinen (2003:703), Christopher and Towill (2001: 235) and Gilmour (1999: 357), will be examined.

### 3.2 LAMBERT AND STOCK

The channel of distribution theory as seen in Lambert and Stock (1999: 106) are used as comparison to other relevant supply chain management theories. This indicates the major flows of material in a channel of distribution.



**Figure 3.1: Channel of Distribution**

Source: Lambert and Stock (1999: 106)

Most distribution channels are loosely structured networks of vertically aligned firms. The specific structure depends to a large extent on the nature of the product and the firm's target market. There is no "best" structure for firms in the same product market. It is management's responsibility to determine their channel structure within the framework of the firm's corporate and manufacturing objectives, its operating philosophy, its strengths and weaknesses, and the infrastructure of its manufacturing facilities and warehouses. Should the entity target multiple market segments, management may have to develop multiple channels to service these markets efficiently (Lambert & Stock, 1999: 106; Lambert, *et al.*, 1998: 506).

Lambert and Stock (1999: 102) emphasise the importance of cost-trade offs within the channel of distribution in order to improve efficiency and effectiveness within the channel. These cost-trade offs can be performed either within a single firm or between different levels of the channel. The single firm's goal would be to find the

most efficient way to offer the desired level of service. For the channel, the goal is to improve overall efficiency by reallocating functions, and therefore costs, amongst its members. The level of customer service the manufacturer offers, for example, will have a significant impact on other channel members.

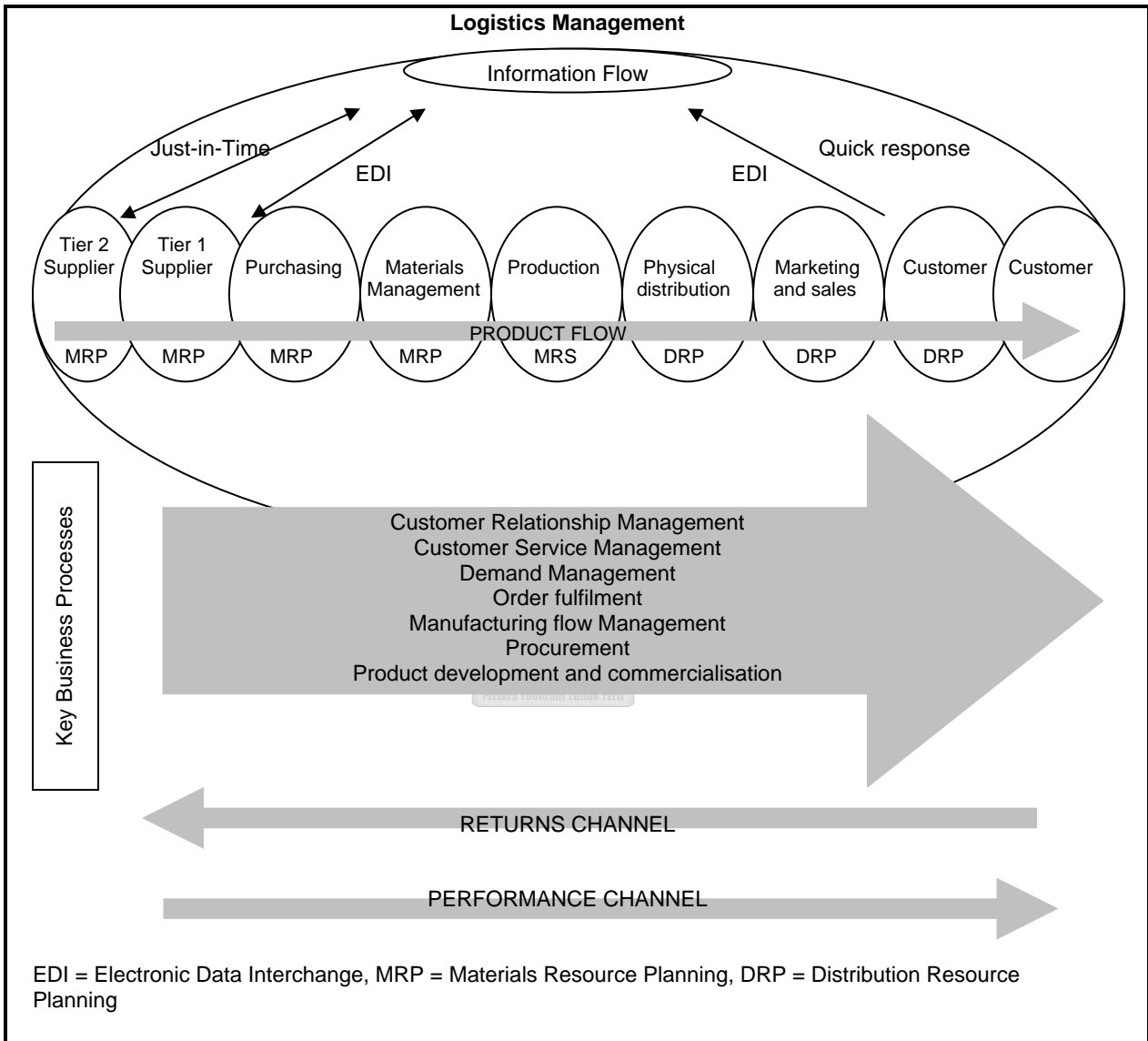
Information sharing and communications within the channel is very important. A manufacturer whose product availability is poor and whose order cycle time is inconsistent may force the wholesaler to carry more inventories for safety reasons. This will enable the wholesaler to offer a more acceptable level of service to the retail level of the channel, but will afford him a higher level of logistics costs. The lower logistics costs for the manufacturer were achieved at the expense of the other channel members, and the entire channel may be less efficient (Lambert and Stock, 1999: 102-103).

If management concentrates on systems changes that improve logistics efficiency or effectiveness, it may be possible to satisfy all of the entity's objectives. The latest communication technology offers a unique opportunity for improving the efficiency and effectiveness of the channel of distribution. If communication flows throughout the channel are improved, all members will be able to reduce inventories while improving customer service (Lambert and Stock, 1999: 103-105).

Although not specifically called a supply chain, the distribution shows the same attributes as that of a supply chain, i.e. supplier, firm and customer (upstream and downstream flows within the channel). Here the manufacturer is the entity, with the wholesaler and retailer the respective customers. Comparing it to Mentzer, *et al.*'s channel relationships as seen in Chapter 2, this channel of distribution is a combination of the direct supply chain, where there is only a supplier, entity and customer, and the extended supply chain, which has a more complicated structure that includes supplier's suppliers and customer's customers. In this case the customer's customer would be the retailer to the wholesaler.

### **3.3 LAMBERT, STOCK AND ELLRAM**

Figure 3.2 shows how supply chain management spans organisational boundaries, considering trade-offs both within and among entities regarding where inventory should be held and where activities should be performed:



**Figure 3.2 Supply Chain Management**

Source: Lambert, Stock and Ellram (1998: 505)



According to Lambert, *et al.*, (1998: 504-505) channels develop when many exchanges take place between producers and consumers. The alignment of firms that bring products or services to market has been called the supply chain, the demand chain or the value chain. Supply chain management is a systems approach that is highly interactive and complex, and requires simultaneous consideration of many trade-offs.

The dynamic nature of the business environment requires management to monitor and evaluate the performance of the supply chain regularly and frequently. When performance goals are not met, management must evaluate possible supply chain alternatives and implement change (Lambert, *et al.*, 1998: 504-505).

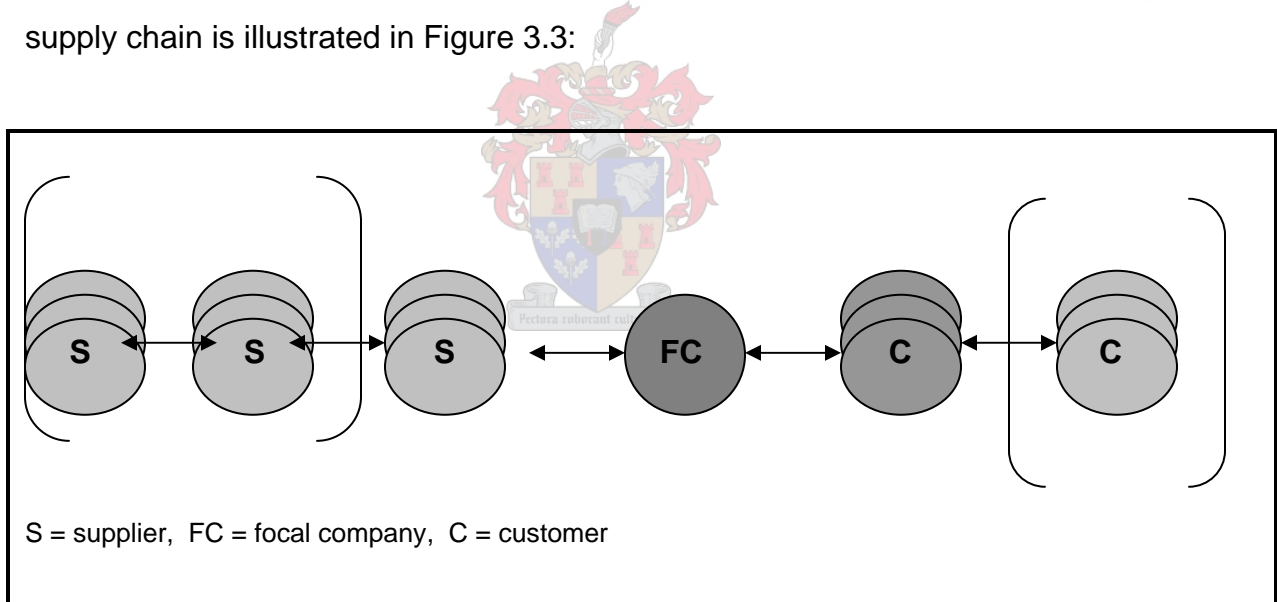
### **3.4 KEMPPAINEN AND VEPSÄLÄINEN**

Kemppainen and Vepsäläinen (2003: 701) identified the potential supply chain management as; a strategic view of materials and distribution management that show the benefits to individual entities from the boost of performance of the supply chain as a whole through specific business processes across functional and corporate borders. According to Kemppainen and Vepsäläinen (2003: 702) the analysis of supply chain management practices refers to the extent to which entities share information within supply chains and what types of orders, schedules and plans are made jointly between partners within these supply chains.

Kemppainen and Vepsäläinen (2003: 702) identified the following three expected trends for supply chain management and some anticipated breakthrough strategies. This was mainly based on the structural changes observed by managers.

### 3.4.1 THE EMERGENT SUPPLY CHAIN

In the early 1990s entities started to identify their business environment from the supply chain perspective and to build effective supply chains that operate according to the best supply chain management practices. The practices were assumed to be consistent throughout companies and supply chains. Operations were typically analysed and problems were identified from the viewpoint of material flow efficiency. Improvement plans focused on operational issues. McMullan (1996: 79) reports that inventory management and cost competitiveness were perceived as key supply chain management issues. Supply chain collaboration extended only to the closest partners, and in many cases second-, third- and *n*'th-tier suppliers and customers were not identified. Information was collected from the customer side, but was not shared upstream. The typical view of an emergent supply chain is illustrated in Figure 3.3:



**Figure 3.3: How supply chains were first perceived in the early 1990s – the Emergent Supply Chain**

Source: Kempainen and Vepsäläinen (2003: 703)

A major trend in the emergent supply chain appears to be that each entity focused on their first-tier suppliers and customers. Today supply chain collaboration

extends far beyond first-tier suppliers and customers. Entities are more aware of the intricacy and the increasing uncertainty of business operations, and inter-firm relationships are complex in that they no longer fit into simplified supply chain illustrations despite the continuous effort to decrease the number of suppliers. Managing an effective portfolio of all buyer-supplier relationships as adapted to product and market conditions was considered as good practice (Kemppainen & Vepsäläinen, 2003: 704).

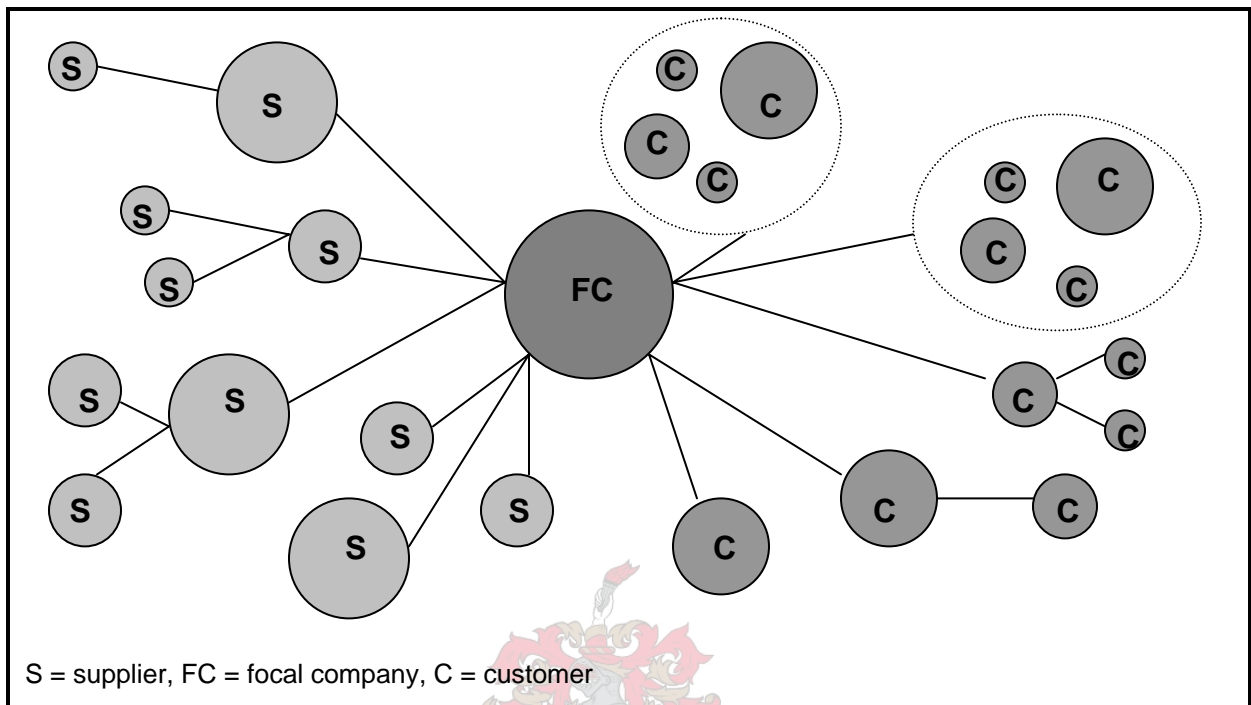
Industrial entities were also learning to listen to customer needs. This resulted in standardisation and modularisation being implemented to enable cost-efficient mass customisation. According to Kemppainen and Vepsäläinen (2003: 704) this was in accordance with supply chain management principles as introduced in the late 1990s.

### **3.4.2 THE EXTENDED SUPPLY CHAIN**

Figure 3.4 illustrates Kemppainen and Vepsäläinen's (2003: 704) extended supply chain. The level and extent of information sharing is harder to assess than in the emergent ones, due to the changing relationships and supply chain structures. Fawcett and Magnan (2002: 339) emphasised that chain-wide transparency has not realised and only a few entities fully understood their supply chains, even though more and more entities worked harder to make processes and relationships transparent.

Kemppainen and Vepsäläinen's (2003: 704) study reveals that the distinction between partners and standard suppliers or customers guides collaboration. Key partners have better access to planning information and order-specific data whereas so called standard suppliers and customers have to be satisfied with continuing uncertainty. However, even with partners, information sharing may be limited to informal and occasional sharing of thoughts and views among managers. Kemppainen and Vepsäläinen (2003: 704) indicated that dramatic growth in

information sharing calls for new types of buyer-supplier relationships (which are yet to be innovated over the next decade, if ever).



**Figure 3.4: The Extended Supply Chain**

Source: Kemppainen and Vepsäläinen (2003: 704)

### 3.4.3 SUPPLY NETWORKS

Kemppainen and Vepsäläinen (2003: 705) summarised the predictions made on the emerging mega-trends challenging the foundations of business relationships and promoting value management:

- Collaboration will be the most strategic capability in the extended supply chain.
- Service and support will become as important as the product self.
- Entities will improve their service capability to adapt in a turbulent environment.

- Assets and functions not at the core of value delivery are to be divested.

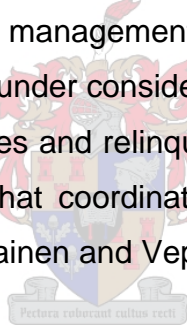
According to Kemppainen and Vepsäläinen (2003: 705), collaboration not only refers to the development of dyadic buyer-supplier relationships, but also to facilitating real time information sharing within supply chains. The success in turbulent business environments depends on delivering new products and services at a faster rate and transforming value chains into customer-focused virtual networks.

Kemppainen and Vepsäläinen (2003: 705) do not see above-mentioned trends as radical. The current operating modes of industrial entities and those trends being implemented are not far removed from each other. Component suppliers are transforming into module suppliers, offering not only a narrow manufacturing expertise but a holistic service solution. Product manufacturers do not only sell the product but also services such as financing, maintenance, and replenishment. Kemppainen and Vepsäläinen (2003: 705) suggest that not only is information sharing the new dominating operating mode, but also the sharing of cost information to enable chain-wide cost minimisation.

The importance of focusing on core competencies is resulting in the increasing outsourcing of operations, which is at the heart of supply chain management. A problem with outsourcing is the potential loss of control. Kemppainen and Vepsäläinen (2003: 706) uses the term 'hollow corporation' to provide reminders of the risks of losing both assets and talents as a result of outsourcing of manufacturing operations and just coordinating product flows to markets. Kemppainen and Vepsäläinen's (2003: 706) interpretation of structural changes necessary in forming supply chain networks includes clear market-based relations for the functions that were outsourced. Reducing the number of suppliers or channels and building a customised relationship with the selected partners often forms the extended network.

The next stage in networking would be to relax some of the tight dyadic relationships and bring in more of the market coordination through standardisation, shared systems and competitive services. Kemppainen and Vepsäläinen (2003: 706) alternate their focus on two networking mechanisms, linking and scooping: firstly relationships are built between individuals and entities for continuity, and then more units are included under common control for scale economies.

Buyer-supplier relationships will become long-term and intensive in supply networks. It is expected that there will be more partnership arrangements instead of arms-length relationships. The intensity of this development depends on two factors: the position of the entity in the supply chain and the direction of relationship (buyer/supplier). Collaboration is expected to become the dominant way of supply and demand management and to impact upon logistical performance. Supply chains are under considerable change and entities reposition themselves by assuming new roles and relinquishing old ones. It is expected that there will be dominant entities that coordinate, integrate, and orchestrate value offering of supply chains (Kemppainen and Vepsäläinen (2003: 711-712).



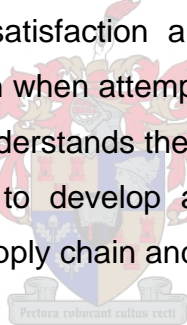
On the other hand, Kemppainen and Vepsäläinen (2003: 712) argue that supply chains and networks are too large and complex to be controlled by only one entity. Many entities view themselves as a driver and leader of the chain but there will definitely be other interested candidates. The large channel partners strive to take strong positions, e.g. as total service providers, whereas some small channel partners also pursue rather comprehensive roles as integrators or innovators.

In conclusion it is seen that increasing customer requirements and improved information technology have affected supply chain management efforts. Today the extended multi-tier structures of supply chains as well as the need for information sharing and collaborative planning are better understood within entities. Information sharing and coordination are often considered to be the preconditions

for successful supply chains. Kemppainen and Vepsäläinen (2003: 717) emphasised that, owing to continuous structural change of the business environment that is reflected in the supply chains and individual entities, the very concept of the supply chain, let alone the practice of managing one, should be subject to re-examination in a wider context. To reach, and even exceed, the current ideal of supply chain management practices, the strategic preconditions for innovative networking also need to be in place in a entity.

### **3.5 CHRISTOPHER AND TOWILL**

According to Christopher and Towill (2001: 235) a key feature of the present business day is the idea that it is supply chains that compete, not entities, and the success or failure of supply chains is ultimately determined in the marketplace by the end consumer. Customer satisfaction and marketplace understanding are crucial elements for consideration when attempting to establish a new supply chain strategy. Only when an entity understands the requirements and constraints of the marketplace, can they attempt to develop a strategy that will assist them in meeting the needs of both the supply chain and the end customer.



Supply chain performance improvement initiatives strive to match supply to demand, thereby driving costs down, simultaneously improving customer satisfaction. This requires that uncertainty within the supply chain be reduced as much as possible to facilitate a more predictable upstream demand. Christopher and Towill (2001: 235) emphasises that it is impossible to remove uncertainty entirely from the supply chain. Specific supply chains will have to accept uncertainty but need to develop a strategy that still enables them to match supply and demand.

Getting the right product, at the right price, at the right time to the consumer is not only the key element to competitive success but also the key to survival. Customer satisfaction and marketplace understanding are crucial elements for consideration

when attempting to establish a new supply chain strategy. In a business environment where demand is volatile and the customer requirement for variety is high and relatively unpredictable, a high level of agility is required from the entity (Christopher & Towill, 2001: 234-235).

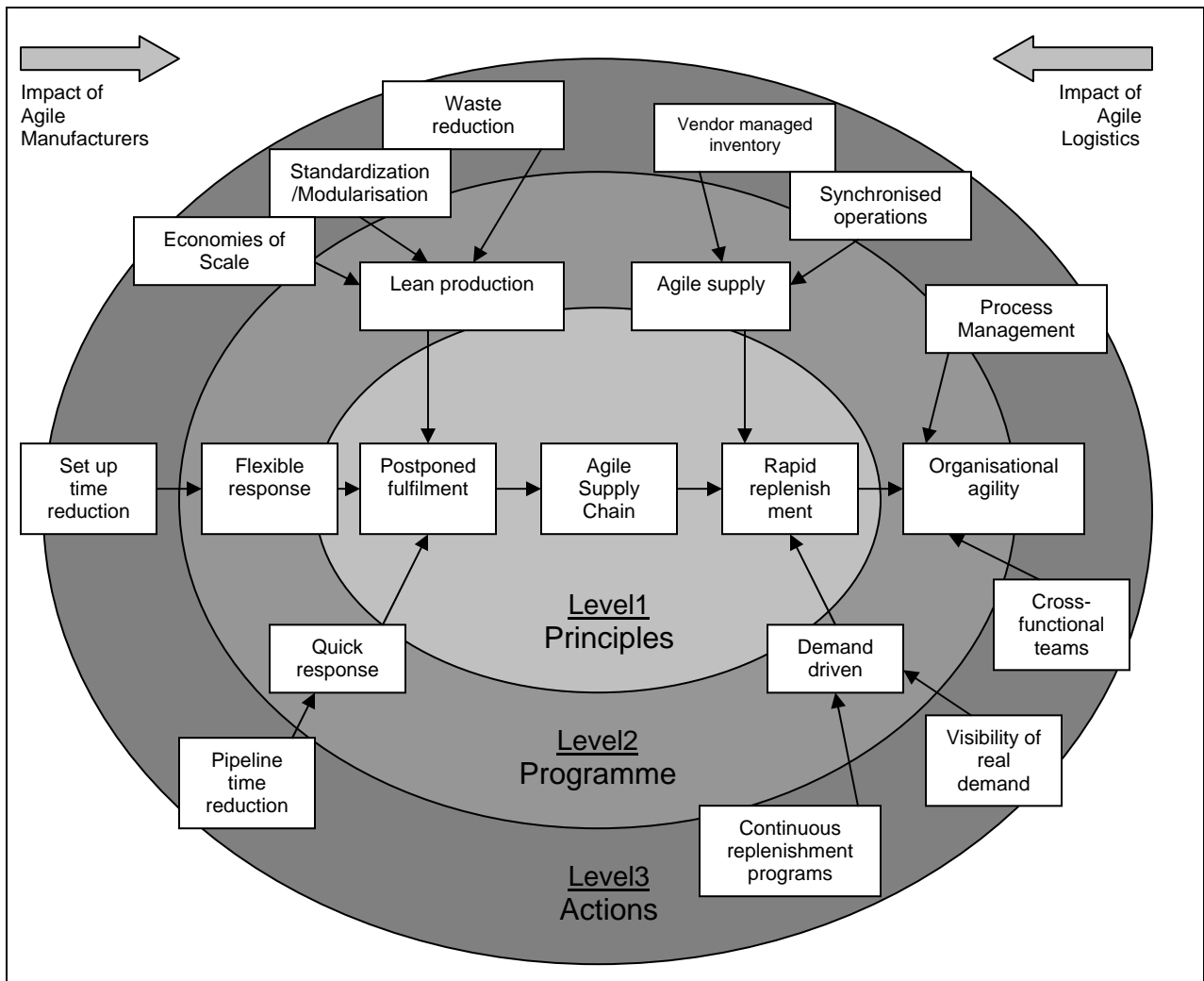
Agility is a business-wide capability that embraces organisational structures, information systems and logistics processes. A key characteristic of an agile entity is flexibility. Initially, agility was believed to be in flexible manufacturing systems, but was later extended into the wider business context and the concept of agility as an entity orientation originated (Christopher & Towill, 2001: 236).

Naylor, Naim and Berry (1999: 107) define agility and leanness as:

- Agility meaning using market knowledge and a virtual corporation to exploit profitable opportunities in a volatile marketplace.
- Leanness meaning developing a value stream to eliminate all waste including time, and to enable a level schedule.

According to Christopher and Towill (2001: 242) the real focus of supply chain re-engineering should be on seeking ways in which the appropriate combination of lean and agile strategies can be achieved. They propose an integrated model to provide the essential infrastructure to assist in this process, as seen in Figure 3.5:





**Figure 3.5: An integrated model for enabling the agile supply chain**

Source: Christopher and Towill (2001: 243)

Christopher and Towill (2001: 242) argue that lean methodologies could be a big contributor to the creation of agile enterprises. In Figure 3.5 a three-level framework suggests a summarisation of the agile supply chain. Here various strands, which contribute to the agile supply chain, are brought together. Level 1 represents the key principles that underpin the agile supply chain; rapid replenishment and postponed fulfilment. Level 2 identifies the individual programs such as lean production, organisational agility, and quick response, which must be implemented in order for Level 1 principles to be achieved. Level 3 specifies

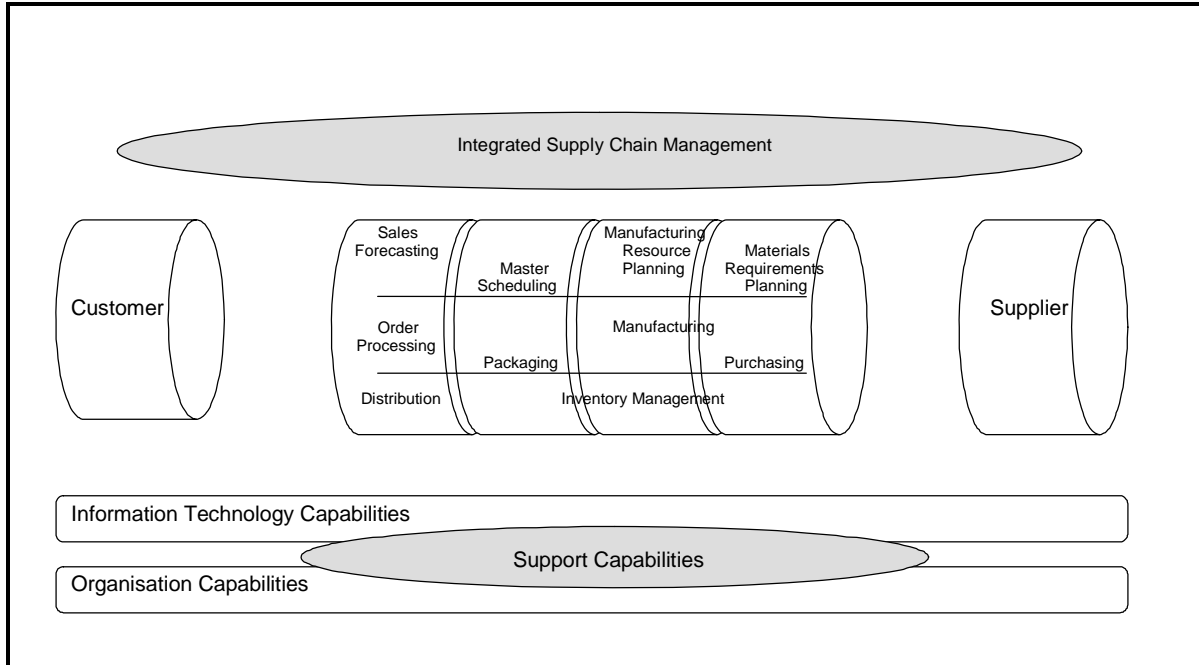
individual actions to be taken to support Level 2 programs, e.g. time compression, information enrichment, and waste elimination. Not all of these characteristics as shown in Figure 3.5 may be necessary in any one specific market/manufacturing context, but it is likely that the agile supply chain will represent many of these elements (Christopher & Towill, 2001: 243).

Rapid replenishment requires agile suppliers, entity agility, and a demand driven supply chain. Nor must the cultural side be forgotten, since it may be the single biggest barrier to effective change. Creating an agile supply chain clearly requires a number of significant changes to the status quo. Supply chain managers also need to be change managers, not just managing change within the entity, but managing change in the way that relationships between entities are structured (Christopher & Towill, 2001: 244).

It is becoming increasingly apparent that competitive advantage derives from the combined capabilities of the network of linked entities that is by now known as the supply chain. This is a fundamental shift in the traditionally held view of a business model based upon a single firm. It has also become apparent that markets today are increasingly volatile, less predictable and therefore the need for a more agile response has grown. This leads to the conclusion that a pre-requisite for success in these markets will be an agile supply chain (Christopher & Towill, 2001: 245).

### **3.6 GILMOUR**

Gilmour (1999a: 355-356) illustrated the integrated supply chain model as comprising functional process capabilities with organisational characteristics as well as information technology as support.



**Figure 3.6: The integrated supply chain model**

Source: As adapted from Gilmour (1999: 357)

It comprises six functional process capabilities, which are supported by enabling capabilities in organisational characteristics and information technology. An entity with an integrative approach to managing its supply chain operations will tend to have the majority of these capabilities in place:

- Process capabilities:
  - Customer-driven supply chain. A customer-driven supply chain enables manufacturers to understand their customers' needs and proactively offer solutions that deliver increased value.
  - Efficient logistics. An ability to move products and materials from suppliers through manufacturing and to customers at the lowest possible costs while meeting or exceeding customer requirements.

- Demand-driven sales planning. Accuracy of projections for product volume and mix and their consistent use throughout the organisation in production scheduling, vendor management and sales and operations planning.
  - Lean Manufacturing. Effective utilisation of the manufacturing base (achieving high equipment reliability, minimal rework, low inventories, short change over times) while maintaining high levels of flexibility and quality.
  - Supplier Partnering. Integration of manufacturers' and suppliers' supply chain activities to maximise the value and cost efficiency of purchased material and services.
  - Integrated supply chain management. Management of the supply chain at two levels: tactical management across functional and entity boundaries; and strategic consideration of cost and performance options.
- Information Technology Capabilities:
    - Integrated Information Systems. Improved quality and timeliness of business data to drive supply chain planning, execution and performance monitoring from a common base, resulting in high integrity and consistency of decision making.
    - Advanced technology. To improve the efficiency of workflows and to enable new ways to manage the supply chain.
- Organisation Capabilities:
    - Integrated Performance Measurement. Enables the translation of business objectives into specific operational and financial targets for elements in the supply chain. Regular measurement

and analysis of supply chain performance benefits suppliers and customers.

- Teamwork. A focus on building the knowledge base of individuals enhances the ability of employees to work together effectively to achieve broader business goals and improve performance.
- Aligned Organisation Structure. A cross-functional structure with the objective to support business processes.

According to Gilmour (1999: 362), cost is a crucial competitive element for entities, but it is not the only element of their strategy. With the more complex strategies that entities pursue, effective supply chain management is a key strategic element and operating an integrated logistics systems a reasonable objective.

### **3.7 COMPETITIVE ADVANTAGE OF SUPPLY CHAIN MANAGEMENT**

In the private sector, competitive advantage can be obtained through strategy and supply chain management. Research done by Deloitte and Touche (2002: 271) indicates that 98% of respondents agree that logistics and supply chain management is either 'critical' or 'very important' when looking at saving costs. Although departments in the public sector are not competing with companies for a competitive advantage, it can still use private sector management principles to gain a 'competitive advantage' by adding value to customers, reducing costs, and increasing customer satisfaction (Lau, Pang and Wong, 2002: 271). This also applies to the Department of Defence (DOD), which is a government department in the Republic of South Africa. This research will aim to assist the SA Army to utilise supply chain management efficiently and effectively in order to add value for the entity.

### 3.8 SUMMARY

Various authors' theories on supply chain management were discussed. The efficient and effective utilisation of a supply chain in an entity is important, with the focus on reducing costs while achieving a competitive advantage through adequate supply chain management.

Lambert and Stock emphasised the use of a channel of distribution where the major flows of material in a channel of distribution are noted as important. This is a simple theory, but the basics of distribution management, such as information sharing, communication and logistics functions, are included.

Lambert, Stock and Ellram underlined that organisational boundaries can be extended within a supply chain, considering trade-offs both within and among entities within the supply chain. The supply chain highlights key business processes, while information flow plays a vital role in this highly interactive and complex systems approach supply chain.

The theories of Kemppainen and Vepsäläinen included a complex mix of supply chains, starting at the very basic and simple, and ending in a complex arcade of role players. The analysis of supply chain management practices refers to the extent to which entities share information within supply chains and what type of orders, schedules and plans are made jointly between partners within these supply chains. Kemppainen and Vepsäläinen identified various expected trends for supply chain management. Firstly, supply chains can be very simple in that they only extend to the closest partners, focusing only on their first-tier suppliers and customers. Secondly, it may become more complex, with second- or even third-tier suppliers and customers involved. Lastly, supply networks where clear market-based relations are included for the functions that are outsourced.

Christopher and Towill's support the agile supply chain concept. Here the

emphasis falls on agility, as it is impossible to remove uncertainty entirely from the supply chain. Entity specific strategies must be developed to enable entities to match supply and demand. In a business environment where demand is volatile and the customer requirement for variety is high and relatively unpredictable, a high level of agility is required from the entity. Here agility calls attention to the ability of the entity to use market knowledge to exploit profitable opportunities in a volatile market, while developing a value stream by eliminating all waste (including time). The most appropriate combinations of lean and agile strategies must be achieved. Creating an agile supply chain requires a number of significant changes to the status quo of the entity, where managers should not only manage the change within the entity, but also the relationships between entities in the supply chain.

Gilmour's supply chain is an integrated supply chain model comprising of functional process capabilities, with organisational characteristics and information technology as support. These functional process capabilities, which include customer-driven supply chain, efficient logistics, lean manufacturing, demand-driven sales planning, supplier partnering and integrated supply chain management, are supported by integrated information systems and advanced technology. Organisational capabilities, which include integrated performance measurement, teamwork and aligned organisation structure also support these functional process capabilities. Gilmour states that with more complex strategies that entities pursue, effective supply chain management is a key strategic element and operating an integrated logistics system a reasonable objective to pursue.

Although supply chains can become very complex, it consists of basic, simple components that can be applied to all entities in order to establish and implement a supply chain for supply chain management. The SA Army must use these basic components to streamline their current supply chain in order to implement efficient and effective supply chain management.

## **CHAPTER 4: ARMY LOGISTICS AND SUPPLY CHAIN MANAGEMENT**

### **4.1 INTRODUCTION**

The term 'management' is seldom used in the context of military operations, yet several aspects of modern warfare lend themselves to common management disciplines. Information management controls, filters, processes and routes the flow of data and information on the battlefield. Manpower management has a significant role in that it becomes more important as more specialised personal qualifications and training are needed to operate and maintain advanced weapon systems. Movement management is applied throughout a campaign to accumulate the force in the theatre of operations and to deploy it in the various zones in the theatre. The term management is even occasionally used in combat operations with regard to fire control. As more advanced, effective and expensive weapon systems enter the battlefield, efficiency must be considered, along with the more traditional effectiveness objective in mind. Attaining efficiency depends on good management (Kress, 2002: vii).

However, according to Kress (2002: vii), the broadest, most complex and probably the oldest of all the managerial aspects of warfare is logistics – the management of combat resources and combat means.

### **4.2 DEFINING LOGISTICS IN A MILITARY CONTEXT**

Van Creveld (1977: 1) defines logistics as the practical art of moving armies and keeping them supplied. Strategy, like politics, is said to be the art of the possible. What is possible is determined not merely by numerical strengths, doctrine, intelligence, arms and tactics, but by those regarding requirements, supplies expected and available, organisation and administration, transportation and channels of communication.

Kress (2002: 4) defines logistics as the art of moving armies. It comprises the order and details of marches and camps, and of quartering and supplying troops. In a word, it is the execution of strategic and tactical enterprises. Kress (2002: 5) defines



logistics as the process of planning and executing the movement and sustainment of operating forces in the execution of military strategy and operations. It is the foundation of combat power – the bridge that connects the nation’s industrial base to its operating forces (Kress, 2002: 5).

War is associated with terms such as destruction, annihilation, conquest and defeat. Its conduct is dictated, to a large extent, by abstract and intangible terms such as leadership and morale. Still it may be possible to treat it as a production system in the economic and engineering sense. War can thus be viewed as a system that produces outputs from inputs, in spite of the malicious actions of an agent called “the enemy”, through a process that is called warfare or combat (Kress, 2002: 5).

Using this as basis to define logistics, Kress (2005: 5) characterise it as a discipline that encompasses the resources that are needed to keep the means of the military process (operation) going in order to achieve its desired outputs (objectives). Logistics includes planning, managing, treating and controlling these resources.

#### **4.3 THE PURPOSE OF LOGISTICS IN THE ARMY**

Experience of history in warfare since the military expeditions of Alexander The Great to the Gulf War teaches us that logistics is an important and inseparable part of the military and of warfare. Logistics facilitates movement, fire and sustainment of momentum and vitality of combat forces along time and space. Military logistics is a multi-dimensional and complex entity that constitutes one of the most important and essential components of warfare. Kress (2002: 2) highlights that logistics can be viewed as a complex mix of physical entities, processes and rules – that is, as a system – that is governed by mostly abstract concepts and principles. This complex mix is a critical ingredient in any attempt to conduct war, and constitutes (the) logistics *raison d’être* (foundation). Throughout history numerous military leaders did not realise the essence of logistics and failed to appreciate its impact on the battlefield. They paid dearly for their negligence. George Washington in the American War of Independence, Napoleon in Spain and in Russia, General Ludendorff in WWI, Field marshal Montgomery in WWII and General McArthur in the Korean War, are but a few examples of commanders who excelled in combat

planning and execution whose disregard of logistics resulted in grave operational consequences (Kress, 2002: 2).

According to Kress (2002: 2), the purpose of logistics is quite clear: to support the waging war and to sustain the troops on the battlefield. In particular, the purpose of logistics is to facilitate movement and fire, to treat and evacuate casualties and to deploy and position human resources, and supply them with food and other personal needs. Logistics also fulfils a psychological function by impacting on morale. As provider of military resources, logistics play an important role in unifying the force, preserving its motivation and strengthening the moral authority of its commanders.

#### **4.4 LOGISTICS IN THE MODERN MILITARY CONTEXT**

Since the end of the Cold War, the United States' Department of Defence (USDOD) has dramatically reduced its fighting forces and logistics infrastructure (USDOD, 1999: i). It also reports that significant reductions can be achieved by adopting a variety of different logistics support practices. The Department has taken a number of significant steps in recent years directed at improving its outdated and inefficient logistics processes. The Office of the Secretary of Defence and each of the military services and appropriate Defence commands have established a number of significant logistics reengineering efforts.

The USDOD (USDOD, 1999: i, 11-12) has indicated as one of their top three acquisition priorities, the requirement to modernise their logistics systems. They indicated that this would cut costs, reduce infrastructure and cycle times, and most importantly, improve support of their 21<sup>st</sup> century War fighters (their clients). In their FY2000 USDOD Logistics Strategic Plan, they have indicated that by FY2006, the USDOD logistics process will possess defining characteristics in some focus areas. The most important ones applicable include: (USDOD, 1999: i, 11-12)

- Integrated supply chain. The USDOD logistics process will operate as a fully integrated supply chain that ensures products and services efficiently meet the needs of a joint war fighting force. The logistics process becomes a continuous and integrated operation from the

supplier of materiel to the ultimate customer. Logistics performance measures are based primarily on satisfying customer requirements at the point of need.

- Streamlined business processes. Large investments in inventories and personnel are replaced with significantly improved reliability, shortened processing cycles, agile manufacturing, flexible maintenance, and time-definite delivery of products and services. Organisational echelons are limited to those that demonstrate a value-added contribution to the war-fighting mission.
- 'Best value' products and services. USDOD obtain products, services, and providers competitively. War fighting requirements are satisfied directly by using 'best value' logistics providers. The logistics process selects the method of support from organic and commercial providers that assures the correct quantities, proper product and service quality, and timely delivery of product and service.
- Information access. Widespread access to information permits tailoring support to mission needs rapidly as scenarios and conditions evolve. Compressed times for responding to requirements are facilitated through common information interfaces. The interfaces enable timely and unambiguous communications among the participating services, agencies, and joint commands as well as private-sector activities and allies.

The transformation of the 21<sup>st</sup> Theatre Army Area Command (TAACOM) in Kaiserslautern, Germany, to a Theatre Support Centre (TSC) began in October 1998. With that change, the command activated the theatre's first distribution management centre (DMC) to be structured under the Chief of Support Operations (Paun, 2003: 12-15). The DMC acts as the distribution management support element for the Deputy Commander for Support Operations. The DMC is responsible for controlling the theatre's Army supply chain management mission, roles, and functions by balancing the existing capabilities of the distribution infrastructure with day-to-day and projected operational requirements. Since its implementation, the DMC not only has had a major impact on the theatre in general, but its accomplishments also have been felt in areas as far away as Afghanistan. The DMC is at the leading edge of

developing and implementing sound supply chain management policies, practices, and procedures. It is constantly looking at ways to streamline processes, creating an efficient but effective logistics distribution pipeline while cutting costs, manpower, and infrastructure.

When the transformation process was implemented within the Republic of South Africa after 1994, the concept of a centralised Logistics Agency was developed and structured under command of Chief Joint Support within the SANDF (Log Guidelines for GSB's in the DOD, 1999: O-2). The concept is based on support formations and general support bases, which provide common support to all SANDF activities while unique support is to be rendered by various capabilities in the Arms of Services.

The SANDF logistics support function consists of various elements. These include logistical support for internal operations and exercises, logistical support for external operations and exercises, as well as supply support for domestic logistical demands within the SANDF (Witbooi, 2004).

The Public Finance Management Act (PFMA), Act 1 of 1999, Framework for Supply Chain Management (PFMA, 1999: 2), directs departments within the public sector, including the Department of Defence (DOD), to utilise supply chain management. With this publication, the DOD is instructed to implement supply chain management efficiently and effectively and must provide for at least the following:

- Demand management;
- Acquisition management;
- Logistics management;
- Disposal management;
- Risk management and
- Regular assessment of supply chain performance.

#### 4.5 SOUTH AFRICAN ARMY CAMOUFLAGE CLOTHING SUPPLY CHAIN

The SA Army camouflage clothing supply chain has been identified as an extended supply chain, including suppliers of the immediate supplier and customers of the immediate customer. The SA Army controls the distribution of its camouflage clothing by firstly issuing it as an initial issue to new members of the SA Army, and secondly with regular maintenance of the members' uniform by exchanging obsolete/used camouflage clothing for new uniform pieces on a 'one-to-one' basis (Witbooi, 2004; Brewis, 2005; Du Toit, 2005; Johnson, 2006).

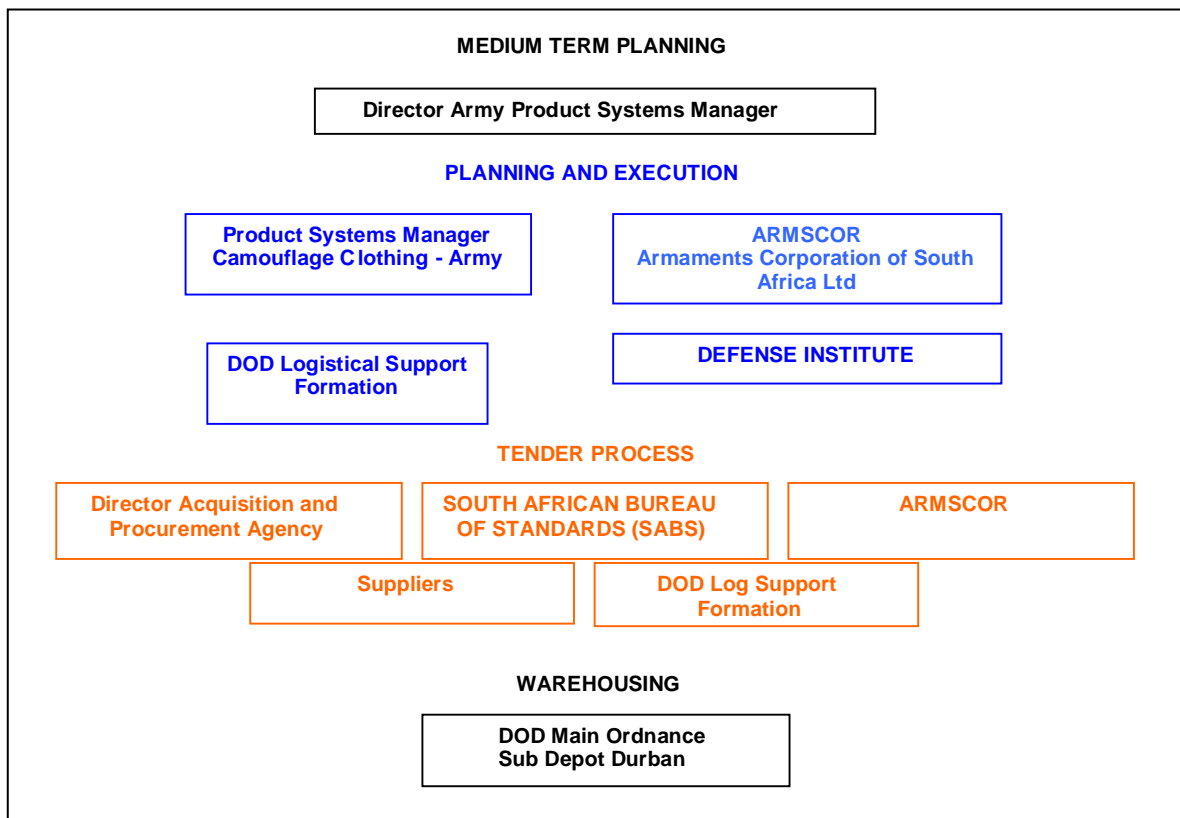
Johnson (2006) and Du Toit (2005) have identified various role players in this extended supply chain. The extended supply chain consists of five levels and these levels have been applied to the SA Army camouflage clothing supply chain:

- Level 1 – Supplier's Supplier. The supplier of combat readiness clothing to the SANDF (as contracted by the SANDF by means of a tender process).
- Level 2 – Supplier. DOD Mobilisation Centre of the SANDF in Bloemfontein. All camouflage clothing are demanded on this depot and issued from here.
- Level 3 – Organisation/Entity. Support Base.
- Level 4 – Client. Force Structure Element (FSE). The unit that demands clothing from the Support Base.
- Level 5 – Client's Client. The soldier on ground level.

##### 4.5.1 LEVEL 1: SUPPLIER'S SUPPLIER

Various role players are involved on this level of the supply chain (Brewis, 2005; Du Toit, 2005; Johnson, 2006). It is important to take note that there are various phases that take place before the manufacture of camouflage clothing within the SANDF is complete. Phase one is the manufacturing of the camouflage textile, while the second phase includes the making of the clothing pieces from the textile. Outsourcing is not new to the SA Army as most non-core and non-sensitive services

and items (such as laundry services, procurement of items, etc.) are outsourced by Director Acquisitions and Procurement. After completion, the manufactured camouflage textile and –clothing are delivered to depots where it is stored. Clients (Support Bases and units) demand clothing from the depot, which is managed by the Product Systems Manager Camouflage Clothing – Army (PSM CC). Thereafter it is distributed to lower levels (users) according to planning requirements. Figure 4.1 is a summary of the planning, execution and tender phases with regard to the textile manufacturing process, with the main role players indicated in each process:



**Figure 4.1: Role Players, Textile manufacturing process**

Source: Du Toit (2005); Johnson (2006).

Director Army Product Systems Manager sets up a medium term business plan for a period of 5 years in order to plan for camouflage clothing, as determined through a needs assessment according to the strategic business plan. The PSM CC ensures that this business plan is executed, determining on a continuous basis the adequate requirement according to the need on hand and current stock levels. As soon as the requirement is determined, the PSM CC liaises with ARMSCOR. ARMSCOR in turn liaises with Defence Institute and contracts them (by means of a service contract,

known as a Service Level Agreement (SLA)) to provide information on what is required (in terms of the configuration management of items) in order for ARMSCOR to be able to place an order for the required textiles. Defence Institute also provides the required quality stipulations for the SABS. The SABS compares this with current specifications and determine if it needs to be altered (the SABS provide a quality service to the DOD). The DOD Log Support Formation (specifically the task of In- and Outbound Logistics) coordinates the in- and outbound logistics with regard to the textiles' movement into and out of the depot (Du Toit, 2005; Johnson, 2006).

This textile process is illustrated in Table 4.1:

**Table 4.1: Textile Manufacturing Process**

Process	Role Player	Time Frame
Determination of Need – Medium Term Planning Process.	Dir Army Product System Manager	5 years. Continuous.
Determination of Need – Execution of Medium Term Plan.	Product System Manager Camouflage Clothing (PSM CC)	Continuous.
Codification and Cataloguing. <ul style="list-style-type: none"> <li>The camouflage material is codified and assigned a catalogue number.</li> </ul>	PSM CC LSF	Continuous.
Ledger creation on system / Assignment of Family Group / Control Guidelines.	PSM CC	13 – 16 weeks.
Specifications allocation. Specifications are allocated to the material that needs to be manufactured.	PSM CC ARMSCOR	
Tender Process. <ul style="list-style-type: none"> <li>Tender Bulletin published at Government Printers.</li> <li>Supplier contact ARMSCOR for a copy of the tender with specifications and details of textile that must be manufactured.</li> <li>All specifications of firms determined by ARMSCOR (point allocation system is used where points are allocated for criteria such as BEE companies, female, PDI and SMME's, etc.).</li> </ul>	ARMSCOR	

Process	Role Player	Time Frame
<ul style="list-style-type: none"> <li>• Firm submits tender.</li> <li>• The SABS do a capability report on the firms who submit tenders. The firm must score <math>\geq 90\%</math> to assure competency in delivering goods.</li> </ul>		
<p>Capability reports on firms are submitted to ARMSCOR for evaluation purposes.</p>	ARMSCOR Tender Board	
<p>Adjudications. Allocation of Tender.</p> <ul style="list-style-type: none"> <li>• Letter of Acceptance is sent to the successful supplier.</li> <li>• The supplier detail is coupled to the Financial Management Centre and a supplier code is allocated to the supplier.</li> <li>• The ledger is allocated to the receiving depot.</li> <li>• Delivery timings are allocated and schedules are solicited.</li> <li>• A Government Order (GO) for the requirement is printed in the name of the supplier.</li> <li>• Copies of the GO are sent to the Supplier, DOD Main Ordnance Sub Depot (DOD MOSD) Durban and the SABS.</li> </ul>	PSM CC Supplier	2 weeks.
<p>Pre-Production Meeting.</p> <ul style="list-style-type: none"> <li>• Specifications are discussed with supplier to ensure that the textiles are manufactured according to the set specifications.</li> <li>• It may happen that suppliers request cancellation of their order at this stage as they have not taken many costs into account and realise that they will not be able to meet the tender specifications (In this case the second best supplier is allocated the order after the cancellations are approved).</li> </ul>	Supplier SABS	4 weeks minimum. This whole process may take a very long time to complete.
<p>Pre-Production Sample.</p> <ul style="list-style-type: none"> <li>• The supplier provides a pre-production sample of the material to the SABS according to tender specifications.</li> <li>• Only the SABS may approve the pre-production sample.</li> <li>• This first pre-production sample</li> </ul>	Supplier DOD MOSD Durban	As stipulated by contract.



Process	Role Player	Time Frame
<p>evaluation by the SABS are paid for by the SANDF.</p> <ul style="list-style-type: none"> <li>• If not approved by the SABS, the supplier must submit a 2<sup>nd</sup> or even 3<sup>rd</sup> sample, until it meets SABS approval (This is paid for by the supplier and can be very costly).</li> <li>• After the approval the supplier goes into full production and arranges in-process inspections/final inspections with the SABS. They also arrange for scheduled delivery with the depot as the production process dictates (This is amended continuously).</li> </ul>		
<p>Delivery at Main Ordnance Sub Depot (Durban).</p>	<p>DOD MOSD Durban Supplier</p>	<p>As completed.</p>
<p><b><u>Depot Issue Voucher/Receipt Voucher Process</u></b></p> <ul style="list-style-type: none"> <li>• The supplier contacts the depot 7 days prior to delivery to arrange a date and time for delivery.</li> </ul>	<p>DOD MOSD Durban</p>	
<p>The depot verifies the invoice and delivery note.</p>	<p>DOD MOSD Durban</p>	<p>1 day.</p>
<p>Count/Measure/Weigh.</p> <ul style="list-style-type: none"> <li>• The invoice/SABS certificate and delivery note are certified against order data to ensure that the correct amount of items are delivered as indicated on the delivery note, and that it is delivered in a serviceable condition. At this stage the SABS will be possession of a sample per lot/batch number as provided by the manufacturer.</li> <li>• The transit personnel checks, writes the piece number and quantity on a depot piece list and packs it into stillages.</li> <li>• The textile with the piece lists and delivery notes are sent to the textile warehouse.</li> <li>• The warehouse commander checks the quantity of the bales and piece lists to see if it corresponds with the delivery note.</li> <li>• When the warehouse commander is satisfied with the order, he signs the</li> </ul>	<p>DOD MOSD Durban</p>	

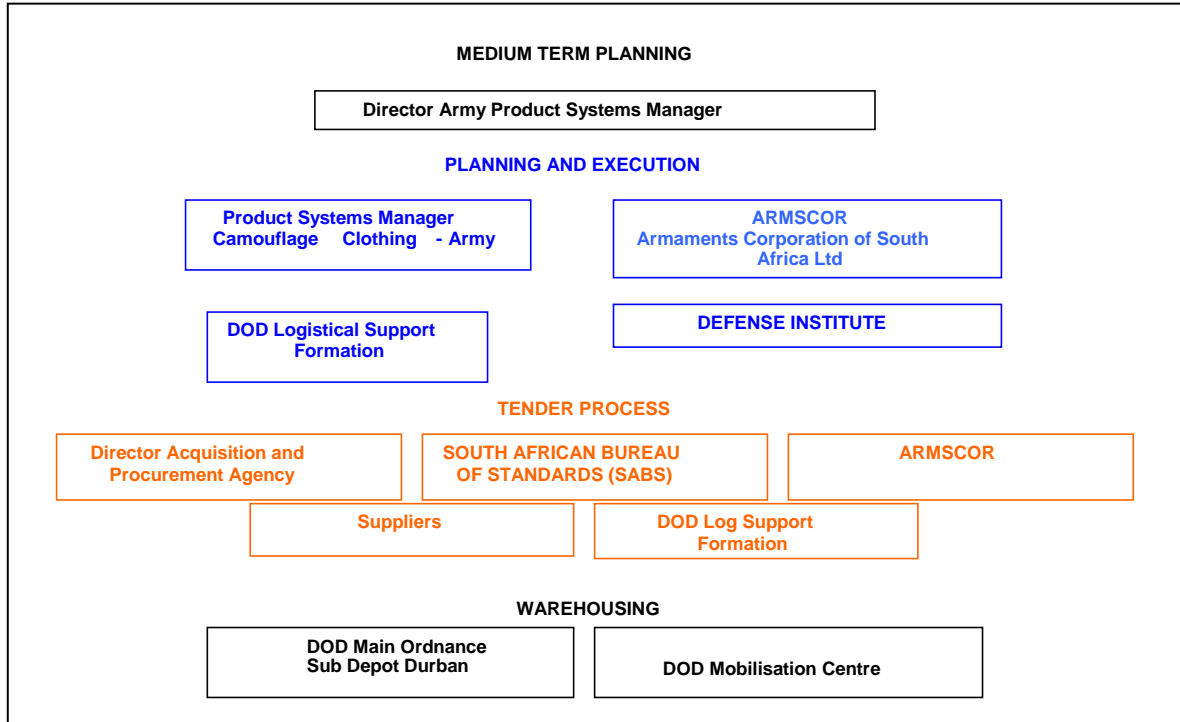
Process	Role Player	Time Frame
<p>documents and returns it to transito.</p> <ul style="list-style-type: none"> <li>• Transit personnel create a file, allocate a consignment number to it and send it to Materiel Logistic Stores Administration (MLSA).</li> <li>• Here a Receipt Voucher is generated and is returned to transito.</li> <li>• The transito personnel write the particulars of the receipt voucher in a receipt voucher register.</li> <li>• The register with the receipt voucher is forwarded to the textile warehouse.</li> <li>• The warehouse commander allocates a batch number, writes all the details of the receipt voucher in the warehouse receipt voucher book.</li> <li>• The warehouse commander returns the documents to transito.</li> <li>• After the personnel of transito checked and signed for the receipt voucher, the documents are forwarded to MLSA where the receipt voucher is posted (finalised).</li> </ul>		
<p>Finalisation of receipt voucher.</p> <ul style="list-style-type: none"> <li>• Receipt voucher is verified.</li> <li>• Receipt voucher is posted (finalised).</li> </ul>	DOD MOSD Durban	
<p>Sent for payment of supplier.</p> <ul style="list-style-type: none"> <li>• Copy of the posted receipt voucher, with a copy of the GO and invoice concerned, are sent to Dir Acquisition and Payment for payment of supplier.</li> </ul>	DOD MOSD Durban	1 day.
<p>Issue of Textiles.</p> <ul style="list-style-type: none"> <li>• MLSA confirms every morning if there are any picking slips (stock to be issued/picked out of the shelves). If there is, the following information appears on it. <ul style="list-style-type: none"> <li>• The demanding factory and code number.</li> <li>• Demand and line number.</li> <li>• Qty, NPN and date.</li> </ul> </li> </ul>	DOD MOSD Durban	
<p>The accounting section sends the picking slip to the textile warehouse.</p>	DOD MOSD Durban	

Process	Role Player	Time Frame
<p>Stock separated.</p> <ul style="list-style-type: none"> <li>• The warehouse commander checks the NPN and quantity on the picking slip and prepares the necessary total of textile which will correspond with the required meterage of the picking slip.</li> <li>• The quantity and batch number is written on the picking slip, signed and returned to MLSA.</li> </ul>	DOD MOSD Durban	
<p>Issue Voucher generated.</p> <ul style="list-style-type: none"> <li>• MLSA generates an issue voucher the next day.</li> <li>• The warehouse commander signs for the issue voucher, enters the relevant detail in the warehouse issue voucher register, confirms the total meterage again and returns the documents (issue voucher book, piece lists and the textile) to transito.</li> </ul>	DOD MOSD Durban	1 day.
<p>Dispatching of textiles.</p> <ul style="list-style-type: none"> <li>• The transit personnel checks the issue, signs the warehouse issue voucher register to this effect, loads the textile into PX containers with the necessary documents and dispatches the textile to the demanding factory.</li> <li>• The transit personnel take the issue voucher to MLSA, where the issue voucher is updated systematically.</li> </ul>		

Source: Du Toit (2005); Jordaan (2005); Christoffel (2006).

After the textile is manufactured and stored, the clothing still needs to be manufactured. The same tender process is used to invite tenders from suppliers to manufacture camouflage clothing from the textile. This is called the “Cut/Make/Trim process” (Du Toit: 2005). The camouflage clothing manufacturing process follows the same path as with the camouflage textile manufacturing process. The same role players are involved, with the addition of the DOD Mobilisation Centre in

Bloemfontein, which is the only clothing depot in the SANDF that warehouse and distribute camouflage clothing to clients. Planning is done over the medium term and executed in the short term involving the PSM CC, DOD Logistical Support Formation and ARMSCOR (See Figure 4.2):



**Figure 4.2: Role Players, “Cut/Make/Trim” process**

Source: Du Toit (2005); Johnson (2006)

The “Cut/Make/Trim” process is summarised in Table 4.2:

**Table 4.2: “Cut/Make/Trim” Process**

Process	Role Player	Time Frame
Determination of Need – Medium Term Planning Process.	Dir Army Product System Manager	5 years. Continuous.
Determination of Need – Execution of Medium Term Plan. A copy of the business plan handed to DOD Mobilisation Centre, Base Ordnance Depot, Bloemfontein (DOD MOB BOD) for next financial year.	Product System Manager Camouflage Clothing (PSM CC) DOD MOB BOD	Continuous.
Codification and Cataloguing. • The camouflage material is codified and assigned a catalogue number.	PSM CC LSF	Continuous.

Process	Role Player	Time Frame
Specifications allocation. <ul style="list-style-type: none"> <li>• Specifications are allocated to the material that needs to be manufactured.</li> </ul>	PSM CC ARMSCOR	13 – 16 weeks.
Tender Process. <ul style="list-style-type: none"> <li>• Tender Bulletin published at Government Printers.</li> <li>• Supplier contact ARMSCOR for a copy of tender with specifications and details of the clothing that must be manufactured.</li> <li>• All specifications of firms determined by ARMSCOR (point allocation system is used where points are allocated for criteria such as BEE companies, female, PDI and SMME's, etc.).</li> <li>• Firm submits tender.</li> <li>• The SABS do a capability report on the firms who submit tenders. The firm must score <math>\geq 90\%</math> to assure the SABS of their competency in delivering the goods. Capability reports on firms are submitted to ARMSCOR for evaluation purposes.</li> </ul>	ARMSCOR	
Adjudications. Allocation of Tender. <ul style="list-style-type: none"> <li>• Letter of Acceptance is sent to the successful supplier.</li> <li>• The supplier detail is coupled to the Financial Management Centre and a supplier code is allocated to the supplier.</li> <li>• The ledger is allocated to the receiving depot.</li> <li>• Delivery timings are allocated and schedules are solicited.</li> <li>• A Government Order (GO) for the requirement is printed in the name of the supplier.</li> <li>• Copies of the GO are sent to the Supplier, DOD MOSD Durban and the SABS.</li> </ul>	ARMSCOR Tender Board	
Pre-Production Meeting. <ul style="list-style-type: none"> <li>• Specifications are discussed with supplier to ensure that the clothing items are manufactured according to the set specifications.</li> </ul>	PSM CC Supplier	2 weeks.

Process	Role Player	Time Frame
<ul style="list-style-type: none"> <li>It may happen that suppliers request cancellation of their order at this stage as they have not taken many costs into account and realise that they will not be able to meet the tender specifications (In this case the second best supplier is allocated the order after the cancellations are approved).</li> </ul>		
<p><b>Pre-Production Sample</b></p> <ul style="list-style-type: none"> <li>The supplier provides a pre-production sample of the clothing piece to the SABS according to tender specifications.</li> <li>Only the SABS may approve the pre-production sample.</li> <li>This first pre-production sample evaluation by the SABS are paid for by the SANDF.</li> <li>If not approved by the SABS the supplier must submit a 2<sup>nd</sup> or even 3<sup>rd</sup> sample until it meets SABS approval (This is paid for by the supplier and can be very costly).</li> <li>After the approval the supplier goes into full production and arranges in-process inspections/final inspections with the SABS. They also arrange for scheduled delivery with the depot as the production process dictates (This is amended continuously).</li> </ul>	Supplier SABS	4 weeks minimum. Can become a very lengthy process.
Delivery at DOD Mobilisation Centre, Bloemfontein.	Supplier DOD Mobilisation Centre Transito	As stipulated by contract.
<p><b><u>Depot Issue Voucher/Receipt Voucher Process</u></b></p>		
<p>A depot receipt voucher is created.</p> <ul style="list-style-type: none"> <li>The supplier contacts the depot 7 days prior to delivery to arrange a date and time for delivery.</li> </ul>	DOD Mobilisation Centre Supplier	As completed.
The depot verifies the invoice and delivery note.	DOD Mobilisation Centre	Continuous.
<p>Count/Measure/Weigh.</p> <ul style="list-style-type: none"> <li>The Inspection/RELEASE/Acceptance Certificate (KT225), SABS certificate and delivery note are verified against</li> </ul>	DOD Mobilisation Centre	

Process	Role Player	Time Frame
order data to ensure that the correct stock is delivered according to the delivery note and that it is in a serviceable condition (The SABS will at this stage be in position of a sample per lot/batch number).		
Appointment with Material Group. <ul style="list-style-type: none"> <li>• An appointment is made with the material group to deliver the stock to correct group.</li> </ul>	DOD Mobilisation Centre	
Receipt of Group Goods (Works on a First-in, First-out (FIFO) system). <ul style="list-style-type: none"> <li>• The stock goes through the count/measure/weigh process at the group goods.</li> <li>• The Transito personnel compile the Stores Receipt Advice (SRA) to confirm that the invoices and clothing delivered do indeed correspond.</li> </ul>	DOD Mobilisation Centre	
Printing of receipt voucher. <ul style="list-style-type: none"> <li>• Receipt voucher is verified.</li> <li>• Receipt voucher is posted (finalised).</li> </ul>		
Sent for payment of supplier. <ul style="list-style-type: none"> <li>• Copy of the posted receipt voucher and GO, with a copy of the GO and the Invoice concerned are sent to Dir Acquisition and Payment for payment of supplier.</li> </ul>	DOD Mobilisation Centre	

Source: Du Toit (2005); Schutte (2006).

Du Toit (2005) noted that variables could influence above-mentioned processes. One such variable is time. Although an issue voucher (IV) should only take one day to generate, the average time it takes to generate an IV in the depot is up to 21 days. This has a very big influence on the time delay to complete the process.

#### 4.5.2 LEVEL 2: SUPPLIER

The DOD Mobilisation Centre, situated at De Brug in Bloemfontein, is used to mobilise all troops that are deployed outside the borders of the Republic of South

Africa (RSA). Here troops are issued with all kit necessary to complete the mission, and they are prepared here for that what awaits them by means of lectures, training, etc. Personnel administration is also completed in order to ensure that they are medically and psychologically classified to be fit to be deployed outside the RSA (Walker, 2006).

Except for mobilising all troops in the SANDF, the Mobilisation Centre is the only depot providing camouflage clothing to the whole of the SANDF. Suppliers deliver all camouflage clothing here and it is issued to clients in the rest of the SANDF (See Figure 4.2 and Table 4.3) (Du Toit, 2005; Schutte, 2006):

**Table 4.3: Receipts and Issue Process at DOD Mobilisation Centre**

Process	Role Player	Time Frame
Delivery at DOD Mobilisation Centre (Bloemfontein).	Supplier DOD Mobilisation Centre	As stipulated by contract.
<b><u>Depot Issue Voucher/Receipt Voucher Process</u></b>		
A depot receipt voucher is created. <ul style="list-style-type: none"> <li>The supplier contacts the depot 7 days prior to delivery to arrange a date and time for delivery.</li> <li>The clothing is delivered at the Transito sub-section of the BOD.</li> </ul>	DOD Mobilisation Centre Supplier	As completed.
The depot verifies the invoice and delivery note.	DOD Mobilisation Centre	Continuous.
Count/Measure/Weigh. <ul style="list-style-type: none"> <li>The KT255/SABS certificate and delivery note are verified against order data to ensure that the correct stock is delivered according to the delivery note and that it is in a serviceable condition (At this stage the SABS will be in possession of a sample per lot/batch no).</li> </ul>	DOD Mobilisation Centre	Continuous.
Receipt of Group Goods (FIFO system). <ul style="list-style-type: none"> <li>The stock goes through the count/measure/weigh process at the group goods.</li> <li>The Transito personnel compile the Stores Receipt Advice (SRA) to confirm that the invoices and clothing delivered do indeed</li> </ul>	DOD Mobilisation Centre	Continuous.



Process	Role Player	Time Frame
correspond.		
Printing of receipt voucher. <ul style="list-style-type: none"> <li>• Voucher is verified.</li> <li>• Voucher is posted (finalised).</li> </ul>	DOD Mobilisation Centre	Continuous.
Sent for payment of supplier. <ul style="list-style-type: none"> <li>• Copy of the posted receipt voucher, with a copy of the GO and invoice concerned are sent to Dir Acquisition and Payment for payment of supplier.</li> </ul>	DOD Mobilisation Centre	Continuous.
Client demand on depot. <ul style="list-style-type: none"> <li>• The client (Support Base) estimates the requirement according to its current stock levels in the warehouse.</li> <li>• This is compared against the minimum and maximum levels that must be in their warehouses.</li> <li>• A requirement is identified and the client's supply support section (commodity manager for camouflage clothing) places an electronic demand on the depot by using the Mob Centre's depot code.</li> <li>• This demand is automatically routed to the PSM CC.</li> </ul>	PSM CC Support Base DOD Mobilisation Centre Support Base	Continuous.
PSM approve demand with regard to requirement. <ul style="list-style-type: none"> <li>• PSM CC compares the demand against the client's business plan and either authorises the demand, cancel the demand, or change, the total according to the business plan and only then authorises the demand.</li> </ul>	PSM CC	Continuous.
Issue Voucher generated. <ul style="list-style-type: none"> <li>• The accounting section of the supply support services centre at the DOD Mob Centre generates all issue vouchers every morning that has been authorised by the PSM CC.</li> <li>• These issue vouchers are sent to the warehouse for issuing of stock.</li> </ul>	DOD Mobilisation Centre	
Stock separated. <ul style="list-style-type: none"> <li>• The stock is separated by the warehouse personnel and moved to Transito for movement/</li> </ul>	DOD Mobilisation Centre	

Process	Role Player	Time Frame
delivery/collection.		
Movement of stock. <ul style="list-style-type: none"> <li>• Stock is placed in Transito for movement purposes.</li> <li>• Clients that have the ability and funds to collect their stock are contacted and a block time arranged for collection.</li> <li>• Delivery: Stock that must be delivered to units are either packed in containers for railway movement, or couriered to units. The payment for delivery is directly debited against the Support Base's budget.</li> </ul>	DOD Mobilisation Centre	

Source: Du Toit (2005); Schutte (2006).

Clients budget on an annual basis for funds to pay for the delivery of goods (be it by means of courier, railway services, etc.) They are then only allocated a certain percentage of their budget to ensure that it fits in with the overall Defence Force budget. This may result in clients not receiving adequate funds for operational purposes to ensure that unit functions can be completed. Clients pay for delivery of goods by means of a "direct debit" against their budget. Some units do not have enough funds allocated against their budget for the delivery of goods to pay for the delivery of clothing from the Mobilisation Centre. The Mobilisation Centre has IVs that has not been finalised in over a year's time because units do not have the funds to collect stock. IVs can only be finalised as soon as goods are received by the client, and it is indicated so against signature in the "Received By" section of the IV. The IV is then mailed back to the Mobilisation Centre who finalises it by executing the final computer actions against the "open" IV. This action is called "posting" the IV, meaning it is finalised on the system. This IV is then removed from the "IV outstanding" list, reflected on the depot's management reports. Should it not be finalised, it will reflect on the depot's management reports until finalised. The stock issued to clients is still in the Transito, where it lies until the units can afford for it to be delivered. This can result in various complications; it needs to be secured against theft, can be destroyed should a fire break out, etc. (Brewis: 2005, Du Toit: 2005).

Du Toit (2005) also highlighted the fact that unnecessary items are procured at the end of the financial year. During the last quarter of the financial year, left over funds are identified that needs to be spend in order for it not to be forfeited. It happens that any amount of items is procured in order to spend the money. This result in clothing that is not needed being procured, and clothing needed overlooked. The specific need for the commodity at ground (FSE) must be properly identified.

Brewis (2005) supports this in that he states that research done on the demand for any item within the SANDF is doubtful. Money is spent that could be utilised in other areas, but product systems managers are concerned that they will loose the money allocated to them. Not only is it money wasted on items not needed, but also these excess of items need to be stored, secured, stock take must be done and obsolete items must be disposed off. This all entails a huge amount of money that need not be spent.

#### 4.5.3 LEVEL 3: ORGANISATION/ENTITY

The SA Army Support Base is the client of the DOD Mobilisation Centre. There are 14 SA Army Support Bases in the SANDF. These Support Bases are geographically distributed throughout the whole of the RSA (January, 2006):

**Table 4.4: Support Bases and their Clients within the SANDF**

<b>Support Base</b>	<b>Regular Forces Clients (FSEs)</b>	<b>Part Time Force Clients (FSEs)</b>	<b>Commandos</b>
<b>Bloemfontein</b>	1 SAI Meg Inf Bn	Regt Bloemspruit	11 Commandos in the process of closing down
	44 Para Regt	Vrystaat Art Regt	
	1 Para Bn	Regt Pres Steyn	
	School of Armour		
	1 Spec Serv Bn		
	1 SA Tank Regt		
	Group 36 HQ		
<b>Total</b>	<b>7</b>	<b>3</b>	<b>(11)</b>
<b>Durban</b>	Group 9 HQ	Durban Light Inf	9 Commandos in the process of closing down
	Group 10 HQ	Durban Regt	
	<b>SA Army Band (30)</b>	<b>Natal Carbineer</b>	

Support Base	Regular Forces Clients (FSEs)	Part Time Force Clients (FSEs)	Commandos
		Natal Field Arty	
		1 Natal Mounted Rifles	
		Umvoti Mounted Rifles	
		19 Field Engr Regt	
<b>Total</b>	<b>3</b>	<b>7</b>	<b>(9)</b>
<b>Johannesburg</b>	46 SA Bde	Wits Rifles	20 Commandos in the process of closing down
	21 SAI (Light Inf Bn)	SA Irish Regt	
	35 Engr Sup Regt	Rand Light Inf	
	SA Army Gym	Tvl Scottish	
	1 Construction Regt	Jhb Rifle Regt	
	Group 16 HQ	Regt Oos Rand	
	Group 18 HQ	Regt President Kruger	
		Transvaal Horse Arty	
		6 LAA Regt	
		Regt Oos Transvaal	
		Regt Vaalrivier	
		1 Light Horse Regt	
		6 Field Engr Regt	
<b>Total</b>	<b>7</b>	<b>13</b>	<b>(20)</b>
<b>Kimberley</b>	ADA School	Kimberley Regt	15 Commandos in the process of closing down
	10 AA Regt	44 AA Regt	
	Basic Trg Depot (3 SAI)		
	Group 22 HQ		
<b>Total</b>	<b>4</b>	<b>2</b>	<b>(15)</b>
<b>Kroonstad</b>	School of Engineers	Regt de Wet	20 Commandos in the process of closing down
	2 Fld Engr Regt	Regt Louw Wepener	
	SA Army Band (50)		
	Group 24 HQ		
<b>Total</b>	<b>2</b>	<b>2</b>	<b>(20)</b>
<b>Ladysmith</b>	5 SAI (Light Inf Bn)		11 Commandos in the process of closing down
	121 SAI (Light Inf Bn)		
	Group 27 HQ		
<b>Total</b>	<b>3</b>		<b>(11)</b>

<b>Support Base</b>	<b>Regular Forces Clients (FSEs)</b>	<b>Part Time Force Clients (FSEs)</b>	<b>Commandos</b>
<b>Lohatlha</b>	61 Mech Inf Bn		4 Commandos in the process of closing down
	8 SAI (Light Inf Bn)		
	Combat Training Centre		
	16 Maint Unit		
	101 Field Workshop		
	Group 23 HQ		
<b>Total</b>	<b>6</b>		<b>(4)</b>
<b>Nelspruit</b>	<b>Group 12 HQ</b>	<b>Regt Both</b>	<b>15 Commandos in the process of closing down</b>
	<b>Group 33 HQ</b>		
<b>Total</b>	<b>2</b>	<b>1</b>	<b>(15)</b>
<b>Oudtshoorn</b>	Inf School		5 Commandos in the process of closing down
	Group 2 HQ		
<b>Total</b>	<b>2</b>		<b>(5)</b>
<b>Pietersburg</b>	15 SAI (Light Inf Bn)	Regt Christiaan Beyers	8 Commandos in the process of closing down
	118 SAI (Light Inf Bn)		
	SA Army Band (30)		
	Group 14 HQ		
	SMA HQ		
<b>Total</b>	<b>5</b>	<b>1</b>	<b>(8)</b>
<b>Port Elizabeth</b>	6 SAI (Light Inf Bn)	Prince Alfred Guard	22 Commandos in the process of closing down
	14 SAI (Light Inf Bn)	First City	
	Group 6 HQ	Regt Piet Retief	
	Group 46 HQ	Buffalo Volunteer/Rifles	
<b>Total</b>	<b>4</b>	<b>4</b>	<b>(22)</b>
<b>Potchefstroom</b>	2 SAI (Mot Inf Bn)	Regt De La Rey	19 Commandos in the process of closing down
	12 SAI (Spec Inf Bn)	Regt Skoonspruit	
	School of Arty	Potch University Regt	
	4 Arty Regt	Regt Mooirivier	
	Arty Mob Regt		
	1 Int Regt		

<b>Support Base</b>	<b>Regular Forces Clients (FSEs)</b>	<b>Part Time Force Clients (FSEs)</b>	<b>Commandos</b>
	Group 20 HQ		
	Group 30 HQ		
<b>Total</b>	<b>8</b>	<b>4</b>	<b>(19)</b>
<b>Youngsfield</b>	9 SAI Bn	Cape Town Highlanders	11 Commandos in the process of closing down
	SA Army Band (30)	Cape Town Rifles	
	Group 1 HQ	Regt WP	
	Southern Mil Pol Region	Cape Field Arty	
	CMI Youngsfield	Cape Garrison Arty	
	Mil Police Wynberg	Regt Oranjerivier	
	Southern Mil Correctional Facility	3 Fld Engr Regt	
	J Task Force HQ WC	71 Signal Regt	
	DOD School of Log Trg		
	Hum Resource Support Satellite		
<b>Total</b>	<b>10</b>	<b>8</b>	<b>(11)</b>
<b>Dequar Rd</b>	Infantry Formation		
	Artillery Formation		
	Armour Formation		
	Support Formation		
	Intelligence Formation		
	Training Formation		
	Army College		
	Tech Services Unit		
	102 Field Workshop HQ		
<b>Total</b>	<b>9</b>	<b>0</b>	<b>0</b>

Source: De Beer (2006).

The main aim of the SA Army Support Base is to fulfil in the logistics needs of their clients within their area of responsibility. The current SA Army Support Base replaces the old Maintenance Units that fulfilled the logistic functions within the SA Army. The SA Army Support Base satisfies various functions for their clients (De Beer, 2006; January, 2006). These functions include:

- Human Resource Management.

- Hospitality Services.
- Security Services (Guarding).
- Technical Maintenance Services.
- Transportation.
- Warehousing.
- Procurement Services.
- Supply Support Services (includes accounting, warehousing, transito function, commodity management function and the disposal of stores).

The fact that the Support Bases and FSE's are geographically situated throughout the RSA makes the distribution of camouflage clothing to these Support Bases and FSE's very difficult. This influences the extent to which the maintenance of camouflage clothing is efficiently and effectively managed within the SA Army camouflage clothing supply chain. This supply chain to the client of the Support Base, the FSE, takes place as follows (Witbooi: 2004):

**Table 4.5: Process for Maintenance of Camouflage Clothing  
on Organisational Level**

Process	Role Player	Time Frame
Determination of Need.	Commodity Manager for Camouflage Clothing	Continuous.
Determination of Stock Levels. <ul style="list-style-type: none"> <li>• Do physical stock take on camouflage clothing in store/ or,</li> <li>• Draw a report of stock levels from CALMIS.</li> </ul>	Commodity Manager Camouflage Clothing	Continuous.
Determine demand. <ul style="list-style-type: none"> <li>• Compare stock levels with estimated minimum and maximum levels of stock.</li> <li>• Determine quantity of clothing needed to fill stock levels.</li> </ul>	Commodity Manager Camouflage Clothing	Continuous.
Place demand on depot. <ul style="list-style-type: none"> <li>• Place a computerised demand on CALMIS on depot code 03788 (Mob Centre) for demand of clothing.</li> <li>• Log demand in the clothing demand register for follow-up.</li> </ul>	Commodity Manager Camouflage Clothing	Weekly.
Follow up demand.	Commodity Manager	Weekly.

Process	Role Player	Time Frame
<ul style="list-style-type: none"> <li>▪ Check on system to determine which demands have been satisfied, partially satisfied or cancelled.</li> <li>▪ Contact PSM CC to determine why demand was cancelled if so.</li> <li>▪ Re-submit cancelled demands if arranged so with PSM CC.</li> </ul>	Camouflage Clothing	
<p>Demand satisfied.</p> <ul style="list-style-type: none"> <li>▪ Should an adequate amount of demands be satisfied, the commodity manager contacts the Mob Centre to arrange for delivery/collection of items.</li> </ul>	Commodity Manager Camouflage Clothing	Continuous.
<p>Collection of Stock.</p> <ul style="list-style-type: none"> <li>▪ Should the Support Base collect stock, a Logistical Run must be arranged in order to collect the stock.</li> <li>▪ An arrangement for a block time is made with the Mob Centre and stock is collected as arranged.</li> </ul>	Commodity Manager Camouflage Clothing	Continuous.
<p>Courier Delivers Stock.</p> <ul style="list-style-type: none"> <li>▪ Stock is delivered to the Transito of the Support Base.</li> <li>▪ Stock is checked and signed for.</li> </ul>	Support Base Transito	Continuous.
<p>Stock is Delivered by Railway.</p> <ul style="list-style-type: none"> <li>▪ Arrangements are made for collections of container at Railway head.</li> <li>▪ Container is delivered to Transito.</li> </ul>	DOD Mobilisation Centre Support Base Transito	Continuous.
<p>Transito Action.</p> <ul style="list-style-type: none"> <li>▪ Container/Packaging is opened and checked for completeness. Order is compared with IV of Mob Centre.</li> <li>▪ All discrepancies (surplus/shortages) are noted and followed up.</li> <li>▪ Stock is brought to account of the Support Base by means of a RV.</li> <li>▪ IV are signed and mailed back to Mob Centre for finalisation.</li> <li>▪ Stock is moved to the warehouse for storage.</li> <li>▪ RV is registered in RV Register File and sent to warehousing per signature.</li> </ul>	Support Base Transito	Continuous.
Warehousing Action.	Support Base	Daily.



Process	Role Player	Time Frame
<ul style="list-style-type: none"> <li>• Items are stored in bins and bin location is indicated on RV.</li> <li>• RV is sent to accounting section for finalisation per register and signature.</li> </ul>	Warehousing Dept	
Accounting Action. <ul style="list-style-type: none"> <li>• Accounting section finalises RV by indicating the bin location of stock on CALMIS.</li> <li>• RV Filed</li> </ul>	Support Base Accounting Dept	Daily.

Source: Witbooi (2004); Brewis (2005).

#### 4.5.4 LEVEL 4: CLIENT

The Support Base warehousing manager establishes block times for clients (FSE's) and communicates these block times to them on a monthly basis. The FSE then contacts the warehousing department to confirm block time, should they have a great amount of members that needs to be issued. Should there only be single members to do uniform maintenance, these members arrive on the day allocated to the FSE and complete their uniform maintenance (Witbooi: 2004).

**Table 4.6: Process for Maintenance of Camouflage Clothing for the Client**

Process	Role Player	Time Frame
<b>Issue to FSE</b>		
Block times for issuing of FSE. <ul style="list-style-type: none"> <li>• Warehousing arranges block times for all clients as a set schedule per month.</li> </ul>	Support Base Warehousing Dept	Weekly.
FSE members (client's client) reports to uniform maintenance department for issue of clothing.	FSE Client	Continuous.

Source: Witbooi (2004); Brewis (2005).

#### 4.5.5 LEVEL 5: CLIENT'S CLIENT

The soldier arrives at the warehousing department and completes his/her uniform maintenance with a member of the department. Camouflage uniform and combat footwear are exchanged on a 'one-to-one' basis. Should the member need new uniform that has not been issued previously, it is issued to the member by means of an IV. A uniform maintenance proforma is completed and the member signs this in order to confirm that he/she has exchanged camouflage clothing as indicated, or has received the new uniform as indicated on the issue sheet. This is then updated on the system in order for the members Personal Equipment Register (PER) to be a true reflection. The relevant IV's and RV's are generated and the members sign all documentation before he/she leaves. This documentation is taken to the accounting department for finalisation and filing purposes.

**Table 4.7: Process for Maintenance of Camouflage Clothing for the Soldier**

Process	Role Player	Time Frame
Member is issued with clothing. <ul style="list-style-type: none"> <li>▪ The uniform maintenance dept completes a proforma, which indicates all relevant clothing issued to the FSE member.</li> <li>▪ The uniform maintenance dept captures the issue of clothing on the member's PER.</li> <li>▪ This is done by completing the computerised capturing of data on the system.</li> <li>▪ The member's PER reflects against the FSE.</li> </ul>		
The member signs for the issue in the "Received By" section of the IV.		
The member signs for the exchange in the in the "Issued By/Received By" section of the RV/IV (a double action as he/she has given in something for exchange of something else).		
The IV is finalised and sent to the accounting section for filing.		

Process	Role Player	Time Frame
A copy of the IV is placed on the manual PER of the member in the uniform maintenance department of the Warehousing Section.		

Source: Witbooi (2004; Brewis (2005).

#### 4.6 APPREHENSIVE ISSUES IN SA ARMY SUPPLY CHAIN

Several concerning issues have been raised by the various role players in the SA Army camouflage clothing supply chain. These issues all have an influence on the efficiency and effectiveness of the supply chain of the SA Army.

Witbooi (2004) noted that the attitude of the depot members is experienced as negative. This influences the relationships between members of the Support Base and the Depot negatively. This has an indirect effect on the customer services rendered to the FSE by the Support Base.

Effective communication levels are a problem throughout the camouflage clothing supply chain. It happens that demands on the depot are cancelled without any correspondence or communication between PSM CC, depot members or Support Bases. (Witbooi, 2004; Brewis 2005; Du Toit, 2005; Johnson, 2006; Christoffel, 2006). Communication within unit lines is also problematic. Christoffel (2006) state that communication within their warehouse department is ineffective, although communication to his Officer Commanding is rated as effective.

Labour saving devises and the serviceability of material handling equipment are of great concern to warehousing personnel. Not enough money is available to regularly service or replace equipment in order to provide an efficient and effective service to clients (Witbooi, 2004; Brewis, 2005; Christoffel, 2006).

Members are concerned that not enough is being done to determine the actual requirement before orders are placed on suppliers. This entails research on items, as well as on suppliers that tender for orders. Suppliers are awarded a tender, just to

cancel their tender because of an inability to complete it or because of bankruptcy of the company (Witbooi, 2004; Brewis, 2005; Jordaan, 2005; January, 2006).

The information systems (management reports and CALMIS) that are currently used are to an extent appropriate for the management of the supply chain, but the concern raised is the ability of the IT hardware that is used to complete the computerised transactions (Witbooi, 2004). This include hardware such as computers, as well as LAN points and cabling that is not sufficient to carry the capacity of the information (Witbooi, 2004; Brewis, 2006). Problems also encountered with the computerised logistic system are that Support Bases work on CALMIS or UIMS (Unit Information Management Systems), where the Depots work on DIMS (Depot Information Management Systems). These systems “speak” to each other in order to align all information on the system. It happens that, due to the deteriorating condition of the cabling and IT hardware, information is lost and problems occur in the management of the supply chain (Brewis, 2005).

Logistical top management must also address the current performance measurement systems. Although controls and control measures are a current strong point in the management of resources within the SA Army, they do not address all specifics for efficient and effective supply chain management. Attention must be given to the performance measurement of the SA Army camouflage clothing supply chain in order for logistical top management to identify and address problem areas within this supply chain (Brewis, 2005; Johnson, 2006).

The budget of the SA Army is a big factor in the efficient and effective running of the supply chain (Witbooi, 2004; Brewis, 2005; Du Toit, 2005; Johnson, 2006). This includes the procurement of clothing, and the transport thereof to and from depots and Support Bases:

- The clothing budget is cut to a minimum, resulting in not enough money spent on the procurement of clothing for uniformed members.
- The transport of clothing from the depot is also very expensive. Units budget for the transportation of items, just to have the budget cut to the minimum, resulting in not enough money to transport clothing to the

## Support Bases.

Personnel issues have a crucial impact on the efficiency and effectiveness of the supply chain. Since the transformation process has been implemented within the SANDF and SA Army, and posts have been cut to the bare minimum, serious problems have been encountered because of personnel issues. Johnson (2006) noted that due to this, there is “no supply chain in the SA Army”. Personnel are also lacking in experience required to complete the work properly (Brewis, 2005). Due to personnel shortages, members are overworked, de-moralised and inexperienced in their field of work (Witbooi, 2004; Brewis, 2005; Johnson, 2006).

The staffing of members in posts that they are not able to manage, and the understaffing of departments is also an important issue. Members must go on course in order to be promoted (courses that can take up to six months at a time to complete), but no substitute is provided for that period. Members within that department must then do their work in order for the process to continue, putting more strain on departmental members (Johnson, 2006).

Personnel illness and absenteeism also plays a big role in the efficient and effective management of the supply chain (Christoffel, 2006). Christoffel (2006) notes that younger members must be appointed in physical posts such as the warehousing department, as older members have difficulty in completing strenuous labour intensive work in the textile warehouse. The transferring of members (to other units and the SAPS) also plays a big role in problematic issues encountered in the camouflage clothing supply chain.

The relationships between suppliers and the DOD are very important. In the camouflage clothing supply chain, only ARMSCOR may communicate and penalise the suppliers. Relationships between channel members are not very good. This could be due to various reasons. One reason is that members work on different business levels within the SANDF and a culture of superiority exists within the SANDF. Another is that command channels must be used when communicating formally and channel relationships are virtually non-existent because of these channels of command (Brewis, 2005; Du Toit, 2005).

#### 4.7 SUMMARY

The SA Army camouflage clothing logistics revealed elements of improvement, as compared to supply chain management principles. Logistics in a military context is the practical art of moving armies and keeping them supplied. Camouflage clothing forms an important element of the total supplies of a soldier in sustaining military and of warfare capabilities. Camouflage clothing logistics in the SA Army is a complex mix of physical entities, processes and rules – that is, as a system – that is governed by mostly conceptual concepts and principles.

Supply chain management can enhance camouflage clothing logistics in the SA Army, if the principles are properly applied. The USDOD has indicated the requirement to modernise their logistics systems as one of their top priorities. They indicated that this would cut costs, reduce infrastructure and cycle times, and, most importantly, improve support of their 21<sup>st</sup> century War fighters (their clients). In a modern military context, the South African Public Finance Management Act (PFMA) regulates logistics within the Department of Defence. The PFMA instructs the DOD to implement supply chain management efficiently and effectively.



Role players, processes involved, time frames applicable, and concerning issues raised by role players within this supply chain of the SA Army camouflage clothing logistics were identified. The SA Army camouflage clothing supply chain is an extended supply chain with the following important role players to consider:

- Director Army Product Systems Manager.
- Product System Manager Camouflage Clothing.
- Armaments Corporation of South Africa Ltd. (ARMSCOR).
- DOD Logistical Support Formation.
- Defence Institute.
- Dir Acquisition and Procurement Agency.
- SABS.
- Suppliers.

- DOD Main Ordnance Sub Depot Durban.
- DOD Mobilisation Centre Bloemfontein.
- SA Army Support Formation.
- Support Bases within the SANDF.
- Force Structure Elements (FSE) (aka units) within the SANDF.
- The soldier on the ground.

Possible problems identified in the SA Army camouflage clothing logistics includes personnel issues or problems, attitude of members in the supply chain, communication issues, the lack of serviceable labour saving devices and material handling equipment, lack of adequate research and development, the information systems used, the budget of the SA Army for clothing and lastly the relationship between suppliers and the DOD. All issues addressed had a negative implication on the efficient and effective management of the SA Army camouflage clothing supply chain.

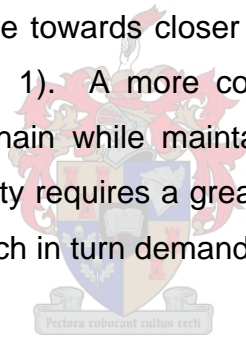
The SA Army is a military institution fighting for peace as their core function. The manufacturing and distribution of clothing is not their core function and can therefore be outsourced to address most of the concerns raised under the present system. The management of outsourcing should be as such that it adheres to all applicable principles of supply chain management.

## **CHAPTER 5: SUPPLY CHAIN MANAGEMENT APPLICABLE TO THE SOUTH AFRICAN ARMY CAMOUFLAGE CLOTHING COMMODITY**

### **5.1 INTRODUCTION**

In this chapter the supply chain management theory will be compared to the SA Army supply chain. The globalisation of the economy is exposing buyers and suppliers to a countless number of opportunities for potential trading relationships. Although it is stated in Chapter 2 that there are increases in entities who tend to compete as an integrated supply chain, rather than a collection of single organisations, this tendency seems not to be found in the SA Army supply chain.

Through globalisation, entities are forced to look for more efficient and effective ways to coordinate the flow of materials between facilities, into and out of the business. This orientation seems to move towards closer relationships between suppliers and clients (Mentzer, *et al.*, 2001: 1). A more coordinated planning approach would reduce costs in the supply chain while maintaining satisfactory customer service levels. Market place uncertainty requires a greater flexibility on the part of individual entities and supply chains, which in turn demands more flexibility in their supply chain relationships.



The SA Army supply chain will be compared to this supply chain management theory in order to determine to what extent it relates to this theory.

### **5.2 SA ARMY CAMOUFLAGE CLOTHING SUPPLY CHAIN**

As stated in Chapter 2, Mentzer, *et al.* (2001: 4) has identified three forms (or degrees) of supply chains: a “direct supply chain,” an “extended supply chain,” and an “ultimate supply chain:”

- The direct supply chain consists of an entity, a supplier, and a customer involved in the upstream and/or downstream flows of products, services, finances, and/or information.



- The extended supply chain includes suppliers of the immediate supplier and customers of the immediate customer, all involved in the upstream and/or downstream flows of products, services, finances, and/or information.
- The ultimate supply chain includes all the entities involved in the up- and downstream flow of products, services, finances and information from the ultimate supplier to the ultimate customer. This supply chain can become very complicated when third party financial providers can become involved in the supply chain. This is accomplished while assuming some of the risk, while also offering financial advice. A third party logistics provider is performing the logistics activity between two of the companies; while a market research firm is providing information about the ultimate customer to a company well back in the supply chain. Mentzer, *et al.*, (2001: 4) illustrates with this the multiple functions that complex supply chains can and do perform.

In comparing the supply chain management theory with the practical information gathered from the Army camouflage clothing commodity, a reasonable deduction would be that the SA Army supply chain is an extended supply chain. It includes suppliers of the immediate supplier, as well as customers of the immediate customer. As the SA Army is in control of all its logistics and financial business processes except for the physical making of the textile and clothing (which is outsourced by means of a tender process to a supplier), it will not be classified as an ultimate supply chain.

### **5.3 SUPPLY CHAIN MANAGEMENT**

As seen in Chapter 2, supply chain management involves multiple firms, multiple business activities, and the coordination of activities across functions and across entities in the supply chain. Mentzer, *et al.* (2001: 18) uses these aspects to define supply chain management as the systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of

improving the long-term performance of the individual companies and the supply chain as a whole.

Mentzer, *et al.* (2001: 5) categorises the management of the supply chain into three classifications: firstly a management philosophy, secondly the implementation of a management philosophy, and lastly a set of management processes.

As a philosophy, supply chain management takes a systems approach to viewing the supply chain. Here the supply chain is seen as a holistic entity, rather than a set of separate parts, each performing its own core functions. Supply chain management, as a management philosophy, seeks coordination and the unification of intra- and inter-firm operational and strategic capabilities. Mentzer, *et al.* (2001: 7) summarises by proposing that supply chain management, as philosophy, show the following characteristics:

- A systems approach to viewing the supply chain as a whole, and to manage the total flow of commodities inventory from the supplier to the ultimate customer;
- a strategic orientation towards cooperative efforts to synchronise and converge intra-firm and inter-firm operational and strategic capabilities into a unified whole; and
- a customer focus to create unique and individualised sources of customer value, leading to customer satisfaction.

Various business systems come into play in the SA Army supply chain. Planning, budgeting, control, organising, finances, logistic systems, etc. are all systems that are involved in the supply chain. It is still questionable if all of these business processes are integrated as a system to work together as a supply chain management philosophy.

When entities take up a supply chain management philosophy, they must determine and establish management practices that permit them to operate or behave consistently with this philosophy. Mentzer, *et al.*, (2001: 7) identify various activities necessary to successfully implement a supply chain management philosophy:

- Integrated behaviour.
- Mutually sharing information.
- Mutually sharing risks and rewards.
- Cooperation.
- The same goal and the same focus on serving customers.
- Integration of processes.
- Partners to build and maintain long-term relationships.

To be fully effective in today's competitive environment, firms must expand their integrated behaviour to incorporate customers and suppliers. Many once-central operational corporate activities – product design and development, services and facilities management, logistics and manufacturing – have been taken over by suppliers. There has been an ever-increasing focus on managing the external relations from source to consumer. (Brewer, Button & Hensher, 2001: 81; La Londe & Masters, 1994: 39). In the SA Army supply chain, suppliers (external to the SANDF) and customers (internal to the SANDF) are incorporated into the supply chain. The level of integration though, especially with regards to suppliers, is questionable. Suppliers are only tendered to make textile and clothing to particulars determined by ARMSCOR, with absolute no inputs from their side. Customers also have no inputs with regards to how the supply chain are managed, only being able to demand clothing, and receiving what is available (Brewis, 2005; Du Toit, 2005; Johnson, 2006; Jordaan, 2005).

To implement a supply chain management philosophy, especially for planning and monitoring processes, it is required to mutually share information among supply chain members. Cooper, Lambert, and Pagh (1997: 1) emphasised frequent information updating among the chain members for effective supply chain management. Openly sharing information such as inventory levels, forecasts, sales promotion strategies, and marketing strategies reduces the uncertainty between supply partners and results in enhanced performance (Barratt, 2004: 36). In the SA Army supply chain, the sharing of this kind of logistical information is very limited. Suppliers receive textile- and clothing specifics via tender, and orders as determined

by the PSM CC and ARMSCOR. The sharing of logistical information is limited to the SANDF only. Computer information systems such as CALMIS and DIMS provide information to the PSM CC, depots, Support Bases and units. Actively sharing logistical and statistical information for planning purposes are limited to the Dir PSM, PSM CC, ARMSCOR and the depots. Logistical information is provided to the supplier by ARMSCOR (in conjunction with the PSM CC) in the form of orders. These orders are based on statistical information and medium term planning. Logistical information sharing between suppliers and the SANDF are limited to ARMSCOR and the supplier. The supplier only communicates with the depot for the collection of material and the delivery of clothing. ARMSCOR or the PSM CC does not approach Support Bases or units to gather information for planning purposes (Brewis, 2005; Du Toit, 2005; Johnson, 2006; Jordaan, 2005; Schutte, 2006).

Effective supply chain management also requires mutually sharing risks and rewards that yield a competitive advantage. Uncertainty spreads throughout the supply chain and may lead to inefficient processing and non-value adding activities. Persson (1995: 13) stated that “the more the uncertainty related to a process, the more waste there will be in the process.” The presence of uncertainty stimulates the decision maker to create safety buffers in time, capacity or inventory to prevent a bad chain performance, which restricts operational performance. Partnerships with key suppliers and customers may reduce uncertainty and complexity (Van der Vorst & Beulens, 2002: 413-413; Mentzer, *et al.*, 2002: 8). Uncertainty is a big factor within the SA Army supply chain. The SA Army is a relatively big organisation, with great amounts of uncertainty, such as budgetary constraints, personnel constraints, lack of expertise due to transformation and retrenchment, etc. Great amount of stores are kept in order to ensure a safety buffer. This leads to inventory levels of unnecessary stores that may reduce the supply chain’s efficiency and effectiveness, rather than increase it. It also leads to great costs on unnecessary stores that could have been channelled to more necessary resources (Brewis, 2005; Du Toit, 2005; Johnson, 2006; Schutte, 2006; Witbooi, 2004).

Collaboration is a very broad and encompassing term. Many authors cite mutuality of benefit, rewards and risk sharing with the exchange of information as the foundation of such cooperation. It refers to similar or complementary, coordinated

activities performed by firms in a business relationship to produce superior mutual outcomes or singular outcomes that are mutually expected over time. Cooperation is not limited to the needs of the current transaction and happens at several management levels (e.g., both top- and operational managers), involving cross-functional coordination across the supply chain members (Barratt, 2004: 30-31; Mentzer, *et al.*, 2001: 9). The SA Army has a long supply chain in that the various role players are extended over great distances throughout the RSA. This makes it very rigid, with command and control situated at top management. The option of collaboration must be researched and investigated by the DOD. By collaboration, the SA Army should be able to integrate several of the business processes, either centrally within the SA Army (to keep control), or by outsourcing these business processes such as manufacturing, coordination and procurement, warehousing and transportation. This will make the supply chain more efficient and effective, reducing costs such as transportation and warehousing, as well as saving on personnel costs. A more flexible supply chain must be implemented (Brewis, 2005; Du Toit, 2005, Johnson, 2006).

Cooperation begins with joint planning and ends with joint control activities to evaluate performance of the supply chain members, as well as the supply chain as a whole. In addition to planning and control, cooperation is needed to reduce supply chain inventories and pursue supply chain-wide cost efficiencies. These improvement initiatives could be interpreted as the redistribution of costs and inventory both up and down the supply chain (Barratt, 2004: 31-32; Mentzer, *et al.*, 2001: 9). As the SA Army does not have competitors, they should implement vertical integration, which include collaboration with customers, internally (across functions) and with suppliers.

La Londe and Masters (1994: 39) proposed that a supply chain may succeed if all the members of the supply chain have the same goal and the same focus on serving customers. Establishing the same goal and the same focus among supply chain members is a form of policy integration. Policy integration is possible if there are compatible cultures and management techniques among the supply chain members. The SA Army consists of members representing the demographics of South Africa. Through the transformation process, several cultures and types of managers have

been integrated within the larger SANDF. This had a severe impact on the management of business processes. The fact that the focus and goal between top and lower levels of management differ creates a problem with the operating efficiency within the SA Army supply chain. Because the SA Army is a non-profit government organisation, the motivation of making profit does not exist, so output maximisation and cost minimisation is not part of the operating management process. SA Army policy is also very rigid and according to set principles, not being able to be amended without following a rigid and timeous channel of command (Brewis, 2005; Du Toit, 2005; Johnson, 2006)

The implementation of supply chain management requires the integration of processes from sourcing to manufacturing, and to distribution across the supply chain. Integration can be accomplished through cross-functional teams, in-plant supplier personnel, and third party service providers. In the SA Army supply chain, suppliers (external to the SANDF) and customers (internal to the SANDF) are incorporated into the supply chain. As previously stated, the level of integration, especially with regards to suppliers, is still in question.

Suppliers are only contracted to manufacture textile and clothing to specifics determined by the SANDF, with absolute no inputs from their side. Customers also have no inputs with regards to how the supply chain are managed, only being able to demand clothing, and receiving what is available (Brewis, 2005; Du Toit, 2005; Johnson, 2006; Jordaan, 2005). According to Daugherty, Ellinger and Gustin (1996: 25), successful integration should result in more efficient logistics operations. Integrated logistics has been credited with achieving cost reductions while increasing efficiency and productivity. The SA Army should integrate several of the business processes, either centrally within the SA Army (to keep control), or by outsourcing these business processes such as manufacturing, coordination and procurement, warehousing and transportation. This will make the supply chain more efficient and effecting, reducing costs such as transportation and warehousing, as well as saving on personnel costs. A more flexible supply chain must be implemented (Brewis, 2005; Du Toit, 2005, Johnson, 2006).

The SA Army should use all four stages of supply chain integration (Stevens' (1989), in Mentzer, *et al.*, (2001: 9)) in order to streamline their supply chain:

- Stage 1. A base line case. The supply chain is a function of fragmented operations within the individual company and is characterised by staged inventories, independent and incompatible control systems and procedures, and functional segregation (The SA Army supply chain reflects Stage 1 of integration).
- Stage 2. Begins to focus internal integration, characterised by an emphasis on cost reduction rather than performance improvement, buffer inventory, initial evaluations of internal trade-offs, and reactive customer service (The SA Army supply chain may reflect some of these trades).
- Stage 3. Reaches toward internal corporate integration and characterised by full visibility of purchasing through distribution, medium-term planning, tactical rather than strategic focus, emphasis on efficiency, extended use of electronics support for linkages, and a continued reactive approach to customers.
- Stage 4. Achieves supply chain integration by extending the scope of integration outside the company to embrace suppliers and customers.

Effective supply chain management is made up of a series of partnerships and thus requires partners to build and maintain long-term relationships. Tate (1996: 7) argues that an increasing number of entities are entering into long-term relationships with carefully selected third-party logistics providers. It is not unusual that all of the primary activities in a chain – inbound and outbound logistics, operations, marketing, sales, and service – will be performed by any one firm to maximise customer value. Except for relationships with suppliers, the SA Army supply chain does not have any other relationships or partnerships in order to increase the efficiency or effectiveness of the supply chain (Brewis, 2005; Du Toit, 2005; Jordaan, 2005; Johnson, 2006).

As opposed to focussing on activities that constitute supply chain management, other authors have focused on management processes. Lambert, Stock and Ellram (1998: 504) propose that, to successfully apply supply chain management, all firms within a

supply chain must overcome their own functional silos and adopt a process approach. All the functions within a supply chain are reorganised as key processes. The critical differences between the traditional functions and the process approach are that the focus of every process is on meeting the customer's requirements and that the firm is organised around these processes. As previously stated, it can be seen that the SA Army supply chain focuses on traditional functions, not having a systems approach. The customer's requirements are met very basically, taking historical data into account when planning, not the real requirement of the customer (Brewis, 2005; Du Toit, 2005; Johnson, 2006; Jordaan, 2005; Witbooi, 2004).

#### **5.4 SUPPLY CHAIN MANAGEMENT VERSUS SUPPLY CHAIN ORIENTATION**

The idea of viewing the coordination of a supply chain from an overall system perspective, with each of the tactical activities of distribution flows seen within a broader strategic context (as seen in supply chain management as a management philosophy) is more accurately called a supply chain orientation (Mentzer, *et al.*, 2001: 11). Supply chain orientation is defined as the recognition by an entity of the systematic, strategic implication of the tactical activities involved in managing the various flows in a supply chain. An entity can possess this orientation if its management can identify the implications of managing the up- and downstream flows of products, services, finances, and information across their suppliers and their customers (Mentzer, *et al.*, 2001: 11).

Supply chain management is the implementation of a supply chain orientation across suppliers and customers. According to Mentzer, *et al.*, (2001: 11) entities implementing supply chain management must first have a supply chain orientation. As example can be seen that the entities involved in an extended supply chain (Figure 2.1.b) have a supply chain orientation, except for the first supplier and the last customer. Since the first supplier only focuses on its customer and the last customer only on its supplier, neither can be said to have an upstream and downstream orientation.

A supply chain orientation is a management philosophy, and supply chain management is the sum total of all the clear management actions undertaken to



realise that philosophy. Although the SA Army has a degree of supply chain orientation, the implementation of that orientation towards fully integrated supply chain management is still in question.

## 5.5 ANTECEDENTS TO SUPPLY CHAIN MANAGEMENT

Supply chain relationships are typically long-term and require substantial strategic coordination. Antecedents to supply chain management are factors that could enhance or impede the implementation of a supply chain orientation philosophy. The SA Army, within its degree of supply chain orientation, needs to address the following in the implementation:

- Trust.
- Commitment.
- Interdependence.
- Organisational compatibility.
- Vision.
- Key processes.
- Leaders.
- Top management.



Moorman, Deshpande, and Zaltman (1993: 81) define trust as a willingness to rely on an exchange partner in whom one has confidence. Trust and commitment is an essential ingredient for the successful long-term relationships that are a component of the implementation of supply chain management. Due to the rigid command and control orientation and history of the SA Army, this will be a difficult factor to succeed in (Johnson, 2006). Commitment could also be a volatile factor, as this would be determined by the personal attitude and culture of personnel working in the supply chain. Daugherty, *et al.*, (1996: 25) identified that corporate-wide commitment/attitude change as the factor contributing most to successful implementation of integrated logistics. Employees must be made aware of the advantages associated with integration and encouraged to “buy-in” to a new approach.

The interdependence of an entity on a partner refers to the entity's need to maintain a relationship with the partner to achieve its goals. This dependence is what motivates willingness to negotiate functional transfer, share key information, and participate in joint operational planning (Lau, *et al.*, 2002: 273; Mentzer, *et al.*, 2001: 13). This in itself would be a crucial factor to the implementation of supply chain orientation within the SA Army. A culture of dependence on suppliers and customers must be developed and implemented in order to be successful. This would be a great challenge for such a big organisation that is very much focused on command and control.

Corporate philosophy or culture and the management techniques of each entity in a supply chain should be compatible for successful supply chain management. Organisational compatibility was defined as complementary goals and objectives, as well as similarity in operating philosophies and corporate culture. It is argued that the importance of corporate culture and its compatibility across supply chain members cannot be underestimated. (Mentzer, *et al.*, 2001: 13; Golicic, *et al.*, 2002: 851-852).

There should be an agreement on supply chain management vision and key processes. The creation and communication of a market-winning competitive supply chain management vision shared not just by individual entities but also by the whole supply chain, is essential before any supply chain management project can begin (Mentzer, *et al.*, 2001: 13-14). The SA Army supply chain role players do not have a share vision with shared key processes. This must be investigated and implemented.

In terms of power and leadership structure of a supply chain, there needs to be a firm that assumes the leader role. Supply chains need leaders as much as individual entities do. The supply chain leader plays a key role in coordinating and overseeing the whole supply chain (Cox, 1999: 172; Mentzer, *et al.*, 2001: 14). The SA Army acts almost as the only key role player (defined as leader) in the camouflage clothing supply chain. When implementing the supply chain orientation, the SA Army will outsource most of the logistic function, but need to keep a firm grip on the control aspects.

Top management support plays a critical role in shaping an entity's values, orientation, and direction. Top-level managers have a considerable bearing on the performance of an entity. Lambert, Stock, and Ellram in Mentzer, *et al.* (2001: 14) suggest top management support, leadership, and commitment to change is important factors to the implementation of supply chain management. Logistical top management within the SA Army must definitely support the implementation of a supply chain orientation in order for the implementation process to be successful. Due to the chain of command within the SANDF, little can be implemented without top management authority. Logistical top management should involve SANDF top management in order for them to buy-in to a supply chain orientation and the implementation of a supply chain philosophy. Logistical top management can create and implement logistical processes and procedures. Involving top management will assist with the successful implementation of a supply chain orientation within the SANDF (Brewis, 2005; Du Toit, 2005; Johnson, 2006; Witbooi, 2004).

## **5.6 PERFORMANCE MEASUREMENT AND CONTROL IN SUPPLY CHAIN MANAGEMENT**

As an indispensable management tool, performance measurement provides the necessary assistance for performance improvement in pursuit of supply chain excellence (Chan & Qi, 2003: 209). Neely, Gregory and Platts (1995: 80) defines performance measurement as the process of quantifying effectiveness and efficiency of action, where measurement is the process of quantification and action leads to performance. According to Horngren, *et al.* (1999: 244), two attributes of performance are commonly measured:

- Effectiveness: the degree to which a predetermined objective or target is met (i.e. quality and time).
- Efficiency: the relative amount of inputs used to achieve a given level of output (i.e. cost involved).

Performance measurement provides important feedback information to enable managers to monitor performance, reveal progress, enhance motivation and communication, and diagnose problems (Chan & Qi, 2003: 210).

Chan and Qi (2003: 211) suggested that a holistic system-thinking perspective is employed to suit the real initiatives of supply chain management. The supply chain performance should be measured beyond the organisational boundaries rather than focusing per entity. The performance measurement system should span all the business aspects involved in the supply chain.

According to Dekker (2003: 1), issues addressed by accounting literature are the make-or-buy decisions and outsourcing of activities, inter-organisational cost management, supply chain relationships, alliances and business networks and value chain analysis.

Ramos (2004: 134) suggests that effective management accounting techniques can create considerable value for inter-organizational supply chains by:

- providing timely and accurate information about the activities required for their success (i.e. to support and facilitate decisions throughout the organisation); and
- providing information about the efficiency and quality of tasks performed, and about the performance of managers and operating units (i.e. to ensure that actions are consistent with plans).

Both issues are related to the need for information and sharing information.

In order to show a real insight of supply chain performance, the appropriate performance measures that best suit the supply chain context must be used. The measures should indicate the comprehensive performances of supply chains. They should involve relevant non-financial and intangible dimensions of performance. These performances should cover such areas as: those of critical concern to supply chain common goals and strategies; those of inter-influence and of common concern among the supply chain partners; and those concerning both internal partners and external customers (Chan & Qi, 2003: 212). The SA Army uses the budget, management reports and CALMIS reports in order to judge its measure of performance. A definite performance measurement system for the supply chain of

the SA Army should be developed and implemented in order to evaluate it and determine its absolute efficiency and effectiveness (Brewis, 2005; Du Toit, 2005; Johnson, 2006). Total value-chain-analysis treats each of the business functions as an essential and valued contributor, integrating and co-ordinating the efforts of all business functions, in addition to developing the capabilities of each individual business function. This does not imply that managers should proceed sequentially through the value chain. There are important gains to be realised (in terms of cost, quality, and the speed with which new products are developed) from having the individual parts of the value chain work concurrently (Horngren, *et al.*, 1999: 4, 14).

Some critical dimensions of performance measures should be taken into account when developing supply chain performance measurement systems for the SA Army: (Chan & Qi, 2003: 212-213)

- Input measures. These include popular dimensions such as time and costs.
- Output measures. From suppliers through manufacturers to distributor and sales, the processes add value to the materials and products or provide services. There are a variety of popular performance dimensions in supply chain management: delivery reliability in timeliness and error-free, flexibility in manufacturing, customer responsiveness' to demand and new product introduction.
- Composite measures. Productivity, efficiency, and utilisation are composite performance measures widely employed to assess the outputs in comparison with inputs or expectation. Composite measure involves both inputs and outputs.

When using a performance measurement method, supply chain managers can easily benchmark the performances of the whole system, and then analyse the effectiveness of their strategies, identifying the potential opportunities. All this feedback information facilitates more objective decision-making and performance improvement in supply chain management (Chan & Qi, 2003: 222).

Controlling is the process of monitoring performance and taking corrective actions as needed (Schermerhorn, 2004:102). The four steps in the control process are firstly to establish performance objectives, secondly to measure actual performance, in the third place to compare results with objectives and lastly to take the necessary action to resolve problems or explore opportunities. The SA Army must utilise this four step process and establish control measures for the camouflage clothing supply chain. Establishing these controls will assist in the performance measurement of the camouflage clothing supply chain, as well as with the efficient and effective control of the camouflage clothing supply chain.

Effective control measures must have certain characteristics such as flexibility, accuracy, results orientated, etc (Schermerhorn, 2004: 105; Robbins & Decenzo, 2001: 421). The SA Army should evaluate their control measures and ensure that it portrays the characteristics of effective controls. If not, it must be changed in order to support effective control.

Control by using the management process occurs when management functions are implemented well. Discipline is an essential part of control in an entity. Lastly, using financial ratios that deal with issues of liquidity, leverage, asset management, and profitability, assists information and financial controls (Schermerhorn, 2004: 108). It is important that the SA Army re-evaluate their control measures and ensure that it is up to standard in order to measure and correct deviations within their logistical supply chain sphere.

## **5.7 CAMOUFLAGE CLOTHING SERVICE DELIVERY IN THE SA ARMY**

The SA Army has an extended supply chain, with external suppliers and internal customers. Suppliers manufacture the camouflage textile and –clothing necessary in order to clothe the SA soldier. Planning is done on a medium term basis, managing the amount of clothing needed. There are phases that take place before the manufacture of camouflage clothing within the SANDF is complete. Phase one is the making of the camouflage textile, while the second phase includes the making of the clothing pieces from the textile. Suppliers tender for manufacturing contracts, which are then allocated by means of outsourcing the manufacturing of textile and

clothing to the supplier. Outsourcing is not new to the SA Army as most non-core and non-sensitive services and items (such as laundry services, procurement of items, etc.) are outsourced by Director Acquisitions and Procurement. After completion, the manufactured camouflage textile and –clothing are delivered to depots where it is warehoused. Clients (Support Bases and units) demand clothing from the depot, which is managed by the PSM CC. The depot issues the clothing to the Support Base, which issues it to the client either as an initial issue, or with regular uniform maintenance on an exchange ‘one-on-one’ basis.

Several business processes are involved in the management of this supply chain, but it is not fully integrated to form an efficient and effective supply chain, taking cost, time and quality into consideration. Although it seems as if the SA Army has a supply chain orientation, it still needs to be implemented as a fully integrated supply chain. This rigid supply chain has different business processes, managed according to SANDF policy, without the possibility of becoming a flexible, integrated philosophy. Command and control dictates the way things are managed, and currently too much red tape prevent the flexibility that is necessary to become an efficient and effective supply chain.

Although the SA Army has acceptable control and control measures for resource management, no adequate performance measurement system exists for the SA Army camouflage clothing supply chain in order to measure camouflage clothing supply chain efficiency and effectiveness. The SA Army must investigate and implement a supply chain performance measurement system. Performance measurement (with regards to supply chain management) can facilitate inter-understanding and integration among the supply chain members. It also provides insight to reveal the effectiveness of strategies and to identify success and potential opportunities. It makes an indispensable contribution to decision making in supply chain management, particularly in re-designing business goals and strategies, and re-engineering processes.

The key to implementation lies in focusing initially on introducing changes within the SANDF, and then extending the process to include suppliers and customers.

Although this seems a simple solution, the rigidity and security element of the SANDF will have a great influence on decisions made.

The DOD and SA Army logistical top management must become more involved in suggesting, investigating and supporting the implementation of integrated supply chain management. This could facilitate an organisation wide attitude change, guiding other members of the supply chain to become more involved in the success of implementing and managing it. A corporate wide culture of efficient and effective supply chain management must be established and managed. In this regard communication is a very important factor that needs to be investigated and managed to a greater extend. There can never be enough communication between members of the supply chain.

## **5.8 CONCLUSION**

The SA Army should consider outsourcing the procurement, manufacturing, warehousing and distribution of its camouflage clothing commodity, and the strategic merits of closer relationships with suppliers. Integrating forward into the supply chain, by outsourcing all logistical business functions (except for buffer/safety stock for operational purposes) total cost can be reduced. Forming strategic alliances with supply chain partners such as suppliers or intermediaries (e.g. transportation and/or warehousing services) can create customer value and reduce cost. The supply chain should operate as a business entity.

This will create a major change in the SA Army, leading to greater use of outsourced services. Cost can be saved through outsourcing these business processes. Security with regard to camouflage clothing can be a risk, but currently the manufacturing of the textile and clothing items are already outsourced. Supply chain partnerships and relationships will be extremely important. Outsourcing can reduce the administrative and managerial burden on managers. The costs associated with managing warehousing operations, transport, maintenance and repair workshops, etc. can be reduced.



Should the SA Army decide to investigate outsourcing as an option to improve the efficiency and effectiveness of its supply chain, it should take important factors into consideration. They must reach a realistic understanding between suppliers and customers about the job that must be done, or goals that must be reached, each partner understanding what role they play. Partnerships should have compatible cultures and values. They must be prepared to share information on strategic non-sensitive issues. Good policies and procedures do exist currently in the SANDF and a well-established policy department can ensure that adequate policy and procedures are established and implemented. Policy should address appropriate subjects such as supplier requirements, purchasing procedures, materiel management and warehousing, physical distribution, issuing procedures and handling of obsolete/used clothing, etc.

Efficient and effective controls should be implemented to ensure adequate control. Control policies and procedures will have to be amended, and must be clearly spelled out and defined. Performance goals must be formulated, and performance measures put into place. This can be monitored with internal controls set out formally and regulated by management. The SA Army must act on performance and take corrective actions, should it be necessary, on a continuous basis.



Without clear guidelines, the extension of the supply chain will be that of failure. A clear contract between the SA Army and external suppliers will have to be put into practice, with methods for terminating the partnership defined clearly, for security and performance grounds.

The SA Army lacks an integrated supply chain philosophy and clear supply chain management practices. Although it would be difficult and cumbersome to implement an integrated supply chain, with supply chain management philosophy and practices within the SA Army, the principle need to be incorporated in order to enhance efficiency and effectiveness in today's economic environment.

The level of outsourcing (privatisation) and the effectiveness of control will determine the degree of success the SA Army will achieve.

## **CHAPTER 6: SUMMARY**

### **6.1 RESEARCH PROBLEM**

The aim and nature of the research study was identified. The theoretical framework provided background on why the study should have been conducted. The rationale of the study was explained with the research problem, objectives and hypothesis identified in order to support this rationale. The research design and methodology of the study explained in detail the manner in which that study was conducted, and a summary of the most common definitions and descriptions were provided to clarify the reading material.

### **6.2 INTRODUCTION TO THE SUPPLY CHAIN AND SUPPLY CHAIN MANAGEMENT**

The supply chain was defined as a system of basic flows, demand and supply, where three or more entities are involved, directly in the upstream and downstream flow of products, services, finances, and/or information. Supply chain management is the integration of planning, coordination and control of all business processes and activities in the supply chain, in order to efficiently and effectively deliver superior consumer value to the end-consumer, while satisfying all relevant role-players within the supply chain.

Three forms of supply chains exist. Firstly a direct supply chain, secondly an extended supply chain and lastly, the ultimate supply chain, which include all the entities involved in the up- and downstream flows of products, services, finances and information from the ultimate supplier to the ultimate customer.

Supply chain management can be seen as a management philosophy, the implementation of a management philosophy and lastly as a set of management processes. As a philosophy, supply chain management takes a systems approach to viewing the supply chain. The implementation of a management philosophy requires that a set of activities is coordinated within the supply chain in order to facilitate the entity to operate or behave consistently with this supply chain philosophy.

An entity should recognise the systematic, strategic implication of the tactical activities involved in managing the various flows in a supply chain. It is not to say that entities with a supply chain orientation can implement it – it requires a supply chain orientation across several entities directly connected to the supply chain.

It is recognised that many antecedents and consequences of supply chain management can influence the implementation of supply chain orientation philosophy by either enhancing it or hamper it.

The scope of supply chain management encompasses two categories: functional and organisational. The functional scope refers to that traditional business functions which are included or excluded in the implementation and the process of supply chain management. The organisational scope of supply chain management encompasses what kind of inter-firm relationships are relevant to the participating firms in the implementation and the process of supply chain management.

Critical success factors are important. A range of factors that differentiate more agile manufacturing entities from less agile manufacturing entities were established. Performance measurement and control provide the necessary assistance for performance improvement in pursuit of supply chain excellence. Performance measurement and the importance thereof play a critical role in the entity. The value chain was identified as the sequence of business functions in which utility (usefulness) is added to the products or services of an entity.

Critical dimensions of performance measures exist. These include inputs, outputs, and composite measures. The recognition of an entity of the important criteria for performance measurement design is significant.

Controlling is the process of monitoring performance and taking corrective actions as needed. The four steps in the control process are firstly to establish performance objectives, secondly to measure actual performance, in the third place to compare results with objectives and lastly to take the necessary action to resolve problems or explore opportunities. Effective control measures must have certain characteristics

such as flexibility, accuracy, results orientated, etc. Control by using the management process occurs when management functions are implemented well. Discipline is an essential part of control in an entity. Using financial ratios that deal with issues of liquidity, leverage, asset management, and profitability, assists information and financial controls.

### **6.3 SUPPLY CHAIN MANAGEMENT THEORY**

Various authors' theories on supply chain management were discussed. The efficient and effective utilisation of a supply chain in an entity is important, with the focus on reducing costs while achieving a competitive advantage through adequate supply chain management.

Lambert and Stock then emphasised the use of a channel of distribution where the major flows of material in a channel of distribution are noted as important. This is a simple theory, but the basics of distribution management, such as information sharing, communication and logistics functions, are included.

Lambert, Stock and Ellram underlined that organisational boundaries can be extended within a supply chain, considering trade-offs both within and among entities within the supply chain. The supply chain highlights key business processes, while information flow plays a vital role in this highly interactive and complex systems approach supply chain.

The theories of Kempainen and Vepsäläinen included a complex mix of supply chains, starting at the very basic and simple, and ending in a complex arcade of role players. The analysis of supply chain management practices refer to the extent to which entities share information within supply chains and what type of orders, schedules and plans are made jointly between partners within these supply chains. Kempainen and Vepsäläinen identified various expected trends for supply chain management. Firstly, supply chains can be very simple in that they only extend to the closest partners, focusing only on their first-tier suppliers and customers. Secondly, it may become more complex, with second- or even third-tier suppliers and customers involved. Lastly, supply networks were clear market-based relations are

included for the functions that are outsourced.

Christopher and Towill's support the agile supply chain concept. Here the emphasis falls on agility, as it is impossible to remove uncertainty entirely from the supply chain. Entity specific strategies must be developed to enable entities to match supply and demand. In a business environment where demand is volatile and the customer requirement for variety is high and relatively unpredictable, a high level of agility is required from the entity. Here agility calls attention to the ability of the entity to use market knowledge to exploit profitable opportunities in a volatile market, while developing a value stream by eliminating all waste (including time). The most appropriate combinations of lean and agile strategies must be achieved. Creating an agile supply change requires a number of significant changes to the status quo of the entity, where managers should not only manage the change within the entity, but also the relationships between entities in the supply chain.

Gilmour's supply chain is an integrated supply chain model comprising of functional process capabilities, with organisational characteristics and information technology as support. These functional process capabilities, which include customer-driven supply chain, efficient logistics, lean manufacturing, demand-driven sales planning, supplier partnering and integrated supply chain management, are supported by integrated information systems and advanced technology. Organisational capabilities, which include integrated performance measurement, teamwork and aligned organisation structure also support these functional process capabilities. Gilmour states that with more complex strategies that entities pursue, effective supply chain management is a key strategic element and operating an integrated logistics system a reasonable objective to pursue.

Although supply chains can become very complex, it consists of basic, simple components that can be applied to all entities in order to establish and implement a supply chain for supply chain management. The SA Army must use these basic components to streamline their current supply chain in order to implement efficient and effective supply chain management.

#### 6.4 SA ARMY CAMOUFLAGE CLOTHING SUPPLY CHAIN

The SA Army camouflage clothing logistics revealed elements of improvement, as compared to supply chain management principles. Logistics in a military context is the practical art of moving armies and keeping them supplied. Camouflage clothing forms an important element of the total supplies of a soldier in sustaining military and of warfare capabilities. Camouflage clothing logistics in the SA Army is a complex mix of physical entities, processes and rules, a system that is governed by mostly conceptual concepts and principles.

If the principles of supply chain management are properly applied within the SA Army, it can enhance their supply chain for camouflage clothing. The USDOD has indicated the requirement to modernise their logistics systems as one of their top priorities. This would cut their logistics costs, reduce infrastructure and cycle times, and, most importantly, improve support of their 21<sup>st</sup> century War fighters. The South African Public Finance Management Act (PFMA) regulates logistics within the Department of Defence. The PFMA instructs the DOD to implement supply chain management efficiently and effectively.

Role players, processes involved, time frames applicable, and concerning issues raised by role players within this supply chain of the SA Army camouflage clothing logistics were identified. The SA Army camouflage clothing supply chain is an extended supply chain with the following important role players to consider:

- Director Army Product Systems Manager.
- Product System Manager Camouflage Clothing.
- Armaments Corporation of South Africa Ltd. (ARMSCOR).
- DOD Logistical Support Formation.
- Defence Institute.
- Dir Acquisition and Procurement Agency.
- SABS.
- Suppliers.
- DOD Main Ordnance Sub Depot Durban.

- DOD Mobilisation Centre Bloemfontein.
- SA Army Support Formation.
- Support Bases within the SANDF.
- Force Structure Elements (FSE) (aka units) within the SANDF.
- The soldier on the ground.

Possible problems identified in the SA Army camouflage clothing logistics includes personnel issues or problems, attitude of members in the supply chain, communication issues, the lack of serviceable labour saving devices and material handling equipment, lack of adequate research and development, the information systems used, the budget of the SA Army for clothing and lastly the relationship between suppliers and the DOD. All issues addressed had a negative implication on the efficient and effective management of the SA Army camouflage clothing supply chain.

The SA Army is a military institution with peacekeeping operations as their core function. The manufacturing and distribution of clothing is not their core function and can therefore be outsourced to address most of the concerns raised under the present system. The management of outsourcing should be as such that it adheres to all applicable principles of supply chain management.

## **6.5 RESEARCH RESULTS, RECOMMENDATIONS AND CONCLUSIONS**

The SA Army has an extended supply chain, with external suppliers and internal customers. Suppliers manufacture the camouflage textile and –clothing necessary in order to clothe the SA soldier. Planning is done on a medium term basis, managing the amount of clothing needed. There are phases that take place before the manufacture of camouflage clothing within the SANDF are complete. Phase one is the making of the camouflage textile, while the second phase includes the making of the clothing pieces from the textile. Suppliers tender for the manufacturing contracts, which are then allocated by means of outsourcing the manufacturing of textile and clothing to the supplier. Outsourcing is not new to the SA Army as most non-core and non-sensitive services and items (such as laundry services, procurement of

items, etc.) are outsourced by Director Acquisitions and Procurement. After completion, the manufactured camouflage textile and –clothing are delivered to depots where it is stored. Clients (Support Bases and units) demand clothing from the depot, which is managed by the PSM CC. The depot issues the clothing to the Support Base, which issues it to the client either as an initial issue, or with regular uniform maintenance on an exchange ‘one-on-one’ basis.

Several business processes are involved in the management of this supply chain, but it is not fully integrated to form an efficient and effective supply chain, taking cost, time and quality into consideration. Although it seems as if the SA Army has a supply chain orientation, it still needs to be implemented as a fully integrated supply chain. This rigid supply chain has different business processes, managed according to SANDF policy, without the possibility of becoming a flexible, integrated philosophy. Command and control dictates the way things are managed, and currently too much red tape prevent the flexibility that is necessary to become an efficient and effective supply chain.

Although the SA Army has acceptable control measures for resource management, no adequate performance measurement system exists for the SA Army camouflage clothing supply chain in order to measure camouflage clothing supply chain efficiency and effectiveness. The SA Army must investigate and implement a supply chain performance measurement system. Performance measurement (with regards to supply chain management) can facilitate inter-understanding and integration among the supply chain members. It also provides insight to reveal the effectiveness of strategies and to identify success and potential opportunities. It makes an indispensable contribution to decision making in supply chain management, particularly in re-designing business goals and strategies, and re-engineering processes.

The key to implementation lies in focusing initially on introducing changes within the SANDF, and then extending the process to include suppliers and customers. Although this seems a simple solution, the rigidity and security element of the SANDF will have a great influence on decisions made.



The DOD and SA Army logistical top management must become more involved in suggesting, investigating and supporting the implementation of integrated supply chain management. This could facilitate an organisation wide attitude change, guiding other members of the supply chain to become more involved in the success of implementing and managing it. A corporate wide culture of efficient and effective supply chain management must be established and managed. In this regard communication is a very important factor that needs to be investigated and managed to a greater extend. There can never be enough communication between members of the supply chain.

Should the SA Army decide to investigate outsourcing as an option to improve the efficiency and effectiveness of its supply chain, it should take important factors into consideration. They must reach a realistic understanding between suppliers and customers about the job that must be done, or goals that must be reached, each partner knowing definitely what role they play. Partnerships should have compatible cultures and values. They must be prepared to share information on strategic non-sensitive issues. Good policies and procedures do exist currently in the SANDF and a well-established policy department can ensure that adequate policy and procedures are established and implement. Policy should address appropriate subjects such as supplier requirements, purchasing procedures, materiel management and warehousing, physical distribution, issuing procedures and handling of obsolete/used clothing, etc.

Efficient and effective controls should be implemented to ensure adequate control. Control policies and procedures will have to be amended, and must be clearly spelled out and defined. Performance goals must be formulated, and performance measures put into place. This can be monitored with internal controls set out formally and regulated by management. The SA Army must act on performance and take corrective actions, should it be necessary, on a continuous basis.

Without clear guidelines, the extension of the supply chain will be one of failure. A clear contract between the SA Army and external suppliers will have to be put into practice, with methods for terminating the partnership defined clearly, for security and performance grounds.

The SA Army lacks an integrated supply chain philosophy and clear supply chain management practices. Although it would be difficult and cumbersome to implement an integrated supply chain, with supply chain management philosophy and practices within the SA Army, the principle need to be incorporated in order to enhance efficiency and effectiveness in today's economic environment.

The level of outsourcing (privatisation) and the effectiveness of control will determine the degree of success the SA Army will achieve.



## LIST OF SOURCES

- Akkermans, H., Bogerd, P. & Vos, B. 1999. Virtuous and vicious cycles on the road towards international supply chain management. *International Journal of Operations & Production Management*. **19**(5/6), 565-581.
- Barratt, M. 2004. Understanding the meaning of collaboration in the supply chain. *Supply Chain Management: An International Journal*. **9**(1), 30-42.
- Bester, C. 2003. *The management of information inside the general support base concept of the South African National Defence Force*. Stellenbosch: University of Stellenbosch. (MMil-thesis)
- Bester, M.J. 2004. Staff Officer Class 2: Clothing. Director Army Product Systems Management. Army Office. [Personal communication]. 09 November.
- Brewer, A.M., Button, K.J., & Hensher, D.A. (eds.). 2001. *Handbook of Logistics and Supply-Chain Management*. Amsterdam, etc.: Pergamon.
- Brewis, A. 2005. Interview with Staff Officer Class 2 General Commodities; Main Ordnance Depot; South African National Defence Force, on 14 July 2006. Pretoria.
- Chan, F.T.S. & Qi, H.F. 2003. An innovative performance measurement method for supply chain management. *Supply Chain Management: An International Journal*. **8**(3), 209-223.
- Christoffel, S.W. Warehouse Commander; Department of Defence Main Ordnance Sub Depot Durban; South African National Defence Force. (personal communication. April 12, 2006).
- Christopher, M. 2000. The Agile Supply Chain: Competing in Volatile Markets. *Industrial marketing Management*. **29**(1), 37-44.

- Christopher, M. & Towill, D. 2001. An integrated model for the design of agile supply chains. *International Journal of Physical Distribution & Logistics Management*. **31**(4),. 235-246.
- Cooper, M.C., Lambert, D.M. & Pagh, J.D. 1997. Supply Chain Management: More Than a New Name for Logistics. *International Journal of Logistics Management*. **8**(1), 1-14.
- Cottrill, K. 1997. The supply chain of the future. *Distribution*. **96**(11). 52-54.
- Daugherty, P.J., Ellinger, A.E. & Gustin, C.M. 1996. Integrated logistics: achieving logistics performance improvements. *Supply Chain Management: An International Journal*. **1**(3). 25-33.
- De Beer, H. 2006. Interview with Warrant Officer Class 1 User Systems; South African Army Support Formation; South African National Defence Force on 26 June 2006. Pretoria.
- Dekker, H.C. 2003. Value chain analysis in interfirm relationships: a field study. *Management Accounting Research*. **14**(1). 1-23.
- Du Toit, A. 2005. Interview with Staff Officer Class 1, In and Outbound Logistics; Department of Defence Logistical Support Formation; South African National Defence Force on 22 July 2005. Pretoria.
- Fawcett, S.E. & Magnan, G.M. 2002. The rhetoric and reality of supply chain integration. *International Journal of Physical Distribution & Logistics Management*. **32**(5), 339-361.
- Gattorna, J.L. & Walters, D.W. 1996. *Managing the Supply Chain. A Strategic Perspective*. Houdsmill, etc.: MacMillan Press Ltd.
- Gilmour, P. 1999a. A strategic audit framework to improve supply chain performance. *Journal of Business & Industrial Marketing*, **14**(5/6), 355-363.

- Gilmour, P. 1999b. Benchmarking supply chain operations. *Journal of Physical Distribution & Logistics Management*, **5**(4), 283-290.
- Golicic, S.L., Davis, D.F., McCarthy, T.M. & Mentzer, J.T. 2002. The impact of e-commerce on supply chain relationships. *International Journal of Physical Distribution & Logistics Management*. **32**(10), 851-871.
- Handfield, R.B. & Nichols, E.L. (1999) *Introduction to Supply Chain Management*. Englewood Cliffs, NJ: Prentice-Hall.
- Horngren, C.T., Foster, G., Datar, S.M. & Uliana, E. 1999. *Cost Accounting in South Africa: A Managerial Emphasis*. South Africa: Prentice Hall South Africa (Pty) Ltd.
- January, N.J. Senior Staff Officer Support Systems. South African Army Formation. South African National Defence Force. (personal communication. 26 June, 2006).
- Johnson, I.R. 2006. Interview with Director Product System Manager; South African Army Office; South African National Defence Force on 17 May 2006. Pretoria.
- Johnson, J.C., Wood, D.F., Wardlow, D.I. & Murphy Jr, P.R. 1998. *Contemporary Logistics*. 7<sup>th</sup> ed. New Jersey: Prentice Hall.
- Jordaan, M. 2005. Interview with Manager: Clothing Systems Combat Support; ARMSCOR on 26 July 2005. Pretoria.
- Kress, M. 2002. *Military Logistics. The Art and Science of Sustaining Military Operations*. Boston, etc.: Kluwer Academic Publishers.
- Lambert, D.M. & Stock, J.R. 1999. *Strategic Logistics Management*. 3<sup>rd</sup> ed. Singapore: Irwin/McGraw-Hall.

- Lambert, D.M., Stock, J.R. & Ellram, L.M. 1998. *Fundamentals of Logistics Management*. Boston, etc.: Irwin/McGraw-Hill
- Lamming, R., Johnsen, T., Zheng, J. & Harland, C. 2000. An initial classification of supply networks. *International Journal of Operations and Production Management*. **20**(6), 675-691.
- Lasser, W. & Zinn, W. 1995. Informal Channel Relationships in Logistics. *Journal of Business Logistics*. **16**(1), 81-106.
- Lau, H.C.W., Pang, W.K. & Wong, C.W.Y. 2002. Methodology for monitoring supply chain performance: a fuzzy logic approach. *Logistics Information Management*, **15**(4), 271-280.
- Lockamy III, A. & McCormack, K. 2004. The development of a supply chain management process maturity model using the concepts of business process orientation. *Supply Chain Management: An International Journal*. **9**(4), 272-278.
- Magnus, L. 2005. [http://www.ey.com/global/Content.nsf/South\\_Africa/25\\_Jan\\_05\\_Supplier\\_performance\\_as\\_a\\_national\\_competitive\\_strength](http://www.ey.com/global/Content.nsf/South_Africa/25_Jan_05_Supplier_performance_as_a_national_competitive_strength) accessed 09 June 2006.
- Mcpherson, A. & Wilson, A. 2003. Supply Chain Management: Improving Competitive Advantage in SMEs. In Jones, O. & Tilley, F. (eds.), *Competitive Advantage in SMEs*. Great Britain: Antony Rowe Ltd.
- McMullan, A. 1996. Supply chain management practices in Asia Pacific Today. *International Journal of Physical Distribution & Logistic Management*. **26**(10), 79-95.

- Mentzer, J.T., DeWitt, W., Keebler, J.S., Min, S., Nix, N.W., Smith, C.D. & Zacharia, Z.G. 2001. Defining Supply Chain Management. *Journal of Business Logistics*. **22**(2), 1-25.
- Monczka, R., Trent, R. & Handfield, R. 1998. *Purchasing and Supply Chain Management*. Cincinnati: International Thompson Publishing.
- Moorman, C., Despondé, R. & Zaltman, G. 1993. Factors Affecting Trust in market Research Relationships. *Journal of Marketing*. **57**(1), 81-102.
- Morgan, R.M. & Hunt, S.D. 1994. The Commitment-Trust Theory of Relationship Marketing. *Journal of Marketing*. **58**(3), 20-39.
- Naylor, J.B., Naim, M.M. & Berry, D. 1999. Leagility: Integrating the lean and agile manufacturing paradigms in the total supply chain. *International Journal of Production Economics*. **62**(1-2), 107-118.
- Neely, A., Gregory, M. & Platts, K. 1995. Performance measurement system design: A literature review and research agenda. *International Journal of Operations & Production Management*. **15**(4), 80-116.
- Paun, M.S. 2003. Managing Materiel Distribution in the 21<sup>st</sup> TSC. *Army Logistician*. May-June, 12-15.
- Perry, M. & Sohal, A. 2000. Quick response practices and technologies in developing supply chains. A case study. *International Journal of Physical Distribution & Logistics Management*, **30**(7/8), 627-639.
- Persson, G. 1995. Logistics Process Redesign: Some Useful Insights. *International Journal of Logistics Management*. **6**(1). 13-26.
- Porter, M.E. 1985. *Competitive Strategy: Techniques for Analyzing Industries and Competitors*. New York: Free Press.

- Power, D. 2005. Supply chain management integrations and implementations: a literature review. *Supply Chain Management: An International Journal*. **10**(4), 25-263.
- Power, D.J., Sohal, A.S. & Rahman, S. 2001. Critical success factors in agile supply chain management. An empirical study. *International Journal of Physical Distribution & Logistics Management*. **31**(4), 247-265.
- Proctor, H.L. & Cook, A.J. 2002. DLA's New Inventory Management Strategy. *Army Logistician*. September-October. 2-5.
- Ramos, M.M. 2004. Interaction between management accounting and supply chain management. *Supply Chain Management: An International Journal*. **9**(2). 134-138.
- Republic of South Africa. Parliament. 1999. *Public Finance Management Act, Act 1 of 1999. Regulations in terms of the Public Finance Management Act, 1999: Framework for Supply Chain Management*. <File:///H/Acts 2004/Public Finance management 7.htm> [3/25/2004 3:41:04 pm].
- Republic of South Africa. Department of Defence. 1999. *Appendix O to GSB MDSC Guidelines: Logistics Guidelines for General Support Bases in the DOD*. Pretoria: SANDF.
- Republic of South Africa. Department of Defence. 1983. *Gesamentlike Militêre Woordeboek (GMW), Joint Military Dictionary (JMD)*. Pretoria: SADF.
- Robbins, S.P. & Decenzo, D.A. 2001. *Fundamentals of Management*. 3<sup>rd</sup> ed. New Jersey: Prentice-Hall, Inc.
- Schermerhorn, Jr, J.R. 2004. *Core Concepts of Management*. New Jersey: John Wiley & Sons, Inc.



- Schutte, W. Staff Officer Class 1 Base Ordinance Depot; Department of Defence Mobilisation Center; South African National Defense Force. (personal communication. March 10, 2006).
- Sridharan, U.V., Caines, W.R. & Patterson, C.C. 2005. Implementation of supply chain management and its impact on the value of firms. *Supply Chain management: An International Journal*. **10**(4). 313-318
- Tate, K. 1996. The elements of a successful logistics partnership. *International Journal of Physical Distribution & Logistics Management*. **26**(3), 7-13.
- Taylor, D. & Brunt, D. 2001. *Manufacturing Operations and Supply Chain Management. The LEAN Approach*. Great Britain: Thompson Learning.
- Thompson, A. & Strickland, A.J. 2001. *Strategic Management: Concepts & Cases*. International edition. New York: McGraw-Hill/Irwin.
- United States of America. 1999. *DOD Logistics Strategic Plan*.  
[www.acq.osd.mil/log/mdm/exinfo.htm](http://www.acq.osd.mil/log/mdm/exinfo.htm)
- Van Creveld, M. 1977. *Supplying War. Logistics from Wallenstein to Patton*. Cambridge, etc.: Cambridge University Press.
- Van der Vorst, J.G.A.J. & Beulens, A.J.M. 2002. Identifying sources of uncertainty to generate supply chain redesign strategies. *International Journal of Physical Distribution & Logistics Management*. **32**(6), 409-430.
- Walker, A. 2006. Interview with Staff Officer Class 3: Operational Intelligence; Joint Operational Headquarters; South African National Defence Force on 02 March 2006. Pretoria.
- Witbooi, V.O.E. 2004. Interview with Staff Officer Class 1: Logistics Management; Army Support Base Youngsfield; South African National Defence Force on 08 November 2004. Cape Town.