

“Simplicity is the ultimate sophistication”

(Leonardo DaVinci)

Unlocking the code to hardwood pulpwood supply – an analysis to determine if intervention in the stump-to-mill supply chain by NCT will increase hardwood pulpwood supply from its members in KwaZulu-Natal?

By

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Submitted in fulfillment of the requirements
for the degree of
Masters in Business Administration (MBA)
at the
University of KwaZulu-Natal

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SEPTEMBER 2006

EXECUTIVE SUMMARY

NCT Forestry Co-operative Limited has experienced decreased yearly hardwood pulpwood volume sales over the last several years. This indirectly means NCT members have decreased their hardwood pulpwood volume trade to NCT over the last several years.

Combined with the general under-supply of hardwood pulpwood from its members, NCT's current systems do not accurately predict the monthly and yearly volumes from its members. This is because many factors play a role and influence the physical volume of hardwood pulpwood supplied during the marketing process from the stump to the mill.

Two independent studies have been carried out by NCT, to determine the main factors causing NCT members to under-supply their hardwood pulpwood. Both reports sighted "price" as the major factor and driver in contributing to NCT members making a decision to bank their timber or dispose of it elsewhere.

Due to NCT's core business being export orientated, "price" is considered to be "exogenous" by nature or defined as an "uncontrollable variable" as the mill delivered price NCT offers its members is a factor of the macro economic conditions between South Africa, United States of America and Japan. More specifically the "price" NCT offers its members is a factor of the exchange rate between the South African rand and the United States dollar.

The second contributing factor which was sighted by NCT members as to why they were under-supplying their hardwood pulpwood was "operational issues".

"Operational issues" can be refined to issues pertaining to the stump-to-mill supply chain. "Operational issues" as apposed to "price" can be considered as a "controllable variable" as every component within the stump-to-mill supply chain can be controlled and managed.

This paper specifically undertakes to investigate, in more detail, what specific factors within the stump-to-mill supply chain are causing NCT members to under-supply their hardwood pulpwood to NCT.

Mitigating research into the stump-to-mill supply chain as an area of concern for NCT is the fact that South Africa is currently and forecasted for the future, to have an under-supply and over-demand of hardwood pulpwood. This factor alone has many knock-on effects within the entire forestry value chain.

Combined with the under-supply and over-demand situation for hardwood pulpwood, is the fact that NCT's competitors define the profile of an NCT member, being mainly associated to the medium and small grower category, as the most liquid form of hardwood pulpwood resource available.

By understanding the problems the contracting fraternity faces in the value chain, further mitigates the focus on the stump-to-mill supply chain as a problem area for NCT.

Research exposes that mainly "second economy" or "informal contractors" work in the environment of medium and small grower categories.

For independent contractors, this environment is characterized by failure to reach economies of scale, lack of business skills, poor access to finance and training, difficulties in getting public liability insurance cover and limited help from the large corporate grower organisations.

In general, NCT members falling into the medium and small grower categories will invariably experience un-professional service from independent contractors. This causes conflict in the stump-to-mill supply chain and can damage the marketing service NCT provides to its members and markets.

The loyalty of NCT hardwood pulpwood owning members will be tested as the sale of hardwood pulpwood moves more and more into a "sellers" market, which will inherently mean an increase in the bargaining power and leverage these members will enjoy. Buyers who position themselves to satisfy these anticipated increased needs of private/independent growers will most likely enjoy competitive advantage.

This study has found that competitive advantage partly lies in more control and management of the stump-to-mill supply chain. The study has also recommended that NCT adopt a combined strategy of backward vertical integration with keiretsu (a combined supply chain management strategy that incorporates few suppliers and backward vertical integration in a coalition partnership) in its approach to gain more control of the stump-to-mill supply chain.

The study further concluded that the orthodoxy of supply chain management (SCM) emphasises competitive advantage through increased operational control and efficiency combined with market responsiveness from production and distribution processes into the hands of NCT.

Further, the paper found that anticipated future competition for NCT would be between the stump-to-mill supply chains rather than between firms. Indirectly this means NCT will have to increase the scope of service to its members and that means increasing its service in the stump-to-mill supply chain.

An effective hardwood pulpwood procurement (marketing) strategy rolled out by NCT using a combination of backward vertical integration and keiretsu as supply chain management strategies, in a drive to gain more control and management over the stump-to-mill supply chain was strongly recommended.

This strategy will not only increase the control over the volume supplied to NCT but will also increase the sustainability of fibre by creating planned felling schedules.

This strategy will also provide a stable environment for the “informal” or “second economy” contractors to work in, while satisfying the increasing needs of NCT members, and in the process creating a competitive advantage by providing a much-needed additional service.

By adopting the supply chain management approach of using both backward vertical integration and keiretsu as strategies will allow for benchmarking between the two strategies to take place, while at the same time due to increased planning, economies of scale will be achieved leading to cost savings.

Cost savings in the stump-to-mill supply chain will allow NCT more flexibility in defending its mill delivered prices.

Hence, the key to unlocking the code to hardwood pulpwood supply from the NCT membership partly lies in the intervention of the stump-to-mill supply chain by adopting a dual supply chain management strategy of both backward vertical integration and keiretsu by NCT in the stump-to-mill supply chain.

However, one can capture the hill by using “service” only, but this strategy will not necessary help you hold the hill. A combined strategy of “price” and “increased service” will more than likely allow NCT to capture and hold the hill.

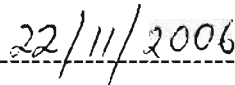
DECLARATION

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DATE

ACKNOWLEDGEMENTS

The successful completion of this research would not have been possible without the support, advice, assistance and encouragement of others.

I would like to record my sincere thanks and appreciation to the following people:

- My supervisor, Mr. Mike Poulter, for his professional and constructive guidance during the course of my research efforts;
- My employer NCT Forestry Co-operative Limited, for the bursary towards this qualification and the use of their member database to conduct the research.
- The staff and lecturers of the MBA Unit for your invaluable contribution and assistance
- Prof. Debbie Vigar-Ellis for her continuous pressure and professional support and advice.
- Sala Price my girlfriend, for her help, patience and understanding.
- Michele Perry, Peter Keyworth, Russell Morkel, François Oberholzer for their contributions in helping the project reach finality.
- My Mom and Dad for their help in editing.

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Terminology

ASP: Annual Supply Potential.

DWAF: Department of Water Affairs and Forestry.

Fibre: Wood cell whose properties vary from one tree species to another; the main raw material for papermaking.

Forestry: DWAF describes forestry as including the use, management and processing of non-timber forest products, a vast category involving fruits, plants, medicinal herbs and animals found in forests and woodlands. Forestry also means the use of forest woods for fuel and for the manufacturing of charcoal; the production of important construction materials, including wooden beams, poles and thatching; and the provision of grass for grazing for domestic and wild animals (DWAF, 2006).

FSA: Forestry South Africa – association representing timber growers in South Africa

Hardwood: Eucalyptus and wattle species

Harvesting: The cutting down, de-branching, de-barking (if need be), cross-cutting and stacking of round logs or tree lengths at compartment road side.

Intermediary: A person or entity who brings parties together and assists in negotiating terms.

Loading: Includes the mechanical loading of roundwood from a depot onto long haul vehicles.

Long Haul - Extended primary transport: If timber is moved from the stump area past the traditional compartment roadside landing directly to either an intermediate storage site (depot, rail siding or merchandising yard) or a processing plant, it is classified as extended primary transport. Primary transport methods and systems are used in the entire process.

NCT: NCT Forestry Co-operative Limited.

PAMSA: Paper Manufacturing Association of South Africa.

Pulp: Mechanically or chemically produced mass of fibre for production of paper and/or board.

Pulpwood: Wood suitable for making into pulp; not usually good enough for sawmilling.

Rotation Age: The age at which a stand is considered mature and ready for harvesting.

Primary transport – Short Haul: is the extraction of timber from the stump area to the compartment roadside. This can be executed by whatever means available, for example manual extraction; animal slipping; skidding by skidder or tractor; forwarder; agricultural tractor/trailer configuration or even chute or cable yarding.

SADC: Southern African Development Community.

SAFCOL: South African Forestry Company Limited.

Secondary intermediate transport – Short Haul: If timber has undergone primary or extended primary transport and is in temporary storage (not at the mill) and is reloaded onto another mode of transport, it is being subjected to secondary transport. However, if this timber is once again moved to temporary storage sites, a depot or rail siding and does not reach the mill, it has not been subjected to the complete cycle of secondary transport, and has thus been subjected to secondary intermediate transport.

Secondary transport – Short Haul is on the other hand the subsequent transport of the same timber from the compartment roadside to an intermediate storing place or directly to the mill.

Secondary terminal transport – Long Haul If timber is transported directly from a compartment roadside or depot or rail siding to the mill, it has been subjected to secondary terminal transport.

Softwood: Pine species.

Stump-to-mill supply chain: The stump-to-mill supply chain comprises the independent operations of harvesting, short haul, loading and long haul from the plantation stump-to-mill gate.

Stump-to-mill supply chain management: The management of the entire value-added chain, from stump-to-mill.

SED: Small end diameter.

Supply Chain: A supply chain is a network of facilities and distribution options that performs the functions of procurement of materials; transformation of these materials into intermediate and finished products; and distribution of these finished products to customers.

Supply chain management (SCM): Supply Chain Management is the management of the entire value-added chain, from the supplier to manufacturer right through to the retailer and the final customer. SCM has three primary goals: Reduce inventory, increase the transaction speed by exchanging data in real-time, and increase sales by implementing customer requirements more efficiently.

KZN: KwaZulu-Natal.

CHAPTER 1

Introduction, Problem and Structure of the Report

1.1 Introduction

NCT Forestry Co-operative Limited (NCT) has experienced decreasing year-on-year sales in hardwood pulpwood volumes. This means NCT members have decreased their yearly hardwood pulpwood volume supplies to NCT.

This paper aims to find a key to unlock the reasons why NCT members' are under-performing in their supply of hardwood pulpwood to NCT's strategic markets.

During the process of finding the key to unlock the fibre code to hardwood pulpwood supply the paper covers various areas within the South African forestry industry, which mitigate the circumstances surrounding the under-supply of hardwood pulpwood in general.

According to its website, NCT is recognised as an international supplier of quality round wood timber and the largest forestry marketing organisation in Southern Africa. NCT was established in 1949 as a marketing co-operative to cater to the needs of private and independent timber growers. As a co-operative, its members who share in profits, own NCT. Today membership stands at approximately 2100 shareholding members, representing a total area of approximately 296 000 ha or 21% of afforested land in South Africa (NCT, 2006, paragraph 3).

NCT's role is to act as agent for both members and processors; the best market prices are negotiated on behalf of its members and stable supplies of quality round wood timber is sourced from its members for local and export markets. Members not only benefit from the wide range of services NCT offers, but also share in its annual profits and qualify for bonuses based on their patronage and committed supply, obviously depending on available revenue (Perry, 2006, p.1).

NCT's Chairman, Dr. Carl Seele, reports in NCT's 2005 Annual Report (NCT, 2005, p. 2) "Most of the timber marketed by NCT is sold on the international market in US Dollars. The continued strength of the Rand, especially in its relation to the US Dollar, has therefore resulted in very difficult conditions for NCT's members selling pulpwood destined for export. Pulpwood prices in local currency had to be adjusted downwards to levels, which in real terms are rock bottom. This factor, together with numerous other factors affecting the farming community, has resulted in a general mood of pessimism among many NCT's members. For the Co-operative the effects of this strength of the Rand has been exacerbated by a very competitive timber sourcing environment in which NCT's ability to match competitive prices offered by other purchases has been severely limited. In order to remain financially healthy, NCT has resisted the temptation to subsidise timber prices from expected future earnings".

Difficult macro economic trading conditions combined with strong national competition means NCT needs to look at all possible angles to maintain and increase its membership and membership resource supplies to remain competitive.

NCT has over the last two years conducted two mutually independent studies defining the reasons for decreased hardwood pulpwood supply from its members to NCT's strategic markets.

The first study was undertaken by NCT in 2005. Two hundred and forty five NCT members were contacted by phone on the basis that they had the biggest decrease in eucalyptus hardwood pulpwood supply over the past year compared to their previous years' supply (Pettit, 2005, paragraph 1).

The second study was undertaken by NCT in 2006. One hundred and fifty NCT members were selected in terms of being the largest suppliers of eucalyptus to NCT and were sent a questionnaire requiring them to answer questions related to their eucalyptus hardwood pulpwood supply (Perry, 2006, p. 40).

Both reports were ultimately seeking to find out what were the main reasons/variables causing NCT members to under perform in the supply of their eucalyptus hardwood pulpwood to NCT and NCT's strategic markets.

In summary, both reports concluded that "price" and "operational issues" were the two main factors in the decision making process to sell or hold back sales of their hardwood pulpwood. However, NCT members considered "price" in both reports as the main driver in the under-supply of their hardwood pulpwood to NCT's strategic markets. This conclusion can be re-affirmed by the statements made by NCT's Chairman above.

Due to the strong rand, the real effect of "price" combined with "other variables", is pointed out in NCT's Annual Report for 2005, where the eucalyptus hardwood pulpwood volume supply from NCT members reduced by 14% from the previous year. This reflected a reduction from 1 377 000 tonnes in 2004, to 1 184 000 tonnes in 2005 (NCT, 2005, p. 18).

The 14% reduction in the supply of hardwood pulpwood was also the major contributor to the overall reduction in NCT's sales for 2005 if compared with overall sales in 2004. Total sales of 2 486 000 tonnes in 2004 reduced to 2 334 000 tonnes in 2005, a reduction of 5.71% (NCT, 2005, p. 18).

This under-supply in eucalyptus hardwood pulpwood had a direct effect of a 6% reduction on turnover from R 722,091,000 in 2004 to R 660,896,000 in 2005 (NCT, 2005, p. 25).

Being export driven the "price" that NCT can offer its members is geared around macro economic factors, more specifically exchange rates which in turn is a factor of the political and economic climate of South Africa, United States of America and Japan.

In conclusion, to the analysis of "price" offered by NCT to its members, as long as NCT, as a business, is export orientated "price" can be considered as an **"uncontrollable variable"** in the framework of NCT's business.

1.2 The problem

NCT members have identified “operational issues” or stump-to-mill supply chain issues as the second largest factor leading to the under-supply of their hardwood pulpwood to NCT and NCT’s strategic markets (Perry, 2006, p. 55).

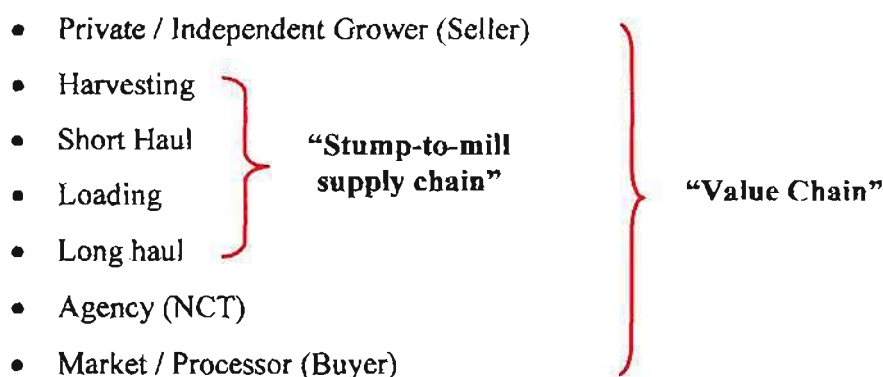
The components within the “operational” or stump-to-mill supply chain are all controllable, and therefore holistically the “operational” or stump-to-mill supply chain can be defined as a **“controllable variable”**, as all aspects within the physical stump-to-mill supply chain can be managed in one way or another.

Considering the above reasons this report has identified and has focused on operational issues, more specifically the physical stump-to-mill supply chain between private and independent hardwood pulpwood grower members’ of NCT and NCT’s strategic markets.

This targeted focus on the stump-to-mill supply chain is an attempt to gauge if intervention by NCT (level and type) will be the key in un-locking the code to hardwood pulpwood supply.

The stump-to-mill supply chain can be broken up into four separate components/operations within the value chain and can visually be depicted as follows:

Figure 1: The stump-to-mill supply chain



This area of study has not only been identified by the fact that it is the second largest variable causing under-supply of eucalyptus hardwood pulpwood to NCT , but as opposed to price, the stump-to-mill supply chain is a controllable variable, making it an area of study for positive issue identification and progressive intervention.

There are two other major external environmental factors that exacerbate the need to target the stump-to-mill supply chain between private/independent hardwood pulpwood growers and NCT and these are:

- South Africa's commercial hardwood pulpwood is currently and will probably remain in an under-supply position from a global perspective; however, national supply and demand can be affected by regulation and economics.
- Private hardwood pulpwood growers in the medium and small grower category constitute the majority of NCT members and also provide the most accessible form of hardwood pulpwood to the open market, thus making them a sought-after target by competing hardwood pulpwood buyers.

If NCT members have identified the stump-to-mill supply chain as the second largest factor for their under-supply, correcting the problem should theoretically increase supply and could give NCT a competitive advantage in increasing its market share from this private/independent resource owning segment.

This report will analyse the eucalyptus and wattle stump-to-mill supply chain, mutually exclusively, in order to answer the research question of whether intervention by NCT in the stump-to-mill supply chain is needed and if so, what level and type of intervention is needed, to un-lock the fibre code to increased hardwood pulpwood supply from its members?

The research objectives of this report are as follows:

- Quantify the extent of forward integration into the stump-to-mill supply chain by the sample group per specie, per district and province.
- Quantify which variables cause the sample group not to forwardly integrate into the stump-to-mill supply chain for the KwaZulu-Natal province.

- Quantify the need for intervention in the stump-to-mill supply chain.
- Quantify the need for intervention in the stump-to-mill supply chain per specie, per district and province.
- Quantify which one of three methods of intervention in the stump-to-mill supply chain is deemed more favourable by the sample group.
- Quantify if the sample group would be more inclined to trade their hardwood pulpwood to a buyer who offered intervention in the stump-to-mill supply chain.
- Quantify which “point of sale” is found most desirable to the sample group per specie, per district, per province.

1.3 Structure of the research report

The following chapters comprise the research report:

Chapter 2: Chapter 2 comprises the literature review on the theory of supply chain management, and how it can be used to address the research problem.

Chapter 3: Chapter 3 gives a general overview of the South African forestry industry, combined with a summary on the current supply and demand situation for South Africa’s commercial forestry resource and ownership. Included in this overview are topics, which exacerbate the need for NCT to focus on “operational issues” such as:

- The changing market dynamics.
- Medium and small private and independent growers will become more of a resource target for procurement by NCT’s competitors.
- Increased bargaining power and leverage expected from independent hardwood pulpwood NCT members.

Finally, an overview is given as to why the competitive advantage lies in the supply chain.

Chapter 4: Chapter 4 comprises of the research methodology including the statement of the problem, research objectives, research design/strategy, questionnaire design, sample design, data collection, data analysis and research limitations.

Chapter 5: Chapter 5 comprises the findings of the research in a sequence aimed at answering all the research objectives.

Chapter 6: Chapter 6 comprises the discussion of the findings and conclusions to the findings.

Chapter 7: Chapter 7 comprises recommendations for NCT Forestry Co-operative Limited.

Chapter 8: Conclusion

This concludes the introduction, the problem and structure of the report and after the conclusion leads to chapter two, the theoretical framework.

1.4 Conclusion

NCT Forestry Co-operative Limited has faced yearly traded volume decreases over the last several years. NCT's current systems do not accurately predict monthly and yearly volume sales from its members. One of the main reasons being, is that although members plan their monthly and yearly volume supplies to NCT one year in advance, members seldom deliver what they planned. The main reasons cited for not delivering is "price" and "operational issues" as sighted in a study conducted by Perry (2006, p .55).

As "price" is considered an uncontrollable variable, this paper is focused on "operational issues" which are considered controllable variables.

"Operational issues" are defined as issues relating to the stump-to-mill supply chain. This paper will be focusing on the issues relating to the stump-to-mill supply chain and analysing what specific variables relate to the hardwood pulpwood under-supply.

This study therefore explores the theory of supply chain management and seeks to find applicable theory within the framework of supply chain management and apply this theory to NCT's case study. On that note, chapter 2 explores the theory of supply chain management and has selected two strategies within the broader framework of supply chain management as the most applicable in addressing the "operational issues" faced by NCT in the stump-to-mill supply chain.

CHAPTER 2

Supply Chain Management

2.1 Introduction

This chapter deals with the theory of supply chain management as well as backward vertical integration and keiretsu as strategies identified in helping NCT gain more control, while at the same time increasing its level of service to its members, in the stump-to-mill supply chain.

Due to the fact that NCT has in the past and is currently engaged in, backward vertical integration within the stump-to-mill supply chain makes the study and research of these theories pertinent to the research undertaken in this report. Heizer and Render (2001, p. 438), describe vertical integration as a strategy of supply chain management.

NCT as a marketing agency relies heavily on independent harvesting, short haul, loading and long haul contractors. Besides NCT brokering long haul transport, NCT has no direct relationships with intermediaries within the stump-to-mill supply chain.

Heizer and Render (2001, p. 434) further state that as firms strive to increase their competitiveness via product customization, high quality, **cost reductions**, and speed to the market place, they place added emphasis on supply chain management.

NCT has in the past and is currently using the strategy of backward vertical integration in the stump-to-mill supply chain. However, with regards to its current policies, NCT has not fully embraced the potential of other supply chain management strategies in harnessing the potential of extracting better efficiencies and cost savings from the stump-to-mill supply chain.

It is on this note that the theory of supply chain management in conjunction with supply chain management strategies are explored, with the aim of finding a strategy best suited for where NCT currently finds itself in relation to its future vision of more stump-to-mill intermediary control and management.

2.2 The theory of supply chain management

Supply chain management (SCM) is a business management process that traditionally has been associated with manufacturing (Miller, 1998, p. 38).

Miller, (1998, p.38) further states that since effective SCM is designed to help organizations become leaner and more competitive by managing the flow of materials and services more efficiently and eliminating any non-value or repetitive activities from the supply chain, it should be considered a workable business process for any business. Therefore, more and more, this strategic approach to business operations is being applied to the non-manufacturing sector.

The national association of purchasing management's (NAPM) *Glossary of Key Purchasing Terms* defines supply chain management (SCM) as "the identification and management of specific supply chains that are critical to a purchasing organization's operations" (Gentry and Dobler, 1998, p. 2).

According to Robert M. Monezka, director of Michigan State University's Global Procurement and Supply Chain Benchmarking Initiative, early discussions on SCM dealt with managing the supply chain within a single company. Now, Monezka suggests the focus is more on cross-company planning and implementation. In this environment, various organizations connected by the supply chain would work together to streamline the processes from beginning to end (Monezka, 1998, p. 8).

Monezka's (1998, p.14) further observations find that firms interested in supply chain management want to use it for increased customer satisfaction and enhanced competitive positioning.

"Organisations are pursuing the simultaneous objectives of globalization, customer satisfaction and total quality management," says Joseph R. Carter, (Carter, 1998, p 8), NAPM professor from Arizona State University and a supply chain management researcher. "This has caused the strategic reach of supply chain management to increase."

Carter (1998, p. 8) gives several reasons for organizations' entry into SCM: "Push for high quality and flexibility, high degrees of product and service customization, lean manufacturing, focus on customer preferences, quick response to market changes, tremendous cost pressures, trend toward horizontal organizations using self-managed teams, and development of a learning organization focus".

Kranz (1998, p. 2) says "SCM is about managing the bi-directional flow of information and product from origin of supplier to the end user, with the goal of reducing costs and cycle times associated with planning, sourcing, receiving, manufacturing, and distributing".

Elliff and Murphee (1998, p.14) state that in supply chain management you will observe the following:

- A focus on the end-to-end process rather than on the individual functional departments.
- More intense and committed supplier relationships.
- Greater sharing of information between key suppliers and the buying organisation.
- Greater focus on performance measurements of key suppliers and the buying organisation.
- Aligned incentives of customers, suppliers, and buying organisations.
- Superior customer service and satisfaction.

Gallant, (1998, p.19) states in his article "Changing the mindset – essential for successful Supply Management" that to be successful the fundamental change in approach has to be matched by a change in mind and skill set, not only for the buyer employees, but also for the department's suppliers and customers.

Gallant, (1998, p.19) further states that supply chain management, with its emphasis on involvement in the complete supply chain from conception to end use, could achieve savings between 15 percent to 40 percent. If NCT could achieve these margins of savings by intervention into the stump-to-mill supply chain, it would give NCT exceptional bargaining power in defending its mill delivered prices.

Tom Peters (1998, p.31) adds, “Being an excellent company is no longer sufficient – success in the future will require that a firm be a valued member of a successful value chain”

Pye, (1998, p. 34), states it is no surprise that successful supply chain management (SCM) requires top-notch suppliers. Finding and working with suppliers that can contribute to a purchasing and supply department is essential to the ongoing management of the supply chain.

Pye, (1998, p. 34), further states that there are key traits to look for when selecting suppliers to assist in supporting your SCM model. Unfortunately, these traits are not the types of items that show up on a financial report or pricing list. Here, buying organizations must look for attributes that go beyond the traditional supplier qualification requirements.

Pye (1998, p. 34) further describes that combined with selecting the best intermediaries or stakeholders within the supply chain, key attributes, to look for in intermediaries or stakeholders include:

- **Vision and long-term goals:**

All stakeholders within the supply chain must share a common vision for the chain to remain successful. The right people must be involved with the right vision and look at the supply chain from a total process perspective. The suppliers need a clear understanding of the process and the reasons for driving the procurement cost down.

- **Focus:**

Signing the contract and laying the plans for SCM are the starting blocks. All stakeholders need to be dedicated and focused on making the relationships work. Unity is strength. Stakeholders need to be careful not to fall into positional, unit-price-driven mentalities.

- **Risk sharing:**

Stakeholders in SCM do not focus as closely on unit price of goods involved, instead stakeholders are working to drive down the total cost of procurement throughout the supply chain. This exposes the involved parties to some elements of risk. All

stakeholders must share the risk. Concerned stakeholders must bring the issues to debate and all stakeholders must participate in solving areas of concern.

- **Reporting capabilities:**

The suppliers' ability to provide solid reporting is critical to the success of SCM. It is critical to have a reporting structure in place that can feed information to the buyer efficiently and effectively. Concise information with regards to key performance areas within the supply chain is invaluable to buyers but also to the individual stakeholders within the supply chain.

- **Communication:**

Effective communication in SCM is essential for success. Both the purchaser and the suppliers must keep the channels of communication open. Project leaders or supply chain managers must at all time encourage open and honest debate with stakeholders in the supply chain.

- **Attitudes on sharing:**

Managing a supply chain is a challenging task. By selecting suppliers with the proper vision, focus, resources and communication style in addition to any other traits required by the stakeholders, you can increase the effectiveness in managing the various supply chains, driving down the overall costs of procurement past that of the single unit price. (Pye, 1998, p. 34)

2.3 Supply chain management strategies

Heizer and Render (2001, p. 438), further state that companies must decide upon a supply-chain strategy. These strategies may vary, however Heizer and Render (2001, p. 438), further describe these strategies as follows:

One such strategy is the traditional American approach of *negotiating with many suppliers* and playing one supplier against another. A second strategy is to develop *long-term*, "*partnering*" relationships with a few suppliers that will work with the purchaser to satisfy the end customer.

A third strategy is *vertical integration*, where firms may decide to use vertical integration by actually buying the supplier. A fourth variation is a combination of few suppliers and vertical integration, known as *keiretsu*. In a *keiretsu*, *suppliers become part of a company coalition*. Finally, a fifth strategy is to develop virtual companies *that use suppliers on an as-needed basis*.

Due to the nature of contracting with small and medium sized grower members, economies of scale are **not** easily reached. Small harvest areas relate to small volumes and coincide with large geographical work areas, these factors cause down time in moving equipment and people and therefore cause high operational costs.

Due to increased pressure from members, NCT has already adopted a backward vertical integration strategy, by purchasing its own harvesting, short haul and loading equipment. However, the stump-to-mill supply chain with its few stakeholders also fits the fourth strategic variation mentioned by Heizer and Render (2001, p. 438), which is a combination of a few suppliers and vertical integration, known as *keiretsu*.

Keiretsu as well as backward vertical integration as supply chain management strategies, will be further discussed, as these two strategies are the most suited in dealing with the current situation in which NCT finds itself.

Keiretsu and backward vertical integration as strategies within the framework of supply chain management are the most practical and logical selection for NCT to consider in their quest of harnessing the potential of the stump-to-mill supply chain.

2.3.1 Keiretsu networks

Heizer and Render (2001, p. 441), explain that many large Japanese manufacturers have found a middle ground between purchasing from few suppliers and vertical integration. These manufacturers are often financial supporters of suppliers through ownership or loans. The supplier then becomes part of the company coalition known as a **keiretsu**.

Heizer and Render (2001, p. 441), further explain that the members of a keiretsu are assured long-term relationships and are therefore expected to function as partners, providing technical expertise and stable quality production to the manufacturer. Members of the keiretsu can also have suppliers further down the chain, making second and even third-tier suppliers part of the coalition.

Keiretsu as a supply chain management strategy for NCT to adopt, fits in well with the profile of the stump-to-mill supply chain. There are a few suppliers, and if need be NCT can lend financial support to intermediaries as well as offer sustainable contracts which indirectly can be used as a form of collateral for finance.

Keiretsu would allow NCT to incorporate independent intermediaries into the stump-to-mill supply chain as well as incorporate members and their equipment in partial or complete stump-to-mill supply chain solutions. These practical suggestions would still fall under the framework of supply chain management and be controlled and administered by NCT.

Keiretsu combined with backward vertical integration as supply chain management strategies will allow NCT a win-win scenario in utilising a combination of own operations and independent contractors to reach its goal of delivering a service to its members, while creating a healthy comparative environment with the ultimate aim of cost saving.

2.3.2 Vertical integration

When a firm participates in more than one successive stage in the vertical chain, it is said to be *vertically integrated* (Brickley *et al*, 2001, p. 462).

Brickley *et al* (2001, p. 464) further state that, "Firms change their degree of integration over time. An organisation that begins to produce its own inputs is engaging in backward, or upstream, integration, whereas an organisation that begins to market its own goods or to conduct additional finishing work is engaging in forward or downstream integration."

Fry, Hattwick and Stoner (2001, p. 285) describe vertical integration as the degree to which a firm operates in more than one level of the overall production chain.

Boyd *et al*, (2003, p. 45) describe forward vertical integration occurring when a firm moves downstream in terms in terms of the product flow, as when a manufacturer integrates by acquiring or launching a wholesale distributor or retail outlet. Backward integration occurs when a firm moves upstream by acquiring a supplier.

Boyd *et al*, (2003, p. 45) further state that “Integration can give a firm access to scarce or volatile sources of supply or tighter control over the marketing, distribution, or servicing of its products”. However, Boyd, Larreche, Mullins & Walker further warn that “The investment required to vertically integrate often offsets the additional profitability generated by the integrated operations, resulting in little improvement in return on investment”.

Strickland and Thompson (2003, p. 156) would counter argue that more often it is cheaper to outsource certain functions and activities to outside specialists, who by virtue of their expertise and volume can perform the activity/function more cheaply.

Kohls and Uhl (1990, p. 218), allude to the fact that “many agricultural farmers are vertically integrated into the food marketing channels by their respective co-operatives.”

Similarly private and independent timber growers are vertically integrated into the marketing channels for their roundwood by being a member of a co-operative or contracted directly to a processing plant. It is important to point out that the integration referred to above relates to marketing and not to the physical operations of the stump-to-mill supply chain.

Vertical Integration (2006, paragraph 1), summarises vertical integration in the following ways:

2.3.2.1 Benefits of vertical integration

Vertical integration potentially offers the following advantages:

- Reduces transportation costs if common ownership results in closer geographic proximity.
- Improves supply chain coordination.
- Provides more opportunities to differentiate by means of increased control over inputs.
- Captures upstream or downstream profit margins.
- Increases the barriers to entry for potential competitors, for example, if the firm can gain sole access to a scarce resource.
- Gains access to downstream distribution channels that otherwise would be inaccessible.
- Facilitates investment in highly specialized assets in which upstream or downstream players may be reluctant to invest in.
- Leads to expansion of core competencies.

2.3.2.2 Drawbacks of vertical integration

While some of the benefits of vertical integration can be quite attractive to a company, the drawbacks may negate any potential gains. Vertical integration potentially has the following disadvantages:

- Capacity balancing issues. For example, the firm may need to build excess upstream capacity to ensure that its downstream operations have sufficient supply under all demand conditions.
- Potentially high costs due to low efficiencies resulting from lack of supplier competition.
- Decreased flexibility due to previous upstream or downstream investments. (Note however, that flexibility to coordinate vertically-related activities may increase.)
- Decreased ability to increase product variety if significant in-house development is required.
- Developing new core competencies may compromise existing competencies.
- Increased bureaucratic costs.

2.3.2.3 Factors favouring vertical integration

The following situational factors tend to favour vertical integration:

- Taxes and regulations on market transactions.
- Obstacles to the formulation and monitoring of contracts.
- Strategic similarity between the vertically-related activities.
- Sufficiently large production quantities so that the firm can benefit from economies of scale.
- Reluctance of other firms to make investments specific to the transaction.

2.3.2.4 Factors against vertical integration

The following situational factors tend to make vertical integration less attractive:

- The quantity required from a supplier is much less than the minimum efficient scale for producing the product.
- The product is a widely available commodity and its production cost decreases significantly as cumulative quantity increases.
- The core competencies between the activities are very different.
- The vertically adjacent activities are in very different types of industries for example, manufacturing is very different from retailing.
- The addition of the new activity places the firm in competition with another player with which it needs to cooperate. The firm then maybe viewed as a competitor rather than a partner.

2.3.2.5 Alternatives to vertical integration

There are alternatives to vertical integration that may provide some benefits with fewer drawbacks. The following are a few of these alternatives for relationships between vertically-related organizations:

- Long-term explicit contracts.
- Franchise agreements.
- Joint ventures.

- Co-location of facilities.
- Implicit contracts (relying on firms' reputation)

2.4 Conclusion

NCT is uniquely placed within the South African forestry industry in the sense that NCT is a timber marketing co-operative for its members, and therefore is predominantly not a land or resource owner.

Unlike NCT's competitors, like Mondi and Sappi who actively participate in buying land and resource, and by virtue are heavily involved in backward and forward vertical integration as a strategy of supply chain management.

The co-operative model however does not necessarily preclude NCT from getting involved in supply chain management, by default, the fact that NCT is currently engaged in backward vertical integration within the stump-to-mill supply chain means NCT is currently involved in a form of supply chain management.

The question is. Is NCT using the full potential of supply chain management and the strategies it offers to extract the maximum potential from the stump-to-mill supply chain? Currently the answer is no. NCT could adopt keiretsu in combination with backward vertical integration to extract more potential from the stump-to-mill supply chain.

For NCT to get more involved in the stump-to-mill supply chain means that NCT will be delivering an additional service which NCT members have already voiced a need for.

If one compares NCT to Södra a co-operative of over 35,000 private forest owners in southern Sweden (Södra, 2006). Södra has formed a wholly owned subsidiary called Södra Skog– for all forest management services, including planting, felling and wood procurement for the other Södra industries.

Södra Skog (Södra, 2006) points out that their focus on the operational side of the stump-to-mill supply chain has “increased its volumes and strengthened its position in the market”. Further, Södra Skog state that haulage contractors directly contracted to Södra account for 50 per cent of transportation and contractors under local collective agreements account for a further 35 per cent (Södra, 2006).

By NCT gaining more control of the stump-to-mill supply chain, by default other opportunities emerge. These will be more control over the monthly and yearly volumes supplied by members to NCT’s strategic markets. Better resource planning, combined with more reliable supplies. Increased cost savings due to reaching economies of scale combined with increasing the professionalism of intermediary support.

However, what strategy or strategies of supply chain management should NCT adopt? By looking at Södra, we find that not only has an independent “operations” business been put in place, but this business is very active in backward vertical integration combined with a **keiretsu** approach in its transport division.

A combined strategy of both backward vertical integration in combination with a keiretsu approach will not only allow for benchmarking of the two strategies to take place, but will also allow for flexibility in the utilisation of members equipment and existing intermediary support.

CHAPTER 3

The South African Forestry Industry

3.1 Introduction

This chapter covers the salient features of the South African forestry industry. The aim of the chapter is to cover pertinent topics and position the South African forestry industry in context with the dynamics of the changing environment, with specific reference to the current position of “supply and demand” of commercial fibre in South Africa.

The chapter then positions NCT within the industry. The chapter further relates to NCT’s intervention in the stump-to-mill supply chain and compares NCT’s current intervention in the stump-to-mill supply chain to that of a Swedish co-operative by the name of Sodra.

Resource ownership and the changing balance of power are also covered, along with other topics, which help mitigate the need for NCT to deploy a first-mover advantage procurement strategy, in a bid to gain a competitive advantage in the stump-to-mill supply chain over its competitors.

3.2 Salient features of the South African Forestry Industry

Genesis Analytics (2005, p. 4) describes the salient features of the forestry industry as follows:

- The industry employs approximately 170,000 permanent, contract and informal workers of which a large proportion is low-skilled and concentrated in rural areas with high unemployment.
- The industry contributes 1.4% of total formal employment, which is comparable with other large sectors. The textiles, clothing and leather goods sector contributed R 10bn to GDP and employed 193 000 workers in 2003. Gold mining contributed R 23bn and employed 191,000 people over the same period. The forestry, timber and pulp and paper industry earned net foreign exchange of approximately R 7bn in 2003.

- The industry contributes 9.7% to agricultural GDP;
- The industry contributes 1% to the total RSA GDP.
- The industries net contribution to the economy is estimated at R 10.4bn after R 1.8bn has been deducted for environmental impact.
- The industry is internationally highly accredited environmentally and is therefore a strong candidate for accreditation of benefits of carbon sequestration.

3.2.1 Plantation forestry

Plantation forestry provides the raw material for downstream activities such as pulpmilling, paper manufacturing, sawmilling and furniture manufacturing and can thus be regarded as the root of the commercial forestry value chain.

In the Southern Hemisphere, South Africa has the third largest and one of the oldest plantation resources areas. In fact, half of Africa's plantation area is in South Africa. Therefore, South Africa is among the world leaders in the management of, and research on, man-made timber plantations (Owen & Van der Zel, 2000, p. 5).

In 1990 the Government of the Republic of South Africa (RSA) decided to commercialise its timber production activities. The South African Forestry Company Limited (SAFCOL) took over approximately 500 000 ha of State forest land of which 263 000 ha was planted to timber plantations. The official total planted public plantation area was 418 023 ha. The plantation area under private ownership was 952 870 ha, including a wattle area of 124 117 ha (Owen & Van der Zel, 2000, p. 3).

3.2.2 Plantation types

Using the characteristics of the fibre produced, plantations can be classified into two main categories: hardwood and softwood. Eucalyptus (mainly *Eucalyptus grandis*) and wattle (*Acacia Mearnsii*) are the main hardwood species grown in South Africa. Pine (of which *Pinus Patula* is the most common species) accounts for all South African softwood plantations (Genesis Analytics, 2005, p. 4).

3.2.3 Rotation ages

Both hardwood and softwood can be grown on either short or long rotations, depending on the eventual use of the roundwood. For pulping purposes softwood is grown on a short rotation of about 12 to 15 years. For sawmilling purposes, softwood is grown from 15 years to 30 years. Hardwood (eucalyptus) for pulping purposes usually has a short rotation of about 6 to 10 years (Edwards, 2004, p. 479). While hardwood for sawmilling purposes has a rotation age of 20 to 25 years (Coetzee, 1998, p. 117). Rotation ages for hardwood and softwood per end use can be summarised as follows:

Table 1: Rotation Ages

Specie	Pulp	Industrial Saw Logs	Poles	Formal Saw Logs
Pine	+/- 15 Years	+/- 12 – 25 Years	+/- 12 – 18 Years	+/- 25 + Years
Eucalyptus	+/- 8 Years	+/- 8 – 14 Years	+/- 8 – 12 Years	+/- 20 – 25 Years
Wattle	+/- 10 Years	-	-	-

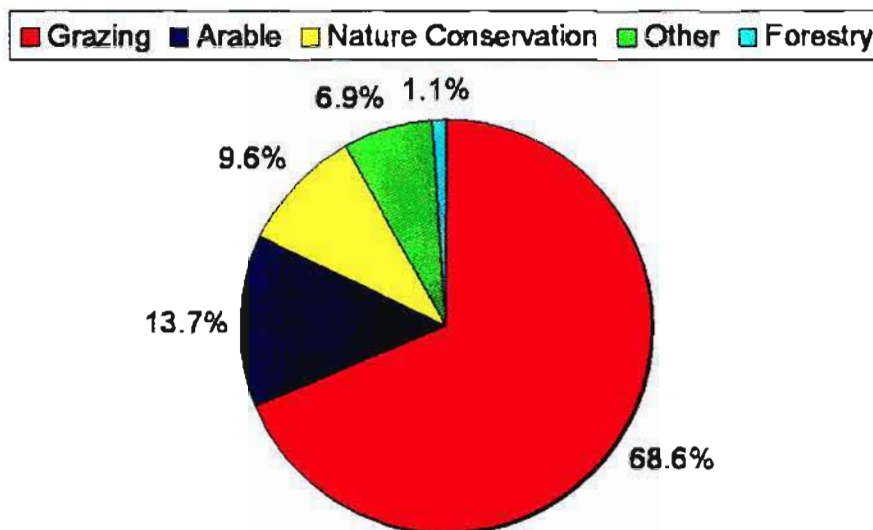
Both softwood and hardwood can be used for pulping purposes, but they are used in different processes and for different types of outputs (Genesis Analytics, 2005, p. 4). Regionally, hardwood (eucalyptus) is the main species planted in KwaZulu-Natal (52.3% of all species in KZN is eucalyptus); with softwood being more prominent in Mpumalanga, Limpopo, and the Western and Eastern Cape (50.2% of all pine plantations are located in Mpumalanga and Limpopo (Godsmark, 2004, p. 6).

The dominating resource type per province is directly related to the dominating buyers in the province. KwaZulu-Natal has several major chipping, pulping and board manufacturers along the eastern seaboard inland, thus causing KwaZulu-Natal to be dominated by pulp rotation crops. Regionally, as one moves north and south out of KwaZulu-Natal the resource changes more to saw timber rotations dominated by softwood and the sawmilling industry.

3.3 Commercial fibre resource ownership in South Africa

Plantation forests cover some 1.37 million hectares, accounting for some 1.1% of the country's total surface, compared to the 0.3% comprised by natural forests, and the respective 13.7% and 68.6% respectively accounted for by agricultural crops and grazing (Mayers et al, 2001, p. 2).

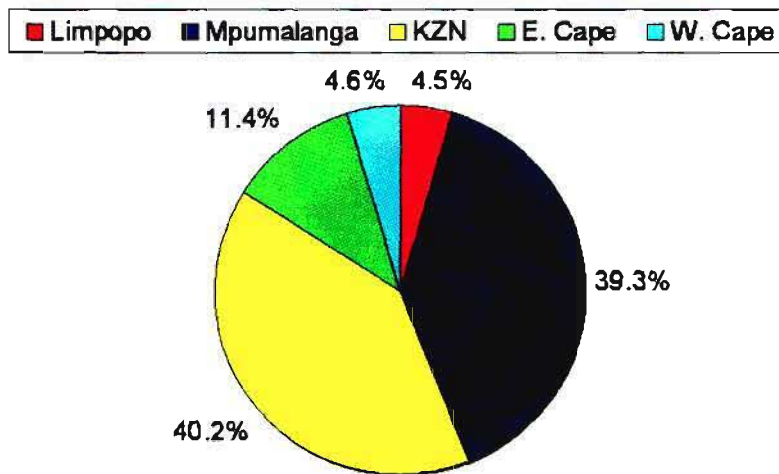
Graph 1: Land use in South Africa



Source: Godsmark, 2004, p. 5

KwaZulu-Natal and Mpumalanga together contain about 80% of the total plantation area with the Eastern Cape accounting for another 11%. Plantation forestry covers some 6.8% of the surface of Mpumalanga, and some 5.9% of KwaZulu-Natal (Genesis Analytics, 2005, p. 28).

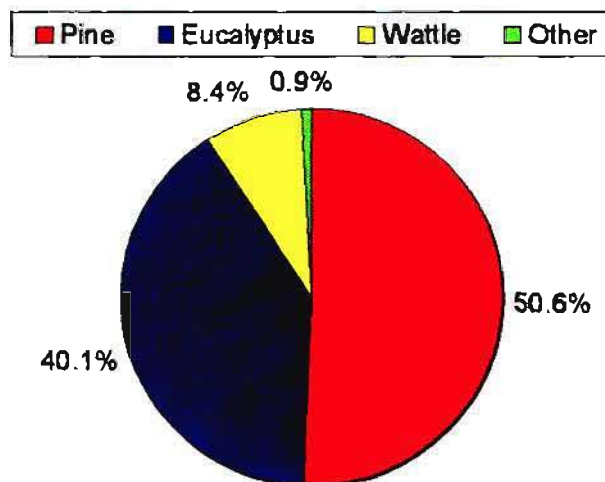
Graph 2: Plantation area by province 2004



Source: Godsmark, 2004, p. 6

Hardwoods are made up of eucalyptus and wattle, mostly in a pulpwood rotation. This rotation length is between 8 – 10 years respectively and accounts for 48.5% of the planted area in South Africa. While softwood, namely pine accounts for 50.6% of the area in South Africa (Godsmark, 2004, p. 7). The following graph illustrates the breakdown of species.

Graph 3: Plantation area by species 2004



Source: Godsmark, 2004, p. 8

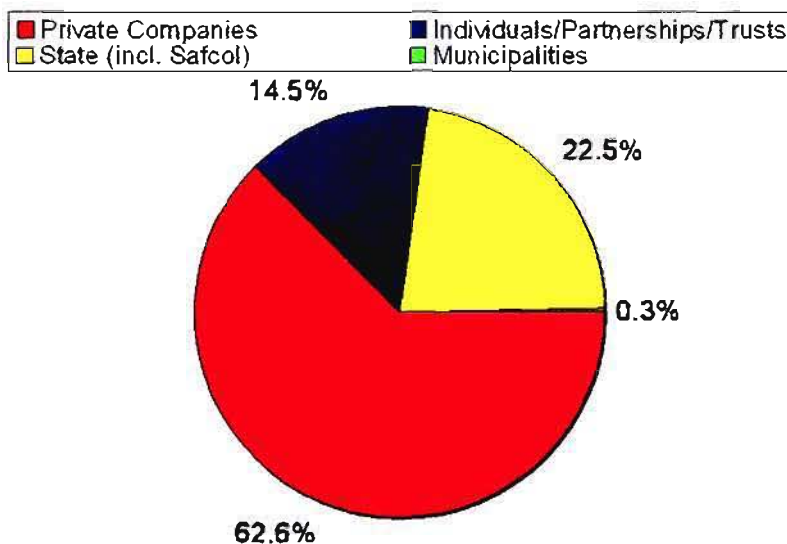
The ownership of South Africa's commercial forestry resource can be broken down into the following two forms of ownership, namely:

Public: 22.5% (South African Government)

Private: 77.1% (Large corporate, medium and small private/independent growers)

(Genesis Analytics, 2005, p. 5).

Graph 4: Plantation area by ownership showing private, state, municipalities and individual / partnerships / trusts for 2004



Source: Godsmark, 2004, p. 9

South Africa's **private** roundwood timber resource is segmented into three main categories of ownership namely:

3.3.1 Large grower category

The **large grower category** is highly concentrated, with the two biggest players owning 40.6% (22.3% Mondi, 18.3% Sappi) of the total plantation area in 2003 (PAMSA, 2004a, p. 6). Global Forest Products owns a further 5% of plantations and other corporate growers about 3%. Two black economic empowerment consortiums (Singisi Forest Products and the Siyaqubeka Consortium) recently signed lease agreements for respectively 3.2% and 1.2% of the total planted area with SAFCOL (Genesis Analytics, 2005, p. 5). The large growers thus

account for approximately 53.1% of plantations in 2003, with a further 22.5% still publicly owned, but expected to be privatized in the near future (PAMSA, 2004, p. 6).

3.3.2 Medium grower category

The **medium grower category**, namely private/independent timber growers/farmers, owned 17.6% of all plantations in 2003 (Genesis Analytics, 2005, p. 5).

The medium grower category is mainly made up of private/independent tree farmers concentrating on short rotation crops of wattle and eucalyptus. Wattle rotation being on average 10 years and eucalyptus 8 years. These two commercial crops are the fastest return on investment crops in forestry.

The large and medium growers are well-organised in industry bodies such as PAMSA and FSA. The interests of about 2100 medium and small grower members are represented by NCT of which 25.6% are made up of small scale timber growers (SSTG's) or previously disadvantaged private growers (NCT, 2005, p. 12).

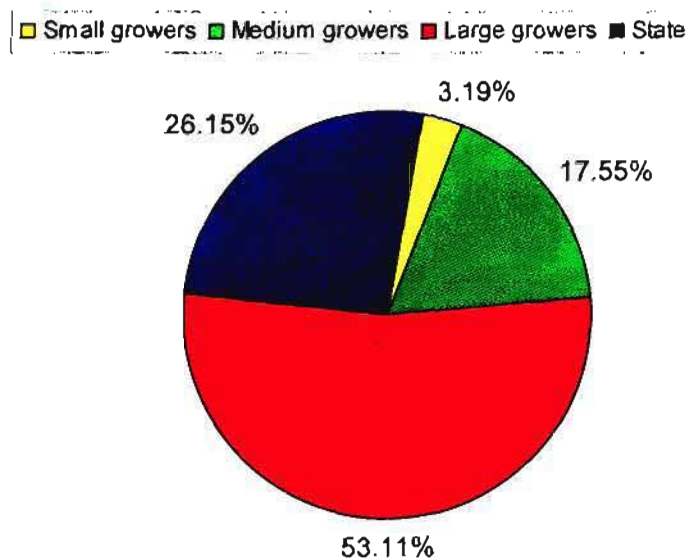
3.3.3 Small grower category

The **small grower category**, namely emerging black growers own the remaining 3.2% of the plantation area in South Africa. There are approximately 31,500 small growers, of which about 24,000 belong to Sappi and Mondi's out-grower schemes, as well as smaller schemes by SAWGU (SA Wattle Growers' Union – project Phezukomkhono) and NCT Forestry Co-operative Limited (Ngubane and Mack, 2004, p. 3).

Sappi's Project Grow, initiated in 1983 and Mondi's Khulanathi, initiated in 1988, provide independent small growers with seedlings, advice and organisational support to plant small woodlots (the national average size is about 2.3ha per woodlot) on their individual or community property (FSA, 2000, p. 8). Over the rotation period, the company provides them with interest free loans (or simple interest of 10% in Khulanathi's case) to cover operational costs and, upon maturity, these growers are contractually bound to sell their timber to the

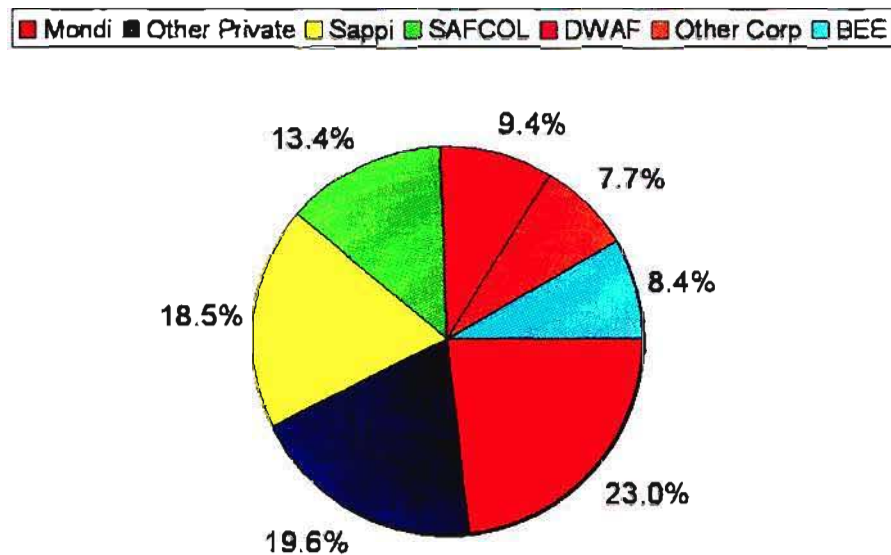
“sponsoring” company for one or two rotations (depending on the specific contract) (Cairns, 2000, p. 36). Of these small growers (of which some 80% are female), about 65% are located in Zululand region (FSA, 2000, p. 9).

Graph 5: Plantation area by ownership showing large, medium and small categories of growers 2003



Source: PAMSA, 2004, p. 14

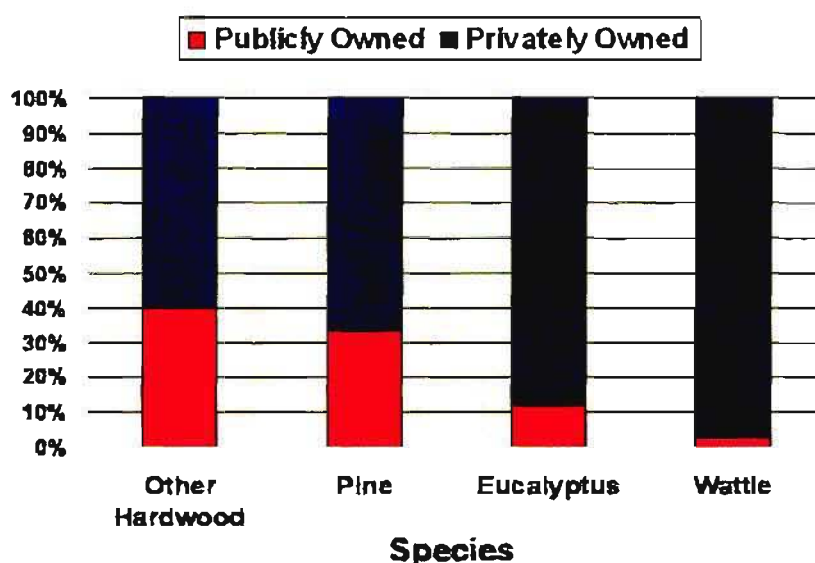
Graph 6: Plantation area showing organisational ownership 2004



Source: Godsmark, 2004, p. 15

“Other private” and “other corporate” percentages when added together equate to 27.3%. This percentage is made up of private and independent timber growers predominantly belonging to NCT Forestry Co-operative Limited, as well as other private sawmilling groups such as Global Forest Products (Pty) Ltd, Yorkor (Pty) Ltd, etc.

Graph 7: Percentage state and private ownership including species 2004



Source: Godsmark, 2004, p. 10

The South African government has over the last several years been engaging in the privatisation of its forestry enterprises, the graph above is a reflection of this fact with increasingly less and less government ownership in commercial forestry.

3.4 There are constrained opportunities for new afforestation

It is commonly accepted that, although plantation forestry has grown rapidly in South Africa in the past, land availability for further afforestation is limited. Though the industry might argue that this is due to the SFRA water use licensing requirements placed on them, the fact remains that, even without such licensing requirements, economically viable plantation expansions would ultimately be constrained by South Africa's water-scarcity. Only 16% of South Africa's surface is climatically suitable for plantation forestry (Van der Zel, 1989, p. 14). Of this

possible area, large parts are, topographically speaking, not viable for plantation purposes, due to the steep gradient and the associated high costs of planting and harvesting.

The only provinces identified for further new afforestation are KwaZulu-Natal and the Eastern Cape. Current estimates suggest that approximately 60,000 ha are available for afforestation in the Eastern Cape and the conservative estimate of total land available for new afforestation in KZN is 40,000ha. It can thus conservatively be estimated that 100,000 ha is still available countrywide for new afforestation, but utilizing this land will require some effort as, (i) most of it falls within communal areas and, (ii) new afforestation is subject to time consuming licensing procedures. The fact that land has been “identified” for new afforestation does not mean that the infrastructure or beneficiation exists to support the afforestation in these areas, but simply that, in terms of water availability, soil quality and environmental concerns, these areas would be suitable for plantation forestry (Genesis Analytics, 2005, p. 13).

3.5 Barriers to entry and expansion of the South African forestry industry

A number of potential barriers exist to entry or expansion of South Africa’s plantation resource. Beyond the natural limits to afforestation and cash flow issues, the major barriers seem to be of a regulatory nature (Genesis Analytics, 2005, p. 9).

3.5.1 Natural limits on land suitable for plantation forestry:

Due to soil quality, water availability and general climatic conditions, there are limited areas suitable for plantation forestry. In some cases, it also depends on the state of the market, as land with lower yield opportunities becomes viable under conditions of sustained higher market prices (Genesis Analytics, 2005, p. 9).

3.5.2 Water and environmental regulation:

A forestry plantation is classified as a Stream Flow Reduction Activity (SFRA) under the National Water Act (the only activity to have been classified as such), as well as an alien invasive species under the Conservation of Agricultural resources Act. The implication of this

is, (i) it is the only water use activity that is subjected to a cooperative governance-based application system, which includes, (ii) a more comprehensive environmental assessment relative to other land use changes (due to the 'alien invasive species' classification). The result of this is that an application to develop a plantation currently takes about two years to process, which presents a substantial barrier to entry (Genesis Analytics, 2005, p. 9).

3.5.3 Communal nature of potential plantation forestry land:

Developing plantation forests on communal land and in partnership with communities requires negotiations, which are often management intensive and time consuming. As most of the remaining land suitable to plantation forestry is in communal areas, this may be a barrier that the industry has to cross in order to secure further areas for the development of the fibre base (Genesis Analytics, 2005, p. 9).

3.5.4 Uncertainty over land rights:

Under conditions of uncertainty over land rights (such as may be the case in cetin areas due to the land reform process), private investors would be unwilling to enter into long-term investments such as plantation forestry (and particularly long rotation plantations) (Genesis Analytics, 2005, p. 9).

3.5.5 Cash flow:

The rotation period associated with plantation forestry implies that potential players need to make large initial investments, without the immediate promise of income and with potential risks (e.g. fire). Given the legacy of artificially low state-determined log prices, this has challenged private sector entry especially in the softwood market and, to some extent, explains the apparent preference for hardwood production in South Africa. With prices currently being market-determined and on the rise, and given projections that demand for roundwood is likely to outstrip supply into the future, the cash flow barrier to entry may be reduced (Genesis Analytics, 2005, p. 9).

3.5.6 Lack of finance for independent plantation owners:

This is particularly an issue for small growers as it prevents them from dealing with cash flow problems. Small growers on communal land face particular challenges, as it is generally more difficult to secure finance for the development of land where individual ownership cannot be used as collateral. The implication is that small growers have little option but to join larger corporate schemes through which they become contractually bound to a single buyer (for the first one or two rotations) (Genesis Analytics, 2005, p. 9).

3.6 The gradual change from softwood to hardwood is expected to continue and possibly increase over the next decade

There is an indication of a tendency to convert pulpwood pine plantations into eucalyptus/wattle (hardwood). It is likely that this trend will continue due to the strong demand for hardwood pulp fibre and the shorter investment period for pulpwood. For example, the planned expansion of Sappi's Ngodwana mill will entail the conversion of some 25,000 ha of pine pulpwood into eucalyptus pulpwood (Genesis Analytics, 2005, p. 12).

The phase out of some Safcol plantations will also affect the area, by reducing *sawnwood* pine plantations. For example, 57,000 ha of sawlog pine plantations in the Western and Southern Cape are to be phased out over a 15 year period that started in 2004. Some 16,000 ha (9,000 ha in the Sand River catchments and 7,000 ha in the St. Lucia area) is to be phased out between 2004 and the end of 2006 (Crickmay, 2005, p. 7). This conversion trend may be offset by shortages of (and subsequent price increases for) solid wood that is expected to emerge in the near future (Genesis Analytics, 2005, p. 12).

3.7 Small growers represent the bulk of new afforestation opportunities

The bulk of remaining land suitable for afforestation falls within communal areas in the Eastern Cape and KwaZulu-Natal. Developing plantations on community land requires dedicated management capacity in order to promote/market plantation forestry to the communities, facilitate interaction with the community, provide the necessary forestry

management skills and to help the community manage the plantations (at least until they are in a position to do so themselves) (Genesis Analytics, 2005, p.14).

3.8 South Africa's commercial fibre resource ownership

It is clear that the South African forestry industry faces a large challenge to increase its afforested areas. Expanding South Africa's commercial forestry land is the only progressive strategy, which will enable the industry to compete on a global scale.

Taking into account that South Africa is a water poor country, a combination of a methodical planned conservative approach to increasing commercial forestry land in catchment areas in combination with sustainable forestry management will increase South Africa's chances to compete in the global fibre market place.

3.9 The plantation market place

The plantation market place is defined by a large degree of vertical integration with downstream activities for both the solid wood and pulpwood components. The major plantation owners are also the major processors, and thus buyers of roundwood (Genesis Analytics, 2005, p. 8).

Genesis Analytics (2005, p. 8) further describes the oligopolistic market place for plantation roundwood timber in South Africa as follows:

- Mondi and Sappi for pulp and paper, Masonite and PG Bison for fibreboard, and Global Forest Products, Komatiland Forestry and Hans Merensky for sawmilling.

This implies that large quantities of roundwood produced are effectively removed from the open market and supplied directly to a company's own processing plants (Genesis Analytics, 2005, p. 8).

If integrated companies decide to take more profit from processing than on the growing side, this may have implications for assessing the pricing mechanism, as a proportion of timber may then be sold at below market prices (Genesis Analytics, 2005, p. 9).

This statement ties in with what caused the genesis of NCT Forestry Co-operative Limited in 1949. The duopolistic market for hardwood pulpwood at the time by Mondi and Sappi caused unsustainable return on investment to private and independent timber growers. Thus the formation of a collective bargaining structure was created in the form of NCT Forestry Co-operative in 1949 and exporting hardwood chips through NCT to off shore strategic markets, for the first time, gave export parity pricing to hardwood pulpwood mill-delivered prices for private and independent timber growers.

3.10 Market geographics

Due to the low value addition in the primary extraction phase and the cost of transport, wood processing plants need to be close to plantations (Genesis Analytics, 2005, p. 32).

Current estimates suggest that this means a maximum of 75km for sawlogs and 300km for pulpwood (Howard, 2004, p. 12).

Due to the oligopoly on softwood pulp by Mondi, Sappi and PG Bison, Howard's statement of 300km would be directed at hardwood pulp not softwood pulp.

Such an estimate is, however based on the availability and quantity of road infrastructure and applies to larger plantations with some scale benefits. For small growers in areas such as the Eastern Cape, with limited infrastructure, the potential supply area could be limited to as little as 90km from the pulp mill (Howard, 2004, p. 12).

This implies that the market for roundwood is essentially a regional rather than a national market, and is concentrated in key provinces such as KZN and Mpumalanga. In later stages of processing, the market becomes national and indeed global in nature (Genesis Analytics, 2005, p. 8).

3.11 The organisational structures used for the marketing of roundwood in South Africa

The organisational structures used for the marketing of roundwood in South Africa are predominantly companies and co-operatives but also includes private agents. A large percentage of roundwood produced in South African timber plantations, especially those owned by large companies, is supplied in house or to associated product or commodity manufacturers and so the marketing function is completed within the organization (Keyworth, 2000, p. 485).

Over and above the timber used for internal consumption, some of the large plantation owners and companies sell some of their roundwood production to other users in which they do not have shareholding or to whom they are not contractually committed. Staffs employed by the plantation owning company normally do this marketing. There remain however, a large number of smaller roundwood producers who do not own or have any association with a processing plant and therefore have to dispose of their roundwood timber on the open market (Keyworth, 2000, p. 485).

3.12 Pricing as a mechanism of trade

The markets for softwood and hardwood operate as separate markets with different pricing mechanisms and dynamics. Softwood plantations in South Africa were traditionally largely state-owned. In order to promote the use of domestic rather than imported timber, government entered into so-called “evergreen”/long term contracts with saw millers in which the millers were ensured favourable prices. Such contracts served to keep the sawlog price artificially low. With the expansion of the private sector and formation of SAFCOL in 1992, to manage and privatise the state’s plantations according to sound business principles, prices have, however, risen significantly in line with international benchmark prices (Genesis Analytics, 2005, p. 10).

Recent restructuring in the timber industry also saw an end to the subsidies received (i.e. mainly by SAFCOL). It is estimated that the log price has since adjusted to reach an

internationally competitive level (Mayers et al, 2001, p. 5) and that short term supply and demand imbalances do not interact to cause price variations (PAMSA, 2004, p. 15).

For pulpwood, the duopolistic market structure kept log prices down historically. Since the middle of the 1970's however, the export of wood chips, (mainly organised by NCT in reaction to the pricing power of the domestic buyers of wood) ensured that domestic market prices were on par with prices that could be attained on the export market (Genesis Analytics, 2005, p. 10).

Although the ability to export fibre may counteract the concentrated nature of the plantation forestry market, it does not mean that concentration and vertical integration will not lead to uncompetitive pricing practices. In strong rand situations, such as we currently experience, the profitability of exports may deteriorate and the only alternative to exporting will be selling to one of the two South African buyers (Genesis Analytics, 2005, p. 11).

The Genesis Analytics report eludes to vertical integration as a cause of uncompetitive pricing practices, in context to NCT, more control of the supply chain, through intervention in the stump-to-mill supply chain would theoretically drive costs down through attaining economies of scale with increased efficiencies and therefore reduce the holistic cost component of the stump-to-mill supply chain to its members. This reasoning would theoretically cause cost savings to its members, especially during difficult exporting market conditions.

3.13 Woodchip exports have caused domestic hardwood pulpwood prices to increase

Woodchip exports (which essentially started with the registration of Central Timber Co-operative (CTC) in 1970) served as a disciplining action on the duopolistic domestic buyers of pulpwood (Sappi and Mondi). As a result, the market prices for hardwood have risen significantly since then to the present level, which is on par with North American prices (Genesis Analytics, 2005, p. 18).

Pulping companies are however concerned that the high price paid by the Japanese for woodchips is an anomaly and that it makes South Africa pulp uncompetitive due to the high input costs. They feel that their profit margin does not allow them to match the prices paid by

the Japanese for the wood they need to buy on the open market. **The only way for them to overcome this is through vertical integration.** This means that the wood currently dedicated to chip exports is unlikely to be switched to domestic pulping, implying that it will not be possible for Mondi or Sappi to build another big pulp mill in South Africa (Rissi, 2005, p. 15). The industry's view of Japan as an anomaly is based on allegations of subsidies provided to the Japanese pulp industry. Within the scope of this project no evidence was, however, found to confirm this allegation (Genesis Analytics, 2005, p. 18).

It can be argued that the vertical integration referred to above relates to large forestry companies integrating themselves backwards into owning land, trees and forwardly integrating themselves into owning the processing plants (chipping, pulping and paper making). It does not inherently mean the companies are integrated into the stump-to-mill supply chain, this proof is found later in the report where the Genesis Analytics report indicates that over the last two decades large forestry companies have moved to the outsourcing of the stump-to-mill supply chain.

From a non-integrated timber grower's perspective, the woodchip phenomenon has made hardwood pulpwood tree-farming in general a profitable exercise for private and independent hardwood pulpwood tree farmers.

In addition, preliminary research has shown that China may potentially emerge as an additional buyer of South African fibre in chip form (Genesis Analytics, 2005, p. 18).

3.14 Supply and Demand

3.14.1 South Africa's commercial plantation fibre shortage

The Genesis Analytics report (2005, p. 90) further informs that demand for wood fibre and wood-based products in South Africa will increase in line with economic growth. The analysis of the market dynamics in each value chain component suggests that the demand for wood-based products will continue to increase in line with domestic and international economic growth and therefore allow for expansion opportunities. In addition, specific opportunities

exist where new markets are opening up for specific products (e.g. woodchips to China) and South Africa is in a good position to tap into increased world demand for certified fibre.

LHA Management Consultants (2004, p. iii) found that South Africa's commercial plantation resource (1 370 000ha) has the capacity to supply **22 million m³** of roundwood per annum.

LHA Management Consultants (2004, p.iii) forecasts that by the end of a 25 year period in approximately the year 2030, the current resource will only be capable of supplying **23.6 million m³** of roundwood per annum.

This figure was determined by LHA Management Consultants (2004, p. iii) after taking into account the removal of plantation areas from riparian zones and conversion to other land uses (in total 128 000 ha will be removed) and increased plantation yields. **This is only 7.2% higher than the current supply capacity.**

LHA Management Consultants (2004, p.iii) further states, with regards to demand, that based on a moderate growth in the Gross Domestic Product (GDP) of 3% per annum, assuming that exports will not increase above current levels and that the current wood chip export volume (5.5 million m³ per annum) is redirected to local pulp mills, the demand by 2030 is estimated at 37.9 million m³ per annum.

By comparing the projected demand and the supply of roundwood, a shortfall of just over 14 million m³ per annum is forecasted for 2030 by LHA Management Consultants.

Even if no forest products are exported by 2030, the demand will outstrip supply by more than 10 million m³ per annum (LHA, 2004, p. iii). Crickmay (2005, p. 2) in their report concludes a shortage of 12.6 million tons per annum by the year 2025.

Crickmay (2005, p. 26) summarises the supply demand position of all commercial species in South Africa as follows:

Table 2: Summary of supply and demand: 2005 – 2034: All Genera

FIVE YEAR PERIOD	TOTAL SUPPLY (tons)	TOTAL DEMAND (tons)	SURPLUS (+) / SHORTFALL (-)	
			(tons)	(%)
2005 – 2009	20,550,761	23,249,214	-2,698,453	-13.1
2010 – 2014	20,087,199	23,932,910	-3,845,711	-19.1
2015 – 2019	18,609,931	24,650,053	-6,040,122	-32.5
2020 – 2024	19,454,356	25,448,516	-5,994,160	-30.8
2025 – 2029	18,666,332	26,372,899	-7,706,567	-41.3
2030 – 2034	18,134,701	27,501,409	-9,366,708	-51.7
Estimated sustainable supply:	19,250,547	25,192,500	-5,941,953	-23.2

Source: Crickmay, 2005, p. 2

Table 3: Analysis of supply and demand: 2005 – 2034: Pine (Excluding sawlogs)

FIVE YEAR PERIOD	TOTAL SUPPLY (tons)	TOTAL DEMAND (tons)	SURPLUS (+) / SHORTFALL (-)	
			(tons)	(%)
2005 – 2009	4,576,051	3,266,000	1,310,051	40%
2010 – 2014	4,225,485	3,242,000	983,485	30%
2015 – 2019	3,116,840	3,242,000	-125,160	-4%
2020 – 2024	3,197,740	3,242,000	-44,260	-1%
2025 – 2029	4,441,426	3,242,000	1,199,426	37%
2030 – 2034	3,372,768	3,242,000	130,768	4%
Estimated sustainable supply:	3,821,700			

Source: Crickmay, 2005, p. 3

Table 4: Analysis of supply and demand: 2005 – 2034: Eucalyptus (Excluding sawlogs)

FIVE YEAR PERIOD	TOTAL SUPPLY (tons)	TOTAL DEMAND (tons)	SURPLUS (+) / SHORTFALL (-)	
			(tons)	(%)
2005 – 2009	9,963,574	12,272,400	-2,308,826	-19%
2010 – 2014	9,376,974	12,340,000	-2,963,026	-24%
2015 – 2019	8,050,747	12,340,000	-4,289,253	-35%
2020 – 2024	8,597,568	12,340,000	-3,742,432	-30%
2025 – 2029	7,143,001	12,340,000	-5,196,999	-42%
2030 – 2034	8,728,321	12,340,000	-3,611,679	-29%
Estimated sustainable supply:	8,643,400			

Source: Crickmay, 2005, p. 3

Table 5: Analysis of supply and demand: 2005 – 2034: Wattle (Excluding sawlogs)

FIVE YEAR PERIOD	TOTAL SUPPLY (tons)	TOTAL DEMAND (tons)	SURPLUS (+) / SHORTFALL (-)	
			(tons)	(%)
2005 – 2009	1,252,124	1,643,000	-390,876	-24%
2010 – 2014	941,921	1,623,000	-681,079	-42%
2015 – 2019	1,203,738	1,623,000	-419,262	-26%
2020 – 2024	886,027	1,623,000	-736,973	-45%
2025 – 2029	1,147,182	1,623,000	-475,818	-29%
2030 – 2034	840,782	1,623,000	-782,218	-48%
Estimated sustainable supply:	1,045,300			

Source: Crickmay, 2005, p. 4

3.14.2 South Africa's current hardwood pulpwood shortage

LHA Management Consultants (2004, p.iii) report points out that the estimated actual **hardwood pulpwood availability** (short term) to be 12 350 000 m³, while the current and short term **demand** is 13 180 000 m³, **showing a current under-supply of 830 000 m³**. The shortfall in hardwood supply can clearly be seen in the following table.

Table 6: Supply and demand comparison (2003)*

Timber or user category	Estimated actual availability (short term) ('000m ³ p.a)	Current demand (‘000m ³ p.a)	Surplus (+) / Shortage (-) (‘000m ³ p.a)
Sawlogs: Pine	4 920	4 800	+ 120
Eucalyptus	405	400	+ 5
Pulpwood: Pine	4 300	3 870	+ 430
Hardwood**	12 350	13 180	- 830
Hardwood jungle (Charcoal)	2000	2000	-
Total	23 975	24 250	- 275

* This includes all roundwood used for pulp, chip, timber board products and ‘other’, but excludes raw material used for charcoal production.

** Hardwood is made up of both eucalyptus and wattle

Source: LHA Management Consultants 2004 “Roundwood Supply and Demand 2030”, p. 2

3.14.3 Conclusion to the supply and demand of commercial fibre resource in South Africa.

Three independently commissioned reports by the Department of Water Affairs and Forestry (DWAF) namely;

1. **2005: June** *"The Contribution, Costs and Development Opportunities of the Forestry, Timber, Pulp and Paper Industries in South Africa"* - Part I - Genesis Analytics (Pty) Ltd.
2. **2005: January** *"Study of Supply and Demand of Industrial Roundwood in South Africa"* - Crickmay & Associates (Pty) Ltd.
3. **2004: August** *"Roundwood Supply and Demand to 2030"* - LHA Management Consultants.

All these independent reports allude to the South Africa's current and future commercial fibre resource shortage, a fact that has to be considered in all future forestry strategic decision making. More specifically all three reports allude to the conclusive evidence that South Africa currently faces a hardwood pulpwood shortage.

3.15 Vertical integration and the South African forestry industry

Genesis Analytics (2005, p. 60) makes the following statement about its report. "One of the clear findings of this analysis is the fact that the pulp and paper industry is characterised by vertical integration, substantial barriers to entry and import parity pricing". The report further states, "Pulp and paper firms are integrated from nurseries and plantations to final paper production". The report further finds that "The pulp and paper component of the industry is dominated throughout all components of the value chain by two firms resulting in substantial buyer concentration in various components. In addition, the pulp and paper market is characterised by high barriers to entry due to the capital intensive nature of the industry (and, therefore the scale of production required), limited fibre inputs available (particularly on the open market), and the extent of vertical integration and outputs are explicitly priced at import parity".

It can be argued that export parity pricing is the major factor determining the mill delivered price of hardwood pulpwood to private and independent tree farmers, which include NCT members. This situation was brought about, and is a direct result of, NCT entering the market as a competitive hardwood pulpwood exporter. However, it must be noted that NCT's influence in creating export parity pricing only extends to hardwood pulpwood and not softwood pulpwood.

The duopolistic nature of the **softwood** pulpwood market is dominated by Mondi and Sappi, and in a combination of large economies of scale, vertical integration and transfer pricing the mill delivered prices for softwood pulpwood is uncompetitive to a private or independent tree farmer. The mill delivered price offered by Mondi and Sappi for softwood pulpwood may be argued by them using import parity pricing, however the scope of this report does not explore this argument. The net result of uncompetitive mill delivered price by Mondi and Sappi for softwood pulpwood is causing the divestiture of softwood pulpwood by private and independent tree farmers.

The South African forestry industry in general, has been no different if compared with world trends, in changing the scope of its vertical integration, according to Genesis Analytics (2005, p. 19) the bulk of low skilled jobs within the forestry industry has been moved to contractors over the past two decades.

Most outsourcing has taken place in the operational aspects of the industry, specifically the stump-to-mill supply chain or the scope of "forest engineering".

This was done mainly to reduce costs but also limit the exposure to an increasingly unionized labour force. Genesis Analytics (2005, p. 19), further allude to the following "By contracting labour and **operational issues** out to independent parties, companies felt that they can focus on their core business activities".

The consequence of outsourcing "low skilled jobs" or "labour intensive operations" indirectly meant that most of the stump-to-mill supply chain would be outsourced to independent contractors.

Genesis Analytics (2005, p. 19) further states that “Although the South African forestry industry is seen as a substantial employer of (particularly low-skilled) labour, a large proportion (approximately 44% of plantation forestry work force) of formal employment (low-skilled labour in particular) positions have been moved to contracting companies that have taken over the management of the bulk of plantations.”

Manyuchi (2002, p. 15) sums up the outsourcing decision by large forestry companies as follows: “It appears that outsourcing in the forestry industry has not been a critically thought through process. Grower companies did not systematically think over certain key issues which now stand as major risks in the industry e.g., availability and development of skills; technology acquisition and exploitation; contractor selection and development (i.e., most contractors are former grower company employees who did not necessarily have entrepreneurial skills to run contractor business)”

Manyuchi (2002, p. 17) further states, “The nature of contracts, according to the contractors, allows the grower companies to stop production due to mill shutdowns or other reasons. A contractor with higher capital commitments will not be able to survive shutdowns. Flexibility in a mechanized operation is reduced if production has to be decreased. This was one of the reasons for outsourcing; contractors can be started and stopped as mill’s timber requirements fluctuate.”

Manyuchi (2002, p. 17) further states, “It is clear that in some cases, contracting in forest engineering is built around costs and penalties for non-compliance. The debate now has to be leveraged to tactical and strategic levels to address partnering, competitiveness and sustainability of contractor businesses.”

It can be debated whether the South African forestry industry was mature enough for the strategic move to outsourcing, in terms of a professional willing and able contracting fraternity. Most of the outsourcing has taken place within the discipline of “forest engineering” which includes the logistics of harvesting, short haul, loading and long haul, which can be further described as the stump-to-mill supply chain and according to Warkotshe (1994, pp. 361 – 368) can make up 70% of the total value chain expenses. It is therefore important that the forest

engineering activities be completed at the lowest possible cost, while adding the maximum value for the customer (Brink and Kellogg, 2000, p. 275).

Although most of the large forestry organisations are vertically integrated into the entire value chain, from owning the land to owning the trees and processing plants. Most forestry companies have completely outsourced their “stump-to-mill supply chains” while very few companies retain some in-house operations.

Therefore, the efficiency of the contracting fraternity is critically important to overall return on investment to both large and small tree farmers. The Genesis Analytics Report elaborates further on the forestry contracting fraternity as follows.

Combining Warkotshe’s observation above with Gallent’s (1998, p.19) observation stating that supply chain management, with its emphasis on involvement in the complete supply chain from conception to end use, could achieve savings between 15 percent to 40 percent, is evidence that there is a lot of scope within the stump-to-mill supply chain to make cost savings by NCT for its members.

From NCT’s perspective entering the stump-to-mill supply chain will be seen as “backward vertical integration” or “upstream” integration.

NCT would benefit in the following ways by backward vertical integration into the stump-to-mill supply chain:

- Improved supply chain management
- Improved opportunities to differentiate.
- Capturing of upstream profit margins.
- Increase the barriers to entry for potential competitors.
- Facilitates investment in highly specialized assets in which upstream players may be reluctant to invest in.
- Leads to expansion of core competencies.

NCT would not benefit in the following ways by backward vertical integration into the stump-to-mill supply chain:

- The quantity required from a supplier is much less than the minimum efficient scale for producing the product.
- The product is widely available commodity and its production cost decreases significantly as cumulative quantity increases.
- The core competencies between the activities are very different.
- The addition of the new activity places NCT in competition with another player with which it needs to cooperate. NCT then maybe viewed as a competitor rather than a partner.

Before NCT decided on outlaying its own capital into backward vertical integration in 2006, NCT considered the model of outsourcing the stump-to-mill supply chain (for its members) to a solution based company who specialized in the complete stump-to-mill supply chain.

This meant NCT members had to commit roundwood volumes per month and per year by pre-defined felling assignments per area in order to reach the minimum proposed contractual volume. NCT would act as an agent and draw up the contract between its “felling assignment members” and the stump-to-mill contracting company.

Unfortunately, due to the many variables NCT members face with regards to labour capacity, other crop commitments, local contractor commitments, seasonality of harvesting, weather and various other issues, NCT was unable to get its members to holistically commit to monthly and yearly volumes to underpin the proposed contractual volume.

It was after this reasoning that NCT then decided to use vertical integration as a means to gain more control of the stump-to-mill supply chain.

Besides satisfying the “operational” needs of its members, the major driver for NCT to become more involved in the stump-to-mill supply chain would be the drive to reach economies of scale and therefore drive down operational expenses, which indirectly will increase the profit margins of its members.

Reduced “operational” expenses will allow NCT to leverage and defend its mill delivered prices, if they are beaten by competitors.

The advantage NCT has is the fact that it has maintained a relatively long standing, stable and growing membership base. The general loyalty of NCT members show towards their co-op is testament in the financial support the membership have given towards NCT’s new projects such as Durban Wood Chips (Pty) Ltd and Pulp United (Pty) Ltd.

This means there is a real possibility that NCT could garner its members support in a stump-to-mill supply chain management initiative. By procuring the buy in of NCT members to the concept of stump-to-mill supply chain management, NCT could use the keiretsu approach to stump-to-mill supply chain management in combination with its own backward vertically integrated operations to control and manage more projects in the stump-to-mill supply chain. This will increase the chances of NCT reaching economies of scale in the “stump to mill supply chain” and increase the chances of driving down costs within this section of the value chain.

Besides straight backward vertical integration, two alternative methods of supply chain management were presented to the sample group in the questionnaire. The first supply chain management method included independent intermediaries who were controlled on a project by project basis by a supply chain manager employed by the buyer. Inherently, this would mean that the buyer employed a supply chain manager who would schedule or assign compartments to be felled and transported on a monthly and yearly basis reaching minimum economies of scale on a sustainable basis per operation, in simple terms this method involved a keiretsu approach.

The second supply chain management method included an “independent supply chain management business” to contract with the buyer to supply chain manage the stump-to-mill supply chain. This inherently would mean that the buyer (NCT) would contract with a “supply chain management company” and would schedule or assign compartments to be felled and transported on a monthly and yearly basis. The aim would be to reach economies of scale on a sustainable basis.

NCT's response to the challenge of gaining control of the stump-to-mill supply chain firstly started with an "outsourcing" approach, followed by the adoption of backward vertical integration. Various constraints in the stump-to-mill supply chain did not allow NCT to outsource. Therefore, the decision was taken by NCT to use backward vertical integration as a method of gaining control of the "stump-to-mill supply chain" and at the same time deliver a service to the members.

NCT needs to revisit its thinking on its intervention in the stump-to-mill supply chain. NCT needs to consider using both backward vertical integration and keiretsu as strategies of supply chain management in gaining control of the stump-to-mill supply chain.

However, as Peters (1998, p. 31) and Gallant (1998, p.19) allude to, embracing supply chain management as a concept, is a paradigm shift and needs a change in mind set.

Firstly, NCT management would have to be educated on the pros and cons of adopting supply chain management into the "stump-to-mill operations". Once NCT's management are convinced of the benefits of using supply chain management and its strategies as a tool, training can then be initiated to line staff in order for them to embrace the concepts and strategies.

NCT has the resources to hold work shops and field days to explain the concept of supply chain management and the concepts of backward vertical integration and keiretsu, with all stakeholders. The adoption of supply chain management by NCT is a concept that will tie seamlessly into the stump-to-mill supply chain for the following reasons:

- By using the concept of stump-to-mill supply chain management in conjunction with assigned felling scheduling will increase the consistency of volume management and volume control by NCT.
- Supply chain management in the stump-to-mill supply chain will create much needed economies of scale for the "second" or "informal" contracting fraternity and therefore by default create more professionalism in contractors.

- NCT members will have flexibility to participate in the chain if they have their own equipment.
- Reduced capital outlay from NCT, the assets of specialised companies would be used.
- It will create much better volume planning for NCT members and lead to much better volume planning by NCT to its strategic markets.
- Increased customer service and satisfaction.

The choice of using both backward vertical integration and keiretsu as supply chain management strategies will diversify the risks in managing the stump-to-mill supply chain, and allow for the benchmarking of both strategies to take place.

If NCT could achieve savings by intervention into the stump-to-mill supply chain, it would give NCT exceptional bargaining power in defending its mill delivered prices.

3.16 Forestry contractors under scrutiny

The Genesis Analytics (2005, p. 43) highlights and summarises the following impacts of contracting on the development of the South African forestry industry:

- The bulk of low-skilled jobs have been moved to contractors over the past two decades.
- Conditions of employment within the contractor environment often do not meet national labour, health and safety standards.
- Conditions of employment have deteriorated when they moved from permanent employment to contract employment.
- Relationships between forestry firms and contractors are unequal, almost adversarial and based on the relative power of the former.
- Contractors exist in a “first economy” to service the formal plantations and in a “second economy”, to provide silviculture and harvesting services to small and medium sized growers.
- According to “first economy” contractors, they operate under very difficult conditions in which contracts are rigid and not negotiable and provide few opportunities for sustainability (e.g. contracts commit contractors to meet minimum wage and health and

safety standards, yet provide year-on-year increases, which contractors consider to be inadequate)

- The majority of contracts are three years in duration, insufficient to enable contractors to lease or purchase equipment. While labour intensity contributes positively to labour absorption, equipment is still required to maintain efficiencies and modernization.
- “First economy” contractors and their representative organisation describe the de-professionalisation of forestry due to contracting. Business managers with no prior exposure to forestry now manage forests, with considerable implications for the industry’s future. It also requires forestry companies to still employ foresters and management staff to oversee the contractors. On their part, many former foresters who are now engaged as contractors indicated their intentions to leave the industry due to difficult relations with forest companies. Further more, due to service delivery and bottom line demands, neither the large firms nor contractors engage in any meaningful training, an assertion supported by low claims against capital Sector Education Training Authority (SETA) skills development allocations.
- “Second Economy” contractors operate under “informal” sector conditions, in highly competitive markets and with poor access to finance and training. All the contractors interviewed use their own funds to start their enterprises and had no assistance either from the forestry firms, government or other agencies in establishing and maintaining their businesses. Contracts with small growers were informal and too small to serve as the basis for acquiring loans.
- No assistance was rendered by the forestry firms to consolidate existing informal contractors. In cases of sudden increases in demand, forestry firms did not seek to expand the capacity of existing contractors, but sought services from other individuals, resulting in growing numbers of highly competitive but unsustainable firms.
- The most urgent requirement of informal contractors is for assistance in securing public liability cover against the risk of fire, which is the highest barrier to their formalisation.
- The second most urgent requirement of informal contractors is for business training. Many contractors do not know how to manage their enterprises (to the point of not knowing if they have made profits or losses at any given period of time). The costs of compliance to minimum wages and health and safety standards render most informal contractors unsustainable.

Genesis Analytics (2005, p. 45) sums up contracting as follows “The result of this is not only an untenable labour situation but also a brokering system that could possibly jeopardize the development of the industry as a whole. The manner in which contracting is currently managed results in a systematic loss of skills in the industry as experienced individuals exit the industry due to the untenable situation. In addition, the nature of contracts and the low margins resulting from the unequal negotiation powers of contractors versus the larger companies result in a deterioration of the capital base of the industry that cannot be maintained or developed under current conditions. The tenuous nature of the current situation is acknowledged by the industry, but as yet, no solutions have been forthcoming.”

Due to the geographic distribution of medium and small growers and their inherently small areas to be harvested, “informal” or “second economy” contractors are usually employed in this environment.

The problems experienced by contractors as described in the Genesis Analytics report above are confirmed by the results of NCT’s two independent reports, where NCT members used “operational issues” as a reason for the under-supply of hardwood pulpwood.

“Operational issues” more specifically stump-to-mill supply chain issues were sighted by NCT medium and small private grower members as the second largest reason after price for their hardwood pulpwood under-supply.

3.17 NCT Forestry Co-operative Limited

NCT is recognised as an international supplier of quality round wood timber and the largest forestry-marketing organisation in southern Africa.

NCT was established in 1949 as a marketing co-operative to cater to the needs of private and independent timber growers.

As a co-operative, its members who share in profits, own NCT. Today membership stands at approximately 2039 shareholding members, representing a total area of over 300 000 ha – 21% of afforested land in South Africa.

NCT's role is to act as agent for both members and processors; the best market prices are negotiated on behalf of its members and stable supplies of quality round wood timber are secured for local and export markets.

NCT members not only benefit from the wide range of services NCT offers, but also share in its annual profits and qualify for bonuses based on their patronage and committed supply, obviously depending on available cash (NCT, 2006).

3.17.1 NCT's current hardwood pulpwood shortage

NCT currently faces a 100 000 ton per annum under-supply of eucalyptus hardwood pulpwood. An under-supply problem, which seems to be worsening every year. The question is, are NCT's members just under-supplying because of price and operational circumstances or is NCT actually losing market share to competitors?

From a national hardwood pulpwood buyer point of view, Mr. Russell Morkel, general manager of Mondi Forests (Pty) Ltd and Mr. François Oberholzer, programme manager for Forest Engineering at the Institute for Commercial Forestry Research in South Africa (ICFR) agree, that the most accessible or least encumbered form of hardwood pulpwood resource in South Africa is from private timber growers **in the medium and small grower categories** (Telephonic meeting 18/04/2006).

This is because hardwood resource procurement from the large grower category is virtually non-existent as these businesses are vertically integrated and are mandated to supply their own resource to their own hardwood pulpwood processing plants.

Medium and small growers tend to be organised and integrated into co-operatives as well as direct supply agreements with independent processors. Even though contractual agreements bind these private growers to some form of channeled marketing, the exit avenues in these

contacts do not pose a serious barrier of exiting and aligning themselves with a more favourable marketing opportunity or buyer.

This evidence will cause major hardwood pulpwood buyers to target this sector as a strategy to increase their market share from these fibre resource ownership categories. This means that the large hardwood pulpwood buyers who may already have direct supply agreements with medium and small private growers could implement a procurement strategy to strengthen and increase their market share of supply from this resource owning sector.

This scenario in summary leaves the **medium and small grower groups** as the most vulnerable resource owners to procurement advances from NCT's competitors. Together these two groups (medium and small growers) make up 20.8% of the total commercial forestry resource available in South Africa (Genesis Analytics 2005, p. 29).

As medium and small private/independent growers make up the bulk of NCT's membership this means that NCT's membership market share will experience increased pressure directly from competitor hardwood pulpwood buyers.

The study in this report focuses on KwaZulu-Natal province, which currently makes up 40.2% of commercial plantations in South Africa. Due to hardwood rotation lengths; approximately 8 years for eucalyptus and 10 years for wattle, these two commercial tree farming crops have the shortest rotation lengths which also means the fastest return on investment opportunity in the forestry industry for their owners. That is why the majority of medium and small private growers have invested in short rotation hardwood pulpwood as a preferred crop of choice, combined with the historic sustainable demand from the pulp and paper, board manufacturing and chipping manufacturing within the province.

Therefore, the form of ownership and type of resource which medium and small growers own in KwaZulu-Natal fits the demand profile of the hardwood chipping, fibre board, pulping and paper making markets exactly, and makes them the perfect target for procurement from competitor hardwood pulpwood buyers.

This also means that competitor hardwood pulpwood buyers in the future will possibly be targeting or more aggressively targeting medium and small grower groups (NCT's resource base) in KwaZulu-Natal for roundwood procurement opportunities.

The question is what strategy could be used by NCT to ensure their members are not enticed away by other competitor buyers? The identification by NCT members themselves, have directly pointed out that the stump-to-mill supply chain is a major reason for their under-supply, and intervention in this area by NCT, may be the key in satisfying the needs of its members, and at the same time increase the supply of hardwood pulpwood. This strategy will also increase the exit barriers for NCT members and gain a competitive advantage over competitors.

3.17.2 Change in the competitive environment

The trade in private hardwood pulpwood is currently moving more towards a "sellers" market situation. The changing competitive environment will mean that suppliers of hardwood pulpwood will acquire more bargaining power, as the demand for their commodity increases.

It also means that private/independent hardwood pulpwood growers will naturally seek out the most competitive buyers for their roundwood and channel their sales in that direction.

Although price, as a mechanism, is a major driver in the decision making process of who to sell to, or who to contract with, this factor combined with the imbalance in supply and demand, will mean private/independent timber growers theoretically will have the opportunity to reach an agreement that is more favorable to them during the bargaining situation.

Medium and small hardwood pulpwood suppliers in the future will have the ability to increase their conditions and terms of trade, and buyers will have to become more flexible in the way they trade with this resource owning segment.

3.17.3 Historical and traditional hardwood pulpwood point of sale

Historically and traditionally, the major hardwood pulpwood buyers have been supplied from both their own plantations and private/independent hardwood pulpwood growers.

Historically and traditionally the unit of measure has always been in tons (six weeks dry), and the point of sale has been over the weighbridge at the market gate.

Due to this historical system of purchasing raw material, hardwood pulpwood buyers have seldom **formally** considered offering its suppliers any alternative point of sale/purchase options.

“Formally” means flexible point of sale/purchase options are a recognized product of the organization.

The fact that some hardwood pulpwood buyers may offer flexible point of sale options, within the stump-to-mill supply chain, due to vertical integration or the management of the stump-to-mill supply chain in some projects, does not necessary mean that the buyer **formally** offers the product to the general target market.

Logically, before a buyer can offer flexible point of sale/purchase options, the buyer needs to exercise some form of control over the stump-to-mill supply chain in order to offer this flexibility.

Buyers may have to intervene in the stump-to-mill supply chain in order to be competitive.

3.17.4 Procurement flexibility needed from the hardwood pulpwood buyers

Due to the current and future forecast of under-supply of hardwood pulpwood, buyers of hardwood pulpwood who target private medium and small hardwood pulpwood growers may need to strategize their procurement options to position themselves to meet the possible increase in trade demands and terms made from private hardwood pulpwood growers.

The increase in trade demands will not only extend to price, but will naturally include more favorable trading terms and conditions. As we already know, this segment has sighted “operational issues” or “stump-to-mill supply chain issues” as a barrier to supply. One can speculate that besides price, operational demands will naturally form part of the bargaining process.

Empirical research which forms part of this study in the form of a questionnaire to private hardwood pulpwood growers in KwaZulu-Natal will determine exactly what these operational needs are, and how they can be satisfied.

3.17.5 Factors effecting supply of hardwood pulpwood to NCT

Many factors play a role in the supply of hardwood pulpwood by private/independent growers to NCT’s strategic markets. A conclusive assumption made by two previous studies done by NCT can be made, one of these factors is the price offered to suppliers, but just how price elastic or inelastic are timber growers?

A study done by Brannlund *et al* (1985, p. 601) in Sweden a number of years ago found supply elasticity to be 0.74, a value smaller than one and therefore indicating that suppliers are relatively price inelastic as a change in price of R1 will result in a change in quantity supplied of 0.74 tons of pulpwood. This can partly be explained by the fact that pulpwood timber prices in Sweden are set at an exogenous level, in other words they are determined without any interaction between demand and supply (Perry, 2006, p. 32).

Robinson (1974) did a similar study on the supply elasticity of timber in North America, as did Adams (1977), both finding fairly inelastic supply elasticity’s of around 0.2 and 0.5.

Brannlund *et al* (1985) goes further in identifying a cross elasticity between pulpwood timber and saw timber in that the higher the price of pulpwood the more timber is transferred from the saw timber market to the pulp market and vice versa. This negative relationship indicates that suppliers view pulpwood and saw timber as substitute’s products of one another, if the price of the one goes up; the volume to the other is reduced (Perry, 2006, p. 32).

One will find this cross elasticity in South Africa with regards to softwood pulp. Private/independent timber growers will first off load their pine pulp (15 year rotation) into the industrial sawmilling sector before supplying softwood pulpwood markets with the balance (Perry, 2006, p. 32).

This is mainly due to the duopoly of the softwood pulpwood market situation. Softwood mill delivered prices for pulp do not yield a return on investment to private/independent timber growers.

In Sweden as is the case in South Africa one of the difficulties of predicting supply behavior of private timber growers is the fact that there are many difference kinds of timber growers who find themselves in many different situations and who respond in many different ways to economic conditions (Perry, 2006, p. 32).

In a study undertaken by NCT in 2005, the following reasons were given by members for their decreased hardwood supply volumes. 245 members across all classes and of all sizes were contacted by phone, selected on the basis that they have had the biggest decrease in eucalyptus supply over the past year compared to their previous years' supply.

Table 7: Reasons for decreased eucalyptus supplies to NCT

MAIN REASONS GIVEN BY MEMBERS: FOR DECREASED EUCALYPTUS PULPWOOD SUPPLIES 2005
Class 1 members 1) Delayed gum felling due to extended wattle season or busy with other activities. 2) Over felled in previous years due to cash flow, fires, drought or snow damage 3) Economic banking 4) Contractor (Harvesting and Transport) / Labour & Mechanical problems. 5) Supplying competitors because of price. 6) Reduced Timber Resource and conversion to other crops. 7) Farm sold / Housing Development / Lease expired / resigned from NCT 8) Skewed Age Class Distribution – no or less mature trees at present. 9) Have a contract with our competitors (Has not honoured NCT Commitment) 10) Other (Deceased, sold standing to NCT member) 11) Increased supplies to special markets
Class 2 members 1) Reduced timber resource. 2) Supplying competitors because of price 3) Other – (illness, liquidation, rail increases = unprofitable to do timber).
Class 3 members 1) Not mature trees. 2) Plan to supply in last quarter of this supply season. 3) Other – (deceased, sick, sold timber standing, sold farm, price).
Class 4 members 1) Supplying competitors because of price. 2) Other – (Sold farm, no mature timber, delayed felling).
Class 5 members 1) Supplying competitors because of price. 2) No resource available.
Class 6 members 1) Supplying competitors because of price.
Class 7 members 1) Mainly no mature trees.

Source: Pettit, 2005, p. 4

As can be seen from the list above many different factors have an impact on supply volumes.

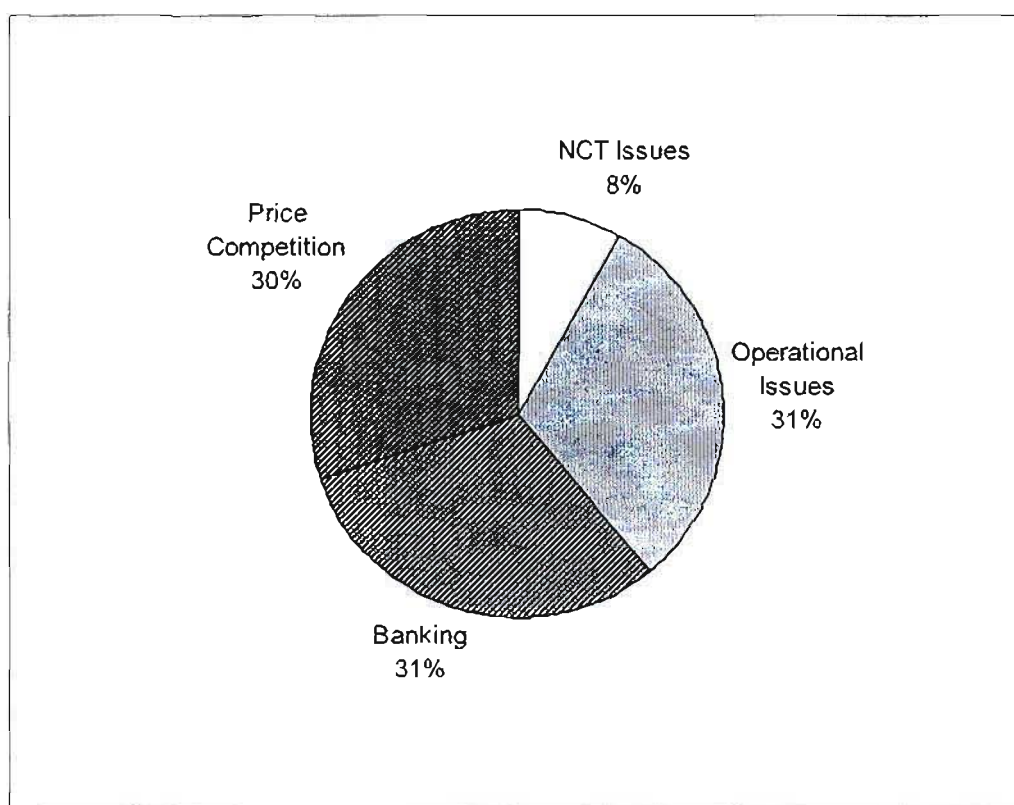
From this list, three main topics can be identified and they are as follows:

- The impact of price in terms of prices offered by competitors
- The impact of operational issues such as harvesting contractor problems, labour problems and the impact of other farming activities.
- Reduced felling or withholding timber due to the economic environment.

Noted, is that this study by NCT looked at actual volumes supplied in one year compared to that of the actual volumes supplied in the next (Perry, 2006, p. 32).

The following diagram sums up the study conducted by Perry in 2006, to examine the variables that influence the supply of eucalyptus pulpwood timber to NCT strategic markets in KwaZulu-Natal (Perry, 2006, p. 55).

Graph 8: Impact of grouped statements on all districts' supply volumes



Source: (Perry, 2006, p. 55)

Note: Price competition and banking form monetary issues, when grouped together price and banking form 61% of the reason why NCT members hold back on the sale of their hardwood pulpwood. Operational issues after monetary issues then becomes the second biggest issue causing NCT members to under-supply their hardwood pulpwood.

3.17.6 NCT's current intervention in "operational issues" or the stump-to-mill supply chain

Historically, NCT owned its own fleet of timber transport vehicles, which it used as a service to collect and deliver its members roundwood. In 1993, NCT decided to outsource the long haul transport to private transport companies and therefore sold its fleet. However, NCT has since then, provided a free transport brokering service to contract transport companies in both rail and road transport, as a service to its members.

From 1993 up until the beginning of 2006, NCT has **not** been vertically integrated backwards into the stump-to-mill supply chain. In 2006, NCT for the first time integrated itself backwardly into the stump-to-mill supply chain by purchasing a harvesting, short haul and a loading system in an "own-ops" environment to harvest, short haul and load roundwood timber.

This capital intensive project (approximately R 3.5 million investment) was made feasible by the fact that NCT owned tree farms which could under pin the system with critical volume in order for the system to reach and exceed the minimum economies of scale, for the project to become economically viable.

Furthermore, the idea was that the system could be contracted out to members at a later stage. The long haul transport in NCT's new stump-to-mill system is brokered by NCT to private timber transporting companies to fulfill a "stump-to-mill product solution".

In essence, NCT has adopted backward vertical integration to control and manage the harvesting, short haul and loading components of one stump-to-mill supply chain, combined

with independent intermediary support through the brokerage of long haul transport on a project by project basis.

Before NCT decided on outlaying its own capital into backward vertical integration, NCT considered the model of outsourcing the stump-to-mill supply chain (for its members) to a solution based company who specialized in the delivering of a complete stump-to-mill supply chain solution.

This meant NCT members had to commit roundwood volumes per month and per year by pre-defined felling assignments per area in order to reach the minimum proposed contractual volume requested by the service provider. NCT would act as an agent and draw up the contract between its “felling assignment members” and the stump-to-mill contracting company/service provider.

Unfortunately, due to the many variables NCT members face with regards to labour capacity, other crop commitments, local contractor commitments, seasonality of harvesting, weather and various other issues, NCT was unable to get its members to holistically commit to monthly and yearly volumes to underpin the proposed contractual volume.

It was after this reasoning that NCT then decided to use vertical integration as a means to gain more control of the stump-to-mill supply chain and provide an additional service to its members.

By comparatively looking at Södra, a Swedish co-operative on how they manage their stump-to-mill supply chain will give insight on the importance this organisation places on the management and control of the stump-to-mill supply chain as a strategic investment in its fibre control and supply.

3.17.7 Stump-to-mill supply chain comparison between NCT and Södra

Södra is a co-operative of over 35,000 private forest owners in southern Sweden. Together, their estates account for some 2 million hectares of productive forest land – over half of the

privately-owned forest in southern Sweden. In 2004, the Group employed over 3,600 people, who work in various roles and from various locations in Sweden, Norway and elsewhere around Europe (Södra, 2006).

In comparison NCT Forestry Co-operative Limited has approximately 2100 members and collectively bargains approximately three hundred thousand hectares of commercial forestry land and employs 465 people of which 348 are wage earners (NCT, 2005, p. 14).

Each of the owner/members belonging to Södra has a say in how each of its forest-related activities and industries is operated – from the forest itself, to transport, bio-energy, wood products and pulp. From its highly democratised base, Södra has grown from a handful of forest owners in the 1930s to a major international forest industry combine. Södra reported sales in 2004 of SEK 13,6 billion, and employed 3,600 people (Södra, 2006).

As a Group, the business is split into four subsidiaries:

- **Södra Skog**– for all forest management services, including planting, felling and wood procurement for the other Södra industries;
- **Södra Cell**– to produce pulp for an enormous range of paper manufacturing;
- **Södra Timber** – to produce sawn and planed timber products for building construction and interiors;
- **Södra Skogsenergi**– to produce bio-fuels, for supply to Södra industries and for sale to external buyers (Södra, 2006).

The Södra Skog's subsidiary will be analysed more closely as it is this subsidiary, which is responsible for the flow of Södra's members' timber and more specifically the management and control of the stump-to-mill supply chain.

Södra Skog as a wholly owned subsidiary of Södra is tasked to supply the group's mills with roundwood and provides forestry services to Södra's members. The "forestry services" are managed and controlled for its members by Södra Skog in 30 forestry districts (Södra, 2006).

Forestry services, involves both silviculture and harvesting commitments which includes full “stump-to-mill supply chain management”.

3.17.8 Södra Skog is one of the largest forestry players in Sweden

“Södra Skog is one of the largest forestry players in the Swedish wood market. The control Södra Skog places on the market can be summarised as the equivalent to a timber truck arriving at a mill every second minute, around the clock, every day of the year” says its website (Södra, 2006)

Almost half of the wood supplied to Södra is bought from members, the rest from other suppliers in Sweden (primarily sawmill chips) and through import (Södra, 2006)

3.17.9 Felling assignments

Most of Södra’s members’ roundwood is purchased through felling assignments, in other words when Södra Skog has been assigned by the forest owner to harvest, short haul, load and long haul their members’ roundwood.

Södra’s 2004 annual report (Södra 2004, p. 25) states the following “Södra Skog’s wood volume supplied to its mills in 2004 was the highest ever, despite felling conditions not always being the best. The storm early in 2004 blew down forest in many places and in all types of forest stands, and this contributed to a heavy flow of wood delivery in March and April 2005. Along with the transport conflict during spring, this prevented wood on motor roads being collected at the planned rate. By August, stocks were back to their normal level. During the last quarter of the year, supply was strained for both saw logs and pulpwood. Heavy rain and inadequate ground frost in the forest and on the roads limited the availability of wood.”

This statement is testament to the level and depth of operational control that Södra Skog undertakes in the stump-to-mill supply chain between its members and markets.

3.17.10 Wood transport streamlined

Södra Skog further describes that during the year it was decided to reduce the number of regions from four to three, each with ten forestry districts. This means that regions and transport areas were brought into line geographically (Södra, 2006).

3.17.11 Transport management has being moved to regional offices, which improves the co-ordination of felling and transportation

Södra Skog further describes the need to secure transport capacity. This has brought about changes related to the 200 or so timber lorries used in wood handling. Södra's own haulage operation was expanded during the year so to manage 15 per cent of transportation requirements. Haulage contractors directly contracted to Södra account for 50 per cent of transportation and contractors under local collective agreements account for a further 35 per cent (Södra, 2006).

3.17.12 Södra a large integrated forestry organisation

Södra's annual report 2005 (Södra, 2006) further states, "Felling assignments and silvicultural work for members is carried out in the forestry districts. The personnel involved provide a comprehensive service that has become something of a yardstick within the industry. Each district is run by a district manager, with a team that includes a felling supervisor, forest inspectors and planners. Felling is carried out by around 200 felling groups, each with a harvester and a forwarder."

Although NCT has a very competent technical department, Södra Skog goes further in its product service to its members by providing physical operational solutions and is not limited only to consulting advice.

3.17.13 Comparison of operational control between Södra Skog and NCT

Below is a comparison between NCT and Södra Skog in terms of percentage control over the stump-to-mill supply chain.

NCT's own operational control percentage of 1.3% was derived by taking the average yearly capacity of its (single) own harvesting system and dividing it into NCT's total volume sales for 2005. Therefore approximately 30 000 tons / year own-ops harvesting capacity divided into NCT's total sales of 2 344 000 tons in 2005.

Table 8: A comparison of harvesting, short haul and loading intervention between Södra Skog and NCT

Company	FOR MEMBERS		
	Harvesting, Short Haul, Loading	Harvesting, Short Haul, Loading	
	Own Operations	Contracted Out	Total
Södra Skog	79%	21%	100%
NCT	1.3%	98.7%	100%

Table 9: A comparison of long haul transport intervention between Södra Skog and NCT

Company	FOR MEMBERS			
	Long Haul	Long Haul	Long Haul	
	Own Operations	Local Collective Agreements	Contracted Out	Total
Södra Skog	15%	35%	50%	100%
NCT	0%	0%	100%	100%

Table 10: A comparison of “stump-to-mill” owned intervention between Södra Skog and NCT

Company	Owned Harvesting	Owned Short Haul	Owned Loading	Owned Long Haul
Södra Skog	79%	79%	79%	15%
NCT	1.3%	1.3%	1.3%	0%

Table 11: A comparison of “stump-to-mill” contracted out management between Södra Skog and NCT

Company	Contracted Out Harvesting	Contracted Out Short Haul	Contracted Out Loading	Contracted Out Long Haul
Södra Skog	21%	21%	21%	75%
NCT	98.7%	98.7%	98.7%	100%

Table 12: A comparison of number of “felling groups” owned by Södra Skog and NCT

Company	Felling Group*
Södra Skog	200
NCT	1

* Felling Group: consists of harvesting, short haul and loading owned and managed by the company.

3.17.14 Summary of Södra Skog’s “operational” involvement in the stump-to-mill supply chain

Södra Skog (Södra, 2006) points out that their focus on the operational side of the stump-to-mill supply chain has “increased its volumes and strengthened its position in the market.”

The management philosophy and concept of operational stump-to-mill supply chain management is believed in so strongly that Södra Skog in the beginning of 2004 introduced a programme to increase its productivity in wood acquisition. This has lead to the modernisation

and renewal of their database business system. This improvement concerns primarily the **systems for felling planning and purchasing** (Södra, 2006).

By analysing NCT's general effort to control the stump-to-mill supply chain we find various short comings.

3.17.15 NCT's short comings in the control of the stump-to-mill supply chain

Unfortunately, NCT faces some short comings which need to be addressed in order for NCT to address change management effectively in the adoption of effective supply chain management and the successful deployment of both backward vertical integration and keiretsu. The following points high light some issues that need to be addressed.

- There is a general feeling amongst management that front line staff whose title contains co-ordinator, implicitly means, "stump-to-mill supply chain management".
- More and more front line employees are being employed without basic forestry skill or knowledge, as the jobs are deemed to be more administration orientated. This is proof that NCT is not looking at stump-to-mill supply chain as an area for possible competitive advantage.
- Job descriptions do not describe or contain any detail to "stump-to-mill supply chain management".
- The current system gives no authority or mutual power sharing of front line staff with intermediaries, in fact, all dealings with intermediaries are at an arms length with NCT and between the member and the intermediary.
- Employees are scared to associate NCT with a contractor's name, in case operational problems arise and the member blames NCT for procuring the contractor.

- “Informal” or “second economy” contractors make up the bulk of intermediary support for medium and small private/independent growers.
- Due to lack of economies of scale and lack of NCT involvement “informal” or “second economy” contractors lack economies of scale and therefore are hard to find and are generally un-professional.
- “Informal” or “second economy” contractor intermediaries are a major cause for conflict in the “stump-to-mill supply chain”.
- Even though service excellence may be experienced by an NCT member in terms of the member knowing that NCT has marketed his/her roundwood to the best buyer at the best price, the service experience can turn into a bitter experience due to conflict in the stump-to-mill supply chain ultimately exposing NCT as a bad service provider.
- All documentation involving intermediaries and NCT are at arms length. In fact all intermediaries are forced to contract with the member and not NCT.
- NCT is expected to market its members’ timber with “informal” or “second economy” contractor intermediaries within the “stump-to-mill supply chain”, this cause’s operational friction throughout the stump-to-mill supply chain, mainly due to lack of forestry expertise, capacity and dedicated management in the stump-to-mill supply chain.
- NCT does not formally have a system to effectively manage the stump-to-mill supply chain.
- Lack of control in the stump-to-mill supply chain combined with “informal” or “second economy” contractors, will ultimately cause NCT as a marketing organisation to have large variances in what members say they will deliver as to what actually is delivered to their strategic markets.

- Lack of formal supply chain management by NCT will ultimately cause loss of market share to other companies who may be prepared to invest in the stump-to-mill supply chain.

In general NCT needs to increase its humane resource management efforts in combination with increased training initiatives relevant to the job.

3.18 Why seek the solution to hardwood pulpwood supply from medium and small independent growers in the stump-to-mill supply chain?

The reasons for the approach in seeking a hardwood pulpwood supply solution in the stump-to-mill supply chain can be summarised as follows:

1. NCT reports

- Studies by NCT have determined that price combined with operational issues or “stump-to-mill supply chain issues” cause its members to under-supply hardwood pulpwood (Perry, 2006, p. 55). Price to a large degree is considered as an “uncontrollable variable” whereas “operational issues” can be considered a “controllable” variable.

2. Supply and demand in general

- South Africa is facing a general fibre shortage across all commercial species into the future.

3. Supply and demand in hardwood pulpwood

- Eucalyptus hardwood pulpwood supply has been diagnosed to currently and into the future be in short supply.

4. Ownership of South Africa’s commercial plantation resource

- Medium and small private/independent growers have the most accessible hardwood pulpwood resource for prospective hardwood pulpwood buyers.
- Medium and small private growers are predominantly hardwood pulpwood growers.

- Medium and small private growers naturally become a target market for procurement advances by NCT and NCT's competitive hardwood pulpwood buyers.

5. Change in the competitive environment

- Hardwood pulpwood will move more and more towards a "sellers" market.
- Medium and small growers in the future will have more bargaining power and leverage.
- There will be an increase in the demands and terms and conditions of trade from medium and small hardwood pulpwood growers.

6. NCT procurement differentiation

- Besides price, NCT will need to differentiate their procurement methods to meet the foreseeable increase in their customers/sellers demands.
- NCT may need to offer a differentiated procurement solution to private hardwood pulpwood customers in order to satisfy their changing needs, if they want to remain a competitive procurer from this resource owning segment.
- This means NCT will have to consider active intervention in the stump-to-mill supply chain.

7. Intervention in the stump-to-mill supply chain

- Intervention in the stump-to-mill by NCT will by default allow flexible point of sale opportunities.
- Intervention will increase economies of scale for contractors and therefore theoretically reduce operation costs by creating economies of scale.
- Intervention in the stump-to-mill supply chain using keiretsu as a strategy will allow members and independent contracting companies to actively take part in the stump-to-mill supply chain, thus building up a competitive intermediary resource base.

8. Flexible point of sale options as a method of differentiation by NCT

- Depending on the level of intervention by NCT in the stump-to-mill supply chain, NCT may be in a position to offer flexible point of sale options to its members. E.g.
 - Mill Delivered
 - Estate/Farm Depot

- Compartment Road Side
- Standing

9. Competitive advantage - “He who captures the hill does not necessary hold the hill”

- If the level of intervention requested by NCT’s members is satisfied by NCT, NCT may create a competitive advantage in procurement from this resource owning sector. However, satisfying the “operational issues” expressed by it’s members does not necessarily mean NCT will stabilise or gain market share from the medium and small grower categories, “price” combined with “operational solutions” or increased “service” needs to be addressed together, in order to create the competitiveness.

It is clear to see that numerous factors play a role in the under-supply of hardwood pulpwood. The focusing on the stump-to-mill supply chain will not only satisfy the needs of NCT’s members, but by default increase NCT’s control of the fibre at the time create economies of scale for independent contractors which should ultimately create a cost saving.

The use of supply chain management in combination with the strategies of backward vertical integration and keiretsu as tools to achieve “operational” control of the stump-to-mill supply chain, fits perfectly, as the theoretical benefits of supply chain management complement and is applicable in the current NCT case study.

3.19 Conclusion

The essence of this chapter was to give a snap shot of the South African forestry industry as it currently finds itself, with specific reference to the supply and demand of commercial roundwood.

In combination with placing the industry in perspective, NCT’s role, position and vulnerabilities were exposed specifically in relation to the stump-to-mill supply chain and lack of formal supply chain management.

By satisfying NCT's members need for intervention in the stump-to-mill supply chain should be seen as an essential project to be carried out by NCT.

The theoretical benefits of using supply chain management and the strategies of backward vertical integration and keiretsu as tools to achieve the intervention in the stump-to-mill supply chain has the following major benefits:

- NCT's members' needs will be satisfied.
- Intervention will lead to economies of scale been achieved through planned felling operations and therefore intermediary cost savings.
- Cost savings in the stump-to-mill supply chain will allow flexibility in NCT's defense with regards to mill delivered prices.

By using both backward vertical integration and keiretsu as strategies in the management of the stump-to-mill supply chain will allow NCT to benchmark both systems independently and determine which system delivers the best operational results as well as which strategy proves to be most cost effective..

By default, the intervention in the stump-to-mill supply chain by NCT will allow NCT to gain a competitive advantage over its competitors, and not only will this initiative give NCT a first mover advantage, but it will satisfy its members needs in conjunction with foreseeable cost savings once economies of scale have been reached.

CHAPTER 4

Research Methodology

4.1 Introduction

This chapter describes the methodology used in the research process. A short description of the problem leading into the main research question followed by the research objectives, gives a good idea of what the problem is, what is trying to be solved and the milestones that need to be achieved.

The research design, questionnaire design, sample design, data collection and data analysis are then covered as separate issues and explained.

4.2 Statement of the problem

NCT members (from two independent reports) have identified “**operational issues**” or **stump-to-mill supply chain issues** as the second largest factor leading to the under-supply of their hardwood pulpwood to NCT and NCT’s strategic markets (Perry, 2006, p. 55).

“Operational issues” or “stump-to-mill supply chain issues” can be defined as “**controllable**” issues, and therefore it is important for NCT to diagnose what the specific problems are within the stump-to-mill supply and pursue a strategy to fix the problem before the competition does.

It is with this problem in mind that a comprehensive survey was undertaken to evaluate which factors in the stump-to-mill supply chain are causing the blockages in supply, and defining whether NCT intervention was needed. If NCT intervention is needed the report will also determine the level of intervention and proposed type of intervention needed.

4.3 Research question

Is intervention by NCT in the stump-to-mill supply chain needed, and if so, what level and type of intervention is needed and will intervention necessarily increase hardwood pulpwood supply?

4.4 Research objectives

- Quantify the extent of forward integration into the stump-to-mill supply chain by the sample group per specie, per district and province.
- Quantify which variables cause the sample group not to forwardly integrate into the stump-to-mill supply chain for the KwaZulu-Natal province.
- Quantify the need for intervention in the stump-to-mill supply chain.
- Quantify the need for intervention in the stump-to-mill supply chain per specie, per district and province.
- Quantify which one of three methods of intervention in the stump-to-mill supply chain is deemed more favourable by the sample group.
- Quantify if the sample group would be more inclined to trade their hardwood pulpwood to a buyer who offered intervention in the stump-to-mill supply chain
- Quantify which “point of sale” is found most desirable to the sample group per specie, per district, per province.

4.5 Research design

Chapter 1 explained that NCT members have, over the past several years, decreased their sales volumes to NCT in hardwood pulpwood. Chapter 1 also explains that NCT members sighted operational issues as a variable causing them to under-supply their volumes of hardwood pulpwood to NCT’s strategic markets.

The intention of this paper is to understand what variables within the operational issues are the root causes, of the under-supply . More specifically what are the root causes, of the failure of the stump-to-mill supply chain.

It is with this in mind that primary research in the form of a questionnaire was conducted amongst the biggest 150 eucalyptus and wattle hardwood pulpwood grower members of NCT Forestry Co-operative Limited.

Eighteen questions relating to the stump-to-mill supply chain were asked, in an effort to determine what the problems are, and if intervention in the stump-to-mill supply chain is needed by NCT.

4.6 Questionnaire design

The questionnaire provided a short introduction to the two major issues sighted by NCT members in two previous studies (Perry, 2006, p. 55) leading to the reasons for their under-supply of hardwood pulpwood. It was also made clear in the introduction that operational issues related to stump-to-mill supply chain issues.

The introduction made it clear that the questionnaire was focused on the stump-to-mill supply chain and the need for NCT to understand the problems its members were experiencing in this environment.

The definitions of “project” and “buyer” were also given to understand the context in which the words were used in the questionnaire. See appendix 6.

A picture of the stump-to-mill supply chain as well as the stakeholders was also provided.

The questionnaire was designed in such a way, as to randomly ask questions related to the stump-to-mill supply chain in different ways to cross-check answers made by the sample group.

The cover letter also stated that the researcher would undertake to supply an executive summary of the research project to all respondents. See appendix 5.

However, not all the questions in the survey were used to answer the research question and objectives.

Questions 1 through to 4: asked respondents to what level they were integrated into the stump-to-mill supply chain, and also required the respondents to rank several variables from 1 to 7 (1 being the biggest reason why they were not forwardly integrated into the stump-to-mill supply chain) The reason for this line of questioning was to:

- a) Determine what level of forward integration the sample group is involved in?
- b) Determine what the sample group's main reasons are for not being forwardly integrated?

Question 5: requested the respondents to indicate by ticking check boxes what level of backward integration they felt was needed from NCT in both eucalyptus and wattle hardwood pulpwood.

The reason for this line of questioning was to:

- a) Determine what level of backward integration from NCT was needed for eucalyptus?
- b) Determine what level of backward integration from NCT was needed for wattle?

Question 6 and 7: requested the respondents to say what their biggest issue with the current stump-to-mill supply was, and what they proposed an ideal solution to be.

The reason for this line of questioning was to:

- a) Determine in the respondents own words what they thought their biggest problem with the stump-to-mill supply chain is.
- b) Determine in the respondents own words what they thought the best solution to be for the stump-to-mill supply chain.

Question 8: requested respondents to answer yes or no to general knowledge about the forestry industry.

The reason for this line of questioning was to:

- a) Determine if the respondents knew of the South Africa's looming general fibre shortage.

- b) Determine if the respondents knew of the current hardwood pulpwood shortage.

Question 9: requested respondents to choose and explain which variable in the stump-to-mill supply chain they thought was more unpredictable; labour or the fuel price.

The reason for this line of questioning was to:

- a) Determine what members considered more unpredictable labour or the fuel price.

Question 10 and 11: requested respondents to choose one of three methods of stump-to-mill supply chain management solutions, which they perceived to deliver a better service and which method they perceived to be more cost effective. The three proposed management solutions were as follows:

- a) The buyer physically owns and controls the harvesting, short haul, loading and long haul (stump-to-mill supply chain) on a project basis?
- b) The buyer contracts with independent contractors to do the harvesting, short haul, loading and long haul (stump-to-mill supply chain), but manages, controls and co-ordinates the work flow by an employed (buyer employed) supply chain manager on a project basis?
- c) The buyer uses an “independent stump-to-mill supply chain management business” to manage, control and co-ordinate independent contractors in the stump-to-mill supply chain on a project basis?

The reason for this line of questioning was to:

- a) Determine which method do members perceive will deliver a better service?
- b) Determine which method do members perceive will be more cost effective?

Question 12: requested respondents to tick yes or no as to whether they would like a full or partial stump-to-mill solution for both eucalyptus and wattle if offered to them by NCT and explain their selections.

The reason for this line of questioning was to:

- a) Cross-check the sample group’s answer with question 1 and question 5.
- b) Understand their need.

Question 13 and 14: requested respondents to rank 1 to 4 with 1 being their most preferred choice of point of sale, combined with reasons for their selections. The points of sale options were as follows:

- Mill Gate
- Farm/Estate Depot
- Compartment Road Side
- Standing

The reason for this line of questioning was to:

- a) Determine which point of sale the sample group prefers.
- b) Cross-check the sample groups selection with questions 1, 5 and 12.
- c) Understand their need.

Question 15: (Given: Optimum market related prices, and their choice in the unit of measure)

The question requested respondents to answer yes or no as to whether they would be more inclined to sell their hardwood pulpwood to a buyer who offered flexible point of sale options?

The reason for this line of questioning was to:

- a) Determine if flexible point of sale opportunities by NCT would cause the sample group to supply NCT?

Question 16: (Given: Optimum market related prices, and their choice in the unit of measure)

The question requested respondents to answer yes or no as to whether they would be more inclined to sell their hardwood pulpwood to a buyer who offered a “partial” or “complete” stump-to-mill solution?.

The reason for this line of questioning was to:

- a) Determine if the sample group was inclined to sell their hardwood pulpwood to NCT if NCT offered a “partial” or “complete” stump-to-mill solution?
- b) Cross-check the respondent’s answer with question 15.

Question 17: requested the respondents to answer yes or no and explain their selection to the question of. Would you be prepared to pay a premium for a stump-to-mill solution?

The reason for this line of questioning was to:

- a) Determine if respondents would be prepared to pay a premium for a stump-to-mill supply chain solution from NCT.

Question 18: requested respondents to differentiate a “good” contractor from a “bad” contractor and explain.

The reason for this line of questioning was to:

- a) Determine what respondents considered a good contractor from a bad contractor.

4.7 Sample design

A sample of 150 NCT members out of 2034 total NCT members were chosen, equating to a 12% sample size of the population.

The sample group was originally extracted from NCT’s membership database in the form of a report. The required report was produced by defining the annual supply potential (ASP) in descending order per district for eucalyptus and wattle as a sorting characteristic in NCT’s searchable oracle database.

From the report an excel database was drawn up of the members and arranged in descending order of their annual supply potential (ASP) for both eucalyptus and wattle per district fulfilling the sample size per district and province.

The excel spreadsheet contained member names, contact details and ASP. This database formed the foundation of the sample group. A summary of the database can be described as follows:

Table 13: Summary of sample population

District	Eucalyptus (NCT members)	Wattle (NCT members)	Total (NCT members)
Greytown	10	10	20
Northern Natal	15	15	30
Southern Natal	32	32	64
Zululand	18	18	36
Total	75	75	150

In order to determine the size of the sample, the following was considered:

Overall, NCT has 2035 shareholding members, of which 1401 members are land owners and the remaining 634 are contractors (Perry, 2006, p. 44). Within NCT, members are subdivided into six district areas. Each district has a district office with staff dedicated to servicing the needs of the members in its district. The six district areas are as follows: (Perry, 2006, p. 45)

- George: Including Reenendal, Knysna and Eastern Cape
- Nelspruit: Including Mpumalanga, Swaziland North, Northern Province
- Greytown : Including Kranskop, Ahrens, Umvoti, Seven Oaks, Stanger, New Guelderland, Lower Tugela
- Northern Natal Including Helpmekaar, Newcastle, Vryheid, Kambule, Utrecht, Louwsberg, Paulpietersberg, Luneberg, Commendale, Piet Retief and Swaziland South
- Southern Natal: Including Tongaat to Port Shepstone on the south coast, to the Drakensberg in the west, and north into the midlands, Mooi River, Karkloof and New Hannover.
- Zululand: Including Melmoth, Eshowe, Nkandla, Babanango, Nongoma and the North Coast.

The province in which this study falls is KwaZulu-Natal and the districts within KwaZulu-Natal are as follows:

- Greytown : Including Kranskop, Ahrens, Umvoti, Seven Oaks, Stanger, New Guelderland, Lower Tugela
- Northern Natal Including Helpmekaar, Newcastle, Vryheid, Kambule, Utrecht, Louwsberg, Paulpietersberg, Luneberg, Commendale, Piet Retief and Swaziland South
- Southern Natal: Including Tongaat to Port Shepstone on the south coast, to the Drakensberg in the west, and north into the midlands, Mooi River, Karkloof and New Hannover.
- Zululand: Including Melmoth, Eshowe, Nkandla, Babanango, Nongoma and the North Coast.

The breakdown of shareholding land owning member per district is as follows:

- | | | |
|--------------------------|---------------------------|----------------------|
| • George: | 31 members or 2% | Western Cape |
| • Greytown: | 160 members or 11% | KwaZulu-Natal |
| • Nelspruit: | 130 members or 9% | Mpumalanga |
| • Northern Natal: | 231 members or 16% | KwaZulu-Natal |
| • Southern Natal: | 547 members or 39% | KwaZulu-Natal |
| • Zululand: | 302 members or 22% | KwaZulu-Natal |
| • Total | 1401 members | |

For the purpose of this study, only shareholding land owning members in KwaZulu-Natal comprised the population sample to be studied.

The breakdown of shareholding land owning members per district in **KwaZulu-Natal** is as follows:

- Greytown: 160 members or 13%
- Northern Natal: 231 members or 19%
- Southern Natal: 547 members or 44%
- Zululand: 302 members or 24%
- **Total: 1240 members or 100%**

The suggested sample size for the study was 150 members, which equates to 12% of the population. The population being 1240 members in KwaZulu Natal. The criteria for selecting the members to participate in this study was based on selecting the members with the largest annual supply potential (ASP) for wattle and eucalyptus, in a given district using a process of selecting a members in descending order of their ASP until the representative sample size for the district was reached. The above ratios where used to determine the number of members per district in the sample.

The selection criteria resulted in a final sample group broken down by district as follows:

- Greytown district members: 20 (13%)
- Northern Natal district members: 30 (19%)
- Southern Natal district members: 64 (44%)
- Zululand district members: 36 (13%)
- **Total number of members in sample group: 150 (100%)**

Further, the sample group per district was divided in two (half wattle and half eucalyptus members) to get equal member representation with regards to wattle and eucalyptus. The final sample group broken down by district and species can be represented as follows:

- Greytown district members: 10 Eucalyptus : 10 Wattle (13%)
- Northern Natal district members: 15 Eucalyptus : 15 Wattle (19%)
- Southern Natal district members: 32 Eucalyptus : 32 Wattle (44%)
- Zululand district members: 18 Eucalyptus : 18 Wattle (13%)
- **Total number of members (sample group): 75 Eucalyptus: 75Wattle (100%)**

4.8 Data collection

Due to the large sample group combined with the wide geographical displacement of the sample group throughout KwaZulu-Natal, combined with a relatively large questionnaire, personal interviews along with telephonic interviews was ruled out.

The researcher provided an excel database of the sample group per district and specie which included the names and contact details of each respondent to an assistant.

The assistant was instructed to e-mail and fax the cover letter and questionnaire to the sample group. This the assistant did using fax and e-mail technology from her NCT computer. All e-mails were attached with a read receipt for monitoring purposes.

The assistant was instructed to e-mail the questionnaire suite to all respondents who had e-mail, and fax the questionnaire suite to those without e-mail. Further, the assistant was instructed to remind the sample group with an e-mail and telephonically to complete their questionnaires one week before the deadline date.

Most respondents returned their completed questionnaires by fax, others posted them back, while a few e-mailed and hand delivered them back to the assistant. By the deadline date on the afternoon of the 28th July 2006, a response of 33%, or 49 responses was achieved.

4.9 Data analysis

All of the results analysed and used in this study except for the questions requesting ranking were represented as percentages. Results were firstly tabulated per district and specie, showing the actual number of responses and then converting the actual number of responses to percentages.

Each response to a question per district and specie was added together, which would also then give a total response for the province. The answers then reflected numbers in a spreadsheet, these results were then represented as percentages for each district and specie and ultimately the province.

4.9.1 Ranking questions relating to the stump-to-mill supply chain

Ranking questions, requested the analysis of four components within the stump-to-mill supply chain these were “harvesting”, “short haul”, “loading” and “long haul” included in this analysis were two species namely eucalyptus and wattle per component per district and province.

Results from the ranking questionnaires related to the stump-to-mill supply chain were tabulated in order of 1 to 7 ascending with variable number 1 representing the variable depicted by the respondents as largest reason for not vertically integrating into the stump-to-mill supply chain.

Together with depicting the variables in ascending order from 1 to 7, each variable was colour coded to use as reference in comparing specie component results to other districts.

For component results depicting the amalgamated answers for both eucalyptus and wattle per district, the raw data per component for eucalyptus and wattle per district was added together and summarised to depict which variables caused NCT members not to forwardly integrate when considering their combined answers for both species.

To reach the provincial summary the same methodology was used, this time taking all the district summaries per component for both species and reaching an overall summary of the province.

4.9.2 Ranking questions relating to the “point of sale”

The ranking question relating to choice in point of sale, was analysed by creating a table depicting the various point of sale options. Answers from each district relating to the two species of eucalyptus and wattle were then added together and concluded in a table depicting a result for both eucalyptus and wattle per district. Tabulated results per district and specie were then calculated to reach a provincial conclusion depicting what NCT members considered their best point of sale choice.

5. Conclusion

The study was conducted using 150 of NCT's largest supplying hardwood pulpwood members. The sample size of 150 members equated to 12% of the KwaZulu-Natal membership population. Of the 150 hardwood pulpwood members selected, half or 75 were the largest eucalyptus supplying members and the other 75 were the largest wattle supplying members.

A questionnaire consisting of eighteen questions was sent to the participants for answering. These questionnaires were accompanied by a covering letter and requested the participant to answer the questions and fax, e-mail or hand deliver the questionnaire back before a certain date.

The questionnaires were e-mailed to those participants with e-mail and faxed to those participants who did not have e-mail.

The survey attracted a 33% response from which to draw the findings and conclusions to the study. Chapter five and six deal with the findings and conclusions respectively.

CHAPTER 5

Findings

5.1 Introduction

The findings from the research conducted are presented in this chapter. Findings specifically relate to achieving the research objectives and are summarised across all four districts, per specie and in some cases per component of the stump-to-mill supply chain, followed by a provincial summary, mostly in tabulated form reflecting percentages.

5.2 Sample profile

The selected sample profile consisted of the largest 150 hardwood pulpwood supplying members of NCT in both eucalyptus and wattle across four districts within the KwaZulu-Natal province. These members were selected on the basis of their annual supply potential (ASP) a theoretical model NCT uses to calculate theoretical volumes to be supplied by its members on a yearly basis. A high ASP indirectly means the member theoretically has a large volume of roundwood to supply for that specific year. This volume could be once off or sustainable depending on area and age class distribution of the member's resource. Members would normally supply the closest geographical highest paying hardwood pulpwood market to their resource. The majority of these NCT strategic markets are clustered around the ports of Richards Bay and Durban. A summary of the sample profile follows:

The following tables represent a summary of the sample profile and feedback received.

Table 14: Summary of the sample profile

Number and percentage of questionnaires sent out to NCT members per district, species and province				
District	Eucalyptus	Wattle	Total	% Per District & Province
Northern Natal	14	14	28	19%
Zululand	19	19	38	25%
Greytown	9	9	18	12%
Southern Natal	33	33	66	44%
Province	75	75	150	100%

Number of spoiled or unanswered questionnaires received: 1

Note: The percentage per district represents the associated membership of the district in relation to the province.

Table 15: Summary of feedback per species per district and province from the population sample

Percentage of questionnaires received back per district per species and province			
District	Eucalyptus	Wattle	Eucalyptus and Wattle
Northern Natal	13%	12%	21%
Zululand	22%	19%	26%
Greytown	17%	15%	44%
Southern Natal	48%	54%	38%
Province	31%	35%	33%

5.3 Summary of findings

The following tables represent a summary of the results obtained from the study, pertinent to the research. Following the summary of the findings, chapter 6 will discuss and conclude the findings relating the objectives of this report.

Table sixteen represents the summary of the extent NCT members are forwardly integrated into the stump-to-mill supply chain in respect of their eucalyptus hardwood pulpwood.

Table 16: Extent of own operations in the eucalyptus stump-to-mill supply chain per district and province by NCT members

District	Harvesting	Short Haul	Loading	Long Haul
Northern Natal	67%	67%	67%	33%
Zululand	60%	40%	60%	60%
Greytown	100%	100%	100%	50%
Southern Natal	18%	36%	27%	27%
Province	61%	61%	63%	43%

Table seventeen represents the summary of the extent NCT members are forwardly integrated into the stump-to-mill supply chain in respect of their wattle hardwood pulpwood.

Table 17: Extent of own operations in the wattle stump-to-mill supply chain per district and province by NCT members

EXTENT OF OWN OPERATIONS IN WATTLE IN KWA-ZULU NATAL				
District	Harvesting	Short Haul	Loading	Long Haul
Northern Natal	67%	67%	67%	33%
Zululand	80%	100%	80%	60%
Greytown	50%	50%	50%	25%
Southern Natal	36%	64%	71%	7%
Province	58%	70%	67%	31%

Table eighteen represents the summary of the extent NCT members are forwardly integrated into the stump-to-mill supply chain in respect of their eucalyptus and wattle hardwood pulpwood.

Table 18: Extent of own operations in eucalyptus and wattle stump-to-mill supply chain per district and province by NCT members

EXTENT OF OWN OPERATIONS IN EUCALYPTUS AND WATTLE IN KWA-ZULU NATAL				
District	Harvesting	Short Haul	Loading	Long Haul
Northern Natal	67%	67%	67%	33%
Zululand	70%	70%	70%	60%
Greytown	75%	75%	75%	38%
Southern Natal	27%	50%	49%	17%
Province	60%	65%	65%	37%

The findings conclude that NCT members overall are more forwardly integrated into their wattle hardwood pulpwood than they are towards their eucalyptus hardwood pulpwood. However, they are less involved with wattle harvesting than they are with eucalyptus harvesting. But more involved with wattle short haul and loading than with their eucalyptus.

Further NCT members in KwaZulu-Natal are more forwardly integrated into their eucalyptus long haul than they are in their wattle long haul.

Overall, NCT members in KwaZulu Natal are over sixty percent forwardly integrated into the stump to mill supply chain with regards to harvesting, short haul and loading and 37% forwardly integrated into long haul.

Table 19 displays the summary of what NCT members chose as their biggest reason for not wanting to forwardly integrate into the stump-to-mill supply chain with regards to eucalyptus hardwood pulpwood within the four districts. Each variable is color coded for ease of comparing.

Table 20 displays the summary of what NCT members chose as their biggest reason for not wanting to forwardly integrate into the stump-to-mill supply chain with regards to wattle hardwood pulpwood within the four districts. Each variable is color coded for ease of comparing.

Table 21 displays the summary of what NCT members chose as their biggest reason for not wanting to forwardly integrate into the stump-to-mill supply chain with regards to eucalyptus and wattle hardwood pulpwood within the four districts. Each variable is color coded for ease of comparing.

Table 19: Reasons why NCT members are not integrated into the stump-to-mill supply chain for eucalyptus in the various districts

NORTHERN NATAL		ZULULAND		GREYTON		SOUTHERN NATAL	
HARVESTING		HARVESTING		HARVESTING		HARVESTING	
Ranking	Main reason for no forward integration by NCT members	Ranking	Main reason for no forward integration by NCT members	Ranking	Main reason for no forward integration by NCT members	Ranking	Main reason for no forward integration by NCT members
1	Laborer availability	1	Enough readily available contractors (cost effective alternatives)	1	Proximity of scale	1	Proximity of scale
2	Laborer turnover absenteeism (incl. HIV/AIDS)	2	Laborer availability	2	Laborer turnover absenteeism (incl. HIV/AIDS)	2	Laborer turnover absenteeism (incl. HIV/AIDS)
3	Proximity of scale	3	Laborer turnover absenteeism (incl. HIV/AIDS)	3	Laborer availability	3	Laborer turnover absenteeism (incl. HIV/AIDS)
4	Technical expertise	4	Proximity of scale	4	Technical expertise	4	Technical expertise
5	Finance	5	Technical expertise	5	Enough readily available contractors (cost effective alternatives)	5	Enough readily available contractors (cost effective alternatives)
6	Enough readily available contractors (cost effective alternatives)	6	Finance	6	Finance	6	Finance
Other		Other		Other		Other	
NORTHERN NATAL		ZULULAND		GREYTON		SOUTHERN NATAL	
SHORT HAUL		SHORT HAUL		SHORT HAUL		SHORT HAUL	
Ranking	Main reason for no forward integration by NCT members	Ranking	Main reason for no forward integration by NCT members	Ranking	Main reason for no forward integration by NCT members	Ranking	Main reason for no forward integration by NCT members
1	Laborer availability	1	Laborer turnover absenteeism (incl. HIV/AIDS)	1	Proximity of scale	1	Laborer availability
2	Laborer turnover absenteeism (incl. HIV/AIDS)	2	Laborer availability	2	Laborer turnover absenteeism (incl. HIV/AIDS)	2	Laborer turnover absenteeism (incl. HIV/AIDS)
3	Proximity of scale	3	Enough readily available contractors (cost effective alternatives)	3	Laborer availability	3	Enough readily available contractors (cost effective alternatives)
4	Technical expertise	4	Proximity of scale	4	Technical expertise	4	Proximity of scale
5	Finance	5	Finance	5	Enough readily available contractors (cost effective alternatives)	5	Other
6	Enough readily available contractors (cost effective alternatives)	6	Technical expertise	6	Finance	6	Technical expertise
Other		Other		Other		Other	Finance
NORTHERN NATAL		ZULULAND		GREYTON		SOUTHERN NATAL	
LOADING		LOADING		LOADING		LOADING	
Ranking	Main reason for no forward integration by NCT members	Ranking	Main reason for no forward integration by NCT members	Ranking	Main reason for no forward integration by NCT members	Ranking	Main reason for no forward integration by NCT members
1	Laborer availability	1	Enough readily available contractors (cost effective alternatives)	1	Proximity of scale	1	Laborer availability
2	Laborer turnover absenteeism (incl. HIV/AIDS)	2	Laborer turnover absenteeism (incl. HIV/AIDS)	2	Laborer turnover absenteeism (incl. HIV/AIDS)	2	Laborer turnover absenteeism (incl. HIV/AIDS)
3	Proximity of scale	3	Laborer availability	3	Laborer availability	3	Enough readily available contractors (cost effective alternatives)
4	Technical expertise	4	Technical expertise	4	Technical expertise	4	Proximity of scale
5	Finance	5	Proximity of scale	5	Enough readily available contractors (cost effective alternatives)	5	Technical expertise
6	Enough readily available contractors (cost effective alternatives)	6	Finance	6	Finance	6	Finance
Other		Other		Other		Other	Other
NORTHERN NATAL		ZULULAND		GREYTON		SOUTHERN NATAL	
LONG HAUL		LONG HAUL		LONG HAUL		LONG HAUL	
Ranking	Main reason for no forward integration by NCT members	Ranking	Main reason for no forward integration by NCT members	Ranking	Main reason for no forward integration by NCT members	Ranking	Main reason for no forward integration by NCT members
1	Proximity of scale	1	Finance	1	Proximity of scale	1	Proximity of scale
2	Laborer availability	2	Enough readily available contractors (cost effective alternatives)	2	Laborer turnover absenteeism (incl. HIV/AIDS)	2	Laborer availability
3	Laborer turnover absenteeism (incl. HIV/AIDS)	3	Technical expertise	3	Laborer availability	3	Laborer turnover absenteeism (incl. HIV/AIDS)
4	Technical expertise	4	Proximity of scale	4	Enough readily available contractors (cost effective alternatives)	4	Technical expertise
5	Finance	5	Laborer turnover absenteeism (incl. HIV/AIDS)	5	Finance	5	Finance
6	Enough readily available contractors (cost effective alternatives)	6	Laborer availability	6	Other	6	Other

Table 20: Reasons why NCT members are not integrated into the stump-to-mill supply chain for wattle in the various districts

NORTHERN NATAL		ZULULAND		GREYTON		NORTHERN NATAL	
WATTLE		WATTLE		WATTLE		WATTLE	
HARVESTING		HARVESTING		HARVESTING		HARVESTING	
Ranking	Main reason for no forward integration by NCT members	Ranking	Main reason for no forward integration by NCT members	Ranking	Main reason for no forward integration by NCT members	Ranking	Main reason for no forward integration by NCT members
1	Enough readily available contractors (cost effective alternatives)	1	Labour turnover/absenteeism (incl. HIV/AIDS)	1	Enough readily available contractors (cost effective alternatives)	1	Labour turnover/absenteeism (incl. HIV/AIDS)
2	Economies of scale	2	Labour availability	2	Economies of scale	2	Labour availability
3	Finance	3	Technical expertise	3	Labour turnover/absenteeism (incl. HIV/AIDS)	3	Labour turnover/absenteeism (incl. HIV/AIDS)
4	Technical expertise	4	Economies of scale	4	Labour availability	4	Economies of scale
5	Labour turnover/absenteeism (incl. HIV/AIDS)	5	Enough readily available contractors (cost effective alternatives)	5	Enough readily available contractors (cost effective alternatives)	5	Finance
6	Labour availability	6	Finance	6	Finance	6	Technical expertise
Other		Other		Other		Other	
NORTHERN NATAL		ZULULAND		GREYTON		NORTHERN NATAL	
WATTLE		WATTLE		WATTLE		WATTLE	
SHORT HAUL		SHORT HAUL		SHORT HAUL		SHORT HAUL	
Ranking	Main reason for no forward integration by NCT members	Ranking	Main reason for no forward integration by NCT members	Ranking	Main reason for no forward integration by NCT members	Ranking	Main reason for no forward integration by NCT members
1	Technical expertise	1	Economies of scale	1	Economies of scale	1	Labour turnover/absenteeism (incl. HIV/AIDS)
2	Economies of scale	2	Labour turnover/absenteeism (incl. HIV/AIDS)	2	Labour turnover/absenteeism (incl. HIV/AIDS)	2	Enough readily available contractors (cost effective alternatives)
3	Enough readily available contractors (cost effective alternatives)	3	Labour availability	3	Labour turnover/absenteeism (incl. HIV/AIDS)	3	Labour turnover/absenteeism (incl. HIV/AIDS)
4	Finance	4	Technical expertise	4	Labour availability	4	Economies of scale
5	Labour availability	5	Enough readily available contractors (cost effective alternatives)	5	Enough readily available contractors (cost effective alternatives)	5	Finance
6	Labour turnover/absenteeism (incl. HIV/AIDS)	6	Finance	6	Finance	6	Other
Other		Other		Other		Other	
NORTHERN NATAL		ZULULAND		GREYTON		NORTHERN NATAL	
WATTLE		WATTLE		WATTLE		WATTLE	
LOADING		LOADING		LOADING		LOADING	
Ranking	Main reason for no forward integration by NCT members	Ranking	Main reason for no forward integration by NCT members	Ranking	Main reason for no forward integration by NCT members	Ranking	Main reason for no forward integration by NCT members
1	Technical expertise	1	Economies of scale	1	Economies of scale	1	Labour turnover/absenteeism (incl. HIV/AIDS)
2	Economies of scale	2	Finance	2	Labour turnover/absenteeism (incl. HIV/AIDS)	2	Labour turnover/absenteeism (incl. HIV/AIDS)
3	Enough readily available contractors (cost effective alternatives)	3	Labour availability	3	Labour turnover/absenteeism (incl. HIV/AIDS)	3	Economies of scale
4	Finance	4	Labour turnover/absenteeism (incl. HIV/AIDS)	4	Technical expertise	4	Finance
5	Labour turnover/absenteeism (incl. HIV/AIDS)	5	Technical expertise	5	Enough readily available contractors (cost effective alternatives)	5	Other
6	Labour turnover/absenteeism (incl. HIV/AIDS)	6	Enough readily available contractors (cost effective alternatives)	6	Finance	6	Technical expertise
Other		Other		Other		Other	
NORTHERN NATAL		ZULULAND		GREYTON		NORTHERN NATAL	
WATTLE		WATTLE		WATTLE		WATTLE	
LONG HAUL		LONG HAUL		LONG HAUL		LONG HAUL	
Ranking	Main reason for no forward integration by NCT members	Ranking	Main reason for no forward integration by NCT members	Ranking	Main reason for no forward integration by NCT members	Ranking	Main reason for no forward integration by NCT members
1	Labour turnover/absenteeism (incl. HIV/AIDS)	1	Economies of scale	1	Economies of scale	1	Economies of scale
2	Labour availability	2	Enough readily available contractors (cost effective alternatives)	2	Labour turnover/absenteeism (incl. HIV/AIDS)	2	Labour turnover/absenteeism (incl. HIV/AIDS)
3	Technical expertise	3	Technical expertise	3	Enough readily available contractors (cost effective alternatives)	3	Labour turnover/absenteeism (incl. HIV/AIDS)
4	Economies of scale	4	Finance	4	Labour availability	4	Labour turnover/absenteeism (incl. HIV/AIDS)
5	Finance	5	Labour turnover/absenteeism (incl. HIV/AIDS)	5	Enough readily available contractors (cost effective alternatives)	5	Finance
6	Enough readily available contractors (cost effective alternatives)	6	Other	6	Other	6	Technical expertise
Other		Other		Other		Other	

Table 21: Reasons why NCT members are not integrated into the stump-to-mill supply chain for both eucalyptus and wattle in the various districts

[illegible]

In summary, Northern Natal sighted the following three main reasons for not forwardly integrating into the stump-to-mill supply chain:

1. Economies of scale
2. Labour availability
3. Labour turnover and absenteeism (Incl. HIV and Aids)

In summary, Zululand sighted the following three main reasons for not forwardly integrating into the stump-to-mill supply chain:

1. Labour turnover and absenteeism (Incl. HIV and Aids)
2. Labour availability
3. Economies of scale

In summary, Greytown sighted the following three main reasons for not forwardly integrating into the stump-to-mill supply chain:

1. Economies of scale
2. Labour turnover and absenteeism (Incl. HIV and Aids)
3. Labour availability

In summary, Southern Natal sighted the following three main reasons for not forwardly integrating into the stump-to-mill supply chain:

1. Labour availability
2. Labour turnover and absenteeism (Incl. HIV and Aids)
3. Economies of scale

In summary, for KwaZulu Natal, the following three main reasons were sighted by participants for both eucalyptus and wattle for not forwardly integrating themselves into the stump-to-mill supply chain.

1. Labour availability
2. Labour turnover and absenteeism (Incl. HIV and Aids)
3. Economies of scale

Table 22 on the next page summarises these facts.

Table 22: Reasons why NCT members are not integrated into the stump-to-mill supply chain for both eucalyptus and wattle in KwaZulu-Natal

KWA-ZULU NATAL PROVINCE EUCALYPTUS AND WATTLE		KWA-ZULU NATAL PROVINCE EUCALYPTUS AND WATTLE	
HARVESTING		HARVESTING	
Ranking	Main reason for no forward integration by NCT members		Main reason for "other"
1	Labour availability	1	Shortage of labour
2	Labour turnover/absenteeism (incl. HIV/AIDS)	2	De-barking a problem, need mechanical de-barking, don't have economies of scale to purchase machine. NCT must provide mechanised harvesting
3	Economies of scale	3	Contractor provides harvesting, short haul and loading
4	Enough readily available contractors - cost effective alternatives	4	Perm labour (minimum wage) more expensive than maximum wage in contracting
	Other	5	Housing labour problematic
6	Finance	6	Transporting labour problematic
7	Technical expertise	-	Steep terrain, need specialised equipment

KWA-ZULU NATAL PROVINCE EUCALYPTUS AND WATTLE		KWA-ZULU NATAL PROVINCE EUCALYPTUS AND WATTLE	
SHORT HAUL		SHORT HAUL	
Ranking	Main reason for no forward integration by NCT members		Main reason for "other"
1	Labour availability	1	Let contractor do short haul
2	Enough readily available contractors - cost effective alternatives	2	If contractor does not do short haul he will not do harvesting
3	Labour turnover/absenteeism (incl. HIV/AIDS)	3	
4	Economies of scale	4	
5	Finance	5	
6	Technical expertise	6	
	Other	-	

KWA-ZULU NATAL PROVINCE EUCALYPTUS AND WATTLE		KWA-ZULU NATAL PROVINCE EUCALYPTUS AND WATTLE	
LOADING		LOADING	
Ranking	Main reason for no forward integration by NCT members		Main reason for "other"
1	Labour availability	1	Let contractor do loading
2	Labour turnover/absenteeism (incl. HIV/AIDS)	2	If contractor does not do loading he will not do short haul
3	Economies of scale	3	
4	Technical expertise	4	
4	Finance	5	
5	Enough readily available contractors - cost effective alternatives	6	
	Other	-	

KWA-ZULU NATAL PROVINCE EUCALYPTUS AND WATTLE		KWA-ZULU NATAL PROVINCE EUCALYPTUS AND WATTLE	
LONG HAUL		LONG HAUL	
Ranking	Main reason for no forward integration by NCT members		Main reason for "other"
1	Economies of scale	1	
2	Labour availability	2	
3	Enough readily available contractors - cost effective alternatives	3	
4	Labour turnover/absenteeism (incl. HIV/AIDS)	4	
5	Finance	5	
6	Technical expertise	6	
	Other	-	

Table 23 represents the percentage of members who request intervention in the stump-to-mill supply chain.

Table 23 represents the percentage of members who request intervention in the stump-to-mill supply chain.

Table 23: Request for buyer intervention in the stump-to-mill supply chain by NCT members

Intervention Required	% YES	% NO
Requested buyer intervention in the stump-to-mill supply chain by NCT members	81%	19%

This table is testament to the need for NCT to intervene in the stump-to-mill supply chain.

Table 24 differentiates the need for partial or complete stump-to-mill supply chain intervention by NCT from its members.

Table 24: Results of partial or complete stump-to-mill supply chain intervention requested by NCT members

District	% PARTIAL	% COMPLETE
Northern Natal	50%	50%
Zuhuland	60%	40%
Greytown	50%	50%
Southern Natal	30%	70%
Province	48%	52%

WATTLE		
District	% PARTIAL	% COMPLETE
Northern Natal	40%	60%
Zuhuland	43%	57%
Greytown	50%	50%
Southern Natal	29%	71%
Province	40%	60%

COMBINED EUCALYPTUS AND WATTLE		
District	% PARTIAL	% COMPLETE
Northern Natal	45%	55%
Zuhuland	51%	49%
Greytown	50%	50%
Southern Natal	29%	71%
Province	44%	56%

The findings determine that although overall 81% of NCT members said they would like intervention in the stump-to-mill supply chain by NCT. It is found that 56% would like a “complete” stump-to-mill intervention while 44% would like a partial stump-to-mill intervention.

The fact that 44% would like a partial solution would be due to their need of still using their own equipment in the supply chain where necessary.

Further the study offered three methods of intervention by a buyer, table 26 describes these three suggested methods and table 27 defines which methods the participants chose in their understanding would deliver the best service at the cheapest cost.

Table 25: Three types of methods to control the stump-to-mill supply chain

Method	Description of Method
A	The buyer physically owns and controls the harvesting, short haul, loading and long haul (stump-to-mill supply chain) on a project basis. (Backward vertical integration)
B	The buyer contracts with independent contractors to do the harvesting, short haul, loading and long haul (stump-to-mill supply chain), but manages, controls and co-ordinates the work flow by an employed (buyer employed) supply chain manager on a project basis. (Out sourcing)
C	The buyer uses an “ independent stump-to-mill supply chain management business ” to manage, control and co-ordinate independent contractors in the stump-to-mill supply chain on a project basis. (Keiretsu)

Table 26: Method selected by NCT members, perceived to give a better service and be more cost effective in the management of the stump-to-mill supply chain

District	METHOD		
	A	B	C
Northern Natal	33%	17%	50%
Zululand	20%	50%	30%
Greytown	38%	25%	38%
Southern Natal	36%	40%	24%
Province	32%	33%	35%

COST EFFECTIVE			
District	METHOD		
	A	B	C
Northern Natal	33%	17%	50%
Zululand	30%	20%	50%
Greytown	50%	25%	25%
Southern Natal	24%	48%	28%
Province	34%	27%	38%

COMBINED SELECTION FOR SERVICE AND COST EFFECTIVENESS			
District	METHOD		
	A	B	C
Northern Natal	33%	17%	50%
Zululand	25%	35%	40%
Greytown	44%	25%	31%
Southern Natal	30%	44%	26%
Province	33%	30%	37%

The findings determine that overall method C which is defined as follows: The buyer uses an **“independent stump-to-mill supply chain management business”** to manage, control and co-ordinate independent contractors in the stump-to-mill supply chain on a project basis, was chosen as the method which participants chose as the method which will deliver the best service at the best rate. The survey then found that method A followed by method B were then chosen. These findings will be discussed in more detail in the next chapter.

Table 27, investigates the respondents' choice to the question of flexibility with regards to the point of sale offered by a buyer in conjunction with a partial or complete stump-to-mill supply chain.

Table 27: The influence, “point of sale flexibility” and “complete” or “partial” intervention has on hardwood pulpwood supply

WILL NCT MEMBERS BE MORE INCLINED TO SELL THEIR HARDWOOD PULPWOOD TO A MARKET WHICH OFFERS FLEXIBLE POINT OF SALE OPTIONS OR A PARTIAL OR COMPLETE STUMP-TO-MILL SOLUTION?					
District	POINT OF SALE		STUMP TO MILL		
	FLEXIBLE	NOT FLEXIBLE	COMPLETE	PARTIAL	
	YES	NO	YES	NO	
Northern Natal	83%	17%	83%	17%	
Zululand	80%	20%	80%	20%	
Greytown	88%	13%	88%	13%	
Southern Natal	60%	40%	80%	20%	
Average Total	78%	22%	83%	17%	

The findings become clear that NCT members would be more inclined to sell their hardwood pulpwood to a buyer who offered flexible point of sale options in combination with offering a complete stump-to-mill service. Point of sale flexibility can only be offered by a buyer if the buyer is confident in managing the supply chain post the point of sale. This question drew a response of 83% from the participants in favour of a complete stump-to-mill service, which is contrary to their previous request of 56% for complete intervention in the stump-to-mill supply chain. The 83% can be defended by the fact that it would be given that a market who offered a flexible point of sale option would be integrated into the stump-to-mill supply chain and provide the additional service.

Table 28 defines which points of sale were found to be most liked by the participants.

Table 28: Preferred “point of sale” by NCT members

KWA-ZULU NATAL PROVINCE	
PREFERRED POINT OF SALE BY SAMPLE GROUP	
POS	Ranking
Mill Gate	
Farm / Estate Depot	
Compartment Road Side	
Standing	
KWA-ZULU NATAL PROVINCE	
WATTLE	
PREFERRED POINT OF SALE BY SAMPLE GROUP	
POS	Ranking
Mill Gate	1
Farm / Estate Depot	3
Compartment Road Side	4
Standing	2
KWA-ZULU NATAL PROVINCE	
EUCALYPTUS AND WATTLE	
PREFERRED POINT OF SALE BY SAMPLE GROUP	
POS	Ranking
Mill Gate	2
Farm / Estate Depot	3
Compartment Road Side	4
Standing	1

Note: No 1 represents the most desired point of sale, while no 4 represents the least desired point of sale.

It was found that NCT members still prefer selling both their eucalyptus and wattle hardwood pulpwood at the mill gate over a weighbridge. However, the summary of whole data set which includes all four districts show that the participants overall rate “standing” as a point of sale as the preferred choice. Overall, in the summary for KwaZulu Natal, standing, followed by mill gate, then depot, and lastly road side, was chosen as the proffered points of sale for their hardwood pulpwood.

5.4 Conclusion

The findings generally conclude that the sample profile is substantially forwardly integrated into the stump-to-mill supply chain. The extent of forward integration by the sample group was measured at over 60% in the harvesting, short haul and loading components of the stump-to-mill supply chain. Further, the findings conclude that the sample group is approximately 37% forwardly integrated into the long haul component of the stump-to-mill supply chain.

The findings also conclude that 81% of the sample group said they want intervention by NCT in the stump-to-mill supply chain. However, the findings also define that 56% would like a complete stump-to-mill solution, while 46% said they would like intervention to be partial.

Importantly the findings conclude that 78% of the sample group would be prepared to sell their hardwood pulpwood to a buyer who offered a complete stump-to-mill supply chain solution.

The sample group also chose a “standing sale” as their first choice as a point of sale. This by default forces the buyer into providing a stump-to-mill solution.

The findings also conclude that the sample group are not prepared to forwardly integrate for the following three biggest reasons:

1. Labour availability
2. Labour turnover and absenteeism (Incl. HIV and Aids)
3. Economies of scale

Further, the findings conclude that the sample group chose keiretsu then backward vertical integration and then out sourcing as the most preferred method of intervention by NCT.

CHAPTER 6

Discussion and Conclusions

6.1 Introduction

This chapter discusses and concludes the findings of the report with regards the objectives as set out in the beginning of the report. Each objective is explained, the findings are discussed in combination with a conclusion at the end of the chapter.

6.2 Discussion

Each objective is firstly explained in inverted commas, followed by an explanation of the table and then followed by a discussion of the findings represented in the table answering the research objective.

6.2.1 Objective Number 1:

“Quantify the extent of forward integration into the stump-to-mill supply chain by the sample group per specie, per district and province”. The following table graphically represents the extent to which the recipients are forwardly integrated into the stump-to-mill supply chain.

Table 29: Extent of forward integration by the sample group per species per district and province

District	Harvesting	Short Haul	Loading	Long Haul
Northern Natal	67%	67%	67%	33%
Zululand	60%	40%	60%	60%
Greytown	100%	100%	100%	50%
Southern Natal	18%	36%	27%	27%
Province	61%	61%	63%	43%

EXTENT OF OWN OPERATIONS IN WATTLE IN KWA-ZULU NATAL

District	Harvesting	Short Haul	Loading	Long Haul
Northern Natal	67%	67%	67%	33%
Zululand	80%	100%	80%	60%
Greytown	50%	50%	50%	25%
Southern Natal	36%	64%	71%	7%
Province	58%	70%	67%	31%

EXTENT OF OWN OPERATIONS IN EUCALYPTUS AND WATTLE IN KWA-ZULU NATAL

District	Harvesting	Short Haul	Loading	Long Haul
Northern Natal	67%	67%	67%	33%
Zululand	70%	70%	70%	60%
Greytown	75%	75%	75%	38%
Southern Natal	27%	50%	49%	17%
Province	60%	65%	65%	37%

The results confirm that currently the sample group is on average 62% forwardly integrated into the harvesting, short haul and loading and 43% integrated with long haul transport **with regards to eucalyptus** in the stump-to-mill supply chain.

The results confirm that currently the sample group is on average 65% forwardly integrated into the harvesting, short haul and loading and 31% integrated with long haul transport **with regards to wattle** in the stump-to-mill supply chain.

The results further confirm that currently the sample group is on average 63% forwardly integrated into the stump-to-mill supply chain with regards to harvesting, short haul and loading and only 37% integrated with long haul transport across **both eucalyptus and wattle**.

The explanation to why wattle has an increase in forward integration over eucalyptus with regards to harvesting, short haul and loading may be due to the fact that the wattle bark season runs from October to May, which is predominantly the summer months that coincides with the best stripping months for wattle pulpwood. Wattle harvesting is therefore more seasonal than eucalyptus due to bark sales, which also coincides with the off season for cane. Farmers will use their cane work force to do their wattle harvesting etc. Hence the higher integration for wattle.

The forward integration for long haul is on average 37% which means this is the lowest area of forward integration by the sample group. The main reason for this is, lack of economies of scale combined with driver availability and enough readably available long haul contractors.

6.2.2 Objective Number 2:

“Quantify which variables cause the sample group not to forwardly integrate into the stump-to-mill supply chain for the KwaZulu-Natal province”. The following table illustrates the main reasons why NCT members are not willing to forwardly integrate themselves into the stump-to-mill supply chain. Variables are color coded to make an easy comparison of ranking between the stump-to-mill components of harvesting, short haul, loading and long haul.

Table 30: Reasons for sample group not to forwardly integrate into the stump-to-mill supply chain

KWA-ZULU NATAL PROVINCE		KWA-ZULU NATAL PROVINCE	
EUCALYPTUS AND WATTLE		EUCALYPTUS AND WATTLE	
HARVESTING		HARVESTING	
Ranking	Main reason for no forward integration by NCT members		Main reason for "other"
	Labour availability	1	Shortage of labour
1	Labour turnover/absenteeism (Incl HIV/AIDS)	2	De-barking a problem, need mechanical de-barking, don't have economies of scale to purchase machine. NCT must provide mechanised harvesting
3	Economies of scale	3	Contractor provides harvesting, short haul and loading
4	Enough readily available contractors - cost effective alternatives	4	Farm labour (minimum wage) more expensive than minimum wage in contracting
	Other	5	Housing labour problematic
6	Finance	6	Transporting labour problematic
-	Technical expertise	-	Steep terrain, need specialised equipment
KWA-ZULU NATAL PROVINCE		KWA-ZULU NATAL PROVINCE	
EUCALYPTUS AND WATTLE		EUCALYPTUS AND WATTLE	
SHORT HAUL		SHORT HAUL	
Ranking	Main reason for no forward integration by NCT members		Main reason for "other"
	Labour availability	1	Let contractor do short haul
2	Enough readily available contractors - cost effective alternatives	2	If contractor does not do short haul he will not do harvesting
3	Labour turnover/absenteeism (Incl HIV/AIDS)	3	-
4	Economies of scale	4	-
5	Finance	5	-
6	Technical expertise	6	-
	Other	-	-
KWA-ZULU NATAL PROVINCE		KWA-ZULU NATAL PROVINCE	
EUCALYPTUS AND WATTLE		EUCALYPTUS AND WATTLE	
LOADING		LOADING	
Ranking	Main reason for no forward integration by NCT members		Main reason for "other"
	Labour availability	1	Let contractor do loading
1	Labour turnover/absenteeism (Incl HIV/AIDS)	2	If contractor does not do loading he will not do short haul
3	Economies of scale	3	-
4	Technical expertise	4	-
4	Finance	5	-
5	Enough readily available contractors - cost effective alternatives	6	-
	Other	-	-
KWA-ZULU NATAL PROVINCE		KWA-ZULU NATAL PROVINCE	
EUCALYPTUS AND WATTLE		EUCALYPTUS AND WATTLE	
LONG HAUL		LONG HAUL	
Ranking	Main reason for no forward integration by NCT members		Main reason for "other"
1	Economies of scale	1	-
	Labour availability	2	-
3	Enough readily available contractors - cost effective alternatives	3	-
4	Labour turnover/absenteeism (Incl HIV/AIDS)	4	-
5	Finance	5	-
6	Technical expertise	6	-
	Other	-	-

The following is a summary of the variables extracted from table 30 depicting the reasons for the sample group for not wanting to forwardly integrate themselves into the stump-to-mill supply chain for both eucalyptus and wattle for KwaZulu Natal. The variables can be summarised as follows, in order of 1 to 6 with 1 denoting the largest reason for non forward integration:

1. Labour availability
2. Labour turnover / absenteeism (Incl. HIV / AIDS)
2. Economies of scale
3. Enough readily available contractors / cost effective alternatives
4. Finance
5. Technical expertise
6. Other

Labour problems can be grouped together, which include labour availability and labour turnover / absenteeism (Incl. HIV / AIDS) as the number one factor for non integration. The second biggest factor in combination with labour turnover / absenteeism (Incl. HIV / AIDS) is economies of scale.

Economies of scale as a factor then follows labour problems, which means members are saying they do not have enough volume to warrant integrating into the stump-to-mill supply chain. NCT members then sight that there is then enough contractors available to do the work.

Finance problems followed by technical expertise and then “other” comprised the order of the last three factors influencing NCT members not to forwardly integrate into the stump-to-mill supply chain.

Most prominently is the fact that labour problems are sighted as the biggest reason for not wanting to forwardly integrate into the stump-to-mill supply chain. This means if NCT were to fulfill the members needs by intervention in the stump-to-mill supply chain, it would be highly recommended to move away from manual operations and pursue mechanized forest engineering solutions.

6.2.3 Objective Number 3:

“Quantify the need for intervention in the stump-to-mill supply chain”. This objective was to determine from the participants their needs for intervention in the stump-to-mill supply chain. The following table illustrates this need for intervention.

Table: 31: Intervention in the stump-to-mill supply chain required by the sample group

Intervention Required	% YES	% NO
Requested intervention in the “stump-to-mill supply chain” by NCT members	81%	19%

81% of the sample group requested that intervention in the stump-to-mill supply chain take place by NCT. This indirectly means that NCT members request intervention by NCT or for NCT to increase its scope of services to include the possible ownership, management and co-ordination of the stump-to-mill supply chain for them.

6.2.4 Objective Number 4:

“Quantify the need for intervention in the stump-to-mill supply chain per specie, per district and province”. This objective was to quantify the depth or degree of the need for intervention within the four components of the stump-to-mill supply chain. The following table illustrates and quantifies where intervention has been requested.

Table 32: Quantification for the need of intervention in the stump-to-mill supply chain, per species and province

District	Harvesting	Short Haul	Loading	Long Haul
Northern Natal	33%	33%	33%	33%
Zululand	38%	50%	50%	63%
Greytown	33%	33%	33%	67%
Southern Natal	89%	67%	72%	83%
Province	63%	54%	57%	71%

LEVEL OF STUMP TO MILL INTERVENTION REQUIRED BY NCT FROM NCT MEMBERS IN WATTLE				
District	Harvesting	Short Haul	Loading	Long Haul
Northern Natal	67%	67%	67%	67%
Zululand	38%	13%	13%	38%
Greytown	50%	33%	33%	67%
Southern Natal	83%	61%	72%	78%
Province	66%	46%	51%	66%

LEVEL OF STUMP TO MILL INTERVENTION REQUIRED BY NCT FROM NCT MEMBERS IN EUCLAYPTUC AND WATTLE				
District	Harvesting	Short Haul	Loading	Long Haul
Northern Natal	50%	50%	50%	50%
Zululand	38%	31%	31%	50%
Greytown	42%	33%	33%	67%
Southern Natal	86%	64%	72%	81%
Province	64%	50%	54%	69%

The findings find that approximately 58% of the sample group would like intervention in the harvesting, short haul and loading components of the stump-to-mill supply chain in eucalyptus as apposed to 54% in wattle and 56% for both eucalyptus and wattle.

The findings also determine that the sample group would like 71% long haul intervention in eucalyptus as opposed to 66% for wattle and 69% for both eucalyptus and wattle.

The previous findings detail that approximately 81% of the sample group would like some sort of intervention by the buyer in the “stump-to-mill supply chain”.

However, previous to those findings, the findings detail that approximately 63% of the sample group is forwardly integrated in harvesting, short haul and loading and that on average the sample group is 37% integrated in long haul for both eucalyptus and wattle.

The fact that 81% of the sample group would like intervention in one way or another is contradicted by the findings that 61% of the sample group detailed specific intervention in the stump-to-mill supply chain in eucalyptus and 57% of the sample group detailed specific intervention in the stump-to-mill supply chain in wattle. 59% of the sample group detailed specific intervention in the stump-to-mill supply chain in both eucalyptus and wattle.

Although the findings find that 81% of the sample group would like intervention more realistically, 59% would like intervention because of their own forward integration.

6.2.5 Objective Number 5:

“Quantify which one of the three methods of intervention in the stump-to-mill supply chain is deemed more favourable by the sample group”. Three different methods of intervention were given to the participants to decide which method they felt would deliver the best service at the least cost. Table 33 illustrates which method was favored by the participants. Descriptions of the methods can be found below the table.

Table 33: Method of stump-to-mill control most favored by the sample group

COMBINED SELECTION FOR SERVICE AND COST EFFECTIVENESS			
	METHOD		
Province	A	B	C
Kwa-Zulu Natal	33%	30%	37%

Method “C - Keiretsu” (37%) which includes the following “The buyer uses an **independent stump-to-mill supply chain management business** to manage, control and co-ordinate independent contractors in the stump-to-mill supply chain on a project basis” was selected by the sample group as the first method perceived that would deliver a better service and be more cost effective. This method contains many elements of a keiretsu supply chain management strategy.

The reasoning behind their selection of method “C” as their first choice was as follows:

The core business of the “stump-to-mill supply chain management business” contracted by NCT is to manage and co-ordinate the logistics between the stump-to-mill components, this

focused attention combined with creating competition between independent contractors should achieve a high level of production, economies of scale and therefore drive costs down.

Method “A – Backward vertical integration” (33%) which includes the following “NCT **physically owns and controls** the harvesting, short haul, loading and long haul (stump-to-mill supply chain) on a project basis” was selected by the sample group as the second method perceived that would deliver a better service, and be more of a cost effective way of managing the “stump –to-mill supply chain”. This method contains many elements of a backward vertical integration supply chain management strategy.

The reasoning behind their selection of method “A” as their second choice was as follows:

Backward vertical integration is capital intensive and will not be flexible to differentiate various commodities in the plantation. However, economies of scale should be reached by the good co-ordination of project work by NCT. The supply chain will be geared around hardwood pulpwood and will become intolerant of harvesting poles which has a much higher ROI than pulpwood. The operation will fall under corporate management within a department and will not be part of the organizations core business, therefore it may be neglected and become either very expensive due to inefficiencies or very cheap due to internal subsidies. Subsidies in this operation will lead to false costing models and expenses will be driven up elsewhere by the co-operative to compensate.

Method “B - Outsourcing” (30%) which includes the following “NCT **contracts with independent contractors** to do the harvesting, short haul, loading and long haul (stump-to-mill supply chain), but manages, controls and co-ordinates the work flow by an employed (NCT employed) **supply chain manager** on a project basis”, was selected by the sample group as the third method perceived that would deliver a better service and be more cost effective.

The reasoning behind their selection of method “B” as their third choice was as follows:

Authority and power over the independent stump-to-mill supply chain by the manager will be lacking, as he will more than likely play a co-ordinating role as apposed to a management role. NCT’s employed manager may not offer favourable rates to the contractors therefore the contractors will not bind themselves to work for NCT. The NCT supply chain manager will be

under pressure to “squeeze” rates in the supply chain, the consequences being conflict over rates, disruptive work flow and a stigma attached to NCT as not a good company to work for.

6.2.6 Objective Number 6:

“Quantify if the sample group would be more inclined to trade their hardwood pulpwood to a buyer who offered intervention in the stump-to-mill supply chain”. The results of this objective are illustrated in table 34. This table depicts the recipients request for flexible point of sale options in combination with the need for a complete stump-to-mill supply chain solution.

Table 34: The influence of the level of intervention on hardwood pulpwood supply.

WILL NCT MEMBERS BE MORE INCLIND TO SELL THEIR HARDWOOD PULPWOOD TO A MARKET WHICH OFFERS FLEXIBLE POINT OF SALE OPTIONS OR A PARTIAL OR COMPLETE STUMP-TO-MILL SOLUTION?				
District	POINT OF SALE		STUMP TO MILL	
	FLEXIBLE	NOT FLEXIBLE	COMPLETE	PARTIAL
	YES	NO	YES	NO
Northern Natal	83%	17%	83%	17%
Zululand	80%	20%	80%	20%
Greytown	88%	13%	88%	13%
Southern Natal	60%	40%	80%	20%
Average Total	78%	22%	83%	17%

The findings in this table reflect that 78% of the sample group is more inclined to sell their hardwood pulpwood to a buyer who offers a flexible point of sale option and that 83% of the sample group are inclined to sell their hardwood pulpwood to a buyer who offered a complete “stump-to-mill solution”.

Together 81% of the sample group would be more inclined to sell their hardwood pulpwood to a buyer who offered intervention in the stump-to-mill supply chain. This by default coincides with the percentage of the sample group who said they would like intervention by a buyer in the “stump to mill supply chain” in objective three.

6.2.7 Objective Number 7:

“Quantify which “point of sale” is found most desirable to the sample group per specie, per district and province”. The results for this objective are illustrated in table 35.

Table 35: Preferred point of sale by the sample group.

KWA-ZULU NATAL PROVINCE	
PREFERRED POINT OF SALE BY SAMPLE GROUP	
POS	Ranking
Mill Gate	
Farm / Estate Depot	
Compartment Road Side	
Standing	
KWA-ZULU NATAL PROVINCE	
WATTLE	
PREFERRED POINT OF SALE BY SAMPLE GROUP	
POS	Ranking
Mill Gate	1
Farm / Estate Depot	3
Compartment Road Side	4
Standing	2
KWA-ZULU NATAL PROVINCE	
EUCALYPTUS AND WATTLE	
PREFERRED POINT OF SALE BY SAMPLE GROUP	
POS	Ranking
Mill Gate	2
Farm / Estate Depot	3
Compartment Road Side	4
Standing	1

The findings conclude that the sample group overall preferred a “standing” point of sale than to any other point of sale. The main reasons for their choice were as follows:

- “If fair value is achieved during a standing sale negotiation, this method of trade takes away any ownership, conflict and unforeseen expenses in the stump-to-mill supply chain”
- “This method of trade allows for no management”
- “Simple method of trade, allowing for focus on the core business of growing trees”
- “Forces buyer to control the supply chain”

The second point of sale choice by the sample group was “mill gate” the main reasons for their choice can be described as follows:

- “Mill gate combined with a weighbridge gives accuracy of goods sold”
- “Why change, conventional mill delivered point of sale has always worked”
- “It does force operational management but it is something we are used to”
- “Accuracy”
- “If buyer controls the stump-to-mill supply chain, pulpwood will go over the weighbridge very dry”
- “Control”

The third point of sale choice by the sample group was “off depot” the main reasons for their choice can be described as follows:

- “Slightly more management than standing and road side point of sale, but forces the buyer to integrate into long haul”
- “Can use my own harvesting and short haul and leave the long haul to the buyer”
- “Allows me flexibility with regards to own ops and gives me more control”

The fourth point of sale choice by the sample group was “road side” the main reason for their choice can be described as follows:

- “Un-accurate”
- “Control of short haul and long haul will be for the buyer and may not be managed well”
- “Lack of control”

6.3 Conclusion

The objectives of this report all centered around quantifying the need and the extent of the need expressed by NCT members for intervention in the stump-to-mill supply chain. The findings prove that intervention in the stump-to-mill supply chain by NCT is needed by its members. The following is a summary, diagnosing the key findings:

- 63% of the sample group is forwardly integrated into the stump-to-mill supply chain with regards to harvesting, short haul and loading from a provincial perspective.
- 37% of the sample group is forwardly integrated into the stump-to-mill supply chain with regards to long haul from a provincial perspective.
- 56% of the sample group would like intervention in stump-to-mill supply chain with regards to harvesting, short haul and loading from a provincial perspective by NCT.
- 69% of the sample group would like intervention in stump-to-mill supply chain with regards to long haul from a provincial perspective by NCT.
- 81% of the sample group said they would like intervention in any form by NCT in the stump-to-mill supply chain.
- The major factors leading to the sample group for not forwardly integrating are the following in order of the factor that contributes the most:
 1. Labour availability
 2. Labour turnover / absenteeism
 2. Economies of scale
 3. Enough readily available contractors / cost effective alternatives
 4. Finance
 5. Technical expertise
 6. Other
- 81% of the sample group said they were inclined to sell their hardwood pulpwood to a buyer who offered either, flexible point of sale options or a complete stump-to-mill supply chain solution.
- 37% of the sample population chose an independent business contracted by a buyer to manage independent contractors within the stump-to-mill supply chain as a method of intervention. This method of intervention leans heavily towards the strategy of “keiretsu”
- 33% of the sample population chose that the buyer vertically integrates itself into the stump-to-mill supply chain as a method of intervention. This method of intervention relates to the strategy of backward vertical integration.

- 30% of the sample population chose that a buyer employs a supply chain manager to manage and co-ordinate independent contractors within the stump-to-mill supply chain on a project by project basis. This approach relates to the strategy of outsourcing.
- The sample group chose the following point of sale options as their preference in the trade of their hardwood pulpwood.
 - Standing
 - Mill gate
 - Depot
 - Roadside

It is clear that after analysing the data and diagnosing the findings that stump-to-mill intervention is a need that has to be satisfied by NCT for its members. However, NCT members are not experts in supply chain management and therefore even though they were asked which of three methods they would like NCT to use in the intervention process of the stump-to-mill supply chain, their answers favored a keiretsu strategy as well as a backward vertical integration strategy.

More importantly, the findings convey that members would like more intervention across all components of the stump-to-mill supply chain. Certain members also want to participate in the stump-to-mill supply chain to various degrees. NCT members would much prefer a full stump-to-mill solution to being offered a partial stump-to-mill solution.

NCT members are also much more inclined to sell their hardwood pulpwood resource to a market who offers a complete stump-to-mill solution.

However, it is also clear that if NCT wants to keep its members happy and loyal, NCT has to satisfy their needs. Monezka's (1998, p.14) observes that firms interested in supply chain management want to use it for increased customer satisfaction and enhanced competitive positioning.

Tom Peters (1998, p.31) adds, "Being an excellent company is no longer sufficient – success in the future will require that a firm be a valued member of a successful value chain"

Gallant, (1998, p.19) further states that supply chain management, with its emphasis on involvement in the complete supply chain from conception to end use, could achieve savings between 15 percent to 40 percent.

Miller, (1998, p.38) further states that since effective SCM is designed to help organizations become leaner and more competitive by managing the flow of materials and services more efficiently and eliminating any non-value or repetitive activities from the supply chain, it should be considered a workable business process for any business.

The findings are proof that stump-to-mill intervention by NCT is needed. Research into the theory of supply chain management from chapter 2 indicates that the adoption of supply chain management as a strategy by NCT specific to the stump-to-mill supply chain is necessary in rolling out an effective hardwood pulpwood procurement programme.

Further both backward vertical integration and keiretsu as supply chain management strategies perfectly fit the stump-to-mill supply chain intervention profile.

NCT needs to consider adopting the concept of supply chain management in combination with the strategies of both backward vertical integration and keiretsu.

CHAPTER 7

Recommendations

7.1 Introduction

The recommendations prescribed to NCT in this chapter relate to several issues which were covered in this report. However, all the issues have some bearing on the stump-to-mill supply chain and all impact and need for a supply chain management strategy within the scope of the stump-to-mill supply chain.

NCT, in two mutually exclusive reports, researched why its members had undersupplied their hardwood pulpwood to NCT and its strategic markets over the last several years. Two major reasons namely “price” and “operational issues” were concluded as the major factors for under-supply (Perry, 2006, p. 55).

“Price” is considered “exogenous” and deemed an “uncontrollable variable” while “operational issues” is deemed a “controllable variable” and comprises the stump-to-mill supply chain.

It was this tangible differentiation combined with other external environmental factors that initiated this study into the stump-to-mill supply chain, as a potential key to un-locking the supply of hardwood pulpwood from NCT members.

The stump-to-mill supply chain was researched in order to find out what factors within the stump-to-mill supply chain are the root causes for NCT members sighting this area as a negative influence on their volumes supplies.

Ultimately, the research endeavor was to seek an answer to the research question and find answers to the objectives through empirical research. Through the conducted empirical research and diagnosis of the findings, this report, combined with the discussion and conclusions to the objectives can make some recommendations to NCT.

7.2 National fibre shortage issues

South Africa is facing a general commercial fibre shortage and more specifically South Africa is currently facing an 830 000 cubic meter under-supply of hardwood pulpwood. (LHA, 2004, p. iii).

NCT has had a noticeable decrease in its net annual total hardwood pulpwood sale volumes over the last several years. One can speculate that the decrease in hardwood pulpwood sales has been due to less disparity between the South African rand and the US dollar, which has placed pressure on mill delivered prices and exporting profits which has caused its members to bank their hardwood fibre resource.

Independent studies by NCT have shown that NCT members attribute their decreased hardwood pulpwood supply over the last several years to be primarily due to two factors, namely price and operation related issues. Either way, NCT has lost volume, and potentially market share over the last few years.

Recommendation

NCT's shortage in hardwood pulpwood supply coincides with the national shortage of hardwood pulpwood. Expansion of NCT's resource base is limited for the following reasons:

- Planting permits governed by legislation and government bureaucracy limits hardwood pulpwood area expansion among its membership.
- NCT's products and services do not create enough competitive advantage to non-member direct supplying private and independent growers to other markets, in order to entice them to become a member of NCT.
- NCT's "price" and "service" needs to become more competitive.

NCT needs to increase its support to Forestry South Africa (FSA), South Africa's premiere forestry organisation representing growers, not necessarily through money but through

increased man power in helping to deal with the increasing governmental issues, specifically relating to planting permits.

NCT's resource base is primarily made up of private and independent tree farmers mostly in the medium and small grower categories, these members should be viewed as a mutually exclusive fibre resource base which underpins NCT's core business, and therefore along with "price" NCT's "service" to its members plays a vital role in maintaining and growing the "loyalty" of its members.

It is on this note that NCT needs to provide a service which encompasses the changing needs of its membership. As the external environment changes with respect to supply and demand in hardwood pulpwood, NCT needs to position its services to satisfy the changing needs of its members.

NCT needs to launch and implement a differentiated hardwood pulpwood procurement strategy to retain and grow the independent and private hardwood pulpwood resource base by delivering a stump-to-mill supply chain management solution for its members.

The role out of this procurement strategy must be underpinned by the principles of supply chain management and can be guided by the words of Miller, (1998, p. 38) who states, "that since effective SCM is designed to help organizations become leaner and more competitive by managing the flow of materials and services more efficiently and eliminating any non-value or repetitive activities from the supply chain, it should be considered a workable business process for any business".

7.3 Resource ownership issues

NCT's membership base mainly lies in the medium and small grower categories. These resource owning categories as a hardwood pulpwood fibre base can be defined as the most liquid form of hardwood pulpwood fibre available for open market trade by NCT's competitors. Combined with this situation NCT in its own right owns very little hardwood pulpwood fibre.

Recommendation

NCT needs to re-introduce loans schemes as a product to its members in order to incentivise its members to plant more hardwood pulpwood. The re-introduction of loan schemes combined with increased pressure from NCT with FSA at government level with regards to planting permits in conjunction with perseverance can only see the current situation with regards to planting permits become more favourable.

NCT must position itself in preparation for a more conducive planting permit system in the short and medium term by getting ready to re-introduce loan schemes to its members.

Due to NCT's financial strength, NCT should consider increasing its own hardwood pulpwood fibre portfolio. Due to NCT having a conservative approach to acquiring more of its own fibre, opposition buyers generally win the race in large open market fibre trade deals, thus slowly increasing their market share of available hardwood pulpwood fibre and mining NCT's opportunities to increase its fibre portfolio. The only way NCT will be able to compete with its competitors in acquisitions is through privatization.

7.4 Bargaining power and leverage issues

Due to the current and future under-supply and over-demand for hardwood pulpwood, the market will move more towards a "sellers" market for hardwood pulpwood. NCT members will become more demanding on the service levels it requires from NCT due to increased pressure from competitors.

Recommendation

NCT needs to position itself, to take advantage of the anticipated increased demands of its membership. It is recommended that NCT deploys a service strategy of stump-to-mill supply chain management using both backward vertical integration and keiretsu as strategies within the framework of supply chain management.

7.5 Internal NCT issues

NCT lacks on the job training and mentorship of front line staff with regards to the concepts of agency and brokerage. Lack of formal policy and procedures with regards to interacting with intermediaries has caused an arms length business relationship to be formed with NCT Forestry Co-operative and intermediaries in the stump-to-mill supply chain with specific reference to harvesting, short haul and loading contractors.

Recommendation

It is highly recommended that NCT introduces a human resource department. NCT is a service orientated business with people making up its core asset base. Employees need to be constantly kept motivated, but lack of career planning, targeted training and mentorship which forms the basic services of a well structured human resource department is lacking.

A good humane resource department would be rolling out new strategies to employees seamlessly. Lack of this resource makes change management within NCT almost non-existent. NCT needs to introduce policies and procedures when dealing with contractors in the stump-to-mill supply chain and follow the strategy through with change management initiated by the “human resources department” and implemented in a trained structured format to front line staff and members.

7.6 Contractor issues

Research has shown that “second economy” or “informal contractors” mostly service the medium and small grower categories. These contractor businesses are also considered high risk businesses for various reasons. The most critical being the lack of sound business skill, finance, economies of scale and sustainable work flow.

Recommendation

NCT can make an impact on the well fare of their contractors, in the form of offering a

planned, sustainable work schedule on a yearly basis through a keiretsu strategy which incorporates the intermediaries into a coalition environment within stump-to-mill supply chain.

Heizer and Render (2001, p. 441), explain that the members of a keiretsu are assured long-term relationships and are therefore expected to function as partners, providing technical expertise and stable quality production to NCT.

By deploying a stump-to-mill supply chain initiative using independent contractors, NCT will create economies of scale for the contractors and therefore increase the professionalism of the contractors operating in this segment of the resource owning market.

The increase of professional service delivery from independent contractors as a result of a closer relationship between NCT and its intermediary strategic partners will by default increase the levels of service members receive and therefore increase customer satisfaction.

Increased customer satisfaction would inherently be caused by NCT's intervention in the stump-to-mill supply chain.

7.7 Operational issues / stump-to-mill supply chain issues

NCT relies heavily on self regulation by members and independent contractors within the stump-to-mill supply chain. NCT provides a free long haul brokerage service. Due to the complexity involved in co-ordinating loading equipment as various loading sites, conflict sometime arises between brokered transport businesses and NCT and NCT and it members. To reduce this conflict NCT owns two mobile loading vehicles.

NCT's integration in the stump-to-mill supply chain is currently limited to (one stump to loading operation) on one of its own tree farms. Other than one "stump-to-loading" operation and a free long haul brokerage service combined by two NCT mobile loading units, NCT does not intervene in any other way in the stump-to-mill supply chain.

In fact, NCT is 1.3% forwardly integrated into the “stump-to-loading” supply chain and 100% reliable on outsourced transport.

Although NCT has performed exceptionally well in brokering rail and road transport for its members, NCT’s brokered road transport to small scale timber growers proves to be a large challenge, as independent transport contractors consistently complain about un-coordinated loading of small volumes from remote places.

In summary NCT’s current “controllable” exposure to the stump-to-mill supply chain is very limited.

On the other hand the main reasons for NCT members not to forwardly integrate themselves and increase their control over the stump-to-mill supply chain can be summarised as follows, number one being the most important reason for non forward integration:

1. Labour availability
2. Labour turnover / absenteeism (Including HIV AIDS)
2. Economies of scale
3. Enough readily available contractors / cost effective alternatives
4. Finance
5. Technical expertise

In summary NCT members in KwaZulu-Natal find the above factors throughout the components of the stump-to-mill supply chain as the biggest reasons why they are not forwardly integrated themselves.

Recommendation

NCT in its capacity has the resources to investigate the “operational issues” or stump-to-mill supply chain issues as referred to in this report. NCT can use a combination of vertical integration and keiretsu as supply chain management strategies to increase its service levels in

the stump-to-mill supply chain to its members and by default this strategy will increase NCT's "control" over fibre supply.

It is recommended that NCT adopts a strategy to increase its service to its members by offering a stump-to-mill supply chain solution that aims to control at least 25% of NCT's yearly hardwood pulpwood volume intake from its members through either backward vertical integration or keiretsu or a combination of both by 2010. This will theoretically equate to approximately two to three hundred thousand tons per year operationally controlled by NCT by 2010.

It is recommended that NCT purchase a semi-ridged truck trailer configuration with a crane to service its out lying small scale timber growing members in transport. If the volumes and demand allows, NCT should purchase more conducive transport vehicles to satisfy the differentiated needs of its resource owning membership base.

Competitive advantage for NCT lies in "service" to its members, and the direction and energy of this service should be directed into the stump-to-mill supply chain for various mitigating reasons already alluded to in this report.

Intervention by NCT in the stump-to-mill supply chain should be orientated towards mechanization and NCT should aim to increase its operational market share of the stump-to-mill supply chain to 25% of NCT's yearly hardwood pulpwood volume traded by 2010.

7.8 Limitations

It is important to place the sample population in perspective to NCT's total membership. The sample profile was made up of 150 of NCT's largest resource owning members and suppliers out of 1240 KwaZulu Natal members. The assumption can be made that the selected sample profile, because of their size in supply, would be in the strongest position to adopt forward vertical integration in the stump-to-mill supply chain over and above any other NCT members.

Considering the relationship of economies of scale allowing the possibility of forward vertical integration in the stump-to-mill supply chain, the results of the study unequivocally find that over 60% of the sample profile are forwardly integrated into the harvesting, short haul and loading components of the stump-to-mill supply chain.

One can speculate that had the sample profile been taken from NCT's smallest supplying members, due to their un-sustainability and lack of economies of scale their forward integration would more than likely be 0%.

In summary the sample group was not randomly selected and therefore the results of forward vertical integration would be bias in favour of a higher percent.

A 33% response rate also limits the amount of data to analyse and limits the accuracy of the results and findings.

The results from the question relating to methods of intervention in the stump-to-mill supply chain would be limited in its accuracy, as it could be argued that most members do not have the theoretical knowledge to make an informed decision with regards to which method would deliver a better service and be more cost effective. That fact that keiretsu as a strategy was favoured could be argued as a lucky out come.

7.9 Future research opportunities

The same study could be conducted using a random sample from the NCT membership base. Future research could also include the scope of harvesting systems most suitable for NCT and its members. Future research could also include the scope of change management, with reference to NCT's current systems to one that formally embraces the "operational" aspect of tree farming services to its members.

CHAPTER 8

Conclusion

8.1 Conclusion

Taking into consideration the changing environmental conditions of the South African forestry industry, with specific reference to the current and future under-supply of hardwood pulpwood, NCT needs to position itself in the market to increase, retain and maintain the loyalty of its members.

In order for NCT to position itself correctly in the market place to take advantage of the changing environment, NCT needs to find a way to gain competitive advantage in maintaining and growing its membership base, in a way that will out compete its competitors.

The “price” NCT offers its members is exogenous by nature and therefore although it is the largest driver in the procurement of roundwood it is governed by variables outside NCT’s direct control.

The second largest driver in the under-supply of hardwood pulpwood according to NCT members is “operational issues” or “stump-to-mill supply chain issues”, every component within the stump-to-mill supply chain can be managed and controlled. It is therefore obvious that if the stump-to-mill supply chain has been identified by NCT members as a problem variable, combined with the fact that this variable can be controlled and managed, makes the stump-to-mill supply chain a perfect area for NCT to target the investment of resources in a drive to finding solutions to the problems faced in the scope of this environment.

Not only have NCT members pointed out the problem in the stump-to-mill supply chain but research has shown that harvesting, short haul and loading contractors who find themselves working in the medium and small grower categories, find it extremely difficult to survive due to the difficulty of reaching economies of scale combined with limited business skill, access to finance and sustainable work flow. The majority of NCT’s membership is made up of tree farmers in the medium and small grower categories.

The difficult business environment for contractors has led to the terminology of describing contractors in this environment to be called “informal” or “second economy” contractors. Contractor problems combined with the reasons given by NCT members why they are not willing to integrate into the stump-to-mill supply chain with specific reference to labour availability, labour turnover issues and lack of economies of scale followed by enough available contractors, finance and technical know how, exacerbates the need for NCT to focus on the stump-to-mill supply chain.

Importantly 83% of the surveyed population who include members who are already integrated into the stump-to-mill supply chain said they were more inclined to sell their hardwood pulpwood to a buyer who offered a complete stump-to-mill supply chain solution, while 78% of the surveyed population said they would sell their hardwood pulpwood to a buyer who offered flexible point of sale options.

In summary 81% of the surveyed population said they would like some form of buyer intervention in the stump-to-mill supply chain. In addition to the surveyed population requesting intervention by NCT in the stump-to-mill supply chain the method of intervention selected by the sample population on the grounds of perceived better service and cost effectiveness was as follows:

- 37% of the sample population chose an independent business contracted by NCT to manage the stump-to-mill supply chain as a method of intervention. (Keiretsu).
- 33% of the sample population chose that NCT vertically integrates itself backwards into the stump-to-mill supply chain as a method of intervention. (Backward vertical integration).
- 30% of the sample population chose that NCT employs a supply chain manager to manage and co-ordinate independent contractors within the stump-to-mill supply chain on a project by project basis. (Out sourcing).

All three methods tie themselves either into the concept of supply chain management and the strategies of backward vertical integration and keiretsu.

Either way, both, backward vertical integration and keiretsu as strategies of supply chain management will perform the theoretical task of gaining “control” of the stump-to-mill supply chain for NCT.

The orthodoxy of supply chain management (SCM) emphasizes competitive advantage through increased operational control and efficiency combined with market responsiveness from production and distribution processes into the hands of NCT. This statement is supported further by Monezka (1998, p.14) whose observations find that firms interested in supply chain management want to use it for increased customer satisfaction and enhanced competitive positioning.

Anticipated future competition for NCT will be between the stump-to-mill supply chain rather than between firms. While well established in other industry sectors, the SCM concept adopted into the stump-to-mill supply chain or within the total scope of the entire “forestry value chain” is newly developed in the forestry industry sector.

Due to the newness of the concept, combined with the application centered on the stump-to-mill supply chain, the NCT board of directors as well as NCT’s management will have to embrace the concept, and sell the concept in conjunction with educating and training front line staff members and intermediaries. Advocating the benefits of shared management and control of the stump-to-mill supply chain through the strategy of supply chain management will be a winning concept.

Review of the theoretical concepts of supply chain management using backward vertical integration and keiretsu strategies within the stump-to-mill supply chain has identified key issues of power among dominant members, processes of chain initiation and innovation, and the inability of backward vertical integration, keiretsu or SCM to offer a viable business strategy for some NCT members. Statistically only 19% of respondents would not be interested in any form of intervention.

NCT member’s hardwood pulpwood as a product is characterised by perishability, heterogeneity and lags in production response to market signals. Members’ profits are

vulnerable to quantity, timing of supply and product specification. Currently many of the “stump-to-mill supply chains” are loose, fragmented, interwoven, unstable or unique.

An effective procurement strategy rolled out by NCT using a combination of backward vertical integration and keiretsu within the framework of supply chain management, in a drive to gain the management and control of the stump-to-mill supply chain between NCT’s members and NCT’s strategic markets is strongly recommended. By default the strategy will roll out a systematic, reliable and cost effective operational stump-to-mill system

This recommendation extends to the active intervention by NCT in the stump-to-mill supply chain, and should be orientated towards mechanization, NCT should aim to increase its operational market share of the stump-to-mill supply chain to 25% of the yearly hardwood pulpwood total volume sold by 2010.

This will not only increase control over the volume supplied to NCT, but will also increase the sustainability of fibre by creating planned felling schedules in combination with achieving cost saving benefits due to reaching “economies of scale” thus allowing NCT increased bargaining power to its members in defending its mill delivered prices.

This strategy will also provide a stable environment for the “informal” or “second economy” contractors to work in, while satisfying the increasing needs of NCT members and in the process creating a competitive advantage by providing a much needed additional service in which members would play active roles within the keiretsu strategy.

Increased “operational” or “stump-to-mill” market share by NCT will naturally decrease competition in the supply chain, while increased services will lead to more member satisfaction and loyalty.

In conclusion, the evidence from the study points to the following. In the event of NCT Forestry Co-operative Limited increasing its service level to its hardwood pulpwood members by providing intervention in the stump-to-mill supply chain, this strategic procurement strategy

will more than likely increase the control and volumes supplied to NCT and its strategic markets.

Hence, the key to unlocking the code to hardwood pulpwood supply from NCT's membership base, partly lies in NCT's intervention in the stump-to-mill supply chain.

However, one can capture the hill by using "price" only, but this strategy will not necessary help you hold the hill, a combined strategy of "price" and "increased service" will more than likely allow NCT to capture and hold the hill.

THE END

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Appendix 1

Reasons for decreased eucalyptus supplies to NCT

MAIN REASONS GIVEN BY MEMBERS:

FOR DECREASED EUCALYPTUS PULPWOOD SUPPLIES 2005

Class 1 members

- 1) Delayed gum felling due to extended wattle season or busy with other activities.
- 2) Over felled in previous years due to cash flow, fires, drought or snow damage
- 3) Economic banking
- 4) Contractor (Harvesting and Transport) / Labour & Mechanical problems.
- 5) Supplying competitors because of price.
- 6) Reduced Timber Resource and conversion to other crops.
- 7) Farm sold / Housing Development / Lease expired / resigned from NCT
- 8) Skewed Age Class Distribution – no or less mature trees at present.
- 9) Have a contract with our competitors (Has not honoured NCT Commitment)
- 10) Other (Deceased, sold standing to NCT member)
- 11) Increased supplies to special markets

Class 2 members

- 1) Reduced timber resource.
- 2) Supplying competitors because of price
- 3) Other – (illness, liquidation, rail increases = unprofitable to do timber).

Class 3 members

- 1) Not mature trees.
- 2) Plan to supply in last quarter of this supply season.
- 3) Other – (deceased, sick, sold timber standing, sold farm, price).

Class 4 members

- 1) Supplying competitors because of price.
- 2) Other – (Sold farm, no mature timber, delayed felling).

Class 5 members

- 1) Supplying competitors because of price.
- 2) No resource available.

Class 6 members

- 1) Supplying competitors because of price.

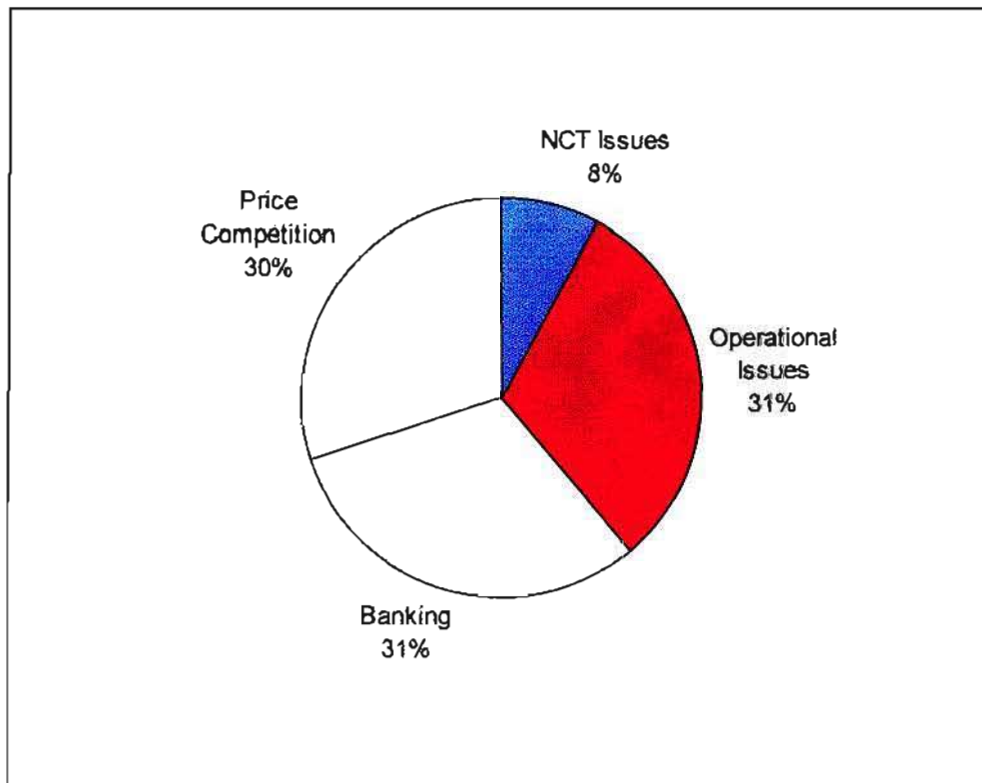
Class 7 members

- 1) Mainly no mature trees.

(Pettit, 2005, paragraph 1)

Appendix 2

Diagram 21: Impact of grouped statements on all districts' supply volumes



(Perry, 2006, p. 55)

Note: Price competition and banking form monetary issues, when grouped together price and banking form 61% of the reason why NCT members hold back on the sale of their hardwood pulpwood. Operational issues after monetary issues then becomes the second biggest issue causing NCT members to under-supply in hardwood pulpwood.

Appendix 3 Permission to collect data from NCT

Please address correspondence to:

Your Ref:

Our Ref:

**NCT FORESTRY
CO-OPERATIVE
LIMITED**



Established 1949

346 Burger Street, Pietermaritzburg 3201
P O Box 1445, Pietermaritzburg, 3200 South Africa
Telephone: +27 (0)33 897 8500
Facsimile: +27 (0)33 897 8501
Webpage: www.nctforest.com

To Whom It May Concern

This serves to confirm that Craig Schütte has permission to send out questionnaires to some 150 NCT members to gather data for his MBA thesis.

These questionnaires are aimed at gauging the members' need for a differentiated procurement approach from buyers. In essence, to establish whether members would be inclined to sell to buyers who offer more than one form of purchase offer.

PL KIME
GENERAL MANAGER



District Offices

Vryheid:	P.O. Box 2036, Vryheid, 3100	Tel: (034) 982 2597	Fax: (034) 982 2880
Greytown:	P.O. Box 671, Greytown, 3250	Tel: (033) 413 1963	Fax: (033) 413 2790
Richards Bay:	P.O. Box 481, Richards Bay, 3900	Tel: (035) 789 6200/1	Fax: (035) 789 6388
Nelspruit:	P.O. Box 6074, Nelspruit, 1200	Tel: (013) 752 2568	Fax: (013) 755 1838
George:	P.O. Box 10615, George, 6530	Tel: (044) 884 0200	Fax: (044) 884 0208



Appendix 4 Ethical clearance approval from Kwazulu-Natal University



RESEARCH OFFICE (GOVAN MBEKI CENTRE)
WESTVILLE CAMPUS
TELEPHONE NO.: 031 – 2603587
EMAIL: ximbap@ukzn.ac.za

2 AUGUST 2006

MR. C SCHUTTE (20350954)
MANAGEMENT STUDIES

Dear Mr. Schutte

ETHICAL CLEARANCE APPROVAL NUMBER: HSS/06364A

I wish to confirm that ethical clearance has been granted for the following project:

“Unlocking the fibre code to hardwood pulp supply – an analysis to determine if hardwood pulp buyers in Kwa-Zulu Natal need to offer flexible point of sale purchase options to private timber growers”

Yours faithfully


MS. PHUMELELE XIMBA
RESEARCH OFFICE

PS: The following general condition is applicable to all projects that have been granted ethical clearance:

THE RELEVANT AUTHORITIES SHOULD BE CONTACTED IN ORDER TO OBTAIN THE NECESSARY APPROVAL SHOULD THE RESEARCH INVOLVE UTILIZATION OF SPACE AND/OR FACILITIES AT OTHER INSTITUTIONS/ORGANISATIONS. WHERE QUESTIONNAIRES ARE USED IN THE PROJECT, THE RESEARCHER SHOULD ENSURE THAT THE QUESTIONNAIRE INCLUDES A SECTION AT THE END WHICH SHOULD BE COMPLETED BY THE PARTICIPANT (PRIOR TO THE COMPLETION OF THE QUESTIONNAIRE) INDICATING THAT HE/SHE WAS INFORMED OF THE NATURE AND PURPOSE OF THE PROJECT AND THAT THE INFORMATION GIVEN WILL BE KEPT CONFIDENTIAL.

cc. Faculty Officer (Post-Graduate Studies)
cc. Supervisor (Mr. M Pouller)

Appendix 5

COVER LETTER OF MBA QUESTIONNAIRE

“Unlocking the fibre code to hardwood supply”

Mr. C.E. Schütte
P.O. Box 1445
Pietermaritzburg
3200

Mr.

Address

Dear Mr/Mrs

RE: MBA Research – The need for flexible point of sale options to private hardwood pulp growers from hardwood pulp buyers

I, Craig Schütte is currently an employee of NCT Forestry Co-Operative Limited and is a registered MBA student (Student No: 203509554) at the University of KwaZulu-Natal. I have chosen to do my final year dissertation on a facet within the forestry industry. Mr. Mike Poulter, a specialist in supply chain management, from the School of Management at the University of KwaZulu-Natal, will be supervising my dissertation. Mr. Mike Poulter can be contacted at the School of Management on the following telephone number (033 2605899).

Dissertation Topic:

Unlocking the fibre code to hardwood pulp supply – an analysis to determine if hardwood pulp buyers in KwaZulu-Natal need to offer flexible point of sale options to private hardwood pulp growers?

Nature and Purpose of Research

The nature and purpose of this research is to analyze the response of private hardwood pulp growers in KwaZulu-Natal, to questions related to hardwood pulp buyer point of sale purchase options which indirectly relates the “stump-to-mill supply chain”.

Ethical Clearance:

Participation in this research is voluntary and all responses will be treated in a confidential manner. There will be no benefits received by participating in the research and participants are free to withdraw at any time without consequences. Results will be analysed on a numerical basis per district and holistically, therefore a respondent's anonymity will be protected.

Sample Group and Scope of Study:

This letter and a questionnaire comprising of four questions has been sent to 150 recipients who comprise 12% of NCT's land owning members in KwaZulu-Natal. The recipients have been chosen from four districts within KwaZulu-Natal and their selection has been based on their annual supply potential (ASP) from NCT Forestry Co-operative Limited's Member Data Base. Participant selection has been based on mutual exclusive selection of members with the highest ASP in both eucalyptus and wattle per district.

Questionnaire

Attached, find the questionnaire that was formulated to determine the needs of private hardwood pulp growers in KwaZulu-Natal and their position on selling their hardwood pulp when given alternative point of sale options.

Thank you for taking the time to complete this questionnaire, and look forward to your response.

NB: Response deadline - to be sent back by 14th July 2006

Kind Regards

Craig Schütte

Craig Schütte

(NCT Marketing and Supplies Co-ordinator Special Markets – Southern KwaZulu-Natal)

Tel: 033 897 8500

Fax: 033 897 8501

Cell: 082 804 8304

E-Mail: craigs@nctforest.com

Appendix 6

MBA QUESTIONNAIRE TO PRIVATE NCT HARDWOOD GROWERS

IN KWAZULU-NATAL

IMPORTANT: PLEASE RETURN BY FRIDAY 28TH JULY 2006

INTRODUCTION:

NCT Forestry Co-operative Limited (NCT) has over the last two years conducted studies in the supply of hardwood pulp wood amongst its members to determine why there is a difference between what the members say they will send (volume) per year and what they actually send per year.

NCT knows, price is the major driver in the sale decision making process, however "operational issues" more specifically stump-to-mill supply chain issues" were sighted as a major area of concern by members in both reports causing under performance in hardwood pulpwood supply.

This questionnaire will specifically look at the stump-to-mill supply chain issues" and in so doing try and understand your needs.

Project: Start & completion of the harvesting, short haul, loading and long haul of a compartment or a specific area.

Buyer: Major hardwood pulpwood buyer/s e.g. NCT, Mondi, Sappi etc.



Question 1

Do you have your own harvesting operation?
(Please tick)

If no, please rank in order of importance: 1= biggest contributing factor why you are not doing your own harvesting:

- Labour availability
- Labour turnover/absenteeism (Incl. HIV AIDS)
- Technical expertise
- Economies of scale (not enough volume)
- Finance

YES	NO
Rank (1-7)	

- Enough readily available contractors / cost effective alternatives
- Other

Please explain "other":

Question 2

Do you have your own short haul?
(Please tick)

YES	NO
-----	----

If no, please rank in order of importance: **1= biggest contributing factor** why you are **not** doing your own short haul:

- Labour availability
- Labour turnover/absenteeism (Incl. HIV AIDS)
- Technical expertise
- Economies of scale (not enough volume)
- Finance
- Enough readily available contractors / cost effective alternatives
- Other

Rank (1-7)

Please explain "other":

Question 3

Do you have your own loading? (Mechanised – e.g. 3 Wheel Bell)
(Please tick)

YES	NO
-----	----

If no, please rank in order of importance: **1= biggest contributing factor** why you are **not** doing your own loading:

- Labour availability
- Labour turnover/absenteeism (Incl. HIV AIDS)
- Technical expertise
- Economies of scale (not enough volume)

Rank (1-7)

- Finance
- Enough readily available contractors / cost effective alternatives
- Other

Please explain "other":

Question 4

Do you have your own long haul?
(Please tick)

If no, please rank in order of importance: **1= biggest contributing factor why you are not doing your own long haul:**

- Labour availability
- Labour turnover/absenteeism (Incl. HIV AIDS)
- Technical expertise
- Economies of scale (not enough volume)
- Finance
- Enough readily available contractors / cost effective alternatives
- Other

YES	NO
Rank (1-7)	

Please explain "other":

Question 5:

Which of the following services would you like a hardwood pulp buyer to offer you?

EUCALYPTUS	
OPERATION	PLEASE TICK
• Harvesting	
• Short Haul	

WATTLE	
OPERATION	PLEASE TICK
• Harvesting	
• Short Haul	

• Loading	
• Long Haul	

• Loading	
• Long Haul	

Please explain your main reasons for your selection:

Eucalyptus:

Wattle:

Question 6

What would you say is **your biggest issue** with the current stump-to-mill supply chain?

Question 7:

What is **your ideal solution** in making the stump-to-mill supply chain work?

Question 8:

Are you aware that there *will* be a general shortage of roundwood fibre in South Africa?

YES	NO
YES	NO

Are you aware that there is **currently** a shortage in hardwood pulp fibre in South Africa?

Question 9:

What variable in the stump-to-mill supply chain do you find more unpredictable?

Labour	Fuel Price
--------	------------

Please explain:

Question 10:

Which method of stump-to-mill supply chain management" would you perceive to get a **better service** from?

- A) The **buyer physically owns and controls** the harvesting, short haul, loading and long haul ("stump-to-mill supply chain") on a project basis?
- B) The **buyer contracts with independent contractors** to do the harvesting, short haul, loading and long haul ("stump-to-mill supply chain"), but manages, controls and co-ordinates the work flow by an employed (buyer employed) **supply chain manager** on a project basis?
- C) The buyer uses an "**independent stump-to-mill supply chain management business**" to manage, control and co-ordinate independent contractors in the stump-to-mill supply chain on a project basis?

PLEASE TICK

A	B	C
---	---	---

Please explain your selection:

Question 11:

Which method of stump-to-mill supply chain management" would you perceive to be **more cost effective**?

- A) The **buyer physically owns and controls** the harvesting, short haul, loading and long haul ("stump-to-mill supply chain") on a project basis?
- B) The **buyer contracts with independent contractors** to do the harvesting, short haul, loading and long haul ("stump-to-mill supply chain"), but manages, controls and co-ordinates the work flow by an employed (buyer employed) **supply chain manager** on a project basis?
- C) The buyer uses an "**independent stump-to-mill supply chain management business**" to manage, control and co-ordinate independent contractors in the stump-to-mill supply chain on a project basis?

PLEASE TICK

A	B	C
---	---	---

Please explain your selection:

Question 12:

Would you like a hardwood pulpwood buyer to offer you a complete (harvesting, short haul, loading, long haul) or partial stump-to-mill "supply chain solution" for your eucalyptus and wattle?

COMPLETE SOLUTION: EUCALYPTUS

PARTIAL SOLUTION: EUCALYPTUS

COMPLETE SOLUTION: WATTLE

PARTIAL SOLUTION: WATTLE

YES	NO
YES	NO
YES	NO
YES	NO

Please explain:

Question 13:

Given: Optimum market related prices, and your choice in the unit of measure.

What "point of sale" would you prefer to use in the sale/purchase of your eucalyptus hardwood pulpwood?

Ranking: 1 being your proffered choice and 4 being your last choice.

EUCALYPTUS PULP	
Point of Sale Option	RANK (1 – 4)
Mill Gate	
Farm/Estate Depot*	
Compartment Road Side	
Standing	

*Farm/Estate Depot: Where an interlink can have access.

Reason/s for your ranking:

a) Mill Gate?

b) Farm/Estate Depot?

c) Compartment Road Side?

d) Standing?

Question 14:

Given: Optimum market related prices, and your choice in the unit of measure.

What “point of sale” would you prefer to use in the sale/purchase of your wattle hardwood pulpwood?

Ranking: 1 being your proffered choice and 4 being your last choice.

WATTLE PULP	
Point of Sale Option	RANK (1 – 4)
Mill Gate	
Farm/Estate Depot*	
Compartment Road Side	
Standing	

*Farm/Estate Depot: Where an interlink can have access.

Reason/s for your ranking:

a) Mill Gate?

b) Farm/Estate Depot?

c) Compartment Road Side?

d) Standing?

Question 15:

Given: Optimum market related prices, and your choice in the unit of measure.

Would you be more inclined to sell your hardwood pulpwood to a buyer who offered flexible point of sale opportunities than to a buyer who did not?

PLEASE TICK

YES	NO
-----	----

Why?

Question 16:

Given: Optimum market related prices, and your choice in the unit of measure.

Would you be more inclined to sell your hardwood pulpwood to a buyer who offered you a choice of a "partial" or "complete" stump-to-mill supply chain solution?

PLEASE TICK

YES	NO
-----	----

Why?

Question 17:

Would you pay a premium for a "stump-to-mill" service solution by a buyer?

PLEASE TICK

YES	NO
-----	----

Please Explain?

Question 18:

What in your mind differentiates a good harvesting contractor from a bad harvesting contractor?

Please Explain?

Good Harvesting Contractor?

Bad Harvesting Contractor?

Thank You: Craig Schütte

IMPORTANT:

PLEASE RETURN ***ASAP*** OR NOT LATER THAN ON OR BEFORE **FRIDAY 28TH JULY 2006.**

Return to: Kathy Holley
Fax: 033 897 8501
E-mail: kathrine@nctforest.com
Tel: 033 897 8500