

**An inquiry into evolving supply chain governance structures in South
African agribusiness**

by

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Tobias Doyer
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ABSTRACT

Supply chain management is emerging as an important source of competitive advantage for agribusinesses globally and in South Africa. The objective of this study was to describe and analyse the emerging governance structures in agribusiness supply chains. Governance structures are the formal and informal institutions that prohibit, permit, or require certain actions and provide the incentives for exchange. Agribusiness managers can choose from a continuum of governance structures which include spot or cash markets, specifications contract, relation-based alliance, equity-based alliance and vertical integration. These structures are distinguished by the composition of market and managed control of the transaction processes.

In this study the constructivist and positivist inquiry paradigms were adopted to address the complexity and interrelation of factors involved in the choice of governance structure. The study was conducted in two stages. The first stage entailed a survey of agribusiness managers to elicit their opinions and perceptions on the strategic direction, preferred present and future coordination mechanisms, strategic focus, the future shape of the agro-food industry and the major factors driving these trends in the South African agribusiness complex. These were compared with global trends. This section was conducted in the positivist paradigm to extend the validation and generalisation of the second stage which was conducted in the constructivist

paradigm. The second stage entailed the analysis of three case studies to identify the drivers for supply chain formation and the expression of these drivers, strategic considerations and transaction characteristics in appropriate governance structures.

The choice of governance structure is influenced by the drivers of change, product characteristics, processes of the supply chain, transaction characteristics and costs. The most significant drivers of change were company competency, consumer behaviour and technology. The perishable nature of most agricultural products, in particular, requires special control and traceability systems to ensure chain transparency in order to certify and assure consumer safety and product quality. These drivers, product characteristics and systems determine the characteristics of the required transaction to facilitate the creation of customer value. Key concepts that emerged in the description of transaction costs are bounded rationality, opportunism, asset specificity and information asymmetry. The optimal governance structure maximises desired transaction requirements while minimising the costs of exchange. The analysis of the case studies showed that these factors cannot be considered in isolation. In each of the cases a different factors was instrumental in the determination of the optimal governance structure. The study identifies a six step decision process for agribusiness managers and researchers to relate drivers of competitiveness to appropriate governance structures.

The emergence of supply chains is driven by evolving consumer demands and societal values on the one hand and the need for agribusiness and inter-agribusiness competency to transform these needs and values into consumer value on the other hand. South African agribusiness are employing technology and closer vertical coordination to improve production processes, quality assurance, traceability and process transparency. In line with global trends South African agribusiness will have to establish ever more sophisticated systems to satisfy consumer needs and societal values as these evolve to include less tangible needs and values such as environmental and ethical concerns.

‘n Onderzoek na die evolusie van voorsieningskettingsbeheerstrukture in Suid-Afrikaanse agribesighede

deur

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UITTREKSEL

Agribesigheidskettingbestuur is besig om na vore te tree as een van die belangrikste stelsel van mededingende voordeel vir agribesighede in ‘n globale konteks en ook binne Suid-Afrika. Die doel van hierdie studie was om die verskynsel van beheerstrukture in agribesigheidsvoorsieningskettings te beskryf en te analiseer. Beheerstrukture is die formele en informele institusies wat sekere aksies verbied, toelaat of vereis en die aansporing voorsien vir ruilverkeer. Agribesigheidsbestuurders kan kies van ‘n kontinuum van beheerstrukture wat kontantmarkte, spesifikasiekontrakte, verhoudingsgebaseerde alliansies, ondernemerskapitaalgebaseerde alliansies, en vertikale integrasie insluit. Hierdie strukture word onderskei deur die samestelling van mark- en bestuurbeheer van transaksie prosesse.

Die konstruktivistiese en positivistiese navorsingsparadigmas was aangewend om die kompleksiteit en onderlinge verbande in die keuse van beheerstruktuur te ondersoek. Die studie was uitgevoer in twee fases. Die eerste fase het ‘n opname onder agribesigheidsbestuurders behels om hulle opinies en persepsies te verkry oor die strategiese fokus, huidige en toekomstige voorkeurkoordinasiemeganismes, die toekomstige vorm van die agri-voedselindustrië en die belangrikste faktore wat die tendense aandryf in die Suid-Afrikaanse agribesigheidskompleks. Hierdie tendense

was ook vergelyk met internasionale tendense. Hierdie fase was uitgevoer in die positivistiese paradigma om die validasie en veralgemening van die tweede fase, wat in die konstruktivistiese paradigma uitgevoer was, te ondersteun. Die tweede fase het die analise van drie gevallestudies behels om die drywers van voorsieningskettingvorming te identifiseer en die beslag van die drywers, strategiese aspekte en transaksiekoste in gepaste beheerstrukture te beskryf.

Die keuse van beheerstrukture word beïnvloed deur die drywers van verandering, produkeienskappe, voorsieningskettingprosesse, transaksie-eienskappe en –koste. Die belangrikste drywers was ondernemingskompetensie, verbruikersgedrag, en tegnologie. Veral die bederfbare aard van meeste landbouprodukte vereis spesiale kontrole en nasporingssisteme om kettingdeursigtigheid te verseker om sodoende verbruikersveiligheid en produkkwaliteit te verseker en te sertifiseer. Hierdie drywers, produkeienskappe en sisteme bepaal die eienskappe van die vereiste transaksie om die verbruikerswaarde te skep. Sleutelkonsepte wat na vore getree het in die beskrywing van transaksiekoste is begrensde rasionaliteit, opportunisme, spesifisiteit van bates en inligtingsassimetrie. Die optimale beheerstrukture maksimeer die vereiste transaksie-eienskappe terwyl dit die koste van uitwisseling minimiseer. Die analise van die gevallestudies het uitgewys dat die faktore nie in isolasie beskou kan word nie. In elk van die gevalle was 'n ander faktor instrumenteel om die optimale beheerstruktuur te bepaal. Die studie identifiseer 'n ses stap besluitnemingsproses waarmee agribesigheidsbestuurders en navorsers die drywers van mededingendheid in verband kan bring met gepaste beheerstrukture.

Die toenemende van voorsieningskettings word aangespoor deur die veranderende verbruikersbehoefte en sosiale waardes aan die een kant en die behoefte vir agribesigheids en inter-agribesigheids kompetensies om hierdie behoeftes en sosiale waardes om te skakel tot verbruikersnut aan die ander kant. Suid-Afrikaanse agribesighede gebruik tegnologie en nader vertikale verhoudinge om produksieprosesse, kwaliteitsversekering, nasporing en prosesdeursigtigheid te verseker. Ooreenkomstig met globale tendense sal Suid-Afrikaanse agribesighede steeds meer gesofistikeerde sisteme moet skep om verbruikersbehoefte en sosiale waardes aan te spreek soos hierdie waardes evolueer na minder tasbare waardes soos omgewings en etiese besorgdheid.

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Chapter 1 Introduction

Chapter 1 Introduction

1.1 The emergence of vertical coordination in the agro-food complex

The world economy at the beginning of the 21st century is increasingly global and integrated. Agribusiness firms are expanding their horizons and procurement networks to source raw materials and products all over the world. This heralds a new age for the agricultural sector and especially for local agribusiness firms which have to compete with powerful multinational firms in domestic and international markets.

As governments all over the world are diminishing their role in the marketing of agricultural products and consumers are posing new demands to the food system, supply chain management has emerged as a key performance area for agribusiness managers. Agribusiness managers have to find ways to realise new opportunities presented by consumer needs and fulfil functions previously performed by governments. Agribusiness is challenged to provide products that not only meet consumer needs, but to exceed their expectations in order to maintain and expand their market share. This is taking the agricultural sector beyond the traditional production, technology and product orientation to a service and quality orientation that encompasses customer and societal satisfactions such as environmentally and socially responsible production practices.

The globalisation of the world economy, consumer demands, social and ethical business and production practices and role of supply chains in this process, especially in the agricultural sector poses the very important question: What role and impact will supply chains have on agriculture and agribusiness?

International trade in processed agricultural, food and fresh products has grown rapidly over the last few decades (Unnevehr, 2000). Increasing product trade is driven partly by trade liberalisation such as the GATT on global scale and on regional level by agreements such as Mercosur and NAFTA. Market-oriented economic reforms is another driver which reduces cross-border distribution costs and trade barriers. Farmers in the developing world are linked to developed countries by profit-

seeking private sector firms. The growth in international trade is taking place against a background of an increasingly industrialised agricultural industry. The 1990's heralded a relatively rapid and intense agroindustrialisation in many low- and middle-income countries (Reardon and Barret, 2000, and Cook, Reardon, Barret and Cacho, 2001). Agriculture is still an important source of employment, economic growth and foreign exchange in many developing countries and also in South Africa. The causes and implications of the industrialisation process on these factors are important to the agricultural and agribusiness sector of South Africa.

Tom Urban coined the phrase 'the Industrialization of Agriculture' at the turn of the previous decade. The term 'agricultural industrialisation' is described as the trend towards economics of scale through the movement to larger production units and the increasing occurrence of vertical coordination and integration between the various stages of the food and fibre system i.e. the supply chain (Antonovitz, Buhr, and Liu, 1996). Boehlje (1996) defines industrialisation as the application of modern manufacturing, production, distribution and coordination methods to the food supply chain. Drabenstott (1995) identified the primary changes as a shift from food commodities to differentiated food products, and a shift from spot markets to more direct market channels, such as production contracts. The Council of Food, Agriculture and Resource Economics (in Sonka, 1995) defines the industrialisation of agriculture as the increasing concentration of farms and vertical coordination (contracting and integration) among the various stages of the food and fibre system. The emerging system is expected to be highly competitive in global markets, more efficient, more responsive to consumer demands, less dependent on government assistance, and more able to rapidly adopt new technologies.

The Reardon and Barret (2000) definition of industrialisation is generally accepted and will be adopted for this discussion: "(1) The growth of agroprocessing, distribution, and farm input provisions off-farm; (2) institutional and organisational change in the relation between agrofood firms and farms such as a marked increase in vertical coordination; (3) concomitant changes in the farm sector, such as the changes in product composition, technology, and sector and market structures." The industrialisation of agriculture is attributed to three general 'drivers of change' namely

the changes in consumer demand; changes in agricultural policy; and changes in the agricultural supply structure.

Consumer demand is probably the most important driver for change in agricultural and food supply chains. Food quality and assurance is increasingly important to the modern health conscious consumer. Recent food scares have also contributed heavily to the newfound consumer attention to the quality of food. (Boehlje, 2000; Drabenstott, 1995; Davis and Langham, 1995; and Verbeke and Viaene, 2000) This presents a significant opportunity to food and agricultural chains to establish a competitive position in the market. Consumers with expanded discretionary income are more discerning in their tastes and demand more convenience, variety, and added value as part of the product mix. Consumer value can be created by giving attention to quality and quality assurance, production processes, assortment width and depth, consumer service, product information, environmentally and socially responsible production practices and traceability. The result is a highly fragmented market on the consumer side where agribusiness is serving a large number of distinct niche markets. (Fearne and Hughes, 1999). The emergence of societal values like fair trade and environmental sustainability are also putting pressure on the food system as consumers increasingly demand these attributes. These trends are largely driven by Non Governmental Organisations (NGO's) in their role as societies' watchdogs. (IFAMA, 2002)

On the retail side a significant degree of concentration is taking place as multiples compete intensively for market share. The only market growth that the retailers can achieve is a result of increased consumer expenditure rather than new customers. This is due to the expansion of the food retail sector in the late 1980's and early 1990's into the markets of independent retailers (butchers, bakers and greengrocers). In response to the limited scope in physical market expansion and changing consumer demand retailer strategies have moved away from location and size dominance to product differentiation and own labels. (Fearne and Hughes, 1999)

Product differentiation is made possible by the advances in production, processing and information and communication technology (Downey, 1996). Biotechnology is used to induce two categories of characteristics namely lowering farm-level

production costs (e.g. pest resistance) and / or enhancing product quality (e.g. nutritional content, storage characteristics, product appearance). Information and Communication Technology provide numerous new opportunities for management and control systems. Electronic communication is nearly instantaneous and removes spatial barriers, enabling managers to monitor production, transportation, inventories, and consumer preferences very fast and accurately. The ability to measure more precisely and track product and processes more easily increases the accountability of each actor in the supply chain for their contribution to the final product (Downey, 1996).

Product differentiation was initially primarily based on processing technologies, quality of raw materials and chain efficiency through lowered costs. As consumer demands are getting more sophisticated (and intangible) supply chains have to utilise communication technology to assure and certify food safety and sustainability (natural and social) of production practises. Traceability, transparency and assurance are now key performance areas in supply chain management. These requirements from the consumers are forcing whole supply chains to invest in capital-intensive production, production management and information systems. Supply chains have to improve the coordination between the actors in order to produce a wider range of high quality differentiated products.

The deregulation of agriculture and agrofood trade is a worldwide phenomenon introduced by the Uruguay Round of Trade negotiations. Increasing liberalisation in world agricultural markets, as well as the range of domestic market reforms in developing countries, is a further impact on agricultural supply chains across the world. The liberalisation efforts, as well as the harmonisation of standards and the encouragement of foreign direct investment, present significant challenges to producers to participate in new marketing opportunities presented under the reforms (Stanton, 2000). Domestic market reforms boosted agricultural exports in general and provided opportunities for investment by global and regional companies in agribusiness in developing countries. The rapid increase of multinational firms in the agri-food sectors also led to increased concentration in the down-stream enterprises in the agri-food chain and contributed to significant changes in the organisation of the agri-food system.

Deregulation of the South African agricultural sector commenced in the 1980's. This process fundamentally changed the structure and the responsibilities of the actors in the sector. Farmers and agribusiness had to shoulder responsibilities and risks in agricultural markets (e.g. product distribution; quality and price control) that were previously fulfilled by government agencies. Various authors have recorded this process extensively (Van Zyl, Kirsten and Binswanger, 1996; Vink and Kirsten, 2000; and Bayley, 2000; amongst others). This process has not proven to be an easy one. The complexity of issues related to new marketing systems, institutions and relationships require innovative approaches and research programs.

Since 1994 the agricultural marketing boards and state trading organisations were abolished as part of the liberalisation process. These marketing boards used to direct the marketing functions in the marketing of agricultural produce to a greater or lesser degree. Farmers and the agribusiness sector therefore never had a direct responsibility in marketing their produce. When the marketing boards were abolished, producers had to devise and establish new institutional structures and arrangements to govern the marketing of food and fibre products to replace the functions and institutions of the marketing boards (Bayley, 2000; Vink and Kirsten, 2000). The next important influence resulted from the liberalisation of agricultural trade. South African farmers were exposed to international prices and competition in domestic markets and new opportunities on international markets. International food and agribusiness trends consequently became a reality to South African markets. The deregulation and liberalisation of the South African agricultural sector exposed farmers and agribusiness alike to international trends. These actors now have to be competitive in order to survive in domestic and international markets.

The last category of change drivers i.e. the change in the agricultural supply structure, is caused by higher price risk in the agricultural environment. This is partly due to deregulation and new consumer demands for differentiated and safe food products. The uncertainty concerning the nature of food quality and problems in detecting quality contributes to the risks in the agricultural sector. Farmers and agribusiness are seeking mechanisms to share and reduce the risks associated with price and product

uncertainty in the supply chain. (Hennessey, 1996; Boehlje, 1999; Boehlje, Akridge and Downey, 1995; Vink and Kirsten, 2000)

The drivers of change in marketing systems, which encourage the adoption of such a chain approach are summarised by Loader (1996) as:

1. Technological progress tends to accelerate structural change. Therefore the dynamics of (and relationships between) such systems are more important than conventional theories of equilibrium.
2. The world-wide return to the market as the focus of agricultural and food policies invites the study of interacting systems, their policies, the role of their organisations and the changes they are experiencing.
3. The globalisation of trade and the increasing internationalisation of economic and social exchange indicate that an approach, which summarises a whole chain of events, regardless of the border, is more appropriate than a narrow national study.
4. The concentration of capital in the agrofood industry and in distribution has revived interest in issues, such as price formation, market structure, institutional influences, the strategies and behaviour of market groups, and in particular the extent of integration in the market.
5. The marginal, yet incontestable role of agriculture in the economies of many developed countries means that, for these countries, an analysis of agriculture as a small if vital part of a larger system is more valid than simply looking at the problems faced by producers.
6. The cases in many countries where the non-integration of the production and marketing systems means that acceptable produce is not marketed and is either unused or inefficiently used.
7. The creative tension between agricultural production and final consumption. The agricultural producer tends to have a certain conception of product quality and quantity, in particular, which is not always shared by consumer groups.

Traditionally, the market-pricing mechanism (auction or spot market) was seen as the most important mechanism guiding the exchange of commodities in the agricultural network. Price and quality (standards and grade usually enforced by government) were the most important indicators directing the process of procuring a constant

supply of homogenous materials. Consumers respond quantitatively to retail prices, while processors interpret these signals and send modified signals to growers via grades and standards (Hennessy, 1996). Zuurbier and Trienekens (2000) describe the 'market-pricing mechanism' as discrete transactional exchanges. Each event is independent of all other dealings, as price alone determines whether the exchange will take place or not. The discretionary exchange is relatively adversarial as both the buyer and the seller attempt to achieve the best economical position through opportunistic or exploitative behaviour.

In spot market transactions, actors rely almost exclusively on a coordinating mechanism that is entirely or nearly entirely external to the exchange relationship. Neither of the parties can influence the price or generic standards and both must adhere to them if effective exchange is to occur. The parties can only withdraw from the transaction (and thus create a shortage of supply or demand) until the terms of the transaction (mostly price and product characteristics) are again satisfactory (Mansfield, 1992; and Peterson and Wysocki, 1997). Spot market transactions are therefore primarily concerned with price, quantity and quality as defined by the (usually limited) grading system. Given the emerging needs of consumers, price signals have thus become too 'fuzzy' to guide the growers in producing and delivering products that will meet these emerging needs (Hennessy, 1996). In contrast to discretionary transactions, relational exchanges are based on longer-term interactions involving repeated transactions¹. These relationships are defined as alliances, or value-adding partnerships, because each actor makes a substantial investment in developing the relationship. Relational exchanges may have many different organisational forms, developing over time from rather loose informal agreements to formal joint ventures. Relational exchanges assume a distribution of proprietary rights over more than one firm (Zuurbier and Trienekens, 2000). Hennessy (1996) uses the example of production contracts as 'crystal clear' mechanisms used to specify the genetics, feeding programmes, and management programmes in the production process. These specifications ensure the provision of a homogeneous product to meet tighter consumer expectations. Supply chains are therefore

¹ Zuurbier and Trienekens (2000) add that over time social interactions develop as discrete transactions. These social interactions smoothen price negotiations and communication in the transaction process.

collections of firms in a business network that cooperate and coordinate to add superior value to satisfy consumer needs.

Bowersox (1992) states the advantages of successful alliances or coordination in the supply chain as the following:

- Reduced cost through specialization
- Improved synergistic performance
- Increased information to support joint planning
- Enhanced customer service
- Reduced risk and uncertainty
- Shared creativity
- Competitive advantage

The Dutch School treats the supply chain, which consists of a series of relational exchanges, as a manageable entity within a broader defined network economy (Omta, 2002). This implies conscious interference in the way supply chains function as opposed to the concept of isolated and independent firms taking decisions based on price alone (Heijbroek, Nederhoed, and van Potten, 1994).

The concept of supply chain management can be defined as the collaboration among actors in a supply system, from the primary producer to the end-consumer, to better satisfy consumer wants and needs at lower costs. It is a process of bringing order to the system that produces, processes and distributes food and agricultural products to consumers. Supply chain management focuses on improving the efficiency and effectiveness of the system that cost effectively delivers a wide range of safe and desirable agricultural products. Supply chain collaboration is an integrative approach to planning and controlling the flow of materials, information and finances from the producers to the consumers by breaking down the barriers that exist between each of the links in the supply chain. Supply Chain Management is an integration of these activities through proven relationships between participants, to achieve a sustainable competitive advantage. (Downey, 1996; Van der Vorst, Beulens, de Wit and van Beek, 1998; and Handfield and Nichols, 1999) Supply chain management clearly

represents more than supply chain logistics. It also represents a complex but focussed set of activities to develop and sustain chain relationships.

1.2 Problem statement

The South African agricultural sector has to compete in a new environment as discussed earlier. This new environment was primarily the result of changes in policies, changes in the demand for agricultural products and changes in the supply of agricultural products. The competitiveness of the agricultural sector will determine the sustainability, profitability, survival and expansion of the sector in the emerging business environment.

The most basic notion of competitiveness is the ability of a firm to produce a commodity at a variable cost lower than the price of the commodity (Fafchamps, de Janvry and Sadoulet, 1995). This notion can be expanded to include the ability of firms to deliver these products to international markets at prices as good as, or better than other suppliers. In this process they should also be able to attract capital, land and labour resources from other economic activities (Freebairn, 1986; Van Rooyen, Esterhuizen and Doyer, 2000; and ABC, 2002).

The challenge to the South African agricultural sector is to achieve and maintain competitiveness in order to survive in the new competitive environment. The sector must achieve this while addressing societal issues such as social equity, environmental responsibility and ethical business practises. Porter (1998) notes that to sustain competitive advantage, firms must achieve more sophisticated competitive advantage over time through providing higher-quality products and services or producing more efficiently. To achieve competitive success, firms must possess a competitive advantage in the form of either lower costs or differentiated products that command premium prices. The firm should therefore have the ability to create and deliver value through cost leadership or differentiation. The key to value creation is based on the intimate knowledge of and rapid response to the complex nature of consumer demand (Ortmann, 2000).

The challenge of delivering value to the consumer at a competitive price is central to the notion of competitiveness. Agribusinesses are therefore challenged to create

superior value and achieve lower prices. In addressing this challenge, vertical coordination between agribusinesses is emerging as an important strategy to achieve domestic and international competitiveness (Hudson, 1990). The evolution of coordinating mechanisms could provide opportunities for individual firms and industries to enhance their competitiveness. This can be achieved by improving the ways to add value and address costs in the supply chain through more effective cooperation and vertical coordination (O’Keefe, 1999). This process of cooperation and coordination is also known as supply chain management. Supply chain management is a key performance area for agribusinesses that want to compete effectively. The competitiveness of a supply chain is based on the delivery of superior customer value at the lowest possible cost, or in other words, product differentiation and cost reduction (including transaction costs) through improved collaboration and coordination between actors in the supply network.

A supply chain is a complex entity consisting of several dimensions namely the product flow or activity dimension, information flow dimension, financial flow dimensions, incentive dimension and the governance dimension. The final dimension, that of governance, is the focus of this thesis. A governance structure (or institution) is the structure that sets the “rules of the game” which prohibit, permit or require certain actions (Gerrard, 2000). Governance structures are arrangements between economic agents in an attempt to decrease uncertainty and the costs of exchange and ownership (Ortmann, 2001). A continuum of governance structures are available to firms and are defined by Peterson, Wysocki and Harsh (2001) as spot/cash market, specifications contract, relation-based alliance, equity-based alliance and vertical coordination. Choosing a suitable governance structure is an important aspect of supply chain management, as this is the structure that facilitates the effective and efficient operation of the other supply chain dimensions. An efficient governance structure will therefore ensure an optimal flow of product, finances and information along the supply chain (from consumer to producer and *vice versa*) at lowest possible coordination, logistical and business cost to the participants. An efficient governance structure will enhance the competitiveness of the participants in the supply chain.

South African agribusinesses are still in the process of adapting to the deregulated business environment. In the process new alliances and relationships between firms

are being forged to manage the total supply chain. Governance of the supply chain is therefore critical for efficiency and consequently competitiveness. The problem for each individual supply chain is to find the most optimal governance structure. However, the knowledge and understanding amongst business leaders and academics on governance structures is still lacking in South Africa. This thesis is therefore addressing this shortcoming by asking the following questions: “Are South African agribusinesses changing they way in which transactions between actors in agricultural supply chains are governed in response to the deregulated, internationalised business environment?”; “Which governance structures are South African Agribusinesses adopting?”; and to a limited extent: “Why are they changing and adapting their governance structures?”

Motivation for the study

In order to understand the way the food system develops, agricultural economists need to understand the nature and development of vertical coordination between firms. It provides insight into appropriate directions for policy makers who wish to improve the functioning of agricultural markets through initiatives in areas such as regulation of the food system, and price and marketing reforms. Organisation structure and government policy have important implications for the strategic and competitive position of individual firms. Therefore, an understanding of governance structures and vertical coordination concepts is of commercial value to firms operating in the food system (Heilbron and Roberts, 1995).

Very little work has been done on governance structures and agribusiness in South Africa. Vink (2000:450) indicates that “...we seem to take the presence of the intermediate capital goods and processing industries for granted...” in his paper on agricultural policy research. Earlier work on agribusiness issues in South Africa includes papers by Berning and Potgieter (1996), Ortmann, (1998) and Esterhuizen and van Rooyen (1999). This thesis also contributes to two other research issues identified by Vink (2000) for the next decade namely structural and institutional issues. More specifically this thesis attempts to address the emergence of supply chain management in the agricultural and agribusiness sector. Very little work has been done on supply chain management issues in South Africa. This includes studies by Troskie and Goedecke (1998) and Troskie and Smit (1999) who analysed the

wheat industry from a supply chain perspective. Several cluster studies were commissioned by the Department of Trade and Industry in, amongst others, the wool, wheat and dairy sectors. In addition Van Rooyen, Esterhuizen and Doyer (2001) studied the interrelation of competitiveness of agricultural supply chains in the South African agrofood complex. Ortmann (2001) addresses the role of supply chains in promoting competitiveness in the agricultural industry and identifies research in agribusiness and value-adding supply chains as relevant research issues for agricultural economists. The research on linkages between firms mostly stems from the development discipline. Machete, Reardon and Donald (1997) address the linkages between small-scale farmers and the agrofood industry, and survey evidence in Southern Africa. Delgado (1999) address the possible institutional innovations for linking small-scale farmers to agribusiness from a theoretical perspective. Ortmann (2000) also addresses the linkages and the role of government institutions in these linkages between small-scale farmers and agribusiness from a theoretical perspective. Karaan (1999) analyses contracts between small-scale and large scale Diamond coast oyster growers from a transaction cost perspective and suggests appropriate contractual agreements to facilitate these transactions. Meissenheimer, Karaan, Vink and Tregurth (2001) discuss the impact of transaction costs in the wine supply chain and make suggestions to enhance the competitiveness of the wine industry by addressing these costs. Tregurth and Vink (1999) and Hardman, Darroch and Ortmann (2002) address the issue of trust in effective coordination between participants in supply chains. The only work done on the role governance of governance in South Africa was done by Karaan (1999) and, from a Southern African perspective, Delgado (1999). The goal of this thesis is therefore to expand on the South African body of knowledge on supply chain governance structures.

1.3 Framework of analysis

This study uses the constructivist paradigm as the dominant philosophy for scientific inquiry. This paradigm is discussed in Chapter 2 and was recently introduced into the agricultural economic enquiring system by Doyer and van Rooyen (2001). The aim of constructivist inquiry is understanding and reconstruction as opposed to positivist approach of explanation, prediction and control. Most agricultural economists use the positivist approach as the dominant research philosophy. The nature of knowledge in the positivist approach centres on the verification of hypotheses to establish facts or

laws. The constructivist approach attempts the individual reconstruction of knowledge by conceptualising the opinions of participants into a general consensus. The conventional positivist benchmarks of internal and external rigour in terms of the validity, reliability and objectivity are replaced by trustworthiness and authenticity of the subject matter and conclusions.

This study is primarily an exploratory study to observe and describe the phenomenon of changing governance structures in the South African agribusiness sector. In the qualitative research schools the reference framework of the researcher and the applied theory binds *a priori* hypotheses that has to be tested against data gathered specifically for this purpose. Because of this the most important problem presented by the quantitative research design is the exclusionary research design because of the difficulties encountered in quantifying some variables. The problem lies not only with the quantification of the variables, but also in the consideration of variables for their usefulness and applicability to the research question. A variable can be excluded because it is not included in the theoretical framework utilised for the study. The danger therefore exists that facts are only considered facts within some theoretical framework. (Denzin and Lincoln, 1994) A study on the evolution of governance structures is essentially an observation of human behaviour on an individual (or transaction) level, which is difficult to quantify. Coase (1998) also notes that quantification is still an ideal in New Institutional Economics, which is one of the most important theories to elucidate the choice of governance structures. A single theory is therefore not used as a point of reference for this study, instead a number of theories and observations are used as aids in interpreting and understanding observations. The research framework presented below is therefore a conglomerate of applicable theories which were identified and utilised to describe, explain and understand the phenomena observed in the research process. The *modus operandi* was not to use theories to evaluate observations (prove/disprove hypotheses), but to relate observations to possible theories that can explain the phenomenon under investigation.

The biggest danger in using the constructivist approach in combination with the case study methodology is misapprehension due to a lack of rigour in the research process. This challenge was addressed by four research strategies namely: an eclectic literature

analysis to identify all the relevant scientific approaches to the problem at hand, application of the framework to the cases, comparing the results obtained to the opinions of participants in the field and a comprehensive survey of the opinions of agribusiness managers on agribusiness strategy, coordination and change drivers. All of the case studies were compiled in the constructivist role of the researchers as a “passionate participant and facilitator of multi-voice reconstruction” rather than the positivist “objective and disinterested scientist” role in informing decision makers, policy makers and change agents.

The basic point of departure (or hypothesis in the traditional positivist sense) of this thesis is that the trends in the international food and agribusiness sector will be observed in South Africa. These trends will put the agro-food complex under competitive pressure. South African agribusiness firms will find new ways to stay competitive in internationalising markets. The governance structure of transactions between participants in supply chains will be one of the important sources of competitive advantage for agribusinesses to exploit. A good governance structure will improve supply chain (and thus participant) competitiveness by reducing transaction costs and improving the effective and efficient flow of goods, services and information in the process of creating exceptional customer value. Therefore, the analysis and the design of supply chain governance must be based on a good understanding of the evolution of the coordination mechanisms in agricultural supply chains and the factors that influence coordination.

The framework of analysis for this thesis is illustrated in Figure 1.1. The first component of the framework is the drivers of change in the agro-food complex (I) namely consumer demand, changing societal values and norms, technology, deregulation and supply structure as discussed earlier. These factors create the environment in which agribusiness firms have to compete. A strong linkage exists between competitiveness (VI) and the drivers of change. Agribusiness firms have to harness and use these drivers to their advantage. These factors are also the drivers of competition as other firms use them to their own advantage. The internationalisation of agribusiness would serve as a good example. Internationalisation provides exciting new opportunities and markets which agribusiness can realise, while it also presents enormous challenges to these same firms to improve their competitiveness lest they

are out-competed in their own markets by international firms. The drivers of change are extensively discussed in chapter 5.

The drivers of the agro-food system influence the characteristics of the product, supply chain and supply chain strategy (II). This is where the drivers shape the way in which supply chain participants collaboratively plan, design and control all the logistical business processes and activities in the supply chain to deliver superior customer value. These dimensions of the supply chain are discussed in chapter 3. Governance structures, which play a fundamental role in this process, are discussed in the following section to show how the other dimensions of the supply chain influence the choice of governance or coordination structure. Agricultural produce has several unique characteristics which discern agricultural supply chains from those in other industries. These characteristics, as defined by Zuurbier *et al* (1996) are the:

- perishability of products;
- variability in quality and quantity caused by genetic variation, season changes, climatological differences, etc.;
- variation in production rate between processors and producers;
- variation in scale efficiencies in the different stages of the production process which makes vertical integration very difficult;
- complementarity of agricultural raw materials which fixes the output ratio of different products;
- the stabilisation of the consumption of agricultural products;
- the increasing awareness of consumers regarding product, production methods, health, safety and environmental impact;
- the intrinsic value of produce, especially that of fresh produce, which is highest at the moment it is harvested; and
- the demand for capital that creates a measure of dependency.

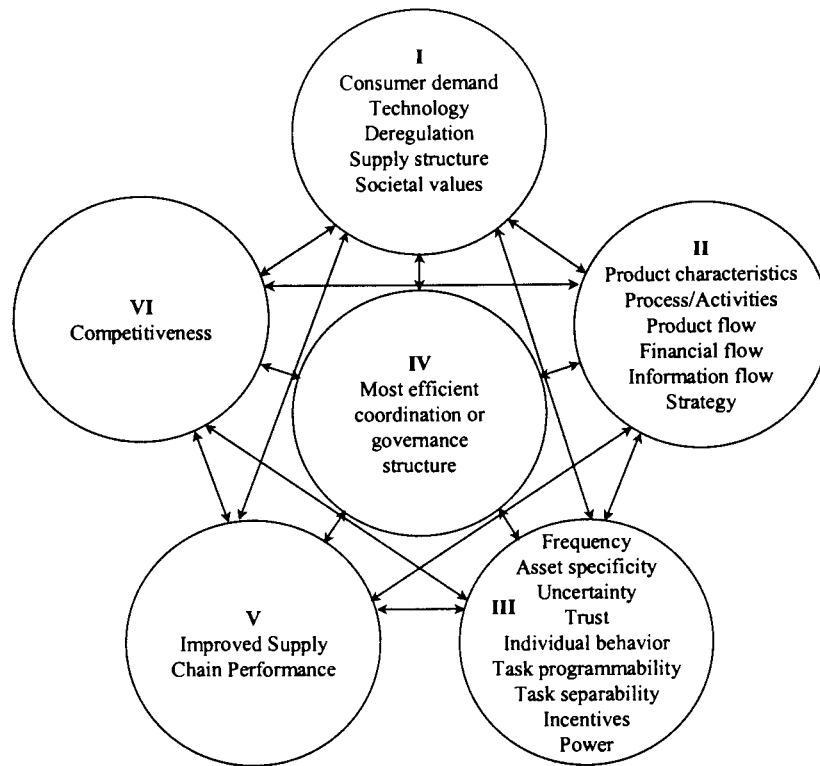


Figure 1.1: Framework of analysis

These characteristics in combination with the supply chain requirements imposed by the drivers of change shape the nature and characteristics of the transactions (III) and interactions between the participants in a supply chain. The most important characteristics of the transactions are the frequency, asset specificity, uncertainty, trust, individual behaviour, task programmability and separability, incentives and the power of these transactions. The combination of these factors defines the characteristics and costs of the transactions required in the supply chain. Given the transaction characteristics and costs, the most efficient coordination or governance structure (IV) for the specific product and industry can be observed and analysed. The interrelation of all of these factors is discussed in chapter 4.

The most efficient supply chain governance or vertical coordination structure will improve the performance of the supply chain (V) which, in turn, will enhance the competitiveness (VI) of the participants in the supply chain.

It is important to note that the framework is used to inform rather than to guide the case studies. The framework was not applied to each case study in a deterministic way as is done in the positivist research paradigm. Each case study is an attempt to “individual reconstruction coalescing around consensus” rather than the verification of hypotheses at the hand of the theoretical framework. In this way parts of the theoretical framework was applied to analyse and explain the different cases.

1.4 Objectives

The general goal of this thesis is to contribute to the general body of agribusiness and agricultural economic research in South Africa as discussed earlier. Supply chain management is emerging as a focus area in the research agenda of South African agricultural economists and is expected gain popularity as supply chains become more prevalent in the agricultural sector. This thesis is generally aimed at expanding research in agribusiness and more specifically on the emerging governance structures in agribusiness supply chains.

The specific goal of this thesis is to explore the emerging types of coordinating mechanisms or governance structures that were set up to improve the coordination and the negotiation process in South African agricultural supply chains and the factors which led to the choice of the specific governance strategy. The context and approach of this thesis is that of supply chain management. Supply chains are manageable entities that regulate the way actors transact with each other. Effective supply chain management has the potential to improve the competitiveness of the South African agricultural sector. Supply chain management and vertical coordination has not received due attention by South African agricultural economists and agribusiness authorities. This relatively new phenomenon needs to be explored and defined to create a solid basis for further research. The goal is addressed at the hand of three objectives.

The first objective is to elucidate the nature and extent of the emergence of supply chain management as a key performance area in the management of South African agribusiness. The reasons for the evolution in the South African agricultural sector and the strategic direction the sector will take must be established. The 'drivers of change' need to be identified to understand underlying pressures for change and the causal relationships in the process of change. The industry response to the pressures emanating from the changes in agricultural policy, consumer demand and agricultural supply need to be investigated to validate the causal relationships in the change process.

The second objective is to observe and describe the manifestation of these trends in the South African agricultural complex at the hand of selected case studies. The intention is to validate and incorporate the observations made in the first two objectives to understand and explain the emergence of supply chains.

The third objective of the thesis is to understand and explain the emerging governance structures in the selected case studies. The choice of governance structure in each of the case studies needs to be evaluated at the hand of relevant theories to explain the critical factors influencing the choice of the structure. Within the framework of the constructivist approach, theory needs to be related to the governance structures observed in practice. The ability of these theories to inform the choice of the most efficient governance structure need to be evaluated.

1.5 Delimitations

This thesis does not strive to evaluate the competitiveness of the various sectors, but rather to consider the importance of governance structures in achieving and sustaining competitiveness. In this way the approach followed is supply chain management with specific emphasis on management. The questions of "why" and "how" are more relevant to the thesis than how much and what value.

The case study approach that is followed needs to be followed up in time to validate the findings in a positivistic sense. The research approach is more exploratory and descriptive than prescriptive and analytical, which leaves ample opportunities for further study in the field.

A series of methodological issues also arises when case study methodology is used. These are the generalisation of the findings, causal or narrative analysis, the nature and role of theory, and authenticity and authority.

Case study research is criticised for its ability to provide a basis for scientific generalisation. A common argument is that a single example cannot be generalised and applied to the whole population. It is important to keep in mind that case studies are answerable to theoretical propositions and not to populations or universes. Case studies should be applied to expand and generalise theories and not to enumerate frequencies. (Lincoln and Guba, 2000; Yin, 1994 and Sterns *et al*, 1998)

Case study researchers can sometimes identify causal relationships after compiling one or two case studies, which is not feasible in survey research. This is possible because the cases are studied in depth, and over time rather than at a single point. However, case study researchers should distinguish between causal and narrative analysis and the validity of the research results gleaned from the process. The narrative account is important to form a sufficient background for the causal analysis, as is used by historians. (Stake, 2000)

Most case study researchers agree on the importance of theory in case study research. However, there is some disagreements about the nature of the theoretical perspective required. For some theory must make sense of a case as a bounded system. Here, the emphasis is on cases as unique configurations that can only be understood as wholes. For others theory should be used to explain the observations in a case in terms of a wider social context. Most authors agree that case analysis always assumes some wider context and the emphasis should be on choosing the correct theoretical construct(s) for this purpose rather than the extent to which theory binds the case format. (Stake, 2000).

The generalisation of results, causal analysis and the theoretical construct supports or undermines the validity, authenticity and authority of the case results. The validation of results at the hand of face and construct validity are therefore important. (Trienekens, 1999 and Stake, 2000)

In conclusion it should be kept in mind that case studies have general relevance, but cannot be used as a basis for scientific generalisation in the conventional kind.

1.6 Outline

The study is primarily concerned with the governance structures that are evolving in the South African agro-food complex. Keeping in mind that supply chain management is a relatively new field in agricultural economics. Chapter 2 expounds the most applicable research paradigm and tools needed to approach the challenge of researching agricultural supply chain governance structures.

Chapter 3 explores the dimensions of the supply chain. It also defines supply chain management and sets the environment for transaction characteristics and costs which determines the optimal governance or vertical coordination structure. Chapter 4 focuses specifically on the governance dimension by introducing the concept of relationships and the evolutions of relationships in agricultural supply chains on which vertical coordination or governance is based. This is followed by three perspectives on governance, namely the transaction cost theory, agency theory and strategic management theory. Vertical coordination or governance is defined in terms of a continuum of choices available to coordinate partners in the supply chain.

Chapter 5 discusses the most important drivers behind the emergence of supply chains in the international agro-food complex. This chapter is constructed in the positivist paradigm. The intention is to validate and generalise the observations made in the case studies. Considerable attention is devoted to the impact of South African agricultural policy on local supply chains. The evolution of the marketing act is extensively discussed since product marketing lies at the core of supply chain management. An extensive survey of the opinions of South African agribusiness managers on coordination preferences and business growth strategies, strategic focus areas, the future shape of the agrofood sector, and the major drivers of change are discussed as a conclusion to this chapter.

The next section of the thesis consists of three case studies to explore the evolving supply chain governance structures in the South African agro-food complex. The case

Chapter 1: Introduction

studies were specifically chosen to represent three examples along the vertical coordination continuum namely market governance (Sandveld potato case), contracting or hybrid governance (contracting in vegetables case) and hierarchy or vertical integration governance (tobacco processing and marketing case). The first (chapter 6) deals with the reasons why the Sandveld Potato Producers are still selling their produce through the auction market and the challenges facing them in establishing a supply chain in their industry in order to improve the competitiveness and profitability of their enterprises. The problems related to the auction market are explored and several possibilities for implementing supply chain strategies are discussed. The second case study (chapter 7) deals with the reasons why vegetable farmers and retailers prefer to bypass the National Fresh Produce Markets to deal directly with each other. Moral hazard and transaction costs are used to explain why contracts or hybrid forms of governance are more suited to vegetable transactions than other forms of coordination. The final case study (chapter 8) deals with a taper integration, a form of hierarchy, implemented by the Potgietersrusse Tabakkoöperasie to facilitate vertical integration in the tobacco chain. The taper integration is explained at the hand of strategic management theory as proposed by Harrigan (1983). The explanatory variables in this case are the bargaining power of the cooperative, competition in the industry and management objectives. Conclusions and recommendations are discussed in the final chapter.

Chapter 2: A New Research Approach for Agribusiness Research

Chapter 2: A New Research Approach for Agribusiness Research

2.1 Introduction

This chapter addresses the research paradigm for supply chain management research. The complexity of the issues involved in supply chain management research necessitates a constructivist paradigm to address research problems. Most agricultural economic research is conducted out of the positivist paradigm. The positivist approach asserts the existence of one absolute, physical-material reality from which there are no variations. This assertion is violated in the agro-food complex – mostly due to the vagaries of consumer tastes and demands, but also due to the complexity and biological nature of agricultural products, production and marketing. The positivist approach focuses on explaining, prediction and control. The constructivist approach focuses on understanding and reconstruction.

Ritson in Padberg, Ritson and Albisu (1997) identifies three traditional problems in agro-food marketing. The first centres on the phenomenon of concentration in the agro-food sector which allows firms to exploit their market power at the detriment of farmers and consumers. Excessive marketing margins due to inefficiencies in the market structure are the second problem, with price formation the third. Analysis of these problems is divided into three broad categories analogous to the problems in the market namely (1) structure/conduct/performance analysis, (2) the analysis of marketing margins, and (3) the analysis of supply and demand relations and the explanation for price movements over time and space. Finally market policies are divided into three broad categories namely (1) price controls (e.g. intervention buying, margin controls, and import taxes), (2) formation of producer or marketing groups and boards (i.e. countervailing power), and (3) various initiatives aimed at improving marketing efficiency (e.g. quality, standards and information). These issues are schematically represented in Figure 2.1.

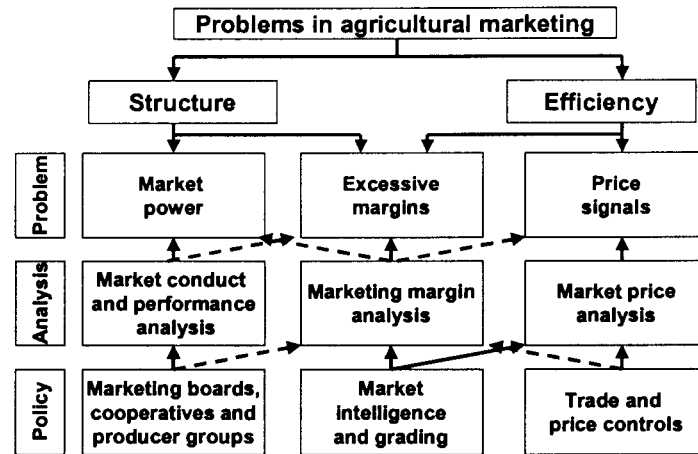


Figure 2.1: Schematic organisation of issues in agricultural marketing

Source: Padberg *et al* (1997)

The core problems in agro-food marketing will always remain. As agriculture is industrialised and supply chain management is implemented agricultural issues will become even more involved, demanding concomitant improvement of research and analysis paradigms and tools. In the past economists and managers have used traditional economic and cost analysis models to examine agro-food market problems. Supply and demand analysis, transaction costs, and other traditional tools were used in the new classical framework to examine the effectiveness of each stage of the flow of products from inputs through farm production and manufacturing to the final consumer. These tools are important and valid for many purposes. However, vital assumptions implicit to much of this paradigm can increasingly be questioned. The following challenges emerge (Downey, 1996, Boehlje, 1999, Zuurbier and Trienekens, 2000):

- With fewer open markets, how is price determined?
- What constitutes a fair price and what does a price reflect that is negotiated behind closed doors?
- How much information flow is needed in a system to ensure that the needs of the consumer are satisfied?
- Who should bear risk and how should risk be divided between the members of the supply chain?

- What is a fair distribution of profits?
- What constitutes fair competition amongst firms when the number of competitors in a system is shrinking and the rest 'collude'?

2.2 Towards a New Inquiry Paradigm

Before we consider the systems available to evaluate the performance of supply chains it would be constructive to consider, for a moment, the inquiry paradigm with which we should approach these challenges.

Beers *et al.* (1998) argues that the diversity and complexity of the challenges involved in supply chain management necessitates a multi-disciplinary approach. A supply chain practitioner should be able to harness the contributions from various scientific disciplines to define adequate sub-problems and to obtain solutions for these from the disciplines available. The different solutions must be successfully synthesised to create a unique solution to the primary problem facing the supply chain. *"It is the explicit multi-disciplinary scope and its own level of abstraction that differentiates this challenge from more specialised disciplines"* (Beers et al, 1998).

Four paradigms have been competing for the paradigm of choice in informing and guiding inquiry: positivism, postpositivism, critical theory and constructivism. A paradigm may be viewed as a set of *basic beliefs* (metaphysics) that deal with the ultimates or first principles. It represents a *world view* that defines, for its holder, the nature of the 'world', the individual's place in it, and the range of possible relations to that world and its parts. Historically there has been a heavy emphasis on quantification in science. Scientific maturity is commonly believed to emerge as the degree of quantification found within a field increases (Denzin and Lincoln 1994).

Positivism was, until recently, the dominant philosophy for scientific inquiry which supplied the dominant theory of how knowledge cumulates and declines in disciplines, but also directly informed virtually all economic practice (Ritzer, 1992). The theory of positivism asserts the existence of one absolute, physical-material reality from which there are no variations (Patton, 1980). In recent years criticism has mounted against the conventional paradigm of quantification in terms of the metaphysical assumptions of positivist and postpositivist inquiry. Ritzer (1992) states

that “Positivist arguments privilege “scientific” methods and knowledge so strongly that they tower imperiously above all public discussion, providing ready-made rationales for expert planning, elite decision making, and weak democracy.” This does not imply a criticism against the application of quantification itself, but the assumptions on which the commonly accepted superiority of quantification has been based.

The critiques against the quantitative schools - i.e. positivism and postpositivism - can be classified into internal or intraparadigm critiques, and external or extraparadigm critiques (Denzin and Lincoln, 1994):

Intraparadigm critiques: In the process of quantification certain variables and subsets of variables are excluded due to the difficulties in quantifying these variables. Consequently the context is “stripped” due to the exclusionary design of the quantitative model. Quantitative research tends to exclude the meaning and purpose of human behaviour in the research context. Qualitative data can provide a rich insight into human behaviour in this context. Positivist and postpositivist research tend to cause a disjunction of ground theories with local contexts. Generalised theory based on aggregated data has little or no relevance to the local context of economic actors i.e. business firms. This is directly related to the inapplicability of general data to individual cases. And finally the positivist and postpositivist research paradigms tend to diminish the discovery dimension in inquiry. The reference framework of the researcher and applied theory binds *a priori* hypotheses that has to be tested against data gathered especially for the purpose.

Extraparadigm critiques. Conventional approaches to research involve the verification or falsification of hypotheses within a certain theoretical framework. The facts or data used for proving or disproving the hypotheses are considered for their applicability to the research question against the background of the chosen theory. It can therefore be said that facts are only facts within some theoretical framework. Theory tends to be underdetermined. This problem is based on the difficulty of successful induction of observations to theory. Although it is relatively easy to deduce certain facts from a specific theory, it is very difficult to induce theory from a set of facts. A set of data can consequently be viewed through the “glasses” of several different theories with

satisfactory results. The challenge, although unattainable, remains to induce a single, unchallengeable theory to explain the “real” truth. Facts are also interdependent and value laden. The use of specific theories lends inordinately more value to certain facts or subsets of facts that what should be the case. The interactive nature of research will always create uncertainty as to what “really” exists. Even in the physical (or hard) sciences, phenomena such as Heisenberg's uncertainty principle and the Bohr complementarity principle indicates measurement and induction uncertainty. In the same way the collection of data influences the behaviour of the subject, while the data collection process is bound by the framework and theories of the researcher (Denzin and Lincoln, 1994).

Table 2.1: Basic Beliefs (Metaphysics) of Alternative Inquiry Paradigms

Item	Positivism	Postpositivism	Critical Theory	Constructivism
Ontology	naïve realism – “real” reality but apprehendable	critical realism – “real” reality but only imperfectly and probabilistically apprehendable	historical realism – virtual reality shaped by social, political, cultural, economic, ethnic, and gender values; crystallised over time	Relativism – local and specific constructed realities
Epistemology	dualist/objectivist; findings true	modified dualist/objectivist; critical traditional/community; findings probably true	transactional/subjectivist; value-mediated findings	transactional/subjectivist; created findings
Methodology	experimental/manipulative; verification of hypotheses; chiefly quantitative methods	modified experimental/manipulative; falsification of hypotheses; may include qualitative methods	dialogic/dialectical	hermeneutical/dialectical

Source: Denzin and Lincoln (1994)

Note: Ontology: What is the form and nature of reality and what can be known about it?

Epistemology: What is the nature of the relationship between the knower and would-be knower and what can be known?

Methodology: How can the inquirer go about finding out whatever he or she believes can be known?

Table 2.2: Paradigm Positions on Selected Practical Issues

Item	Positivism	Postpositivism	Critical Theory	Constructivism
Inquiry aim	explanation: prediction and control		critique and trans-formation; restitution and emancipation	understanding; reconstruction
Nature of Knowledge	verified hypotheses established as facts or laws	nonfalsified hypotheses that are probable facts or laws	structural/historical insights	individual reconstructions coalescing around consensus
Knowledge Accumulation	accretion – “building blocks” adding to “edifice of knowledge” – generalisations and cause-effect linkages		historical revisionism; generalisation by similarity	more informed and sophisticated reconstructions; vicarious experience
Goodness or quality criteria	conventional benchmarks of “rigour” internal and external validity, reliability and objectivity		historical situatedness; erosion of ignorance; action stimulus	trustworthiness and authenticity and misapprehensions
Values	excluded – influence denied		included-formative	
Ethics	extrinsic; tilt toward deception		intrinsic; moral tilt toward revelation	intrinsic; process tilt toward revelation; special problems
Voice	“disinterested scientist” as informer of decision makers, policy makers and change agents		“transformative intellectual” as advocate and activist	“passionate participant” as facilitator of multi-voice reconstruction
Training	technical and quantitative; substantive theories	technical; quantitative and qualitative; substantive theories	resocialisation; qualitative and quantitative; history and empowerment	

Adapted from: Denzin and Lincoln (1994)

Constructivism differs the most from other paradigms in terms of the ontological position. The relativism of the constructivist approach, which assumes multiple, apprehensible, and sometimes conflicting social realities, contrasts significantly with the naïve realism of the positivist paradigm.

Constructivism aims to understand and reconstruct the realities of the actors in the research problem. “Knowledge” used in the reconstruction is based on relative consensus of those competent to interpret the substance of the construction.

Ritzer (1992) points out that although positivism should not be seen as the only research paradigm, the alternatives should be applied with circumspection. Most of the alternative research paradigms are heavily dependent on the interpretive skills of the individual investigator which can be idiosyncratic and essentially unstructured. Morgan (1983) holds a very strong and significant opinion on the application of positivism in research. In a substantive study a determinist, realist, and positivist approach will always remain the most applicable. Unnecessary application of constructivist, or other, research paradigms can be counter-productive. Positivist research 'cuts to the bone' while the danger always exists that the researcher can remain caught up in metaphysical or philosophical exploration of the topic rather than getting down to the important issues of the problem.

The complex view on reality of the constructivist approach is deemed an important complement to positivist paradigms in order to understand the complexities of supply chain management research. The epistemology and methodology of the constructivist approach grants the researcher the opportunity to create knowledge through interaction with the subject(s). The information learned from the interaction can then be used to reconstruct previously held construction in a hermeneutic or dialectical methodology.

New paradigms of inquiry are posing weighty challenges to conventional methodology. The problems associated with conventional methodology can be ameliorated through the augmented application of qualitative data in research. This is not an argument for or against the use of quantitative data, but rather a challenge to carefully consider the fundamental inquiry paradigm relevant to the research problem and consequently the basic assumptions applied in the research problem (Ritzer, 1992, Patton, 1980; Denzin and Lincoln, 1994).

Chain Science is emerging as a distinct discipline in its own right. In the early stages of an emerging discipline specialists are 'specialised problem solvers'. In the second stage of development discipline practitioners exhibit the urge to exchange experiences to structure a 'rule-of-thumb' way in which to conduct investigations and present results. Hypotheses are generated and tested in the third stage to formalise and understand the 'rule-of-thumb' in the embryonic stage of a formal science. The fourth

stage utilises models of causal relations to test the relevance of the developed hypotheses to reality. In the final stage the concepts are operationalised through quantification (Beers *et al.* 1998). This quantification will only make sense if the preceding steps were executed within the right research paradigm.

2.3 Inquiry Tools for the Supply Chain

In the previous section the need for a combination of positivist and constructivist research paradigms was expounded. This section comprises an overview of the theoretical constructs available to the researcher to study the challenges of supply chain management. The theoretical constructs range from procedural to the relational dimensions of supply chains. This is where the biggest challenge is posed to the researcher: to integrate and apply the different (positivist/reductionist) methodologies to render constructivist results that will make sense in complex supply chain systems.

Various tools or methodologies exist to analyse specific aspects of the supply chain. Handfield and Nichols (1999) divides their book *"Introduction to Supply Chain Management"* into three subsections which are: (1) information systems and technology, (2) managing the flow of materials across the supply chain, and (3) developing and maintaining supply chain relationships.

Boehlje (1999) identifies six critical dimensions of the value chain as illustrated in Figure 2.2. These critical dimensions relate to the set of processes or activities that create the attributes or products that are demanded by the consumer, to the flow of products, finance and information between the different participants in the supply chain, induced and maintained by incentive structures within a governance structure.

Three dimensions which describe the supply chain namely the process, performance and institutional dimensions are proposed by Trienekens (1999), and Beers *et al.* (1998). Chain performance refers to the relationship between the supply chain and its environment as perceived by the actors in the chain and the actors within the environment of the supply chain. The perspective of the process focuses on the way the supply chains perform the process of delivering a product with specific attributes to the consumer. These processes encompass primary support, communication, co-ordination, and management. The institutional perspective concentrates on the way

different organisations co-operate with each other in a formalised way. Different possibilities for linking participants together is described and analysed (Beers, *et al.* 1998).

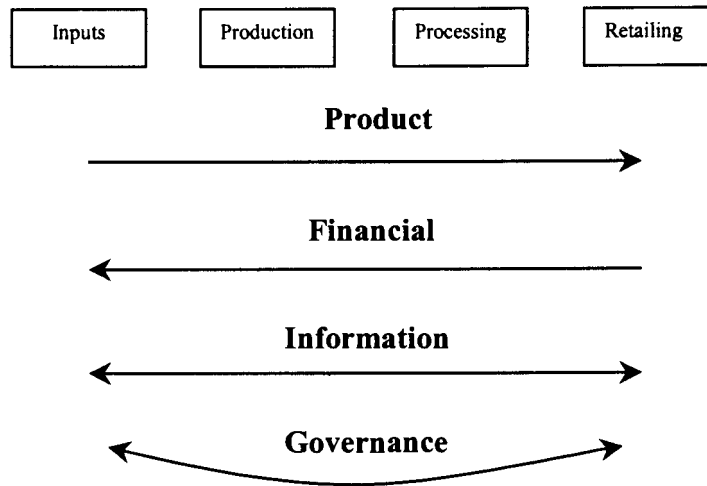


Figure 2.2: Critical dimensions of a value chain

Source: Boehlje, 1999

Boehlje (1999) divides the measurement of economic performance of emerging phenomena in the agricultural industry into two categories as indicated in Table 2.3.

Table 2.3: Measurement of Economic Performance

Physical Product/Financial Stocks and Flows	Relationship/Information Stocks and Flows
1. Quality	1. Trust
2. Yield/input-output/physical efficiency	2. Accuracy of messages (information)
3. Economic value	3. Flexibility
4. Market or transfer price	4. Commitment
5. Time to market	5. Speed of response
6. Errors/mistakes	6. Strength of signals
7. Cost	7. Equitability (fairness)/distributional issues (cost, revenue, risk)
8. Profit	8. Adaptability
9. Return on assets	9. Transition/switching cost
10. Cash flows	10. Value creation and capture
11. Capital turnover	11. Value decay
12. Property rights	

Source: Boehlje, 1999

Trienekens (1999) related various scientific approaches applicable to chains to the three primary dimensions of chain analysis. This division is represented in Table 2.4.

Table 2.4: Possible contributions of different theoretical frameworks to supply chain analysis

Institution	Performance	Process
Transaction cost economics	Transaction cost economics	Supply Chain Management
Agency theory	Agency theory	Information and Communication
Network Theory	Resource Dependency theory	Technology
Strategic Management	Activity Based Costing	Activity Based Costing
Transaction Cost of Ownership	Direct Product Profitability	Direct Product Profitability
	Transaction Cost of Ownership	Transaction Cost of Ownership

Source: Trienekens, 1999

These theories can be evaluated according to their contribution to the research framework in terms of the subject and context of the theory (why), the applicable variables (what), and the problem approach (how). The scientific approaches are classified according to these standards in Table 2.5.

2.4 Research in supply chains

In this section it is argued that the complexity of the business and institutional environments facing business firms in the new global economy extend beyond the scope of neoclassical economics and should be augmented by a holistic application of various economic theories from a constructivist paradigm. Conventional agricultural economic analysis is bound by the Leibnizian inquiry paradigm (positivist). This paradigm approaches reality with in a deterministic view where clear and linear assumptions apply.

Agribusiness activities in South Africa currently occur in a free, deregulated environment. Agricultural economic analysis is challenged to capture complex business reality and decisions in scientific models in order to explain and predict the institutional and governance structures and optimal resource allocation behaviour of firms within a labile global business environment.

Table 2.5: Examples of theory elements of various scientific approaches to vertical co-ordination

Approach	Why? (view of reality)	What? (aspects/variables)	How? (problem approach)
Transaction Cost Economics	Goal: search for the most appropriate organisational form to govern transactions. Elements in view: - nexus of contracts - bounded rationality - opportunism	Frequency Uncertainty Asset specificity (of transactions)	Make/buy decision
Agency Theory	Goal: contract optimisation. Elements in view: - self interest - bounded rationality - risk aversion	Principal Agent Information	Trade-off between risks and costs of measurement
Strategic Management	Goal: competitive advantage Elements in view: - market - strategic position	Stakeholders Competitors Market	Strategy building (e.g. cost / differentiation)
Network Theory	Goal: best network position Elements in view: - dynamic relationships - power - trust	Nodes Links Market	Building network relationships
Resource Dependency Theory	Goal: resource securement/control. Elements in view: - resource dependency - core competencies	Resources: - information - capital - labour - capabilities	Building supply networks Outsourcing
Supply Chain Management	Goal: efficient and effective replenishment Elements in view: - customer orientation - efficiency of processes	Product flow Information flow Processes Co-ordination	Throughput time reduction Gearing processes
Information Technology	Goal: enable co-ordination between parties Elements in view: reduce costs and risk of co-ordination	Data Process Event Object	Information modelling System building Information technology in products
Cost approaches	Goal: cost minimisation Elements in view: - activity based costing - direct product profitability - total costs of ownership	Process Costs Product Ownership	Define processes as cost centres Assign processes to products Define ownership relationships

Source: Trienekens, 1999

The research approach followed in this thesis is a combination of a positivist and constructivist approaches. The combination of these approaches enables a holistic approach to the research problem. Positivism's strong explanatory and prediction

capabilities are combined with the strong understanding and reconstructive capabilities of the constructivist approach. Qualitative and quantitative data can be used in this framework to analyse the trends in the agricultural sector.

The constructivist approach is essential in the growth of supply chain science as a discipline in its own right. Beers, Beulens and van Dalen (1998) outlined the growth of a scientific discipline as follows:

- In the early stages the science exists as a profession of ‘specialised problem solvers’;
- The specialists start to exchange views and experiences in the next stage as specialists identify the need for a structured way to approach challenges in the field. In this stage ‘rule of thumb’ diagnoses and solution are defined;
- The ‘diagnosis-action-rules’ so not always work, are still unsystematic and lack a scientific basis. The next stage in scientific development is to identify and test the practical rules (hypotheses) are applicable and do work. This step is generally recognised as the start of ‘science’ as hypotheses are identified and tested;
- In order to find out why actions have certain consequences, conceptual models of causal relations in reality are generated and tested in the real world.
- When the relevant concepts and valid causal relationships have been identified, the next stage is to make the concepts and relations operational by quantifying it.

Beers *et al* (1998) stated that chain science is probably still in the middle of the second stage. The comments by Trienekens and Zuurbier (2000) on the development of the science would indicate that the science is entering the third stage of scientific maturity. The combination of constructivist and positivist, where the former is used for theory generation and the latter for theory testing, would be an appropriate framework for addressing the changes in South African agricultural supply chains.

2.5 Methodology

The methodology applied in this thesis is primarily case study research. The case studies are used to identify and describe causal relationships in different coordination mechanisms along the vertical coordination continuum. The case studies are qualitative by nature and efforts are made to test the validity of the cases with empirical work as much as possible.

The case study approach gained steady ground as a recognised scientific research tool in recent years (Sterns, Schweikhardt, and Peterson, 1998). Other ways include experiments, surveys, histories, and the analysis of archival information (the favourite playground of agricultural economists) (Yin, 1994). Case studies do not transfer knowledge in the traditional sense of stimulating lower-order thinking skills. However, case studies have proved to be very successful in stimulating higher-order thinking skills e.g. stimulating discussion, promoting analytical thinking and encouraging readers to test hypotheses (Harling and Misser, 1998).

The case study method is one of the most popular methodologies employed by constructivist researchers (Denzin and Lincoln, 1994 and Hammersley and Gomm, 2000). As indicated in Table 2.7, a case study is concerned with understanding the case (or phenomenon) in itself – the focus is not on theoretical inference or empirical generalisation. The primary concern is not to control or influence the variables to determine behaviour, but to observe the study subject in its ‘natural’ state. The basic belief of a constructivist inquiry paradigm in terms of methodological approach is hermeneutical or dialectical (see Table 2.1). Experiments and surveys has theoretical inference, practical evaluation of interventions and empirical generalisation as goals (Hammersley and Gomm, 2000, see also Table 2.7). These goals are based on the experimental and manipulative methodologies of the positivist and postpositivist paradigms. Case study methodology therefore gives the researcher the opportunity to understand and reconstruct observations at the hand of, rather than determined by, theory. It is essentially a reconstruction of individual cases around general consensus without the limitations imposed by the positivist inquiry paradigm. (Denzin and Lincoln, 1994).

Sterns, Schweikhardt, and Peterson (1998) argues that the most important contribution of case study research is the ability of the research instrument to explore the inside of the 'black box' of managerial decision making in agribusiness firms. The three objectives of research are to (1) conduct applied, problem-solving research, (2) to develop new theory, and (3) to test existing theory. They are of the opinion that case study methodology can be selectively applied to meet these objectives.

The case study research method is extensively described by Yin (1994). Traditionally research strategies were arranged hierarchically i.e. case studies are appropriate for the exploratory phase of an investigation, that surveys and histories were appropriate for the descriptive phase, and that experiments were the only way to so explanatory or causal inquiries. According to Yin this view is incorrect inasmuch that case studies have been successfully applied to various phases of the research process.

Three types of case studies can be discerned namely exploratory, descriptive and explanatory case studies. The important conditions that a researcher has to consider in the choice of an appropriate research strategy are:

- (a) The type of research question posed;
- (b) The extent of control an investigator has over actual behavioural events; and
- (c) the degree of focus on contemporary as opposed to historical events.

(Sterns *et al*, 1998; and Yin, 1994).

The familiar array of research questions is:

“who”, “what”, “where”, “how” and “why”

The first and most important condition for choosing an appropriate research strategy is to identify the type of research question being asked. The “what” question can in general be either exploratory or about prevalence. The most appropriate strategy for the former is the case study, while the most appropriate for the latter would be surveys or analysis of historical data.

Table 2.6: Relevant situations for different research strategies

Strategy	Form of research question	Required control over behavioural events?	Focuses on contemporary events?
Experiment	How, why	Yes	Yes
Survey	Who, what, where, how many, how much	No	Yes
Archival analysis	Who, what, where, how many, how much	No	Yes/No
History	How, why	No	No
Case study	How, why	No	Yes

Source: Yin, 1994

However, the application of a case based research strategy is not without dangers. The biggest challenge is the lack of rigour of case study research. Case study investigators have in the past allowed equivocal evidence or biased views to influence the direction of the findings and conclusions. Yin (1994) points out that the problem of bias is possible in any kind of research strategy and has to be dealt with actively.

The second concern about case study research is that they provide little basis for scientific generalisation. A common argument is that a single example cannot be generalised and applied to the whole population. It is important to keep in mind that case studies are answerable to theoretical propositions and not to populations or universes. Case studies should be applied to expand and generalise theories and not to enumerate frequencies. (Yin, 1994 and Sterns *et al*, 1998)

The final peril that the case study researcher has to be aware of is the rendering of massive, unreadable documents that take a long time to produce. This challenge must be addressed by the researcher self as a matter of writing discipline.

The challenges related to the first two challenges to case study research can be addressed with a proper system of research validation as proposed by Trienekens (1999). Two validation tests are relevant to case study research namely face validity

and construct validity. Face validity refers to the degree in which the results of the study reflect the phenomenon studied. This includes a reflection of meaning and content of the concept used; specification of the theoretical dimensions of the concept; and finally the choice indicator for each of the chosen dimensions. Construct validity refers to the correlation between theoretical compositions and eventual empirical evidence. Construct validity gauges the accuracy of identification of variables, concepts and relationships, how they are constructed in a model and how accurately the model is executed.

Table 2.7: A schematic comparison of case study with experimental and survey approaches

Experiment	Case study	Survey
Investigation of a relatively small number of cases	Investigation of a relatively small number of cases (sometimes just one)	Investigation of a relatively large number of cases
Information gathered and analysed about a small number of features of each case	Information gathered and analysed about a large number of features of each case	Information gathered and analysed about a small number of features of each case
Study of cases created in such a way as to control the important variables	Study of naturally occurring cases; or in “action research” form, study of cases created by the actions of the researcher but where the primary concern is not controlling variables to measure their effects	Study of a sample of naturally occurring cases; selected in such a way to maximise the sample’s representativeness in relation to some larger population
Quantification of data is a priority	Quantification of data is <i>not</i> a priority. Indeed, qualitative data may be treated as superior	Quantification of data is a priority
The aim is either theoretical inference – the development and testing of theory – or the practical evaluation of an intervention	The main concern may be with understanding the case studies in itself, with no interest in theoretical inference or empirical generalisation. However, there may also be attempts at one or another, or both, of these. Alternatively, the wider relevance of the findings may be conceptualised in terms of the provision of vicarious experience, as a basis for ‘naturalistic generalisation’ or transferability	The aim is empirical generalisation, from a sample to a finite population, though this is sometimes seen as a platform for theoretical inference

Source: Hammersley and Gomm (2000)

The researcher has three tools available ensure that the validity of the research. These are a good literature analysis to identify all the relevant scientific approaches to the

problem at hand, the case study to apply the framework and finally the opinion of experts in the field. (Trienekens, 1999)

It is clear that case study research is better suited to how and why research questions. The research challenge related to the emergence of governance structures in supply chains is primarily related to the “how and why” of the phenomenon. The case study strategy would therefore be appropriate to the phenomena in the South African agribusiness sector.

However, in order to partly address the shortcomings of the case study methodology a positivist section is added in the form of a survey of managerial opinions on vertical coordination, supply chain management and the future trends in the agribusiness sector. The intention of this section is to validate and extend the generalisation of the case studies.

2.6 Conclusion

In this chapter the methodology and research approach for studying the evolving supply chain governance structures of the South African agribusiness complex is considered. There is a growing understanding that the competitiveness of the food and fibre industry is not only based on the competitiveness of individual firms, but also on the effectiveness of linkages between competitive firms (O’Keefe, 1999).

Firms have to respond efficiently to external shocks like changes in consumer demand, financial and exchange rate risks etc., to remain competitive. However, firms operate in a supply system to which they usually only contribute a relatively small portion of the value of the final product. Individual firms can improve their competitiveness through cooperation and coordination with other firms in the supply chain. Mutual dependency emerges which requires better coordination and control of transactions and, more specifically, investment in productive assets. The institutional and governance structure employed to coordinate the supply chain will determine the manageability, reactivity and ultimately, the competitiveness of the supply chain.

The constructivist approach at the hand of case studies is discussed as the research approach to study the evolution of governance structures in South African

agribusiness supply chains. The case study approach is used for the ability of this research instrument to explore the inside of the 'black box' of managerial decision making in agribusiness firms. The case study methodology is suited to the constructivist research paradigm. The case study methodology enables the researcher to understand and reconstruct observations at the hand of, rather than determined by, theory. It is essentially a reconstruction of individual cases around general consensus without the limitations imposed by the positivist inquiry paradigm.

However, there are several limitations to case study methodology namely the generalisation of findings, nature and role of theory and the validation of the research. Solutions are proposed of which a quantification of the emergence of the emergence of new governance structures is included to establish construct validity and further the generalisation of the research results.

Chapter 3: Supply Chain Management in Agriculture

Chapter 3: Supply Chain Management in Agriculture

3.1 Introduction

In this chapter supply chain management is defined and the different aspects of supply chain management explored in the agricultural industry. The goal is to get an overview of all the dimensions involved in supply chain management that have to be considered and their application in the marketing of agricultural produce. These dimensions represent the activities, processes and exchanges between participants in the supply chain which have to be facilitated by the governance structure. The supply chain delivers the required product to the consumer and therefore plays an important role in value creation. In the framework of analysis the drivers of change determine chain strategy and the required output of the chain. In turn the supply chain processes shape the required characteristics of the transactions between the participants to facilitate value creation. Definitions for supply chain management are presented after which these definitions will be analysed and discussed.

3.2 Defining Supply Chain Management

The process of getting goods to the customers has traditionally been referred to as the physical distribution process (Kotler, 2000). This process starts at the farmer when the farmer chooses the marketing channel that delivers the product to the final consumer at the right time, in the right form and in the most cost-effective manner. In its simplest form the marketing channel for an agricultural product can be represented in terms of the steps or stages involved in marketing of the product as indicated by Kohls and Uhl (1998):

1. Assembly of raw commodities
2. Transportation
3. Grading and classification
4. Processing
5. Further processing
6. Packaging
7. Storage
8. Distribution
9. Retailing

Chapter 3: Supply chain management in agriculture

Supply chain management expands on physical distribution as it also includes the procurement of the right inputs (raw materials, components, and capital equipment), convert them efficiently into finished products and dispatch it to the final destination (Kotler, 2000).

The term Supply Chain Management originates from the logistics discipline where it was defined in terms of the all the constituent parts that make up the system such as material suppliers, production facilities, distribution services, and customers, linked together via the forward flow of materials and the backward flow of information (Stevens, 1989). Ganesham and Harrison (1995) defines a supply chain as 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 the distribution of these finishes products to customers.

Tan (2001) points out that within management science two alternative perspectives on supply chain management distinguished namely that of the purchasing and supply school and the transportation and logistics school. The purchasing and supply school defines supply chain management (or supplier base integration) as attempts by manufacturers to integrate and partnership with their suppliers to more efficiently and effectively manage the purchasing and supply functions. The objectives of these activities are to reduce the supplier base, concurrently engineer supply chain processes, reduce cycle times, reduce inventory, and to improve customer satisfaction. The transportation and logistics school defines supply chain management (or integrated logistics) as attempts by the wholesalers and retailers to integrate the logistics function and partnership with their transportation providers to more efficiently and effectively manage the transportation and distribution functions. The objectives of these activities are to provide visibility to the chain, reduce demand uncertainty, consolidate distribution centres, reduce transportation costs, and to replace inventory with information. Tan (2001) finds that when the two bodies of knowledge was integrated from the two perspectives into a common body of knowledge that encompassed all the value-adding activities on the value chain, researchers and managers realised the importance of incorporating supply chain management in overall business planning process.

Ellram (1991) expands this definition to include the dimension of cooperation and collaboration between firms: "...integrative approach to dealing with the planning and control of the materials flow from suppliers to end-users. It is an approach aimed at co-operatively managing and controlling distribution channel relationships for the benefit of all the parties involved, to maximise efficient use of resources in achieving the supply chain's customer service goals...".

Beamon (1998) indicates that the definition of supply chain management (as originally used in the logistics discipline) has expanded: "...an integrated process wherein a number of various business entities (i.e. suppliers, manufacturers, distributors, and retailers) work together in an effort to: (1) acquire raw material, (2) convert these raw material into specified final products, and (3) deliver these final products to retailers. This chain is traditionally characterised by a forward flow of materials and a backward flow of information. Traditionally, researchers and practitioners have primarily investigated the various processes of the supply chain individually. Recently, however, there has been an increasing attention placed on the performance, design, and analysis of the supply chain as a whole."

The definitions of Ellram and Beamon underline the notion of collaboration and cooperation between firms as introduced in chapter one. The nature of transactions between organisations is evolving from discrete to relational transactions to accommodate the co-operative management and control of distribution channels as a whole as opposed to atomistic firms acting in isolation. Dooley and Akridge (1998) gives a graphical representation (Figure 3.1) of the process that takes place as discrete transactions evolve to relational transactions. Note the change in roles of the sales and purchasing functions and the collaborative R&D planning that ensues as firms co-operate to manage the supply system. Spekman, Kamauff, and Myhr (1998) summarises the revolutionary transformation that the new competition demands and the changes faced by the procurement manager:

Table 3.1: An illustration of Purchasing's New Role

Evolving role	Revolutionary role
Transaction accountant	Information exchange broker
Administers inter-firm contracts	Guides the information and implementation of partnerships and inter-firm networks
Primary point of contact with suppliers	Manager of external manufacturing
Interface with first-tier suppliers	Responsibilities throughout the supply chain
Minimises risks (e.g. supply disruption, incoming defects) to the buying organisation	Manages and leverages the skill of the supply chain
Reacting to external stimuli (reactionary change)	Proactively assessing external information
Safeguarding proprietary/critical information – transaction driven	Enhancing information sharing through the value chain – early supplier involvement
Unidirectional communication	Simultaneous two-way communication
Cross-functional coordination	Functional integration
Cause and effect problem solving	Systems thinking
Purchasing mentality	World view

Source: Spekman et al 1998

The concept of the food supply chain management is defined by (Downey, 1996) as “...the process of bringing order to the system of producing, processing, and distributing food and agricultural products to consumers. From the consumer perspective supply chain management focuses on improving effectiveness and efficiency of the system to deliver a wide range of safe and desirable agricultural products in a cost effective manner. From the suppliers point of view, supply chain management involves the creation of organisational structures and linkages that will ensure a strong position in the market and enhance their profitability.”

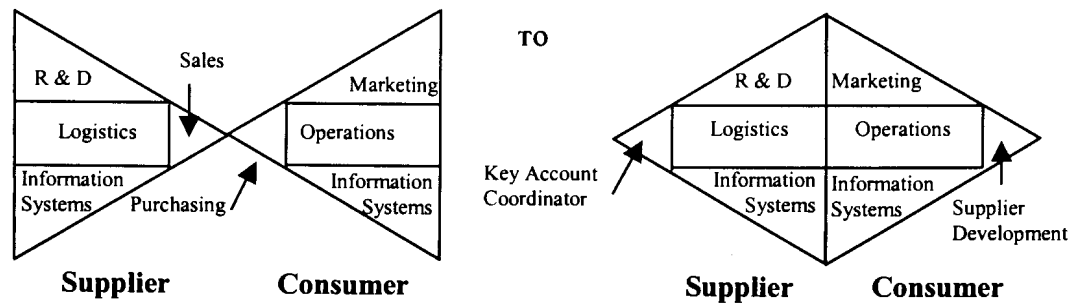


Figure 3.1: Changes in Procurement with Shift to Supply Chain Management

Source: Dooley and Akridge (1998)

“The supply chain encompasses all the activities associated with the flow of products from the raw materials stage (extraction), through to the end user, as well as the associated information flows. Material and information flow both up and down the supply chain. Supply Chain Management is the integration of these activities through proven supply chain relationships, to achieve a sustainable competitive advantage” (Handfield and Nichols, 1999).

Boehlje (1999) expects that supply chain management will improve efficiency through better flow scheduling and resource utilisation, increase the ability to manage and control quality throughout the chain, reduce risks and especially the risk associated with food safety and contamination through trace back, and increase the ability of agricultural industries to respond quickly to changes in consumer demand for food attributed. He identifies six critical dimensions to the supply chain in agricultural industries namely the process/activities, product flow, financial flow, information flow, incentives and governance of the supply chain.

Van der Vorst, Beulens, de Wit and van Beek, (1998) presents an expansive definition of supply chain management as the collaboration among actors in a supply system, from the primary producer to the end-consumer, to better satisfy consumer wants and needs at lower costs. This collaboration is an integrative approach to plan and control the flow of materials from the producers to the consumers by breaking down the barriers that exist between each of the links in the supply chain. Pareto improvement is achieved in the process with none of the parties worse off and one or more of the

parties better off. Additional flows of materials and information is created in the process.

The following points are clear from the preceding definitions of supply chain management:

- It is a co-operative process across firm boundaries;
- with the aim of managing distribution channel processes and relationships;
- to bring order to the system of:
 - acquiring raw material (producing)
 - processing raw material
 - delivering final product to consumers (distributing)
- by means of organisational structures and linkages;
- that;
 - improve the effectiveness and efficiency of the chain;
 - ensure a strong position and;
 - sustainable competitive advantage in the market while;
 - ensuring Pareto improvement for the whole chain.
- to deliver safe and reliable food to the consumer and;
- to create consumer satisfaction – to deliver superior customer value.
- the dimensions of the supply chain are product, financial, information, incentives, and governance structure

A simplified version of the supply chain and its dimensions is presented in Figure 3.2.

3.2.1 Supply chain management definition caveats

Three important aspects are worth noting when discussing supply chain management. Firstly the use of the term ‘chain’ can be seen as an oversimplification of the nature of the supply chain process. The term ‘chain’ could create the impression that a supply chain is a linear and rigid arrangement of firms serving the final consumer. Supply chain management actually refers to a system or network of firms interacting to deliver a product or service of superior value to the end consumer. (Ellram, 1991 and Zylbersztajn and Farina, 1998) Supply chains therefore look less like a pipeline than an uprooted tree, where the branches and roots are the extensive network of customers and suppliers (Lambert and Cooper, 2000). Supply chains are networks of dynamic

relationships that are constructed, deconstructed and revised as circumstances dictate. Supply system management would therefore be a more applicable term to use. The common denominator separating the supply chain from the rest of the agrofood system is the common goal held by the actors namely specific and superior value creation for a clearly defined market (Omta, 2002).

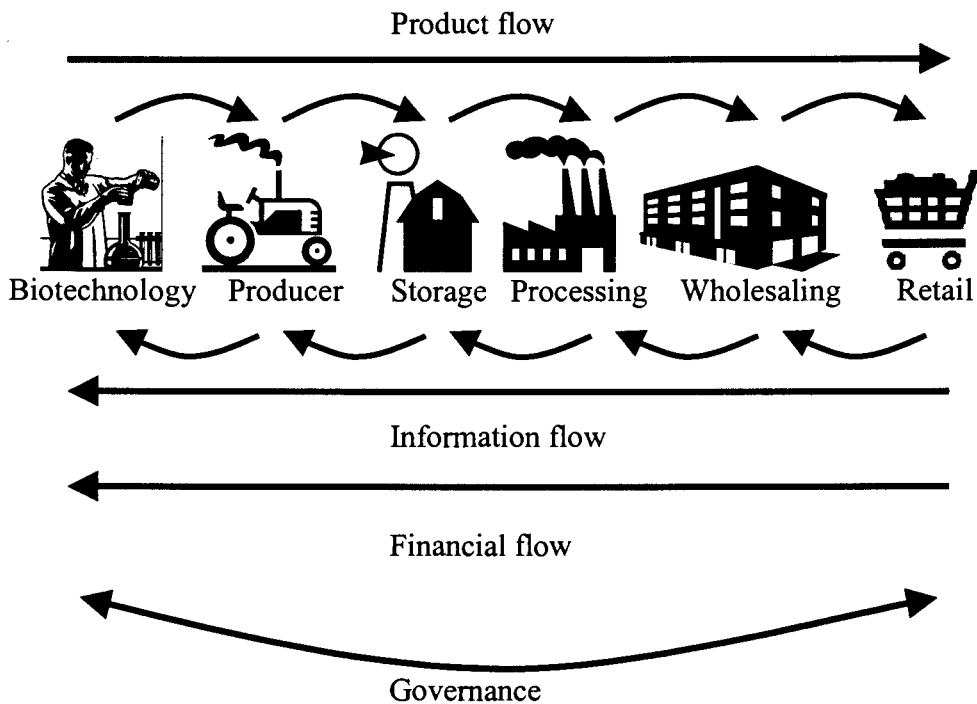


Figure 3.2: Dimensions of the Supply Chain

Adapted from Boehlje (1999), van der Vorst *et al* (1998) and Poirier (1999)

Secondly, Kotler (2000) is of the opinion that the supply chain approach views markets as only a destination point. The company would be more effective by considering its target market's first and then designing the supply chain backward from that point. This criticism is justified as applied to the traditional view on supply chain management (see Stevens, 1989), but it is clear from more recent authors that the definition and application of supply chain management has expanded to a more integrative and holistic approach. A demand chain would therefore be a more applicable term to describe the process.

Supply chain management is therefore probably not the best term to describe the extent and application of the discipline. Demand system management could be a much more accurate description, but the term ‘supply chain management’ is upheld to avoid confusion as it is currently the most widely used term.

The term value chain is also frequently used to describe a supply chain. Michael Porter popularised the usage of the term in his discussions on competitiveness and firm and industry strategy. However, in Porter (1998) he states that: “Every firm is a collection of activities that are performed to design, produce, market, deliver, and support its product. All these activities are can be presented using a value chain...” and “A firm’s value chain is embedded in a larger stream of activities that I term the value system.” (authors’ underlining). The term value chain refers essentially to the processes in the firm itself. The term value system would therefore be the correct terminology to utilise when referring to the supply chain although the term value chain has undergone a semantic evolution over time and will continue to do so.

Omta (2002) positions supply chain management research as a part of Chain and Network Science. Chain and Network Science is the theoretical domain concerned with the “behavioural and social aspects of organisation and governance of exchange relationships, the nature of choices being made, the incentives and constraints, the basis and the use of power, and the nature of interaction and communication.” (Omta, 2002:14). The supply chain management discipline as a sub-discipline of chain and network science focuses on the coordination of activities between actors to deliver a specific product.

3.2.2 Critical dimensions in the supply chain

In the previous section the critical dimensions of the supply chain was identified (Boehlje, 1999). These are:

- Processes/activities
- Product flow
- Information flow
- Financial flow
- Incentives
- Governance

The first dimension of the chain concerns the activities or processes involved in delivering the final product to the consumer. These activities create the attributes that satisfy the consumer's needs (Kotler, 2000 and Boehlje, 1999).

The second critical dimension of a value chain is the product flow across the chain. Aspects like transportation and logistics ensuring that the different elements in the supply chain are delivered to the right processes at the right time (Boehlje, 1999; Stevens, 1989; and Handfield and Nichols, 1999).

The third critical dimension of a supply chain is the financial or cash flow across the chain. The sharing of financial performance information in the chain between participants and stages in the chain is an important aspect of this dimension and often a source of conflict (Boehlje, 1999).

The fourth important dimension of the chain concerns the information flow across the chain. Information is necessary to control primary business processes in chains, generate management information to assist in decision-making and statistics for regulation bodies (Hofman, 1998). A new dimension is information for traceability to give quality and safety assurances to consumers (Verbeke and Viaene, 2000).

The fifth critical dimension of the supply chain is the incentive system that is in place to reward performance and share risk. The conflicts encountered as a result of inflexible contract and similar incentive systems that result in inequitable sharing of gains and losses are constantly challenged to produce systems that are more responsive to dynamic economics and business conditions (Boehlje, 1999).

The sixth and final dimension of the supply chain is the chain governance or vertical coordination system. Alternative governance systems may include open-access markets, various forms of contracts, strategic alliances, joint ventures, franchising arrangements, networks and cooperatives, and vertical ownership. The choice of governance/coordination system will have a significant impact on the distribution of power and control in the supply chain (Boehlje, 1999 and Peterson and Wysocki, 1997). The governance or vertical coordination system is discussed in chapter four.

Poirier (1999) presents a more practical approach that indicates the dimensions of supply chain management implementation in firms. He identifies four dimensions or levels through which a firm has to evolve to achieve advanced stages of supply chain management and to realise the rewards. These levels and the different aspects involves in each level is presented in Table 3.2.

Table 3.2: Levels of Supply Chain Optimisation

	Internal		External	
	Sourcing and Logistics I	Internal Excellence II	Network Construction III	Industry Leadership IV
Driver	Vice President Sourcing (under pressure)	CIO/supply chain leader	Business unit leaders	Management team
Benefits	Leveraged savings	Prioritised improvements across network	Better partner performance	Network advantage, profitable revenue
Focus	Inventory, logistics, freight, order fulfilment	Process redesign, system improvement	Forecasting, planning, customer services, inter-enterprise	Consumer, network
Tools	Teaming, functional excellence	Benchmarks, best practise, activity based costing	Metrics, database mining, electronic commerce	Intranet, Internet, virtual information systems
Action Area	Midlevel organisation	Expanded levels	Total organisation	Full enterprise
Guidance	Cost data, success funding	Process mapping	Advanced cost models, differentiating processes	Demand-supply linkage
Model	None	Supply Chain Intra-enterprise	Inter-enterprise	Global market
Alliances	Supplier consolidation	Best partner	Formal alliances	Joint ventures
Training	Team	Leadership	Partnering	Network processing

Source: Poirier, 1999

The levels of supply chain optimisation as proposed by Poirier (1999) approximates the definitions of supply chain management in the sense that in the lower levels the focus is on the internal logistics practices of the firm with the only external linkage that of product procurement. The next two levels (III and IV) also labelled ‘external’ occur when the business joins forces with external firms to seek the advantages of co-ordination as discussed in the definitions of supply chain management.

The first level of supply chain management implementation is primarily the responsibility of the sourcing or purchasing managers who has to ensure that the right suppliers are selected, they are meeting performance expectations, appropriate contractual mechanisms are employed, and good relationship is maintained with these suppliers (Handfield and Nichols, 1999).

The second level of supply chain management implementation concerns the enterprise as a whole. All the different functions and departments in the enterprise have to be co-ordinated to optimise cross-functional efficiency (Poirier, 1999). The value chain in the firm as defined by Porter (1998) has to be managed efficiently to reduce cycle times, reduce errors and inspection in the enterprise, lessen paperwork and inventories, and to share enhanced value across the network.

The third level of supply chain management is to establish the strategic network. The most important characteristic of this phase is that the best partners are chosen and working models established with them. This model will form the basis for expanded networks that will form the basis of the channel leadership goals of the fourth level.

3.2.3 Synopsis

The most important characteristic of supply chain management is inter-organisational cooperation. The notion of atomistic firms that interact with each other on a transactional basis is discarded for relational interaction with long-term benefits for both partners. These relational interactions are managed in the supply chain management approach to achieve the maximum long-term benefits. The governance or vertical coordination system is of particular importance as it should minimise transaction costs and maximise relational benefits.

The supply chain management process consists of different levels or dimensions that are co-ordinated to attain mutual benefit for all the players involved in the supply chain. Most writers categorise a supply chain in three broad dimensions namely those of product flow or logistics, information and supply chain relations or governance structure (Beamon, 1998; Handfield and Nichols, 1999; and Downey, 1996 amongst others). Boehlje (1999) does point out that the financial flow; incentives and

governance dimensions of the chain are closely interlinked. In view of this the three-dimension approach, namely product flow, information flow and governance structure (discussed in Chapter 4), is adopted to elucidate the nature of supply chains. The dimensions that are not explicitly included will be implicitly dealt with in later chapters as the issues are interrelated.

3.3 Product flow dimension

3.3.1 Introduction

The product flow dimension or logistics can be described as the backbone of the supply chain. The Council of Logistics Management (CLM) defines logistics as “...the process of planning, implementing, and controlling the efficient, effective flow and storage of goods, services and related information from the point of origin to the point of consumption for the purpose of conforming to customer requirements.” (Handfield and Nichols, 1999). The logistics discipline coined the term of supply chain management, but the term has grown in meaning since then. Logistics constitute an important aspect of supply chain management. The logistic requirements of agricultural produce are unique due to the biological and mostly perishable nature of these products. Special care needs to be taken especially when transporting fresh products over vast distances to markets like the European market. There are three important decision areas related to logistics namely location, production, inventory and transportation.

3.3.2 Background

In the 1950's and 1960's, most manufacturers emphasised mass production to minimise unit production cost as the primary operations strategy, with little product or process flexibility. New product development was slow and relied exclusively on in-house technology and capacity. ‘Bottleneck’ operations were cushioned with inventory to maintain a balanced line flow, resulting in huge investment in work in progress inventory. Sharing technology and expertise with customer or suppliers was considered too risky and unacceptable and little emphasis appears to have been placed on cooperative and strategic buyer-supplier partnership. The purchasing function was generally seen as a service to production, and managers paid limited attention to issues concerned with purchasing. In the 1970's Manufacturing Resource Planning

was introduced and managers realised the impact of WIP inventories on manufacturing cost, quality, new product development, and delivery lead-time. Manufacturers responded by implementing new materials management concepts to improve performance within the four walls of the enterprise. The intense global competition in the 1980's forced enterprises to offer low cost, high quality, and reliable products with greater design flexibility. Manufacturers utilised just-in-time (JIT) and other management initiatives to improve manufacturing efficiency and cycle time. In the fast moving JIT manufacturing environment with little inventory to cushion production or scheduling problems, manufacturers began to realise the potential benefit and importance of strategic and cooperative buyer-suppliers relationship. The concept of supply chain management emerged as manufacturers experimented with strategic partnerships with their immediate suppliers. In addition to the procurement professionals experts in transportation and logistics carried the concept of materials management a step further to incorporate the physical distribution and transportation functions, resulting in the integrated logistics concept, also known as **supply chain management**. The evolution was continued in the 1990's as organisations further extended best practise management in managing corporate resources to include more sophisticated reconciliation of cost and quality considerations. Instead of duplicating non-value-adding activities, such as receiving inspection, manufacturers trusted suppliers' control by purchasing only from a handful of certified suppliers. More recently, many manufacturers and retailers have embraced the concept across the value chain (Tan, 2001).

3.3.3 Challenges for the logistical control of agricultural supply chains

Agribusiness has some characteristics that distinguish it from other industries. The most prominent ones are the perishability of the products, non-homogeneity of product quality, unpredictability of supply lead times due to seasonal influences, uncertainty in product availability, and variable product yield. (Van der Vorst, 1996, and Zuurbier *et al* 1996). These constraints are particularly pronounced for South African fresh products on global markets. Delivering fruit on these markets require consistent levels of high quality produce at competitive prices. Product quality is a prime criterion in gaining access and retaining a competitive edge on global export markets. Product quality is determined by the specific genetic characteristics and

physiological status. Inherent product quality at harvest and during storage thereafter is already affected by preharvest conditions such as soil type, relative humidity, temperature, water potential, light, frost and rainy weather at harvest, as well as cultural, disease and pest management practices. In addition, the preharvest environment, general health of the plant and production methods has a large impact on postharvest diseases and the ultimate quality of the product. Certain pathogens that cause root (or tuber), leaf, flower, fruit, pod, stalk or stem diseases before the harvest can often also cause decay of fruit and vegetables after the harvest. In the postharvest environment, vegetables can be infected by both fungal and bacterial pathogens, while fungi mostly attack fruit. The high perishable nature of vegetables and certain fruits owing to their relative high metabolic activity, high moisture content and their extreme sensitivity to physical injury and bruising during harvesting, handling and marketing makes it highly susceptible to fungal attack (Korsten, 1999). Fluctuating temperatures can cause (Ministry of Agriculture and Forestry: New Zealand, 1982):

- Increased weight loss
- Cold damage
- Condensation
- Microbial growth especially fungal if the temperature rises to -8°C or above;
- Autolytic change (internal breakdown)
- Reduced shelf life

The traditional approach to dealing with uncertainties in supply chains is to keep inventories, to create extra capacity or to create slack time. These measures lead to increased logistic costs and a reduction in the flexibility of the production organisation (Van der Vorst, 1996). Due to the limitations imposed the perishability of most agricultural produce; the pressures on modern supply chains (Zuurbier *et al*, 1996) and the high utilisation of available capacities in agribusiness, it is difficult to anticipate supply irregularities using traditional methods. If companies on agribusiness want to play a prominent role in the changing environment, the supply control of successive links in the chain needs to be coordinated (Van der Vorst, 1996)

Bender (1995) summarised the following trends in the development of logistics management in food chains:

Strategic level:

- Specialisation in commodities and equipment
- Stronger and simpler logistic interfaces
- Spread of logistic risks via several (sub) contractors

Tactical level:

- Improvement of logistic conditioning processes and equipment
- Increasing computerisation of logistic processes, including decision support systems (DSS), with incorporation of quality development of commodities n chain processes
- World wide standardised information systems

Operational level: (reduction of:)

- Defects of quantity and quality of the delivered goods
- Breakdowns of equipment
- Lead times in logistic chains
- Stocks or inventory i.e. waiting times
- Administration

Leading companies are implementing several strategies to ensure supply chain performance (Handfield and Nichols, 1999):

- Rationalising supply chains by changing locations and transportation modes;
- Reducing the buffers of inventory and tome between successive steps in the supply chain;
- Increasing the geographic and international scope of the supply chains; and
- Increasing the sophistication of the goods and services accessed through supply chains.

The importance of logistics in supply chain management is therefore to organise the movement of materials from initial raw material supplier across the chain to the ultimate end customer at the inter-organisational level (Handfield and Nichols, 1999).

3.3.4 Supply chain decisions

The cost categories for supply chains according to Handfield and Nichols (1999) are:

- 1) Manufacturing costs – purchased materials, labour, equipment charge and supplier's margin;
- 2) Movement costs – transportation cost, inventory in pipeline and safety stock cost, and duty;
- 3) Incentive costs and subsidies – taxes and subsidies;
- 4) Intangible costs – quality costs, product adaptation or performance costs, and coordination;
- 5) Overhead costs – total current landed costs; and
- 6) Sensitivity to long-term costs – productivity and wage changes, exchange rate changes, product design, and core competence.

These cost categories gives a good indication of the nature of supply chain management decisions. Supply chain management decisions can be classified into four major categories (Ganesham and Harrison, 1995):

- 1) Location
- 2) Production
- 3) Inventory
- 4) Transportation (distribution)

3.3.4.1 Location

The geographic placement of production facilities, stocking points, and sourcing points is the natural first step in creating a supply chain. The location of facilities involves a commitment of resources to a long-term plan. Once size, number, and location of these are determined, so are the possible paths by which the product flows through to the final customer. These decisions are of great significance to a firm since they represent the basic strategy for accessing customer markets, and will have a considerable impact on revenue, cost, and level of service. These decisions should be determined by an optimisation routine that considers production limitations, etc. (Ganesham and Harrison, 1995)

The nature of the product is of particular importance to agricultural related business. The following product factors are important considerations (Marx *et al*, 1998):

- The perishability of the product (especially relevant to agricultural produce)

- The mass and volume of the product, with specific reference to the change of these characteristics along the supply chain
- The size of the product, which may make it difficult to handle and transport
- The risk of pollution associated with the production, manufacturing, handling or transport of the product

3.3.4.2 Production

Production decisions include the questions of what to produce, where to produce and how much to produce. However, for a supply chain this question is very important for the sourcing of the product (Ganesham and Harrison, 1995). Companies are sourcing their products from all over the world to ensure a constant supply of products on their shelves. The sourcing of especially agricultural products has become an international industry (van Hoek, 1996).

3.3.4.3 Inventory

It is very difficult to synchronise the time of production (or acquisition) and consumption (or sales) in an enterprise. It is often not possible to exactly determine the demand for end products, and adequate inventories serve as a buffer against this uncertainty. Due to the seasonality of agricultural production it is virtually impossible to manage the marketing process without inventories. An enterprise without inventories, or with low inventory levels, is very vulnerable to out of stock costs and customers lost as a consequence. However, inventories are expensive to keep and this cost of keeping inventories has to be played off against the risks and costs of low or no inventories. (Marx *et al*, 1998 and Van der Vorst, 1996)

Inventories exist at every stage of the supply chain as either raw material, semi-finished to finished goods. They can also be in-process between locations. Their main purpose is to buffer against any uncertainty that might exist in the supply chain. Since the holding of inventories can cost anywhere between 20 to 40 percent of their value, their efficient management is critical in supply chain operations. Important aspects are the determination of the optimal levels of order quantities and reorder points, and setting safety stock levels, at each stocking location. These levels are critical, since they are primary determinants of customer service levels (Ganesham and Harrison, 1995)

3.3.4.4 Transportation

Transportation decisions are closely linked to inventory decisions since the optimal transportation mode is often a trade-off between the costs associated with the mode of transport and the indirect cost of inventory associated with that mode. Airfreight may be fast, reliable, and require less safety stocks, but is very exorbitant. Sea-freight and railways on the other hand is much cheaper, but these modes of transport will necessitate large inventories to buffer against the inherent uncertainty associated with these modes of transport (Ganesham and Harrison, 1995).

Marx *et al* (1998) identified the following principles for efficient transportation:

- Use the shortest and safest routes;
- Strive constantly to transport optimal numbers of units every time. It will be more cost-effective to wait until sufficient units are available instead of transporting only a few items at a time;
- Limit the back and forth transport of raw materials and other items to the minimum. Also try to eliminate double and in-between handling of materials, which increases the cost and lengthens the waiting and delivery times of products

3.3.5 Conclusion

Lowest cost, quality, delivery, and technological performance do not guarantee success for the supply chain. Increasingly, organisations are finding that they must also be able to compete on the basis of time. This does not mean that cost, quality, delivery, and technology consideration are no longer important. Reducing the time required to provide the end customer with products or services is one of the major forces that is leading organisations to participate in supply chain management initiatives. Adopting an integrated supply chain management approach provides the means to make a significant reductions in the cycle time required to move materials between supply chain members and the end customer (Handfield and Nichols, 1999). Given the perishable nature of agricultural produce time will always be an extremely important aspect in the logistics of agricultural supply chains.

3.4 Information dimension

3.4.1 Introduction

Information is critical in any enterprise to enable management to take informed decision. Supply chain management decisions are taken across organisational boundaries. Information is essential to enable managers to take efficient decisions in an integrated supply chain environment to manage operations and processes in the system. An effective supply chain system should therefore have some kind of inter-organisational information system (IOIS). The prevalence and application of IOISs have expanded along with the explosion of information and communication technology (ICT). The ultimate level of supply chain organisation would supply all members of the system with cost-effective and accurate information in real time (Handfield and Nichols, 1999; and Marx, 1998).

3.4.2 Definition

Uncertainty is the difference between the amount of information needed to fulfil a task and the quantity of information that is already available. This implies that the more uncertainty one faces, the more information is needed. According to this view information is seen as a steering variable responsible for the quality of the decision (Migchels, 1996). Without information, management cannot take sound decisions to further the vision, mission, and objectives of a company (Marx *et al* 1998). Perfect information would imply perfect decisions, but information is hardly ever perfect let alone sufficient. Joint initiatives and free and open exchanges of information will enable enterprises in a supply chain to improve planning capabilities; re-engineer business processes and improves the efficiency across the organisation as a whole (Migchels, 1996)

However, the demand for information is stretching beyond the needs of managers in supply chains to include the information needs of the consumer. The modern consumer demands a safe and healthy product grown in a sustainable way with high quality standards. The supply chain in turn needs mechanisms to guarantee that the product is safe, does not contain harmful substances, and is produced with environmentally friendly production practises. This implies that the production,

processing and distribution of the product must be traceable, verifiable and certifiable to the consumer (Van Roest and Engelbart, 1998; and Viaene *et al* 1997).

According to Verbeke and Viaene (2000) there are four types of information that is exchanged in a supply chain namely process information, business information, market information and traceability data. This information is utilised by the different actors in the supply chain, in Verbeke's model, the consumer markets, retailers, processing industry, and primary producers. The components of a two-way information flow in food supply chains are presented in Figure 3.3.

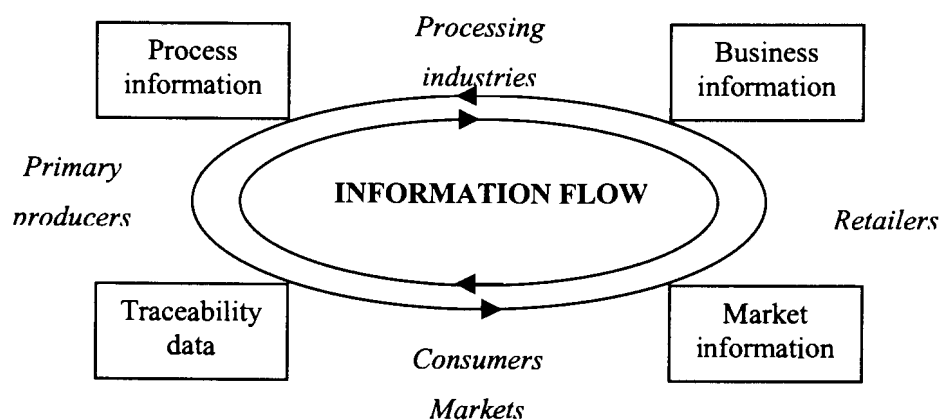


Figure 3.3: Components of a two-way information flow in food chains

Source: Verbeke, 2000

3.4.3 Information technology and information

The development and expansion of information technology application over the last few in all walks of life and enterprise has been nothing short of amazing. Information and Communication Technology (ICT) is enabling Electronic Data Interchange (EDI) between computers and enterprises in a standard format. Barcode scanning at 'Point-of-Sale' (POS), standardisation of article coding, distributed databases, and interactive production planning and –scheduling are improving the effectiveness and efficiency of supply chain decision-making and operation. All of these processes improve the delivery times and business processes in supply chains, attaining the primary

objective of speedy and efficient delivery of the product demanded by the consumer (Zuurbier *et al*, 1996).

Table 3.3: Supply Chain IOIS (Inter Organisational Information Systems) Information Categories

Information categories	Examples of Information Contained in Category
Product information	Product specifications, price/cost, product sales history
Customer information	Customer forecasts, customer sales history, management team
Supplier information	Product line, product lead times, sales terms and conditions
Product process information	Capacities, commitments, production plans
Transportation information	Carriers, lead times, cost
Inventory information	Inventory levels, inventory carrying costs, inventory locations
Supply chain alliance information	Key contacts for each organisation, partner roles and responsibilities, meeting schedules
Competitive information	Benchmarking information, competitive product offering, market share information
Sales and marketing information	Point-of-sales information, promotional plans
Supply chain process and performance information	Process descriptions, performance measures, cost, quality, delivery, time, customer satisfaction, etc.

Source: Handfield and Nichols, 1999

EDI describes both the capability and practice of communication information between two organisations electronically instead of the traditional forms of mail, courier, or

fax. Capability refers to the ability of the various members of the supply chain to use their computer systems to communicate effectively, whereas practise refers to the ability of the members of the supply chain to willingly share and effectively utilise the information exchanges. EDI is used to link supply chain members together in terms of order processing, production, inventory, accounting, and transportation (Handfield and Nichols, 1999).

The benefits of EDI are numerous including (Handfield and Nichols, 1999):

- Quick access to information
- Better customer service
- Reduced paperwork
- Better communications
- Increased productivity
- Improved tracing and expediting
- Cost efficiency
- Competitive advantage
- Improved billing

The types of information demanded and exchanged in the information exchange systems in supply chains are represented in table 3.3.

3.4.4 Conclusion

Information sharing among the members of a supply chain will remain a fundamental requirement for the success of a supply chain. Information enables managers in decision making across functions and enterprises to improve the efficiency of the supply chain. Information is also fundamental to fulfil the need of the consumer for certification and quality assurance. Information systems should enable enterprises to trace, verify and certify the food production process to ensure the health of the consumer. Supply chain management initiatives are unlikely to succeed without the appropriate information, information systems and the technology to support them.

3.5 Trust

In most discussions on supply chain management trust is seen as one of the success factors (Zuurbier *et al* 1996). Trust seems to be the glue that keeps relationships together (Nooteboom, 1999). Trust is not easy to define, identify or to measure. The elements of trust will vary according to the specific situation (Handfield and Nichols, 1999). The advantages and effects of trust in relationships are explored before the concept is defined.

Trust implies that the risk of opportunistic behaviour by one of the partners in the alliance is perceived as very low. When partners trust each other the importance of control in the relationship is made redundant. Consequently the costs associated with control are also reduced (Zuurbier *et al*, 1996). The advantages of trust as discussed by Nooteboom (1999) can be summarised as follows:

- Economises the specification and monitoring of contracts
- Material incentives for cooperation and reduces uncertainty
- Flexibility advantage in comparison to detailed formal contracting that is difficult to modify when the conditions change
- Detailed formal contracting starts a contract on a footing of mistrust
- Lowered costs of search and monitoring because trusting people are less secretive
- Higher efficiency due to better information sharing between organisations
- Partners will deliberate and negotiate on a basis of give and take rather than exit (walk out) when conflict arises

However, it has to be recognised that an individual or organisation is exposed to the risk of betrayal. Trust can therefore be defined as accepting or neglecting the possibility that things will go wrong. Trusting implies that the organisation or an individual is more exposed and vulnerable to the actions of another because the 'trusting' organisation does not engage in risk reduction, avoidance or transfer actions (Blois, 1998).

Crotts and Turner (1999) presented the following summary of the most cited definitions for trust as:

- A willingness to rely on an exchange partner in whom one has confidence;
- One party believes that its needs will be fulfilled in the future by actions taken by the other party;
- A party's expectation that another party desired coordination, will fulfil his/her obligations and will pull its weight in the relationship; or
- The belief that a party's word or promise is reliable and a party will fulfil his/her obligations in an exchange relationship.

Deutsch (1962, quoted in Nooteboom 1999) defines trusting behaviour as actions that (1) increase one's vulnerability (2) to another whose behaviour is not under one's control (3) in a situation where the penalty one suffers if the other abuses that vulnerability is greater than the benefit one gains if the other does not abuse vulnerability. Tregurtha and Vink (1999) argue that the concept of trust consists of two aspects namely the acceptance of relational risk and secondly that the other party, aware of the relational risk exposure, will not behave opportunistically if presented with the option. Trust cannot only be limited to the expectation that the other party will not act in bad faith, but should include a positive expectation of goodwill (Blois, 1998; and Crotts and Turner, 1999). Thus the definition has to be expanded to include an expectation of goodwill as well.

From an economics perspective we instinctively relate trust directly to risk as a subjective probability that something will not go wrong. This is an appealing idea but it would assert trust as calculative, obeying customary estimation of ordinary probabilities. Trust can also be based on routine, lack of awareness, naivety or emotional or ethical commitment (Weber, 1998, and Nooteboom, 1999). The basis for trust can be tacit or explicit and rational. Tacit or implicit trust cannot be subjectively evaluated and measured.

Nooteboom (1999) distinguishes between trust, confidence, relational trust and organisational trust. Trust refers to the relations we engage in by our own choice based on a subjective assessment whether the relational partner is 'trustworthy'. Confidence on the other hand refers to the continuity of the natural and moral order i.e. nature, God, government and the legal system. If things go wrong an actor does

not ascribe it to a lack of judgement on the actor's part (Weber, 1998). Organisational trust is seen as a constellation of behavioural trust. An organisation cannot 'trust' another organisation. The people in an organisation can trust the people in another organisation, but within the structure and culture acting as institutions to guide the behaviour of staff. Therefore organisational trust is a constellation of behavioural trust exhibited by the management and staff (especially the 'gatekeeper' staff functions like purchasing, marketing, and negotiating) within the bounds imposed by the structure and culture (institution) of the organisation.

Trust can be subdivided in three levels namely macro level- (institution based); meso level- (characteristics based); and micro level trust (process based) (Nootboom, 1999; and Tregurtha and Vink, 1999). The institutions based trust is generated by confidence in the 'formal structures' of society and the ability of these structures to enforce sanctions when trust is breached. Characteristics based trust is based on the characteristics (competence and reputation) of the transacting parties (Crotts and Turner, 1999; and Selnes, 1998). Process based trust results from continuous interaction between organisations. The organisations trust each other incrementally based on the experience of several previous transactions. The extent, riskiness, and intensity of the interaction determine the intensity of the resultant trust. Williams (1998 in Nootboom, 1999) presents the sources of cooperation in table 3.4:

Table 3.4: Sources of cooperation

	Macro	Micro
Egotistic	Coercion or fear of sanction from some authority (God, law)	Material advantage or 'interest'
Non-egotistic	Ethics: values, norms of proper conduct	Bonds of friendship, kinship or empathy

Source: Williams (1988) cited in Nootboom (1999)

Trust can also be seen in an operational perspective (Nootboom, 1999). The 'drivers' of trust are especially identified by the emerging discipline of relationship marketing (Selnes, 1998; and Young and Wilkinson, 1989). These 'drivers' give good indication of the practical implication of trust in the daily operation of a

business. Selnes (1998) uses the following model to illustrate the drivers for ensuring continuous relationship marketing:

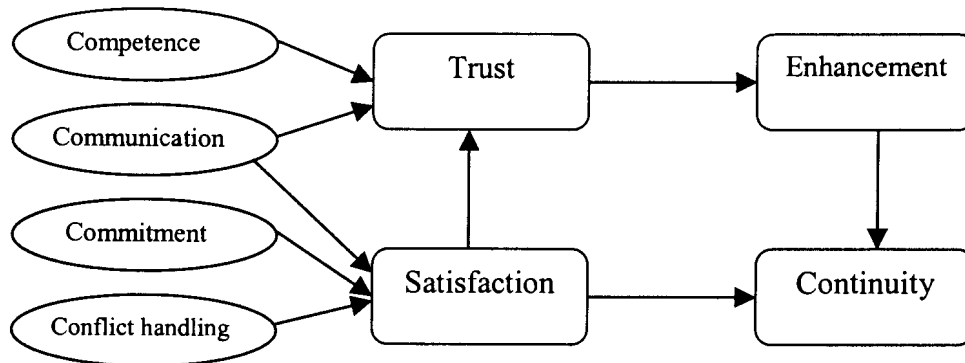


Figure 3.4: A theoretical model of antecedents and consequences of trust and satisfaction in buyer-seller relationships

Source: Selnes, 1998

This model illustrates that relationship continuity is a function of 'enhancement', the intention of the parties to extend the relationship, and satisfaction. However, Selnes (1998) found that trust is a function of satisfaction which both improve the likelihood for relationship enhancement and continuity. It is important to note that reliability, integrity and confidence are measures of trust and not the sources of trust. Deutsch is also criticised for his 'operational approach', which considers the sources of trust rather than the 'construct' of trust (Young and Wilkinson, 1989; and Selnes, 1998). However, the causes (sources) of trust indicated by Selnes (1998) as competence and communication and commitment and conflict handling provides a practical approach for the establishment of trust in day-to-day business relationships. Handfield and Nichols provide the following construct for ensuring trusting relationships between businesses:

- **Reliability**

As indicated earlier, trust depends on the prior contact that organisation or individual had experienced with another individual. The important guideline is to follow through on your commitment, and act in a predictable manner.

- **Competence**

Competence is a subjective estimation by one organisation or person of another's ability to meet its commitments. Organisations should choose a supply chain partner with a documented record of experience in the technology and also that the partner is assigning competent, knowledgeable, and experienced people to manage the relationship.

- **Affect-based trust “goodwill”**

Affect-based trust refers to the emotional investment that develops between individuals that trust each other. This bond defined by common mutual norms, sentiments, and friendship. It is therefore important to select an individual with a high level of knowledge of the technology or function, but also good people skills and good commonsense knowledge.

- **Vulnerability**

Any supply chain is susceptible to several vulnerabilities or risk in the supply chain. Vulnerability is an integral aspect of trust as discussed earlier. The perception of vulnerability needs to be carefully managed by supply partners through information sharing, which assures the other partner that its interests will be protected.

- **Loyalty**

In long-term relationships with other organisations a certain degree of faith is built up over time. This faith is based on the belief that the supply chain partner will also support you in adverse circumstances. A supply chain partner should show genuine responsiveness to the other partner's needs and demand the same if necessary to build an understanding of loyalty.

The concept of trust therefore reduces competitive behaviour in the sense that economic actors will pursue other goals than short-term profits alone. This presents the opportunity for a range of transaction governance structures other than that of a purely competitive market where actors make decision based on price alone. Actors therefore take a strategic and long-term perspective on their interaction and coordination. They trust each other to avoid short-term opportunistic behaviour in favour of long-term strategies and profitability. (Tregurtha and Vink, 1999; Trienekens and Zuurbier, 2000; and Furubotn and Richer, 1998)

3.6 Conclusion

In this chapter supply chain management is defined as the integrated planning, coordination and control of all logistical business processes and activities in the supply chain to deliver superior customer. The most important characteristic of supply chain management is inter-organisational cooperation and collaboration. Three broad dimensions to supply chains are defined namely product flow or logistics, information and supply chain relations or governance structure (detailed discussion in Chapter 4).

The product flow dimension utilises superior cost, quality, timeliness, delivery, and technological performance to enhance supply chain competitiveness. Adopting an integrated supply chain management approach provides the means to make a significant reductions in the cycle time required to move materials between supply chain members and the end customer.

Information sharing among supply chain participants is a fundamental requirement to the success of a supply chain. Information improves the efficiency of the supply chain and fulfils the need of the consumer for traceability, certification and quality assurance. Technology plays an important role in supply chain information and is reviewed in Chapter 5.

Trust is an essential component of closer collaboration and coordination between supply chain participants. The role of trust in supply chains is discussed as an introduction to governance structures in agribusiness. The advantages of trust are that it economises the specification and monitoring of contracts, it gives material incentives for cooperation and reduces uncertainty, it enhances flexibility as opposed to detailed formal contracts which are difficult to modify when the conditions change, it lowers costs of search and monitoring because trusting people are less secretive and it increases supply chain efficiency because of better information sharing between organisations.

Chapter 4: Governance structures in Agribusiness

Chapter 4: Governance structures in Agribusiness

“...The productivity of an economic system depends on specialization. But specialization depends on exchange. And the lower cost of exchange (transaction cost as they have come to be called) the more specialization there will be, the greater the economy and the higher the standard of living of people in that economy. However, the level of transaction costs depends on the institutions of a country, its legal system, its political system and its culture...” Ronald Coase (1998)

4.1 Introduction

In the previous chapter the different dimensions of the supply chain were discussed. The necessity to coordinate these activities and processes across firm and functional boundaries was pointed out.

In this chapter the evolution and nature of the institutions that facilitate vertical coordination are addressed. The purpose of this chapter is to show how relationships (vertical coordination) evolve over time, to identify the possible institutional structures for governing vertical coordination and to develop a theoretical framework analysing optimal governance structures.

North (1990:3) describes institutions as “the rules of the game in a society or, more formally, [are] the humanly devised constraints that shape human interaction.” These structures prohibit, permit, or require certain actions and provide the incentives for exchange on political, social and economic level. Institutions arise to reduce the costs of uncertainty, information and transaction. Institutions can be either formal or informal. Formal institutions comprise laws and regulations and informal institutions refer social conventions and codes of behaviour. (North, 1990, and Ortmann, 2000) Firms maximise profits by making choices within the constraints set out by formal and informal institutions. Governance structures are the set of choices used by firms, in the larger institutional context, to reduce transaction costs. Therefore governance structures are the institutions used by firms to align direction and control of resources across firm and functional boundaries. The nature and evolution of these institutions between firms in supply chains are discussed in this chapter.

4.2 Relationships in agricultural supply chains

Supply chain relationships have to be based on good reasons or benefits to the co-operating organisations to ensure the viability and sustainability of the co-operative relationship. The relevance and importance of cooperation is summarised by Zuurbier *et al* (1996) as:

- The considerable rate of technological development in products, processes, and information;
- Increasing capital intensity of production and product development;
- Increasing diversity in products under the pressure of technology push and market pull;
- Increasing (international) competition due to, amongst others, saturated markets and trade liberalisation;
- High commercial risks because of shorter product life cycles, diversity and capital intensive investments;
- High measure of mutual dependency due to the unique characteristics of agricultural produce; and
- High demands by consumers and society in terms of product safety, health, and environmentally friendly production processes.

Cooperation between firms aims to, and is observed, in the success of the technology-product-market-combination which is induced by the co-operative relationship. Additional consequences can result from:

- More technological possibilities;
- More products and product variations;
- Better products;
- Extended marketing opportunities; and
- More efficient production processes.

(Zuurbier *et al* 1996)

The most important ingredient for successful supply chain relationship is a trusting relationship (Handfield and Nichols, 1999). Supply chain management is built on a foundation of trust and commitment. Trust contributes significantly to the long-term stability of an organisation. Trust is conveyed through faith, reliance, belief, or

confidence in the supply chain partner and is viewed as a willingness to forego opportunistic behaviour. Trust is simply the belief that the supply chain partner will act in a consistent and predicable manner (Spekman *et al* 1998).

Co-operative (trusting) relationships between organisations entail dynamic interaction between the organisations. These relationships with other enterprises are built or evolve over time (Zuurbier *et al*, 1996). It therefore takes time to progress from a market supplier to collaboration with the supplying or buying organisation as a supply chain partner. This process is represented in Figure 4.1:

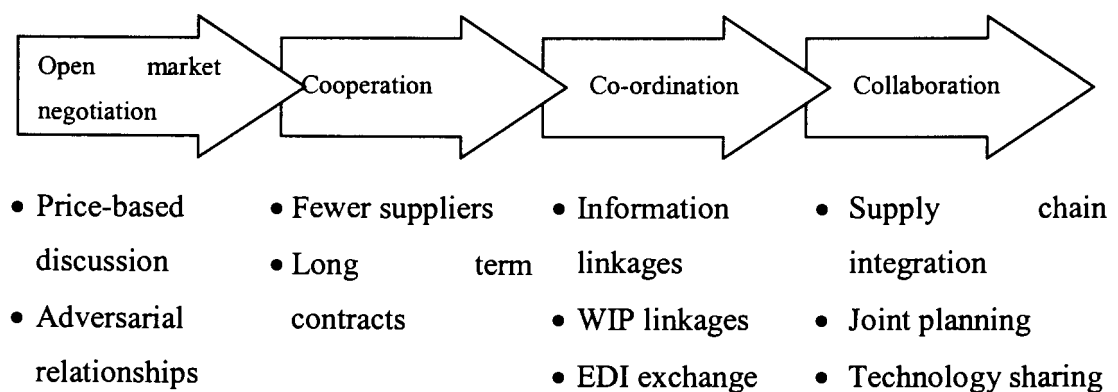


Figure 4.1: The key transition from open market negotiations to collaboration

Source: Spekman, Kamauff and Myhr, 1998

The transformation is presented as a linear process, but a step-wise process would give a better perspective of the organisations moving from one level to the next. The promotion from the one level to the next requires a mind set and strategic orientation change among the supply chain partners. Most firms co-operate and co-ordinate amongst each other in terms of contracts, information and logistical processes to a greater or lesser degree. However the movement from co-ordination to collaboration requires levels of trust and commitment that goes beyond mere co-ordination (Spekman *et al* 1998). The different forms of co-ordination are discussed later in the chapter.

Handfield and Nichols (1999) identify three dimensions to the development of successful coordination namely the strategic, process and operational dimensions. As

a coordinated relationship between firms develops these three dimensions go through different stages i.e. alliance conceptualisation, -pursuance, -confirmation and -implementation/continuity.

The strategic dimension involves the strategic expectations and evaluations of coordination effectiveness as the coordination effort progresses through the development stages. The process dimension outlines the stages of development that shows the required for formation, implementation, and maintenance of coordination. The operational component positions the development of search and selection criteria and operating standards for managing coordination (Handfield and Nichols, 1999).

The different levels of coordination development firstly involve the conceptualisation of the coordination effort. The reasons and envisaged benefits of collaboration are evident to the firm and recognised as an attractive alternative to the current arrangement. The second level is that of alliance pursuance where the firm establishes the strategic and operational considerations that will be used to select the coordination partner. The third level is concerned with coordination confirmation through negotiated strategic and operational expectations between the managers of the negotiating parties. In the final level of coordination implementation/continuity feedback mechanisms have to be implemented to assess performance continually to determine the efficiency and effectiveness of the coordinated effort. The general coordination development model is presented in Figure 4.2

The first level of coordination development is initiated when the organisations realise that a major strategic change is necessary to improve performance. These changes can be changes on the competitive actions of global forms, industry consolidation, alternative distribution and retail formats or major technological change in an industry. Changing market needs and seeking new ways to ensure consumer satisfaction is also a major driver of supply chain emergence. The changes in the agricultural sector driving the supply chain revolution are discussed in greater detail in the introductory chapter. These changes create the awareness of a problem, but managers must also be convinced that a possibility for an improved system exists. As with any change risk is also an important consideration and the possible benefits

should be weighed off against the risks that are incurred by the supply chain initiative (Handfield and Nichols, 1999).

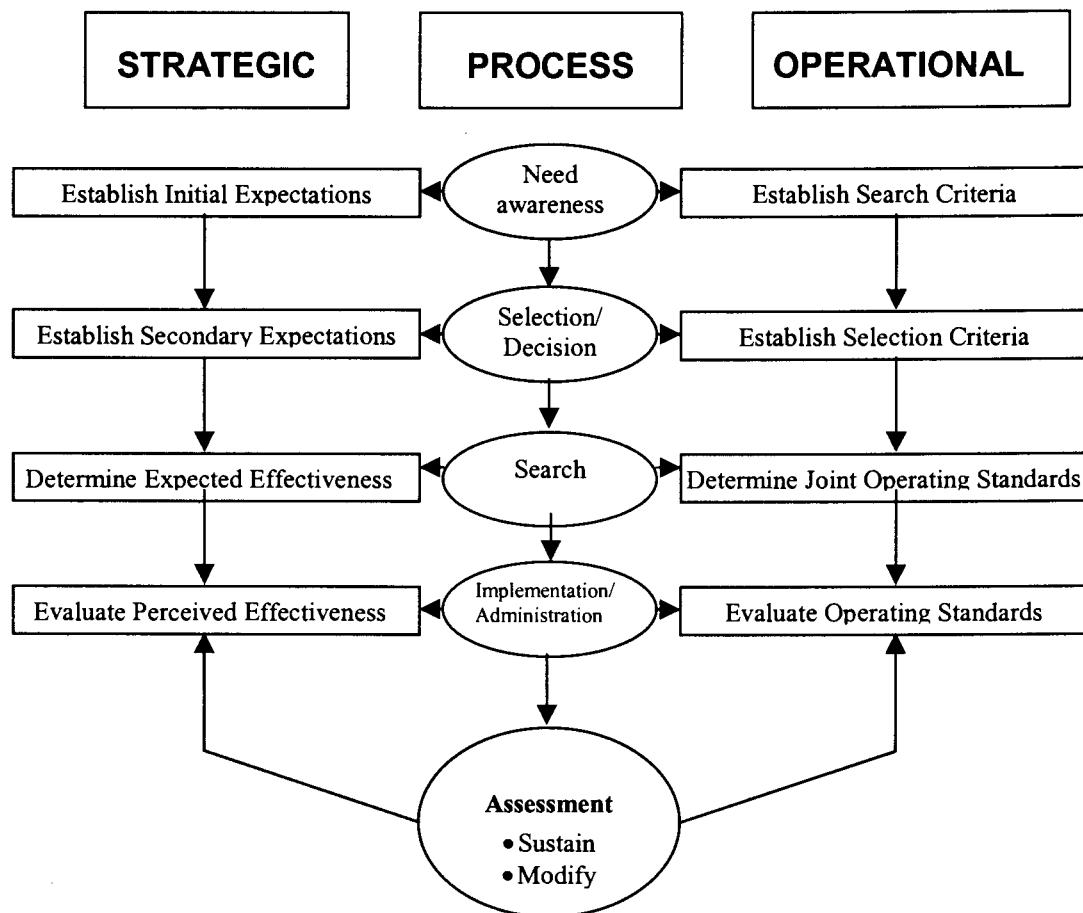


Figure 4.2: General Alliance Development Model

Source: Scmitz, Frankel, and Frayer (1995)

The second level of coordination development or pursuance entails the process of clarifying and defining new strategies for the coordinated relationship. Firms develop a clear view on the goals that they want to achieve in the alliance. These goals are used to develop criteria to enable the firm to effectively identify possible partners for an alliance. In this way the possible partners for coordination is reduced. This process is important to identify the priority areas for effective alignment between the organisations. Firms usually employ the following measures to evaluate the characteristics of a firm for successful alignment for the possibility of a partnership (Handfield and Nichols, 1999):

- Company profile information
- Management capability
- Personnel capabilities
- Cost structure
- Total quality management philosophy and programs
- Process and technological capability
- Environmental regulation compliance
- Financial capability/stability
- Production scheduling and control systems
- Information systems capability
- Supplier sourcing strategies, policies, and techniques
- Long term relationship potential

After the firm successfully identified a partner the two partners in the relationship has to determine the terms of coordination. The partners can use several forms of governance structure to manage the relationship. These governance structures are discussed in the next section. The factors that have to be managed by the governance structure are amongst others (Handfield and Nichols, 1999):

- The length of the relationship and under what conditions the alliance should be terminated;
- How to manage power imbalances when one party has more power than the other in the relationship;
- How to manage managerial imbalances when alliance partners fail to provide equal managerial support in terms of the number of key contacts within each of the organisations;
- How to manage conflict when one supply chain member acts contrary to the alliance understanding;
- How to share profits and costs that ensue from the efforts of the alliance;
- How to match the managerial styles and corporate cultures of the parties engaged in the alliance.

The partners have to operationalise these aspects in terms of the following aspects:

- Assignment of roles and responsibilities in the alliance
- How to measure, specify and quantify operational performance
- Extent and processes of information sharing and transfer
- Communication systems between the parties to ensure that employees understand and contribute to the goals of the alliance

On the final level of coordination formation the results from the previous three levels has to be implemented and continuity ensured. Partners should perform ongoing assessment of perceived alliance effectiveness, revise strategic goals and operating standards based on competitive conditions and changing needs, view the alliance as a permanent system that continually moves between assessment and administration, and to sustain the alliance until the alliance is modified or terminated because it has outlived its strategic competitiveness.

Hughes (1996) identified the following key factors for building successful commercial partnerships:

- Pick a winner – a partner with a track record of success and big aspirations
- Clear benefits for each partner
- Focus on a few partnerships – adopt the rifle approach, not the blunderbuss
- Partners must have good strategic fit – complementary strengths
- Quality leadership – make it difficult for others to follow by delivering quality products with quality service
- Build communication links at all levels between partners – not just at boss level
- Partners should hold same long term objectives
- Build flexible organisations that meet the specific needs of each partnership
- Basic business proposition must make long term commercial sense

The partnerships observed between firms is usually facilitated in some kind of institutional structure – spot market, contracting or vertical integration (Williamson, 1991). Peterson, Wysocki and Harsh (2001) expand these options into a range of possibilities for coordination namely spot/cash market, specifications contract,

relation-based contracts, equity-based alliances and vertical integration. These structures are also referred to as 'governance' structures i.e. the structures that govern the exchange relationships between firms.

4.3 Theoretical approaches for analysing governance structures

Vertical coordination can be defined as the alignment of direction and control across segments of a production/marketing system. The factors that are aligned and controlled are price, quantity, quality, and terms of exchange (Peterson, Wysocki and Harsh, 2001). Hobbs and Young (1999) adds that vertical coordination includes all the ways of harmonising the vertical stages of production and marketing.

The vertical coordination between firms is managed by an institutional structure which governs the actions, rights and responsibilities of the respective partners in the exchange. These institutional structures are known as 'governance structures', which can be arranged on a continuum ranging from spot-market transactions at the one extreme to vertical integration at the other. The extent of the administrative control seems to be the most basic distinguishing criterion that determines the degree of coordination between organisations: ranging from no control from A to B, to complete ownership and control of A over B (Zuurbier, 1996). Williamson developed the idea of a continuum in his writings on transaction cost economics (Zuurbier, 1996; Hobbs and Young, 1999; Peterson and Wysocki, 1997). In this section governance structures are discussed from a transaction cost, agency and strategic perspective.

4.3.1 Transaction cost approach to governance

In recent years, economists have given increasing attention to the microeconomic organisation between firms as the importance of institutions in economic performance become evident (Williamson, 1991, Coase, 1992). This new set of ideas used to explain the governance aspects of the agroindustrialisation process are collectively known as New Institutional Economics (Cook and Chaddad, 2000). Ronald Coase is generally regarded as the father of NIE with his seminal article "The Nature of the Firm" (Coase, 1937). Various writers started to publish on similar topics using roughly similar principles. It is only since the 1960's that the field have become

known under the general designation of New Institutional Economics (Dorward, *et al* 1998).

Coase (1992) indicates that most of the economic analysis in the neoclassical economics framework focused (and still focuses) on the determination of prices and output by the 'invisible hand' of the market. The firm is regarded as a 'black box' in which the factors of production are transformed into products and neither the firm, nor the market is clearly defined. Coase noted that most of the resources in the modern economy are employed within firms and the allocation of these resources are determined by administrative systems and not the market. The efficiency of the economic system therefore also depends on the efficient allocation of resources within firms and needs serious consideration (Coase, 1992; and Williamson, 1991). The question arose that if resource and output are guided by a system of prices, why do firms, and management within firms, exist? The simple answer to this question is that there are costs associated with using the pricing mechanism. These refer for example to the cost of discovering what prices should be, the cost of negotiating individual contracts for each exchange transaction and the costs of accurately specifying the details of a transaction in a long-term contract (Hobbs, 1996). These costs came to be known as transaction costs. The avoidance of these costs is the origin of the firm and the different governance structures between firms. (Coase, 1992). The limiting assumptions of neoclassical economics excludes the analysis of firms and their behaviour in exclusion of price behaviour. The single product firm, operating in a perfectly competitive environment is central to the neoclassic research paradigm. This approach assumes a large number of producers producing a homogenous product under similar conditions and cost conditions. The producers sell their produce to a large number of buyers exhibiting the same demand preferences and none of them large enough to have appreciable market power (Hobbs, 1996). The characteristics of a neoclassic transaction are (Hobbs, 1996):

- Homogeneous product and therefore no costs associated with quality measurement;
- Products with quality differences are regarded as distinct different markets;

- Economic agents possess perfect information and do not have to account for price-, product characteristic- or competitor and trading partner behavioural uncertainties;
- Transactions occur in present time between multiple buyers and sellers excluding the possibility of increased market power buy any of the buyers or sellers;
- Equilibrium and marginal cost focussed; and
- Transactions occur in a frictionless (transaction costless) environment.

Williamson (1996) argues that institutions in general have the effect of minimising transaction costs and thus improving economic performance beyond that which is possible in “neo-classical” markets. The economic institutions of capitalism have the main purpose and effect of economising on transaction costs. Williamson (1991:102) concludes that “(1) firms are not merely extensions of markets but employ different means, (2) discrete contract law differences provide crucial support for and serve to define each generic form of governance, and (3) marginal analysis is typically concerned with second-order refinements to the neglect of first-order economizing.” This implies that the New Institutional Economics is concerned with the qualitative institutional analysis in which structural alternatives are compared in stead of the quantitative equilibrium seeking analysis of the neoclassic Economics. The transaction, and the costs associated with transactions, are the unit of analysis for the New Institutional Economics school.

Hobbs (1996:17) define transaction costs as: “simply the costs of carrying out any exchange, whether between firms in a marketplace of a transfer of resources between stages in a vertically integrated firm, when the neoclassical assumption of perfect information is relaxed.” These costs arise whenever a transaction takes place whether it takes place in a market or command economy, or in a vertically integrated firm (Hobbs, 1996).

There are costs associated with transaction in the exchange process. The exchange relationship between actors in a supply chain are characterised by the following important stages (Jaffee, 1995:26):

- **searching** for exchange opportunities and partners,
- **screening** information about the products/parties one wishes to deal with,
- **bargaining** over the terms of trade,
- **transferring** the goods, services, titles, cash, etc.,
- **monitoring** the exchange to assess whether the agreed terms are complied with,
- **enforcing** the stipulated terms.

Table 4.1 Transaction costs in a commodity trading setting

Type of Transaction Cost	Source/Origin of Costs	Tangible Forms of Transaction Cost
Search Costs	Lack of knowledge about opportunities (e.g. products, prices, demand, supply, trading rights, market outlets)	Personal/Personnel Time Travel Expenses Communication Costs
Screening Costs	Uncertainty about the reliability of potential suppliers/buyers Uncertainty about the actual quality of goods/services offered	Consulting Service Fees Advertising/Promotion Cost Cost of Credit Ratings
Bargaining Costs	Conflicting objectives and interest of transacting parties Uncertainty about the willingness of others to trade on certain terms Uncertainty over transactor rights and obligations	Licensing Fees Insurance Premiums
Transfer Costs	Legal, extra-legal or physical constraints on the movement/transfer of goods	Handling/Storage Costs Transport Costs Bribery and Corruption Expenses
Monitoring Costs	Uncertainty about transactor compliance with specified terms Uncertainty about possible changes in the quality of goods and services	Auditing Fees Product Inspection Charges Investment in Measurement Devices
Enforcement Costs	Uncertainty about the level of damages/injury to a transacting party arising from contractual non-compliance Problems in exacting penalties through bilateral arrangements or through use of third parties	Arbitration, Legal, Court Fees Costs to Bring Social Pressure

Source: Jaffee (1995)

Transaction costs are incurred at each of the stages in the exchange process. These costs include the whole array of costs associated with buying, selling and transferring of ownership of goods and services. These costs are incurred when gathering information, when identifying and screening potential trade opportunities, outlets and partners, when negotiating trading agreements, transferring goods, services, and ownership rights, and when monitoring the conditions that were negotiated (Jaffee, 1995). The types of transaction costs, their origins and possible tangible forms these costs may take, are presented in table 4.1.

Discrete alternative governance structures

As shown earlier, economic institutions exist to minimise the cost of doing transactions in the market and thus improve economic performance. The economic institutions of capitalism have the main purpose and effect of economising on transaction costs. These institutions are discussed as discrete structural alternatives in this section.

Discrete structural alternatives are used to compare institutions in lieu of satisfactory means to describe the continuous variation over the spectrum of possible governance structures. Williamson (1996) identifies three generic discrete structural governance alternatives – market, hybrid, and hierarchy. The predictive ability of the transaction cost approach lies in the difference in transaction costs and competencies which discriminates between the optimal (minimised) alignment of these costs to governance structures.

Williamson (1996) argues that adaptation is central to the economic problem as the survival of the firm depends on its ability to adapt to changing circumstances. In the neoclassical paradigm this involves the process by which producers and consumers respond independently to price changes to maximise their respective profits and utility. This is autonomous adaptation denoted by (A). This kind of adaptation is efficient and sufficient according to the neoclassical approach. However, as pointed out earlier, the basic assumptions of the neoclassical economics are easily violated. Some disturbances in the economy will require coordinated adaptation because autonomous parties interpret and react differently to limited price signals. Actors in

exchanges sometimes need to coordinate to avoid sub-optimisation due to transactions that are maladapted to the environment during the bargaining interval. Firms should therefore employ other mechanisms to facilitate the efficient adaptation of processes, products and transactions to remain competitive in the changed environment. Williamson refers to this adaptation as (C) where (C) denotes cooperation. Cooperation implies a purposeful, deliberate and conscious effort to create adaptive internal coordinating mechanisms as independent adaptations would result in imperfect realignment and organisations could operate at cross-purposes.

Markets are very efficient and effective in facilitating adaptation in (A) respects. Incentives to guide the adaptation are transmitted clearly and strongly by market prices. “Other autonomous traders have neither legitimate claims against the gains nor can they be held accountable for the losses” (Williamson, 1996: 103). However, matters become more complicated in the case of (C) adaptation. Partners involved in the (C) adaptation are bilateral dependent. The use of other, more formal, governance mechanisms, like vertical integration, are more advantageous as bilateral dependency builds up. (C) adaptation, however, comes at a cost. Divisions in the firm can lay claim to the advantages realised, or avoid culpability for losses incurred, because of the vague causal profit or loss relationships to initiatives. The headquarters will have to allocate profits and losses, usually through arbitration, between the different actors involved. Autonomy is replaced by a hierarchical structure which result in degraded incentive intensity and added bureaucratic costs. (Williamson, 1996 and 1991)

Hybrid organisations display intermediate values for the type (A) and (C) adaptation, incentives and administrative controls. Autonomy between the actors in the exchange is preserved which enables firms to react in type (A) adaptation because of the effective translation of incentives. The bilateral dependency between the firms require long-term contracts to be safeguarded by contracts and administrative or bureaucratic apparatus. This, again, reduces the incentive intensity. The advantages that hierarchy enjoys over hybrid with respect to bilateral dependency is that internal contracts can be less complete. Adaptations to disturbances are less costly because (Williamson, 1996:105):

1. “proposals to adapt require less documentation,

2. resolving internal disputes by fiat rather than arbitration saves resources and facilitates timely adaptation,
3. information that is deeply impacted can more easily be accessed and more accurately accessed,
4. internal dispute resolution enjoys the support of informal organisation, and
5. internal organization has access to additional incentive instruments – including especially career reward and joint profit sharing – that promote a team orientation.”

Table 4.2: Distinguishing attributes of market, hybrid, and hierarchy governance structures

Attributes	Governance Structure		
	Market	Hybrid	Hierarchy
Instruments:			
Incentive intensity	++	+	0
Administrative controls	0	+	++
Performance attributes:			
Adaptation (A)	++	+	0
Adaptation (C)	0	+	++
Contract law	++	+	0

++ = strong; + = semi-strong; 0 = weak

Source: Williamson, 1996

The market and hierarchy are characterised by attributes at the opposite ends of the poles. The hybrid governance structure is characterised by semistrong incentives, an intermediate degree of administrative apparatus, and semistrong adaptive ability in both (A) and (C) adaptation, and it operates in a semi-legalistic contract law regime. (Williamson, 1991 and 1996)

Transaction cost economics describes transactions in terms of three dimensions namely (1) the frequency with which the transactions recur, (2) the degree and type of uncertainty to which they are subject, and (3) the condition of asset specificity

(Williamson, 1996). All of these are important in predicting governance structure, but economics attach special significance to asset specificity. Four distinct types of relationship specific investments are identified by Joskow (1993:126) to describe the variations in the importance of asset specificity:

1. Site specificity: The buyer and seller are in a “cheek-by-jowl” relationship with one another, reflecting ex ante decisions to minimize inventory and transportation costs. Once sited, the assets in place are highly immobile.
2. Physical asset specificity: When one or both parties to the transaction make investments in equipment and machinery that involves design characteristics specific to the transaction and which have lower values in alternative uses.
3. Human asset specificity: Investments in relationship-specific human capital that often arise through a learning-by-doing process.
4. Dedicated assets: General investments by a supplier that would not otherwise be made but for the prospect of selling a significant amount of product to a particular customer. If the contract were terminated prematurely it would leave the supplier with significant excess capacity.

Williamson (1996) adds brand name capital and temporal specificity which can be described as a kind of site specificity to which timely response by on-site human assets have been added. Bilateral dependency deepens as asset specificity increases. In the neoclassic market the identity of buyers and sellers is irrelevant as asset specificity is assumed to be insignificant. When firms invest in transaction specific assets identity starts to matter as assets lose productive value when reallocated to the second best alternative use by the second best user.

When classic markets work well, (A) type adaptation occurs at the lowest cost as independent actors adapt to exogenous disturbances. Internal organisation incurs higher costs as hierarchies are subject to higher bureaucratic costs to which no added benefit can be ascribed. When asset specificity, and consequently bilateral dependence, increases as the market require a more coordinated response to exogenous disturbances the high power incentive structure of the market impede effective adaptation. The cost of misalignment between parties increase as the need for type (C) adaptation increases up to the point where internal control or bureaucratic costs would be lower than the cost of misalignment. At this point the transactions

should be governed by a hierarchy rather than the market since the added bureaucratic costs are less than the bilateral adaptive gains that result.

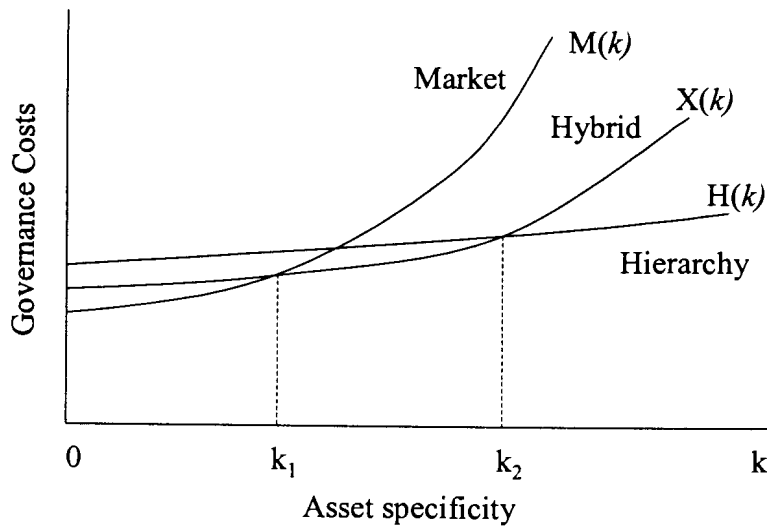


Figure 4.3: Governance cost as a function of asset specificity

Source: Williamson, 1996

Let the market governance costs be denoted by $M = M(k; \theta)$ and hierarchy governance costs by $H = H(k; \theta)$ with k denoting asset specificity and (θ) denote vector shift parameters. When each mode is assumed to choose the same level of asset specificity the following comparative-cost equations are obtained: $M(0) < H(0)$ and $M' > H' > 0$. $M(0) < H(0)$ denotes that bureaucratic costs of internal organisation exceed the costs of the market because the market's efficiency in facilitating type (A) adaptation (when asset specificity is negligible). $M' > H' > 0$ shows the inefficiency of the market to facilitate type (C) responses to exogenous disturbances. When asset specificity and bilateral interdependence becomes significant the costs of internal control is offset by bilateral adaptive gains. The hybrid structure is situated somewhere between the market and hierarchy. Transactions which require adaptation which are neither autonomous or coordinated can be organised in the hybrid mode. If $X = X(k; \theta)$ denotes the governance costs of the hybrid mode then it can be assumed that $M(0) < X(0) < H(0)$ and $M' > X' > H' > 0$ as observed in Figure 4.3. The most

efficient governance structure dictated by asset specificity (k) where k^* is the optimal level would therefore be a market for $k^* = k_1$; hybrid for $k_1 < k^* < k_2$; and a hierarchy for $k^* > k_2$.

The exogenous disturbances that requires adaptive actions by firms to remain competitive introduces uncertainty as another dimension with regards to governance structure. This uncertainty can take two forms namely an increase in the occurrence of the disturbance and the consequence intensity of the disturbance. All of the governance structures are influenced negatively by disturbances in the system, but the hybrid mode is the most susceptible to an increase in uncertainty. Hybrid adaptations cannot be made autonomously as with market governance, or by command as in hierarchical governance, but have to be made by mutual consent. This process takes time and an increase in disturbances or uncertainty render the hybrid mode nonviable. The influence of disturbance frequency and asset specificity on organisational form can be viewed in Figure 4.4.

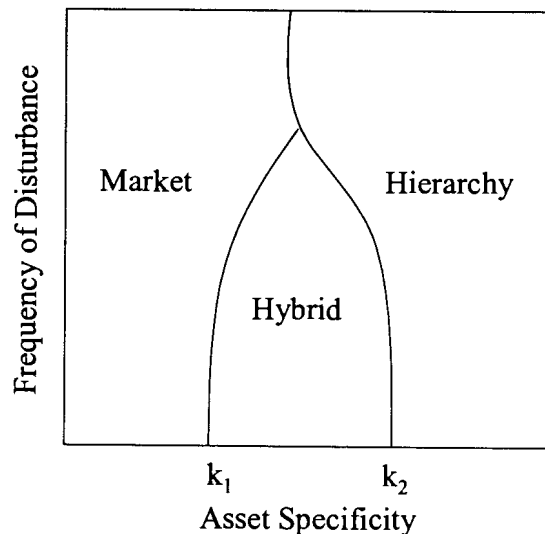


Figure 4.4: Organisation form responses to changes in frequency

Source: Williamson, 1996

4.3.2 Agency theory approach to governance

Transaction costs economics uses primarily asset specificity, environmental uncertainty and small numbers bargaining to predict governance outcomes. Agency theory uses asymmetric information and outcome uncertainty. The firm or supply chain is approached as a nexus of contracts among various participants. (O’Keeffe, 1999) Each link in the supply chain comprises a participant (the principal) that delegates an assignment to another (the agent). The theory deals with the contract between these two parties and seeks to determine the optimal contract. The challenge lies therein that the principal is assumed to have less information on the agent’s action than the agent self and the agent has the opportunity to pursue their own interests. The optimal contract will solve this problem of information asymmetry at the lowest cost. (O’Keeffe, 1999; and Sauvée, 1998)

Two main problems are addressed by agency theory namely the *agency problem* and *risk sharing*. The agency problem arises when (i) the goals of the principal and agent do not converge or are incompatible and (ii) when the principal cannot verify what the agent is doing. This problem is also based in precontractual opportunism where one of the parties has private information about an aspect of the contract that affects the other’s net benefit from the contract. This phenomenon is also referred to as *adverse selection*. The second problem is related to *risk sharing*. *Moral hazard* refers to the shirking on the part of the agent because the task is too complex to be completely monitored or controlled. Principals and agents could have different risk preferences and consequently prefer different actions in response to the risk. (Sauvée, 1998)

Eisenhardt (1989) argues that the trade-off between (a) the cost of measuring behaviour and (b) the cost of measuring outcomes and transferring risk to the agent forms the basis of the principal-agent theory. The focus therefore lies on control characteristics and mechanisms. The principal can either assess and measure the performance of the agent or attempt to minimise the divergence of interests and/or preferences of the members. The latter strategy requires principals and agents to understand and internalise goals. This can be achieved through training and proper selection of members. The assessment of the performance of the agent, either by the behaviour or the outcome of the agent’s actions, determines the ability of the principal

to control the agent. The cost of the performance evaluation depends on the information characteristics of the performed tasks. The task can be characterised according to the task programmability (ability to know the transformation process) or separability (ability to measure outcomes). Peterson and Wysocki (1997) explains these characteristics as:

1. Task Nonseparability

Low task nonseparability: The contribution of individual efforts can be clearly separated through output measurement; therefore, individual rewards can be fairly distributed and a manager is not required to monitor shirking.

High task nonseparability: The contribution of individual effort can *not* be clearly separated through output measurement; therefore, individual rewards can *not* be fairly distributed without a manager to monitor shirking.

2. Task Programmability

Low task programmability: The product transformation process is *not* well established or routine; therefore, input measurement is uncertain and not amenable to monitoring.

High task programmability: The product transformation process is well established or routine; therefore, input measurement is fairly certain and amenable to monitoring.

The ease of performance evaluation in terms of the task programmability and separability determines the choice between the two strategies as depicted in Table 4.3. The task characteristics and the measurement system characteristics are the key dimensions for explaining the choice of control strategy. (Sauvé, 1998)

Table 4.3: Organisational theory and control strategy

Outcome measurability	Task programmability	
	Perfect	Imperfect
High	Behaviour/outcome control	Outcome control
Low	Behaviour control	Socialisation (Clan control)

Source: Eisenhardt (1985) in Sauvé, 1998

Agency theory focuses on the contracts between participants in the supply chain. The theory is criticised as lacking in rigour and too narrow in application to apply to complex organisational systems. (O’Keeffe, 1999; and Heilbron and Roberts, 1995) However, it augments the transaction cost approach by providing insight into uncertainty, attitudes to risk and information. Agency theory treats risk information as a commodity which can be purchased at a cost. This implies that firms can invest in information systems in order to control agent opportunism. Uncertainty is treated in terms of the risk/reward trade-off and not as the mere inability to anticipate events. Outcome uncertainty and the participant’s attitude to risk would influence the contract between the principal and agent. (Eisenhardt, 1989)

4.3.3 The vertical coordination continuum: combining transaction cost and agency theories

Mahoney (1992) provides a general framework to predict and prescribe alternative governance structures of vertical coordination along a continuum of governance structures including spot markets, short-term contracts, franchising, joint ventures, and vertical financial ownership (hierarchy). The Mahoney framework is an integration of agency-related perspectives and transaction cost theory. The motives for vertical integration can be classified into three categories: strategic considerations, output and/or input advantages, and uncertainty in costs and/or prices:

Strategic Considerations

- Entry barriers
- Circumventing regulation
- Maintaining oligopolistic discipline

Output and/or Input Price Discrepancies

- Successive Monopoly

- Bilateral Monopoly
- Upstream Monopoly
- Price Discrimination

Uncertainties about Costs and/or Prices

- Reduce asymmetric uncertainty
- Reduce or transfer risk
- Assure supply (Demand uncertainty)
- Control quality and services
- Control the density of retail outlets
- Reduce shirking (Measurement uncertainty)
- Reduce technological uncertainty
- Appropriate R&D spillovers
- Trading of Technology

However, Mahoney finds that these factors explain the motivation for vertical integration, but are not sufficient to provide insight into the choice of organisational form. The existence of transaction costs contributes to the understanding of vertical organisational for coordination structure. The governance structure chosen to implement the vertical coordination strategy should minimise the costs of negotiating, adapting, monitoring, and enforcing supplier-buyer relationships. Mahoney combines asset specificity, task programmability and separability in his framework to predict eight possible governance structures as presented in Table 4.4.

Low levels of programmability, specificity and separability result in spot market coordination while high levels of the three conditions result in vertical integration. Mixed levels of the conditions result in hybrid governance structures. Peterson, Wysocki and Harsh (2001) presented this expanded vertical coordination continuum as depicted in Figure 4.5.

Table 4.4: Predicting the organisational form of vertical control

	Low Task Programmability		High Task Programmability	
	Low specificity	High Specificity	Low specificity	High Specificity
Low non-separability	1: spot market	2: long-term contract	5: spot market	6: joint venture
High non-separability	3: relational contract	4: clan (hierarchy)	7: inside contract	8: hierarchy

Definitions:

Low task programmability: Observing input (effort) is a poor measure for making rewards.

High task nonseparability: Observing output is a poor measure for making rewards.

High specificity: Human, physical and/or site firm specific investments are high.

Spot market: The price system works smoothly.

Long-term contract: Obligations of principals and agents are specified and enforced by third parties (courts).

Relational contract: Obligations of principals and agents are specified and self-enforced. Social conditioning is applicable.

Inside contract: A hybrid arrangement between a contract and hierarchy that is best described as a 'manager as monitor' setup.

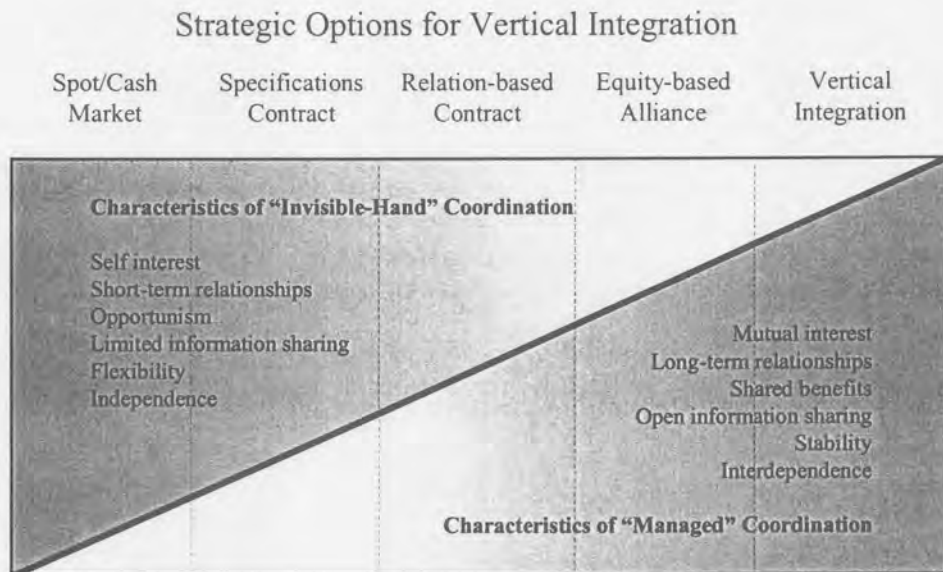
Joint ventures: An equity agreement whereby a separate entity is created.

Hierarchy: A superior-subordinate relationship; financial ownership.

Clan: Organisation that is based on a vital sense of human solidarity.

Source: Mahoney, 1992

The spot market and vertical integration are presented at the extremes of the coordination continuum. The spot market constituted the open market ideal of Adam Smith where the “invisible hand” coordinates market transactions. Individuals are assumed to act only on self-interest and pursue exchange agreements that are short-term, opportunistic, limited as to information sharing, flexible, flexible, and preserving actors’ independence. On the other end of the continuum coordination is managed on the basis of mutual interest for the exchange partners who pursue exchange agreements that are long-term, benefit sharing, open as to information flow, stable, and supportive of interdependence. As strategies are considered from left to right, coordination evolves from being dominated by invisible-hand characteristics through a changing mix of invisible hand/managed characteristics to being dominated by managed characteristics (Peterson and Wysocki, 1997; Hobbs and Young, 1999; Zuurbier, 1996 and 2000).



Note: The diagonal line represents the mix of invisible-hand and managed coordination characteristics found in each of the five alternative strategies for vertical coordination. The area above the diagonal line indicates the relative level of invisible-hand characteristics and the area below the diagonal indicates the relative level of managed characteristics

Figure 4.5: The vertical coordination continuum

Source: Peterson, Wysocki and Harsh, 2001

Coordination mechanisms to the left of the continuum have low intensities of control (“invisible hand”) while those on the right have high intensities of control (“managed coordination”). At the spot market end of the continuum control intensity is very low with *ex ante* control focussing on price negotiation. Both parties can terminate the transaction at this stage and the only *ex post* transaction decision would be to repeat the transaction or not. In a specification contract more *ex ante* control is exercised as the parties negotiate and agree on specific conditions for exchange beyond price. In relation-based alliances the parties adopt a longer term approach beyond the current transaction. Parties are *ex ante* interested in the mutual benefit that might arise from the transaction and *ex post* monitoring that the relationship continues and delivered the envisaged mutual benefits. There are usually several parties involved in equity based alliances which are for example joint ventures, partial ownership arrangement, and clans. The *ex ante* priority for equity-based alliances is to negotiate formal decentralised *ex post* governance structures i.e. the property rights of all the stakeholders. *Ex post*, the execution of governance policies and procedures, focus on the resolution of coordination concerns. Finally vertical integration *ex ante* control focuses on the integration of two entities into one organisation. The *ex post* control is

concerned with the internal implementation of policies and procedures. (Peterson, Wysocki and Harsh, 2001)

Table 4.5 Control intensity across the vertical coordination continuum

	Spot market	Specification contract	Relation-based alliance	Equity-based alliance	Vertical integration
Intensity of control	Low (ex ante dominate)	Moderately low (ex ante dominate)	Moderate (mixed ex ante and ex post)	Moderately high (ex post dominate)	High (ex post dominate)
Focus of control	Immediate transaction	Contract terms	Relationship	Property rights of stakeholders in limited joint entity	Property rights of stakeholders in full entity
Ex ante control	Price discovery	Setting specifications	Relationship building	Negotiating the formal decentralised ex post governance structure	Negotiating the formal centralised ex post governance structure
Ex post control	Yes/no decision to transact Yes/no decision to repeat the transaction	Setting incentives Decision to renew/renegeotiate contract, or seek third party enforcement	Setting informal parameters Mutual resolution or dissolution	Execution of governance policies and procedures in the limited entity	Execution of governance policies and procedures in the full entity

Source: Peterson, Wysocki and Harsh, 2001

4.3.4 Strategic management approach to governance

An enterprise seeks to increase its profits in most instances. Market share, -power and -sustainability are key considerations for any agribusiness in this regard. Competitive advantage can be vested in hard or soft assets. These assets only constitute a real competitive advantage to the firms if the assets are scarce and non-tradable. It is very difficult to achieve both these prerequisites and consequently competitive advantage based on assets are easily eroded. Hard assets are particularly difficult to use to build a competitive advantage since it is relatively easy for other enterprises to acquire similar assets. Immaterial (soft) assets, like brand names, unique location, and long term contracts are a little harder to come by or to establish and therefore constitute a stronger base for creating competitive advantage. (Zuurbier *et al*, 1996)

When it is difficult to establish a competitive advantage based on the soft and hard assets of the agribusiness, the enterprise can also have a recourse in managing the

market environment. The enterprise can strive to reduce the competition in the market or to establish a strong individual competitive position. A competition reducing strategy is usually based on the entry barriers to a specific market. The creation of entry barriers force competitors to make irrevocable investments in soft and hard assets to gain entry to the market. Therefore entrants face the risk of not recuperating their investments if their venture fails, which entails considerable financial risk. (Zuurbier *et al*, 1996)

Five categories of entry barriers are generally recognised (Zuurbier *et al*, 1996):

1. Scale of the enterprise. Scale economics plays an important role in the size of manufacturing plants, distribution, and product development. New entrants are forced to make enormous investments in assets to ensure reasonable returns to scale and then they are faced with the possibility of price-reducing strategies by existing firms in the market. The investment of poultry concerns in capital intensive production facility is an excellent example of an entry barrier based on the scope of the enterprise.
2. Product strategy of the enterprise. An enterprise can limit market access opportunities by serving the market with a wide assortment of products. An entrant will find it difficult to serve a market segment with a new product. Product differentiation is used to improve the competitive positioning of the firm in the market.
3. Organisational form of the enterprise. Vertical integration and exclusive contracting are examples of limiting market access by increasing the costs of entry in the market. A successful investment in the poultry industry, for example, will require huge investments in breeding, fattening, and distribution systems to enter the industry.
4. Manipulation of information by the enterprise. The enterprise can purposefully reveal or withhold information to create a certain perception of the competitive situation within the industry. This information will serve as a deterrent for new entrants to the industry by indicating, for example, that profit margins are extremely low, or competitors are exceptionally strong.

5. Technological dependency. Applicable technology prevents entry or creates dependency.

Reasonable firms will only rarely make considerable investments to influence the market for a product. These investments are usually based on scale economic considerations in production, distribution or manufacturing.

Agriculture in primitive times was a fully integrated system in itself. In subsistence agriculture, vertical integration is almost complete since production, processing and consumption is determined by the same person or group of persons. Subsistence farming evolved into a highly specialised market orientated system with every actor in the supply chain focussing on the activities which it can perform the most efficiently. Specialisation is one of the distinguishing features of present commercialised agriculture. Agriculture as a production industry is compelled to integrate more closely with the other actors due to the process of agro-industrialisation. Consequently, coordination and/or integration between farms and the other firms in the industry, both forward and backward, is inevitable. (Zuurbier *et al.*, 1996)

To understand how to achieve a competitive advantage and how to generalise about the relative position of individual firms within an industry, Porter (1980) developed the concept of generic strategies. These are categories of strategy that follow particular patterns. At the business level, two types of basic competitive advantage have been identified: low cost and differentiation. Though the key success factors of these strategies differ, any successful strategy must pay close attention to both types of advantage while maintaining committed to superiority on one. A differentiator's costs must not spiral out of control, while a low cost-producer should not compromise quality or service too much to maintain discount prices.

Porter (1980) argues that there is potential for a firm to exercise power when:

1. There is little rivalry amongst competing firms
2. No threat of new entrants (high barriers to entry)
3. Low bargaining power of suppliers
4. Low bargaining power of buyers

5. No threat of substitute products

Power is the ability to cause someone to do something that he/she would not have done otherwise. Gaski (in O’Keefe, 1999:20) adopts the following approach for power in distribution channels:

“..the power of a channel member is his ability to control the decision variables in the marketing strategy of another member in a given channel at a different level of distribution. For this control to qualify as power, it should be different from the influenced member’s original level of control over his own marketing strategy”.

The power used by channel members can take on five forms namely (Kotler, 2000):

- *Coercive power* – threat that resource or relationship will be terminated, usually effective when intermediaries are dependent on a single actor in the supply chain.
- *Reward power* – offer of an extra benefit for performing certain actions.
- *Legitimate power* – behaviour required by a contract between the parties, could be expensive to enforce.
- *Expert power* – member has specific knowledge that other chain members value.
- *Referent power* – member highly respected and other channel members conform in order to be associated with this member – usually a strong brand name.

Channel members are most likely to gain cooperation from other members when they use referent power, expert power, legitimate power, and reward power, in that order, and avoid using coercive power (Kotler, 2000).

It is clear from the discussion that firms use strategy and power to impose their goals and views on other channel members to improve their competitive position in markets. This is similar to Williamson’s adaptive response required from firms in an ever changing market environment. However, firms engage in this kind of behaviour for two reasons (1) to improve the responsiveness of supply chains to exogenous disturbances in the market and (2) to build monopolistic advantage by employing entry barriers.

4.4 Conclusions

Institutions are the governance structure which facilitate transaction amongst supply chain participants. The primary aim of supply chain governance structures are to reduce the costs and improve the efficiency of exchange between participants.

The first part of this chapter deals with the evolution of supply chain partnerships. It is clear that partnerships evolve over time to more complex arrangements as partners learn by transacting with each other. The informal institutions governing transactions between supply chain partners goes beyond formal institutions like laws and regulations. Significant relationship specific investments are made over time in these relationships. These relationships are therefore a valuable asset to agribusiness.

The second part of this chapter deals with the theoretical perspective on governance structures. Several characteristics are identified to describe and analyse transactions. These characteristics are related to the cost of transacting. A continuum of vertical coordination strategies are identified ranging from very little internal control (spot market) to complete internal control (vertical integration). Control however, is costly, as business resources have to be dedicated to measure and control the behaviour of the transacting partner. Agribusinesses will therefore only engage in control and monitoring if there is benefit in these activities. The optimal governance structure minimises the cost of control and maximises the benefit or value that arises from the governance of the transaction. The reasons for controlling transaction characteristics are discussed in the next chapter.

Chapter 5: Drivers of change in South African Agribusiness

Chapter 5: Drivers of change in South African Agribusiness

5.1 Introduction

This chapter sets the background for the analysis of the South African case studies. The previous chapters identify the dimensions of the supply chain and the governance structures available to management. The drivers of change essentially constitute the competitive environment in which the agribusiness operate and consequently the strategies that the firm will adopt to maintain and build its competitiveness.

Three main trends are generally recognised in the food system namely the movement away from undifferentiated agricultural commodities towards more specialised products, a movement away from open markets for raw agricultural products towards vertically coordinated transactions, and a movement towards agricultural industrialisation.

Tom Urban coined the phrase “the Industrialization of Agriculture” at the turn of the previous decade. The term ‘agricultural industrialisation’ is used to describe the trend towards economics of scale through the movement to larger production units and the increasing occurrence of vertical cooperation and integration between the various stages of the food and fibre system i.e. the supply chain (Antonovitz, *et al* 1996). Boehlje (1996) defines industrialisation as the application of modern manufacturing, production, distribution and cooperation methods to the food supply chain. Drabenstott (1995) identified the primary changes as a shift from food commodities to food products, and a shift from spot markets to more direct market channels, such as production contracts. The Council of Food, Agriculture and Resource Economics defines industrialisation of agriculture in Sonka (1995) as the increasing concentration of farms and vertical cooperation (contracting and integration) among the various stages of the food and fibre system. The emerging system is expected to be highly competitive in global markets, more efficient, more responsive to consumer demands, less dependent on government assistance, and more able to rapidly adopt new technologies.

"Agroindustrialisation" comprises three related sets of changes: (1) the growth of agroprocessing, distribution and farm-input provision activities off-farm, undertaken by what can be called "agroindustrial firms" or "agribusiness firms"; (2) institutional and organisational change in the relation between agroindustrial firms and farms, such as increasing vertical cooperation; and (3) concomitant changes in the farm sector, such as changes in product composition, technology, and sectoral and market structures. The 1990's heralded a relatively rapid and intense agroindustrialisation in many low- and middle-income countries (Reardon and Barret, 2000; and Cook and Chaddad, 2000)

The trends in agricultural markets can be attributed to three general 'drivers of change' namely the changes in consumer demand; changes in agricultural policy; and changes in the agricultural supply structure. This chapter discuss these three forces in the context of the changes in the South African Agribusiness environment. The first section of this chapter deals with the changes in the consumer market for agricultural produces and the changes in South African agricultural policy. The second part of the chapter is devoted to the views and strategic response of South African agribusiness to the changes in the agrofood sector. The changes in the agricultural supply structure are extensively discussed in chapter 4.

5.2 Changes in the demand for agricultural produce

5.2.1 Consumers and retailers

Expanding production at the hand of improved technology in conjunction with stagnating markets due to low population growth rates in industrialised countries have led to saturated markets. Opportunities for expansion or entry in these highly competitive markets are very scare and many firms are increasingly under competitive and financial pressure. Given these pressures firms are forced to lower their costs and to find innovative ways to provide customer value to enable them to maintain their position in the market. (Fearne and Hughes, 1999; Zuurbier *et al*, 1996; and Boehlje, 1996) Although other markets are increasing in importance, the developed markets have always been an important source of income for South African agricultural and food producers. The United Kingdom, Netherlands, Japan, Mozambique and the United States were the five largest export destinations for South African agricultural

exports in 2001 with export values of R1 936 million, R1 893 million, R1 421 million, R995 million and R944 million, respectively (NDA, 2002). The challenge that saturated markets are posing to agricultural and food producers is not only limited to export markets, but it is fundamentally changing the way agribusiness is conducted. These fundamental changes are permeating the agricultural and food sector from the affluent high-end markets to the economy markets as firms compete to gain market share.

5.2.2 Chain Reversal

Although the term 'supply chain' is generally used, 'demand chain' is actually a much more appropriate term to describe the functioning of the system. Analogous to the change in company orientation towards marketing (Kotler, 2000) from production to marketing, the marketing of agricultural and food products has also evolved. Traditionally the focus of agricultural and food marketing has been on effectiveness and efficiency, or getting products as quickly as possible to customer in sufficient quantities at competitive prices. Since markets have become saturated agricultural and food producers have to find new ways to create customer value as in the case of industrial products. Chain reversal implies that the market or consumer's needs stand central to technological improvement and processes in supply chains. (Boehlje, 2000; Downey, 1996; Drabenstott, 1995; and Zuurbier *et al*, 1996)

5.2.3 New Consumer Demands

Consumer demands is probably the most important driver for change in agricultural and food supply chains. Food quality and assurance is increasingly important to the modern health conscious consumer. Recent food scares have also contributed heavily to the newfound consumer attention to the quality of food. This presents a significant opportunity to food and agricultural chains to establish a competitive position in the market. Consumers with expanded discretionary income are more discerning in their tastes and demand more convenience, variety, and added value as part of the product mix. Consumer value can be created by giving attention to quality and quality assurance, production process, assortment width and depth, consumer service, product information and traceability. Dedicated firms can maintain strong competitive positions by servicing highly defined market niches with specially tailored products, packaging and delivery to meet the needs of these markets. The bulk of agricultural

and food products will require a mass customisation strategy i.e. to provide individually designed products and communication to meet each consumer's requirements on a mass basis. Mass customisation of agricultural and food products cannot be addressed by a single firm and supply chains are challenged to supply mass customised product at competitive prices. The result is a highly fragmented market on the consumer side where agribusiness is serving a large number of distinct niche markets. (Boehlje, 2000; Drabenstott, 1995; Davis and Langham, 1995; Verbeke and Viaene; 2000 and Zuurbier *et al*, 1996)

5.2.4 Societal Values

The topic of the 2002 conference of the International Food and Agribusiness Management (IFAMA) was “Connecting Value with Values”. This is not the first time that this topic was addressed at the conference, but the importance given to corporate social responsibility is significant. The annual reports of most international companies are extending their coverage of traditional profit, loss and business trends to include ‘corporate social responsibility’. However, maximising shareholder value and spending resources on public ecological and ethical concerns contradicts each other. Agribusinesses are challenged to balance these issues in their supply chain processes (IFAMA, 2002).

International agribusiness is devoting more attention to societal values because consumers are increasingly aware of these issues. This is evident in the increasing popularity of ‘green’ parties in European politics and the strength of anti-globalisation movement. Consumers are modifying their buying behaviour according to these values. Bax (2002) indicates that 63% of the Dutch population takes corporate governance into account when shopping and 80% of Belgian consumers want information on the circumstances in which products are produced. The critical issues that agribusinesses should address and balance as identified by Eccles (2002) are presented in Table 5.1.

Table 5.1: Ecology, Ethics and Economy in Agricultural Supply Chains

Ecology	Ethics	Economy
• Air, soil, noise, water, light or skyline pollution	• Bribery, corruption	• Cash flow
• Climate change	• Child labour	• Competitive landscape
• (Disappearing) ozone layer	• Civil rights and equal rights	• Profitability
• (Disappearing) biodiversity	• Fair labour conditions	• Solvability
• Exhaustion of natural resources	• Fair trade	• Market growth
• Food safety	• Use of novel technology (e.g. GMO)	• Market share
• (Hazardous) Waste	• Local culture reinforcement	• Market size
• Health/safety (in/external)	• Training, education and development	• Quality/experience of management team
• Refuse (street rubbish)	• Transparency	• Speed to market (first to market)
• Soil erosion and dehydration	• Usage of animals for research	• Strategic direction

Source: Eccles, 2002

Emerging societal values present challenges to agribusiness management, but also opportunities for value adding. The trend towards customer-centred value creation is taking organisations beyond technology or product innovation. Measuring customer and societal satisfaction is critical to the process of serving the customer and society. This will enable agribusinesses to respond faster and better to customer needs than competition. (Goddijn and Ziggers, 2002) These values are not tangible and will increase the need for traceability, assurance and transparency (5.2.9).

5.2.5 Concentration

The market structure for food and agricultural products is also subjected to a significant evolution. At the retail level companies have been growing and amalgamating into mega businesses - true super markets. A larger market share implies improved economics of scale, higher turnovers, higher margins, and a stronger procurement position. However, these firms are challenged to be big and scale efficient as well as flexible enough to respond to changing customer requirements. (Zuurbier *et al*, 1996)

A significant degree of concentration is taking place at the retail level as multiples compete intensively for market share. The only market growth that the retailers can

achieve is a result of increased expenditure rather than new customers. This is due to the expansion of the food retailing sector in the late 1980's early 1990's into the markets of independent retailers (butchers, bakers and greengrocers) which leaves very little scope for market expansion. As a result retailer strategies have moved away from location and size dominance to product differentiation and own labels. (Fearne and Hughes, 1999).

5.2.6 Consumer demand meet concentration

Consumers, and especially affluent consumers, are highly sensitive to the safety of agricultural and food products. In order to build a competitive position in the market food industry firms launched private labels to satisfy consumer demands for the safety and quality. Food manufacturers, distributors and retailers invested massive amounts of money to build brand recognition and trust with consumers. Information and communication technology enables consumers to communicate the news (or rumours) of chemical or drug contamination or disease outbreaks virtually instantaneously. This can cause enormous damage to a brand, firm or an entire market in a very short timespan. The name of the food industry firm is invariably attached to a private label product and a breach of trust with the consumers can severely compromise the firm in the highly competitive retail market. Food industry firms are therefore extremely set on product standards and quality and exploit their market power to exert considerable pressure on their suppliers to ensure the best (lowest) prices and assured quality standards for their private label products. Similarly, some food industry firms attempt to build differential advantage upon unique qualities of their products. These qualities can usually only be provided and assured through high levels of selectivity and care in the production process.

5.2.7 Biotechnology

Technological advances, and specifically in biotechnology, are providing new opportunities for competitive positioning to agricultural and food producers. Genetically Modified Organisms (GMOs), which is only a small component of biotechnology, are usually designed to induce two categories of characteristics namely lower farm-level production costs (e.g. pest resistance) and or to enhance product quality (e.g. nutritional content, storage characteristics, product appearance). Global positioning systems, preventative animal health programs, complex and safer

agrochemicals will all contribute to the productivity and differentiability products supplied by farmers to the system. Improved supply chain management will be required to ensure the management and provision of differentiated products to the consumer. The provision of GMO free products to the European markets for example, will require supply chain management systems verify and certify these products.

5.2.8 Communication and Information Technology

Communication and Information Technology provide numerous new opportunities for management and control systems. Electronic communication is nearly instantaneous and removes spatial barriers, enabling managers to monitor production, transportation, inventories, and consumer preferences very fast and accurately. This data is utilised to optimise logistics management in the supply chain in order to lower stocks, product losses and out-of-stock costs. Fresh produce especially, is placed under considerable pressure due to the perishable nature of these products requiring low inventories, frequent replenishment and stringent quality control. The ability to measure more precisely and track product and processes more easily increases the accountability of each actor in the supply chain for their contribution to the final product. The implementation of these processes in agricultural and food chains therefore requires considerable cooperation between actors in the chain. (Downey, 1996)

5.2.9 Traceability, transparency and assurance

The issues of traceability, transparency and assurance are closely linked to the new emerging demands of consumers and communication and information technology. Traceability is also called identity preservation and is the ability to track the identity of a product backwards from retail through the different stages of production. Transparency is the availability of information to consumers regarding the processes used at each stage of the product's creation. Assurance is the monitoring and of the food chain for safety by means of product tests and process audits. (Dickson and Bailey, 2002) There are numerous reasons for the emerging importance of traceability, transparency and assurance, but the impact of consumer's health consciousness and safety sensitivity is considered the single most important driving force for the implementation of these systems (Verbeke, Doyer and Visser, 2002). Traceability, transparency and assurance represent an important source of value

adding to improve a company's competitive position in the market. These activities require system or supply chain wide coordination of the activities of each of the actors at each stage of the product's creation.

5.2.10 Synopsis

The drivers discussed in this section are some of the most significant reasons for the emergence of supply chain management in the agricultural and food sector. The most important driver is consumer demand, supported by the pressure on retailers to innovate to maintain and expand their market share. The actors in the supply chain utilise technology, especially biotechnology and information and communication technology to create product differentiation and competitiveness in the retail market. These processes require coordination across the different actors in supply chains to deliver products of superior value. However, these drivers are generic drivers putting pressure on just about every food supply system in the world. The South African political economy and agricultural sector has also experienced substantial changes over the last ten year. These changes and their impact on local supply chains are discussed next.

5.3 The South African situation

5.3.1 Introduction

Food and agricultural policies continue to play a major role in the evolution of the food and agricultural system. The demise of the control board system in South Africa left a vacuum in the cooperation of product allocation and food and agricultural system governance. Actors in supply chains are now faced with new opportunities within a more flexible marketing system like expanded opportunities for product differentiation, but also challenges due to higher risk exposure in the free market. The co-ordinating role of government is being replaced with alternative governance systems.

In addition lowering trade barriers under WTO agreements acts as a double edged sword. On the one hand new market opportunities are presented to the South African agricultural and food systems, but on the other hand, multinational firms are entering domestic markets with new strategies and abilities changing the nature of the

competition in these markets. Local firms have to develop and implement new strategies to compete successfully with powerful and resourceful international companies. These firms are able to procure products from almost any country in the world by means of efficient and effective supply chains. Domestic producers are not only competing against each other any more, but against international producers. Globalisation presents new market opportunities to the South African food and agricultural system. New markets will require particular strategies and processes to serve the diverse requirements of the consumers in these markets. The agricultural and food system can source material from anywhere in the world, obtaining the best price and quality inputs. Bigger markets will create new opportunities to realise economics of scale and scope in manufacturing and distribution of produce.

The creation of trade blocks present additional and more competitive resources to actors in the agricultural and food complex. However, new skills, processes and strategies will be necessary to utilise these resources optimally. The government's role is imperative to the creation of a vital Southern African trade block in terms of the political establishment of the trade block, but even more to establish and maintain an enabling infrastructural environment.

5.3.2 The evolution of South African agricultural policy

The nature of South African agricultural sector and especially the marketing of agricultural produce has changed fundamentally over the last two decades. Various authors have recorded this process extensively (Van Zyl, Kirsten and Binswanger, 1996; Vink and Kirsten, 2000; and Bayley, 2000). This process has not proven to be an easy one. The complexity of issues related to new marketing systems, institutions and relationships require innovative approaches and research programs.

Governments throughout the world are involved in the marketing of agricultural products. The degree of statutory involvement rose sharply in the 1930s due to the worldwide depression where consumers were out of jobs and farmers saw their produce perish in storage, as there was nobody that could buy their products. The public were disillusioned by the “invisible hand of the market” and wanted government to intervene to ensure their economic well being (Lombard, Du Pisanie and Steyn, 1986). The South African economy and agricultural sector was no

exception (Bayley, 2000). The political-economical cycle provides a framework to gain insight into the evolution of the political economy and eventual government involvement in the South African agriculture.

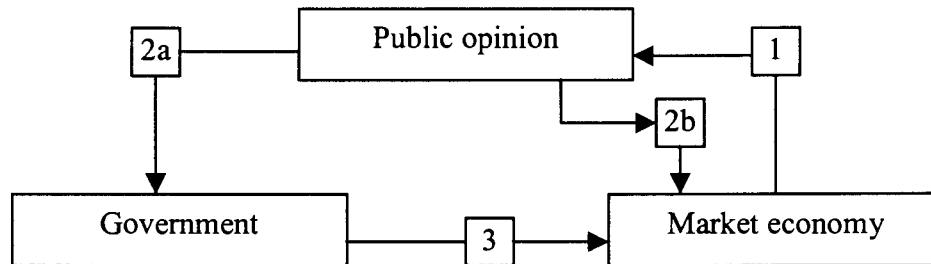


Figure 5.1: The Political-Economical Cycle

Source: Lombard *et al* (1986)

The market economy is a collection of processes regulated by the price mechanism in which private firms are involved. The government is a collection of political processes, autonomous or collective in nature. Public opinion is a collection of information processes that yields a collective opinion. These three elements interact in three dimensions. The first dimension (1) is the result of the mixed market system, which is evaluated by public opinion. Important issues in this regard are for example food prices, commodity prices, market access and distribution of land ownership (Vink and Kirsten, 2000, Bayley, 2000, Mbongwa *et al* 1996). The nature and extent of government involvement in the market economy is influenced by different ideological approaches to addressing the results of the market economy. The second dimension (2a and 2b) concerns the influence that public opinion has on the government (2a) and on the market economy (2b). The efficacy of public opinion on government policy (2a) depends on the prevalent political system i.e. dictatorship, democracy (federal or unitary). Public opinion also influences the market economy directly (2b). This does refer to individual action like consumer resistance to certain products, but rather to collective action like strikes. The importance of this dimension decreases as the efficiency of political dimension (2a) increases. The final dimension is that of government involvement in the market economy. The most important issue in this dimension is the extent of involvement. Direct involvement implies that the government disregards all pretences of a market economy, while indirect involvement would be market orientated (Lombard *et al* 1986).

Agricultural policy in South Africa was guided to a large extent by the general political and economic philosophy of white domination or apartheid. The result of these policies included distorted output and input markets, land and labour markets, infrastructure, agricultural credit services, and the creation of large-scale farms in the hands of white owners (Mbongwa *et al* 1996).

The evolution of South Africa's agricultural political economy can be divided into five main periods namely (Mbongwa, 1996; Vink and Kirsten, 2000; and Bayley, 2000):

- Pre 1900
- Segregation and support – 1910-1947
- 1947 – 1980
- 1980-1994
- Post independence 1994-

These are discussed in more detail in the next section.

5.3.3 Pre 1900

The agrarian economy of South Africa in the 1800's was divided into two main geographic sub-sectors namely coastal and interior farming. Coastal farming included horticulture, livestock and crop farming. Wool, wine, hides and ostrich feathers were exported to Europe. Interior farming was mostly subsistence-based. Livestock farming, by indigenous farmers who produced for home consumption and engaged in surplus marketing to a limited extent, was the primary agricultural system in the interior. Trade between the two regions consisted of livestock, hides and ivory in exchange for guns, ammunition, textiles and transport equipment (Bayley, 2000; and Mbongwa *et al*, 1996).

The discovery of diamonds in 1867 and gold in 1886 in the interior revolutionised the structure of the South African economy. Large and rapidly growing urban areas were developed around the mining areas with the associated demand for food and agricultural products. (Mbongwa *et al*, 1996; and Bayley, 2000).

5.3.4 Segregation and support: 1910-1947

The Union of South Africa was established in 1910. British interests and policies revolved around gold mining and related economic considerations. The mines' requirement for cheap labour was prominent in this regard. Britain also desired political stability after the war and actively pursued improved relationships with the large Afrikaner landowners. The political economy centred around two central and interrelated themes (Bayley, 2000):

- The political and economic deprivation of the African population; and
- The attainment of, and effort to maintain, a symbiosis between the (Afrikaans speaking) state and (English speaking) capital.

The Great Depression and South Africa's delay in coming of the gold standard resulted in lower agricultural prices. This paved the way for stronger lobby groups in agriculture with popular support, which led to the promulgation of the Marketing Act of 1937 (Bayley, 2000).

The expansion of statutory control in over agricultural marketing in this period can be divided into three phases (Bayley, 2000):

- commodity-specific controls were instituted during the 1920s in respect of three commodities – wine, sugar and tobacco;
- commodity-specific interventions expanded during and following the Depression (1930-1936), affecting maize, wheat, livestock, and dairy products; and
- marketing controls were extended, initiated, and managed in terms of the 1937 Marketing Act.

The Marketing Act of 1937

The Marketing Act of 1937 was a consolidation of governmental support to agriculture. Before 1937 State intervention in agricultural marketing was disaggregated and on an *ad hoc* basis. The 1937 Act was the cornerstone of commercial agricultural marketing and policy as the Act was structured to be the most important instrument for State involvement/intervention in agriculture (Vink and Kirsten, 2000).

Bayley (2000) cites the following motivation for the Marketing Act of 1937 by De Swart, who is generally recognised as the architect of the legislation:

- The inelastic demand for agricultural products meant that relatively small changes in the level of supply resulted in relatively large price movements;
- South Africa agricultural production was vulnerable to significant supply shocks due to the weather and the sector's relative isolation from international markets;
- Importing, exporting and storage was risky in a situation of imperfect knowledge about market conditions;
- Market imperfections resulted in significant differences between the prices attained in overseas markets and domestically; and
- The resulting speculation and suspicion of market manipulation, led to widespread dissatisfaction amongst producers.

He furthermore argued that stable prices throughout the year, and a marketing authority with statutory powers including the ability to store and finance surpluses, and to control imports. The problems facing the agricultural sector has become too involved to be handled by thousands of ill organised and financially weak individuals with conflicting interests. He proposed that prices be determined by a small body of responsible men equipped for the task and in possession of all the necessary facts and statistics. (De Swart in Bayley, 2000).

The extent of the statutory and executive powers of the Marketing Act as implemented by the control boards is evident when the interventions that were provided for in the Act are considered (Bayley, 2000):

- the placing or prohibitions on the sale of a commodity by farmers or the purchase of a commodity by trader and processors;
- the placing of conditions or prohibitions on the import or export of an agricultural commodity;
- the conducting and financing of pools;
- the collection of levies to pay for the operations of, and interventions by, the regulatory board;

- the appointment of agents to act on behalf of the board;
- the prohibition of the manufacturing or processing of an agricultural product except with a permit; and
- the fixing of margins for the manufacturing and processing of agricultural commodities.

By 1961 more than 90% of the agricultural production (farm value) was subject to statutory control. The majority of the controls (on 73% of production) were managed by 17 marketing schemes under the auspices of the Marketing Act. The balance of the products (18%) were managed under commodity specific legislation (Bayley, 2000).

5.3.5 Consolidation to Maturity: 1947-1980

In 1948 the National Party defeated the United Party. This victory was partly (but not mostly) due to way the United Party government managed the marketing of agricultural produce. The previous government used the Marketing Act of 1937 to control the price and supply of agricultural produce in the wartime. Farmers received prices that approximated estimated production costs and did not reflect the actual scarcity value of the produce. This led to some dissatisfaction in the rural constituencies which also influenced voting (Bayley, 2000).

The South African economy grew at about 5% per annum until the 1970's after which it grew at about 3% per annum until the 1980's. These growth rates were higher than the population growth rate during this period. However, the economy, and especially agriculture, suffered a high rate of inflation and increasing concentration in the agro-industrial complex. At the beginning of the 1980's these policies had created an unsustainable situation and the agricultural economy badly needed revision.

5.3.6 Maturity to independence: 1980-1994

Given the challenges to the sustainability of the agricultural policies the sector underwent increasing deregulation and market liberalisation seemingly without any stated policy. The most immediate impact from this policy were the decline of the value of the Rand and increasing capital costs. Changes in the reserve requirements by the Reserve Bank made it impossible for the Land Bank to continue subsidised

interest rates for the farming sector. Labour policy was also amended to allow the free movement of labour. The deregulation of the food sector implied increasing activity in the informal sector. The formal sector also benefited from the deregulation and responded with new product and service offerings.

The trade policy reform is of particular significance to the marketing of agricultural products. The trade policy reform was aimed at undoing the decades of 'inward industrialisation' strategies. The Marrakech Agreement called for the tariffication of all agricultural produce as opposed to quantitative measures, and a phased reduction in the tariffs. South Africa reduced its tariffs at a rate faster than required by the Uruguay Round of the Global Agreement on Tariffs and Trade (GATT). The government also negotiated new agreements with the Southern African Development Community (SADC) and the European Union. South Africa is also a member of the Cairns Group which supports the unilateral liberalisation of agricultural trade regardless of the actions by developed countries (Vink and Kirsten, 2000). The net effect of these changes is that the South African agricultural sector is exposed to the vagaries of international markets.

5.3.7 Post-independence 1994-

The main characteristics of the government's new approach were (Bayley, 2000; and Vink and Kirsten, 2000):

- the implementation of GEAR (Growth, Employment, and Redistribution) strategy which was a competitive and outward orientated approach to generating sustained growth;
- currency controls were relaxed;
- free trade and preferential access agreements were sought with, amongst others, the European Union and Southern African States;
- the Labour Relations Act shifted the power balance in favour of labour;
- the commercialisation of parastatals such as Telkom, Transnet and Eskom was initiated; and
- South Africa started to implement WTO commitments.

Within this framework the Marketing Act of 1996 was promulgated. The objectives of the Act were:

- Increased market access for all market participants;
- The promotion of efficiency in the marketing of agricultural products;
- Optimisation of export earnings from agricultural products; and
- Enhancing the viability of the agricultural sector.

The Act was aimed at enabling farmers to stand together to stabilise agricultural prices. Co-operation without state intervention would cut out unnecessary duplication in the marketing which would lower the cost of getting the produce to the consumer in the desired form, time and place (Vink and Kirsten, 2000).

Interventions or government involvement in the agricultural sector should reflect the governments policy goals. The initial presumption was in favour of non-intervention. The responsibilities of the National Agricultural Marketing Council (NAMC) was to advise the Minister of Agriculture on the implementation of the Act. The NAMC was to consultative procedures in the execution of its responsibilities. The NAMC was to be constituted in such a way as to ensure that the statutory advice is based on expertise rather than the interests of particular interest groups (Vink and Kirsten, 2000; and Bayley, 2000).

The promulgation of the 1996 Act heralded the cessation of statutory intervention in agriculture. New players emerged on the markets and familiar institutions vanished.

5.4 Co-operatives: The Agents of the 1937 Marketing Act

Special attention is devoted to the co-operative sector since this sector was extensively involved in the marketing of agricultural produce as agents of the marketing boards. By the mid-1990's co-operatives handled the vast majority of the agricultural production in South Africa. The extent of the involvement of co-operatives in South African agriculture can be observed in Table 5.2. About 250 co-operatives held assets valued at R12.7 billion with a turnover of approximately R22.5 billion in approximately 1200 branches throughout the country and employed approximately 70 000 people (ABC, 1998 and Bayley, 2000).

Table 5.2 The Extent of Co-Operatives in the South African Agricultural Sector (1990)

Product	Involvement
Deciduous and citrus fruit export	100%
Wheat	98%
Maize	93%
Wool	100%
Sunflower	90%
Dried fruit	90%
Tobacco	100%
Wine	86%
Production financing	90%
Fuel	85%
Agro-Chemicals	65%

Source: Bayley, 2000

Co-operatives established this strong presence as agents for the marketing control boards. The massive growth of the co-operative movement can be ascribed to Government support. The following instruments were applied by the Government to support co-operatives (Bayley, 2000; and Vink and Kirsten, 2000):

The Land Bank Act of 1912

- subsidised interest rates to farmers and co-operatives
- this finance was only available to farmers and co-operatives
- these interest rates gave co-operatives a competitive advantage in the input supply and marketing of agricultural produce as they had access to cheaper credit and capital

The Co-operatives Act of 1922

- legislative framework for establishment of limited liability organisational structures
- farmers that owed money to the co-operatives were bound by legislation to delivering their produce to the co-operative
- cheap credit from the Land Bank therefore enabled co-operatives to oblige farmers to deliver their produce to co-operatives

The vesting of statutory marketing powers in agricultural co-operatives

- several co-operatives enjoyed statutory marketing powers for products like ostriches, wine and tobacco

Representation on the control boards

- co-operatives were appointed both as farmer representatives and as agents of the marketing boards on the marketing boards

Control board appointment and remuneration policies for their agents

- marketing boards favoured the appointment of co-operatives as marketing agents
- financing costs of the co-operatives in the execution of their activities were reimbursed by the control boards
- remuneration and appointment of agents favoured co-operative structures
- non-cooperative business found themselves in a weak competitive position in relation to co-operatives given the preferences of the boards and subsidised credit supplied to co-operatives

The silo building program

- the silo building programme allowed co-operatives to build up huge structures (with excess capacity)
- legislation prevented silo building by organisations other than co-operatives

Direct financial support from government

- some co-operatives received direct government support to see them through financial difficulty

Competition policy

- co-operatives were not subject to the provisions of the Competition Act
- the Co-operatives Act determined boundaries for the co-operatives, rendering co-operatives as regional monopolies

Tax status of co-operatives

- prior to 1977 tax was only levied on business with non-members
- after 1977 normal companies tax of 35% was levied
- co-operatives still enjoy special treatment in terms of capital investments and depreciation

Channelling of drought relief through co-operatives

- statutory emergency relief was channelled through co-operatives
- the support of farmers by the government benefited co-operatives indirectly by ensuring a market for agricultural inputs and a supply of products to market

5.5 The Impact of the Marketing Act of 1937 on structures in the Agricultural Sector

The Marketing Act of 1937 had, amongst others, the following consequences (Vink and Kirsten, 2000):

- Beef marketing quotas at the controlled abattoirs resulted in an increase in retail processing and a decrease in producer processing in uncontrolled abattoirs. Large farmers mostly sold at controlled abattoirs as they were able to obtain permits while small farmers sold at the uncontrolled abattoirs.
- Co-operatives were generally appointed as the agents of the marketing boards. This arrangement effectively instated the co-operatives as regional monopolies. Farmers were paid a fixed price regardless of the point of delivery. This resulted in substantial cross-subsidisation from farmers close to markets to those far away.
- The maize scheme resulted in substantial transfers from consumers to producers.
- The implementation of the 1937 Marketing Act distorted the location of capital intensive agro-processing. Berning and Potgieter (1998) noted in this regard that a substantial number of Free State cattle were processed outside the province.

The restrictive licensing of agricultural processors under the 1937 Marketing Act enabled a small number of large-scale agro-processing companies to dominate the processing and marketing of agricultural products. The effect on the milling and baking was summarised by NAMC in Bayley (2000) as:

- The number of registered bakers had fallen from 663 in 1941 to 464 in 1962;
- Millers were taking over bakers at 'excessive' prices with a view to securing a market for their flour, so that there was an increasing danger of a monopoly situation developing;
- In the Witwatersrand three milling groups accounted for 77% of bread production; and
- In certain urban areas bakers were co-operating to such an extent that they were subjecting themselves to production quotas.

The South African Government effectively controlled the marketing of agricultural products of the last six decades. This intervention was justified in terms of factors such as the strategic performance of the sector, the need to stabilise an inherently unstable sector, and to ensure the sustainability of the rural areas in South Africa. The implementation of the Marketing Act had several consequences. The most relevant to the topic of supply chain management are the system of market agents that led to the dominance of the agro-processing sector by a small number of large-scale firms and the use of the marketing controls as vehicles for rent-seeking.

The deregulation and liberalisation of the agricultural sector saw the demise of the marketing boards. In the process of liberalisation all the agricultural marketing boards or state trading organisations were abolished. These marketing boards used to direct the marketing functions in the marketing of agricultural produce to a greater or lesser degree. Farmers and the agribusiness sector therefore never had a direct responsibility in marketing their produce. Most of the functions of these boards were taken over (are in the process in some instances) by the private sector. These functions include to a greater or lesser extent:

- Price formation
- Risk management
- International marketing

- Distribution decisions
- Information supply
- Location of production and processing activities
- Marketing programs and strategies
- Grading and quality standards
- Product procurement
- Management of supply chains
- Decision on the scope and scale of operations

When the marketing boards were abolished producers had to devise and establish new institutional structures and arrangements to govern the marketing of food and fibre products to replace the functions and institutions of the marketing boards (Bayley, 2000; Vink and Kirsten, 2000). The next important influence resulted from the liberalisation of agricultural trade. South African farmers were exposed to international competition in domestic markets and new opportunities on international markets. International food and agribusiness trends became a reality to South African markets.

The deregulation and liberalisation of the South Africa agricultural sector exposed farmers and agribusiness alike to international trends. These actors have to be competitive in order to survive in domestic and international markets.

5.6 South African Agribusiness Strategic Response

Some evidence of the strategic response to the deregulation were already evident in two reports by Vink and Kirsten (2000), and a section 7 committee report on the impact of the deregulation process on the wheat to bread value chain (NAMC, 1999).

Vink and Kirsten (2000) examined the registration of new companies in the agribusiness complex in order to investigate the private sector response to reduced government involvement. The reduced government involvement necessitated private companies to replace the functions previously performed by state departments and marketing boards. Vink and Kirsten (2000) argued that these new business enterprises are more efficient in their service delivery than state and parastatal

institutions. The new enterprises would also present a more diverse set of services to agriculture, create a range of new value added products and engage in export activities.

The increase in registration of new companies after the deregulation period (approx. 1990-1994) can be observed in Figure 5.2. Company registrations increased due to the deregulation process and the newfound confidence in the South African economy after the democratic elections in 1994. The number of companies registered per annum increased rapidly since 1985, but the fastest growth is observed after 1994.

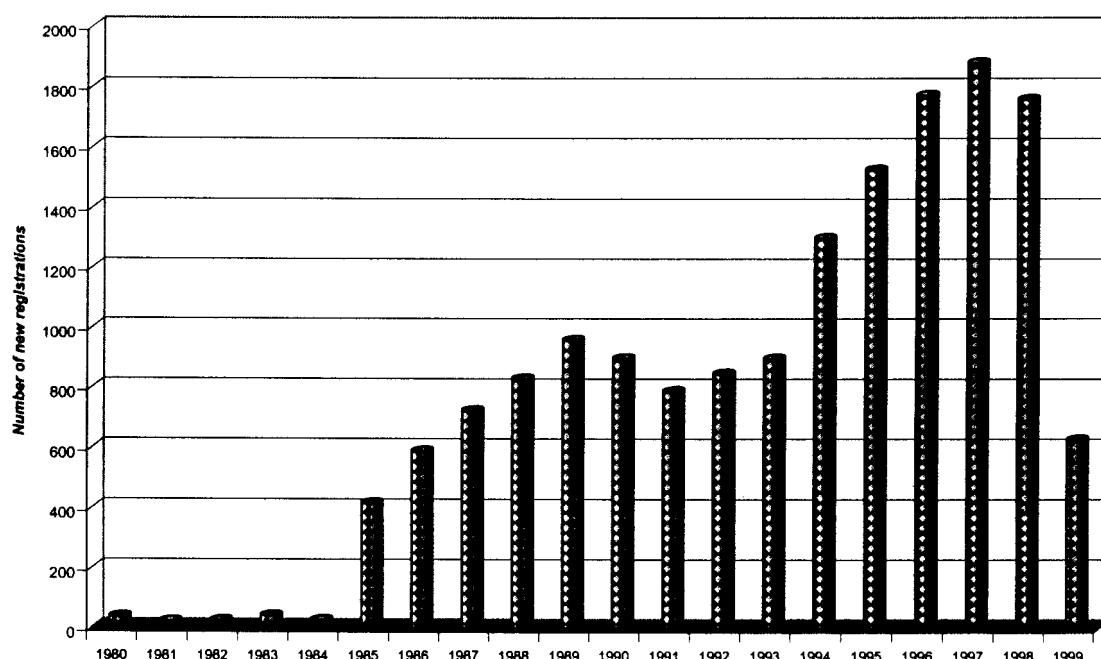


Figure 5.2: Annual New Company Registrations in the Agricultural Sector: 1980 – 1999*

* 1999 figure is only up to March.

Source: Vink and Kirsten, 2000

The deregulation of the wheat sector is also visible in the change of the margins earned by the different players in the bread supply chain. The wheat control scheme was promulgated in 1937 and terminated in 1997 and quantitative wheat import controls were lifted in 1995. The Wheat Marketing Board consisted of seven farmer-, two miller-, one processor-, one baker- and one consumer representative(s) (Wheat

Board, 1993). The shift of power is already evident in the wheat to bread value chain. The share in retail prices by the various role players in the retail sector shows significant changes over the last ten years as presented in Tables 5.3 and 5.4. The shares in retail prices of bread in the downstream activities i.e. production, infrastructure and milling declined significantly while the shares of retailing and baking increased. This shift in relative share can partly be ascribed to the loss of producer's power due to deregulation, and partly to increasing capital costs and expanded product ranges offered to consumers. (NAMC, 1999)

Table 5.3: Percentage Share in the Retail Price of White Bread

Roleplayer	1990/91	1996/97	1998/99
Producer	33.3	24.2	17.9
Infrastructure	6.7	3.3	4.4
Miller	16.7	10.8	9.8
Baker	40.0	42.0	43.9
Retailer	3.3	7.4	11.8
Government	0	12.3	12.2
Total	100	100	100

Source: NAMC, 1999

Table 5.4: Percentage Share in the Retail Price of Brown Bread

Roleplayer	1990/91	1996/97	1998/99
Producer	32.4	23.4	16.7
Infrastructure	6.7	3.8	4.1
Miller	20.9	15.7	12.6
Baker	36.2	46.0	46.3
Retailer	3.8	11.1	20.3
Government	0	0	0
Total	100	100	100

Source: NAMC, 1999

5.6.1 South Africa Agribusiness Survey

A survey to determine the views of agribusiness managers on the shape and drivers of the South African agrofood complex was done in 2001. The survey consisted of six sections namely general information, coordination preferences, strategic direction, strategic focus areas, shape of the agrofood industry, and major factors driving these trends. The survey was mailed to approximately 450 CEO's and managing directors of agribusinesses. A total of 124 questionnaires were received back, of which 94 were usable. This represents a satisfactory response rate of 20.89%. The distribution of responses from the different agricultural sectors is presented in Table 5.5. The contribution of each of these sectors to the gross value of agricultural production is included in Table 5.5 to compare the response distribution to the actual contribution of these sectors. The survey is relatively underrepresented in the livestock section and over represented in the field crop sector. The overall distribution is however satisfactory.

Table 5.5: Response Distribution and Contribution of the Different Sectors to the Gross Value of Agricultural Production in South Africa (1999/2000 season)(%)

	Survey distribution	Contribution to gross value of agricultural production
Field crops	43.6	31.4
Horticultural crops	30.9	26.8
Animal products	25.5	41.9

Source: Own survey and NDA, 2001

Agribusinesses participating in the input supply (44.7%), production (9.8%), processing (17.9%), and marketing (27.6%) functions of the supply chain were represented. The over representation of the input supply function is of some concern.

5.6.2 Growth strategies and coordination preferences

The Ansoff product-market expansion grid is a useful framework to elucidate intensive growth strategies. This matrix is presented in Figure 5.3.

	Current Products	New Products
Current Markets	1. Market penetration strategy	3. Product development strategy
New Markets	2. Market development strategy	(Diversification strategy)

Figure 5.3: Ansoff's Product-Market Expansion Grid

Kotler (2000)

Agribusinesses can opt for one of three intensive growth strategies. The first is the market penetration strategy where the firm attempts to gain more market share in current markets with current products. The second is the market development strategy where the firms attempts to enter new markets with existing products. The third is the product development strategy where the firm attempts to develop products of interest to its own market. The diversification strategy is not seen as an intensive growth strategy as the opportunities are found outside of the current business. South African agribusinesses' growth strategies for the future is mostly centred around the market penetration (35% of all agribusiness managers) and market development (35%). The strategy of agribusiness in South Africa is therefore to use current products to penetrate current and new markets. Only 18% of the managers indicated that they would follow a product development strategy in future with 12% opting for the diversification strategy. When the matrix is considered in terms of the product and market dimension it is interesting to note that the division of the strategic focus between current and new products is respectively 70% and 30% and the division between current and new markets is respectively 53% and 47%. Agribusiness managers will therefore focus more on new markets than the introduction of new products.

The purpose of the questionnaire was to determine whether supply chain management practises were being implemented in the South African agribusiness complex. It is therefore important to determine whether the strategies discussed above will be implemented independently or in cooperation with other enterprises in the supply chain. 47% of agribusinesses indicated that they will implement their strategic direction for the future in cooperation or partnership with other enterprises. 43% indicated that they will base the implementation on their own competences, 8% indicated that they will take over or merge with other companies while 2% indicated other strategies for implementation. It is clear that there is a clear trend towards cooperation and coordination in South African agribusiness supply chains.

Agribusinesses were asked to indicate their current and future coordination preferences according to the coordination continuum suggested by Peterson, Wysocki and Harsh (2001) namely spot/cash market, specifications contracts, relations-based alliance, equity-based alliance, and vertical integration. The most popular coordination mechanism for South Africa Agribusiness is the specifications contract, followed by the spot or cash market. There is a clear trend towards the right of the vertical coordination continuum, although the managers indicate that vertical integration will be reduced in future. These results are according to expectations and it shows that South African agribusinesses are re-engineering their coordination mechanisms to be more responsive and better controlled. This implies that agribusiness governance or coordination systems will increasingly be based on mutual interest, long-term relationships, shared benefits, open information sharing and interdependence according to the Peterson, Wysocki and Harsh (2001) continuum (see 4.3.3). In the Williamson paradigm this will imply that firms will increasingly engage in asset specific investment. This graph clearly illustrates the trend in the emergence of supply chain management in the South African agribusiness sector.

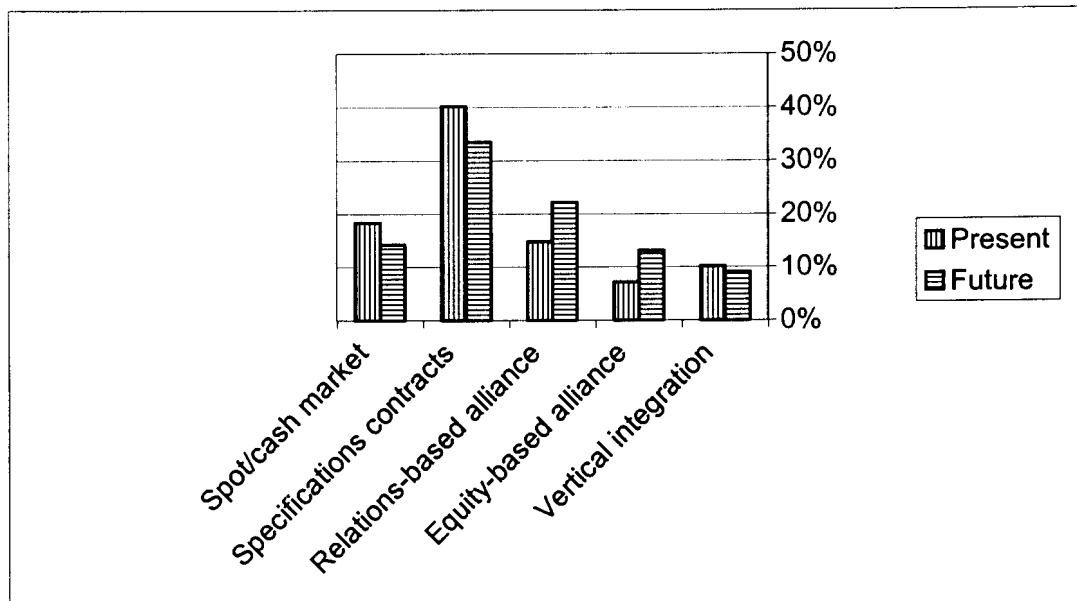


Figure 5.4: Coordination Preferences of South African Agribusiness

Source: Own survey

5.6.3 Strategic focus areas of South African agribusiness

Porter (1980) identified three generic strategies for competitiveness by the firm namely overall cost leadership, differentiation, and focus. The same strategies are employed by various authors in the supply chain management discipline (see Hagelaar, Horbeek, Spee and Don, 1998; and Champion and Fearn, 2001). Zuurbier (1999 a) proposes four strategy drives for firms along the lines of the previous strategies namely:

1. The cost drive – through economics of scope, economising downstream and upstream coordination costs, and a improved scale economics.
2. The value adding drive – similar to the differentiation drive and especially the development of products with bundles of attributes close to new consumer claims.
3. The power drive – building market share through horizontal and vertical expansion, increase profitability, guard risk profile, portfolio of produce that establish differentiation as the basis for successful competitive advantage.

4. The surf drive – integrating new developments in information and communication technology into business systems to facilitate the change from mass customisation to mass individualisation, electronic markets and expanded tracking and tracing capabilities.

Table 5.6: Importance (% choice) of Strategic Focus Areas to South African Agribusiness

Priority	Cost	Value-adding	Power	Surf
1	49 (23)	30 (42)	37 (46)	2 (9)
2	23 (28)	38 (29)	30 (26)	3 (12)
3	25 (26)	28 (24)	30 (22)	7 (20)
4	3 (23)	4 (6)	3 (7)	87 (59)

Numbers in brackets represent future priority

Source: Own survey

The importance of the cost drive or strategy to South African agribusiness firms can be observed in Table 5.6. The power drive is currently second to the cost drive, but the agribusiness managers expect power to be the most important drive in future as they reposition themselves in the market. This is also apparent in the importance of the critical performance areas to the managers as observed in Table 5.7. The optimisation of profitability and risk profile and expanding market share, part of the power drive, is followed by better accounting systems to control costs. The value adding or differentiation drive is never far behind as this is the basis on which the other strategies can be driven. The surf drive is not seen as an important strategy for agribusinesses. The only aspect of the surf drive that enjoys some popularity is the business to business linkages.

Table 5.7: The importance of Core Performance Areas in Strategic Focus Areas

Core Performance Area in Strategic Focus Area	Strategic	
	Focus Area *	Score**
Optimising profitability and risk profile	P	6.34
Increasing market share	P	5.73
Accounting systems to control costs better	C	5.72
Developing new value-added products	V	5.48
Value-adding to address unique customer requirements	V	5.46
Developing and presenting a diverse portfolio of produce	P	5.30
Coordinating with downstream companies to ensure better service/products	C	5.24
Coordinating upstream to plan and implement marketing strategies	C	5.21
Providing new and more convenient products to customers	V	5.15
Strong competition with other supply chains	P	5.15
Computer systems linked with suppliers and buyers	S	4.83
Always buy produce at lowest possible prices	C	4.80
Rationalisation of business	C	4.28
Selling products on electronic markets	S	3.70
Providing agriculture and food products over the internet	S	3.38

* C = cost drive; V = value adding drive; P = power drive; S = Surf drive

**Likert scale 1 (least important) - 7 (most important)

Source: Own survey

5.6.4 Shape of the agrofood sector

It is clear from Table 5.8 that most agribusiness managers agree that electronic markets will dominate the shape of the agrofood sector in future. The next seven factors all indicate shorter supply chains, stronger networks, and closer cooperation between bigger companies, also on a global scale. Small companies and cooperatives will have a negligible effect on the shape of the sector in future. Agribusiness managers feel that there will be more trust and less opportunism in the market indicating a new approach to interaction with other players in supply chains. Virtual networks do not feature as an important factor as opposed to increased use of electronic markets. These figures are compared to an unpublished survey conducted by Zuurbier (1999 b) in Table 5.9.

Table 5.8: The future shape of the South African Agrofood Sector

Factor determining the shape of the agrofood sector	%
Electronic markets	73
Vertically integrated supply chains	72
Mergers, acquisitions and collusion between companies	71
More direct marketing from farmers to consumers	67
Closer co-operation between agribusiness and international commodity trading organisations	63
Networks of companies	63
Closer co-operation between agribusiness and input supplier companies (e.g. fertiliser companies)	61
Increase in global agribusiness networks	61
Increase in global companies	59
Larger scope in companies	54
Input supplying companies dealing directly with farmers	53
More fragmented /niche markets	52
Retail and processing companies increasing in size and market power	48
Bundling of inputs packages – specific combination of seed and chemicals marketed to farmers	45
Increase in regional agribusiness networks	38
Increase in small companies	38
Input suppliers increasing in size and market power	37
Spot markets	28
Virtual networks of companies	28
Less trust/More opportunism in markets	20
Increase in co-operatives	9

Source: Own survey

South African agribusinesses agreed with their international counterparts on fragmentation / niche markets, the reduction of small companies, electronic markets and, significantly, trust and opportunism. Electronic markets can be seen as a spot market, but linked to international markets which gives the market a global dimension. In the previous section (5.6.3) it was shown that South African Agribusinesses focussing on new markets for their products which could be linked to their outlook on the fragmentation of markets and emergence of niche markets. Local agribusiness leaders agree that the opportunism will decrease and trust will increase in the business environment. Rademakers and McKnight (1998) found that an increase in trust and decrease in opportunism is a precursor to supply chain formation in an

industry. This indicates a new approach to doing business and especially coordinating with other actors in supply chains beyond the current spot market approach.

Table 5.9: The Shape of the Agrofood Sector

Item	NL	EU	World	RSA
Larger scope in companies	0.73	0.75	0.70	0.54
Vertically integrated supply chains	0.85	0.91	0.90	0.72
Spot markets	0.23	0.19	0.20	0.28
Networks of companies	0.92	0.88	0.95	0.63
Virtual networks of companies	0.58	0.72	0.70	0.28
More fragmented / niche markets	0.77	0.56	0.60	0.52
Increase in small companies	0.15	0.44	0.45	0.38
Increase in global companies	0.73	0.84	0.80	0.59
Electronic markets	0.81	0.78	0.80	0.73
Less trust / more opportunism	0.27	0.28	0.20	0.20

Source: Zuurbier (1999 b) and own survey

However, the two aspects where the agribusiness managers differ from each other on networks and the impact of company scope and global companies. This indicates the limited scope for company growth in domestic markets. The lower importance of networks indicate, in contrast to the improvement in trust and reduction in opportunism, that South African agribusiness still lags behind international business practises. In the same line of argument South African companies attach less value to the emergence of vertically integrated supply chains, more managers think that the spot market will still play a role and networks of companies are scored significantly lower than their international counterparts.

Given the improvement in trust, but lower values for networks and supply chains, an increase in the importance in supply chains and networks can be expected. Companies will still become larger through mergers and acquisitions and the distance between the producer and consumer will be reduced. This indicates that companies with larger scope operating in more coordinated supply will emerge over time.

The drivers of the changes in the agrofood sector is discussed in the next section to elucidate the differences between the two sectors.

5.6.5 Major Factors Driving the Agrofood Sector

The results of the survey conducted by Zuurbier (1999 b) are presented in Table 5.10 and the results of the expanded South African survey are presented in Table 5.11. The most important factors driving the international agrofood sector are consumer behaviour and technology. This is also evident in South Africa where changing consumer needs and information and communication technology are regarded as the second and third most important factors (company competence was not included in the international survey and these factors would therefore have been the most important). Biotechnology is rated lower by South African managers than information and communication technology. This, in combination with the consumer drive, indicates the strategic direction for the future. Companies will improve their knowledge and communication with consumers by means of better communication technology. This also implies a higher level of information sharing and communication between companies. These are intermediate steps towards supply chain formation as indicated in Chapter 4. In contrast, supply chains are not seen as a big driving force in the agrofood sector on local and international level. However, it is clear from the results that supply chains would probably increase in importance in the agrofood sector of the future.

Company competence is regarded as more important by South Africa agribusiness managers. This is congruent with the importance to cost, local markets and the optimisation of profitability and risk profiles. South African agribusiness firms seem to be on an inward focus to improve their competencies to operate on international markets.

There is a big difference in the perception with regards to multinational companies between the international and South African firms. International managers regard multinational food companies as the third most important driver, while South Africa managers regard the impact of these companies as minimal. This also explains the why managers do not see multinational companies as a big force on local markets.

Table 5.10: Major factors driving the international agrofood sector

Factor	NL	EU	World	Total
Multinational food companies	3,7	3,8	3,7	3,7
Supply chains	3,0	3,2	3,7	3,3
Regions	2,6	2,5	2,7	2,6
Local supply networks	2,9	3,3	3,2	3,1
Technology	3,9	4,0	4,1	4,0
Collusion/mergers	3,8	3,3	3,5	3,5
Consumer behaviour	4,0	3,8	4,4	4,0
Increased competencies	3,4	3,7	3,6	3,6

Source: Zuurbier (1999 b)

South African Agribusiness clearly do not see international or global agribusiness firms as an important threat in domestic markets. They clearly want to enter new markets with their existing products. They intend to do this through improved knowledge of the consumer through better communication and coordination with other firms in the supply chain. The second important focus area is the competencies and the ability of their enterprises to compete effectively on the new markets, especially international markets. Non-core activities will be outsourced to enable companies to devote more attention to core activities. Improved quality will be the most important driver for supply chain formation as indicated in chapter 4.

Table 5.11: Major factors driving the South African agrofood sector

Factor	Score*
Company competency as a competitive edge	3.5
Knowledge of changing consumer needs i.e. consumer behaviour	3.4
Impact of Information and Communication Technology	3.3
South African capability to perform on international markets	3.2
Globalisation – new market opportunities and new competitors	3.2
Cooperation to ensure quality in the supply chain	3.2
Focus on core activities and outsource non-core activities	3.1
Importance of GAP (Good Agricultural Practise); HACCP and other certification systems	3.0
Cooperation in supply chains to serve new consumer demands	3.0
Cooperation to preserve unique product characteristics (e.g. non-GMO certified)	3.0
Cooperation to improve the consistency of the products in supply chains	3.0
Environmental legislation and liability in the international market	2.9
Impact of Biotechnology	2.9
Impact of local supply networks	2.8
Ability of South African firms to serve niche markets	2.8
Impact of deregulation	2.8
Interdependence of firms in the supply chain	2.7
Multinational food companies selling their products in South Africa	2.7
Land redistribution	2.6
Multinational food companies buying their products in South Africa	2.5
Environmental legislation and liability in the South African market	2.4
Economic empowerment of previously disadvantaged	2.4
Importance of commodities as opposed to differentiated products	2.3
Regional trade liberalisation (Southern and Eastern African Trade Blocks)	2.1

* Likert scale 1 (not important) – 5 (very important)

Source: Own survey

5.7 Conclusions

In the first section of this chapter the different drivers for change in the agrifood sector were discussed. The most important drivers are changes in demand for agricultural products, changes in agricultural policy and changes in the agricultural supply structure. The changes in the agricultural supply structure is extensively discussed in chapter three. New consumer demands like an increased awareness for

food safety, a need for variety and entertainment is increasingly met with aggressive retailers employing new technologies leading the way. These trends form the basis of section one of the framework of analysis presented in Figure 1.1. These trends determine the product attributes and activities required to produce these attributes in section two of the framework. The importance of these trends in the South Africa agribusiness sector are quantified in the last section of this chapter.

The South African agricultural marketing environment was substantially influenced by deregulation of the sector followed by the promulgation of the Marketing Act of 1996. The deregulation exposed farmers and agribusiness alike to international markets and opportunities.

The final section of the chapter showed how South Africa agribusinesses are responding to the challenges posed by the deregulation of the agricultural sector. Agribusinesses are clearly preparing themselves to be more competitive on international markets. It is clear that there is a significant move away from market based coordination mechanisms to managed coordination in the South African agribusiness sector. This provides some basis for the generalisation of the results in the case studies that follow. In the first section of the framework of analysis consumer demand, technology, deregulation and supply structure are identified as significant drivers of the emergence of supply chain management. It is clear that consumer behaviour and technology are important drivers in the South African agrofood sector. The impact of deregulation is not seen as a significant driver for the future, probably because the deregulation process is completed and no new impacts are expected. Supply structure is seen as an important driver in the agrofood sector, especially in terms of better coordination and cooperation to ensure and assure product quality. These drivers give rise to the growth of the supply chain philosophy in South Africa, but at a slower pace than their international counterparts.

The next three chapters deal with the observations of these trends in specific case studies in the South African agribusiness sector.

**Chapter 6: Case study: Considerations for managing
the Sandveld Potato Supply Chain**

Chapter 6: Case study: Considerations for managing the Sandveld Potato Supply Chain

The Sandveld Potato case focuses on the spot market governance structure as indicated in Figure 6.1. This case serves to illuminate three insights. The first is that the production and marketing of undifferentiated, homogeneous commodities are characterised by low asset specificity, low task programmability and low task nonseparability. The framework of analysis indicates that a spot market is the most efficient governance structure for the marketing of a commodity. The Sandveld producers are currently using a commodity approach in the production and marketing of their potatoes.

The second insight indicates that the Sandveld potato producers will have to identify and add value to their product to escape from the commodity market. This value will increase mutual interdependency among certain actors in the market, which is the basis of chain formation. If they cannot create such value, a market structure with closer relationships between the participants will remain the optimal governance structure. The value creation must be based on meeting consumer needs.

The third insight is into the factors which inhibit supply chain formation namely adversarial relationships, farmer isolation, volatile prices, and size imbalances between the participants. These factors explain why it is difficult for farmers to escape from commodity markets.

6.1 Introduction

Many South African agribusinesses are buying into the concept of supply chain management. However, implementing and designing supply chains is neither apparent nor easy. In view of the legacy of a highly regulated agricultural economy farm producers are by nature not particularly aligned nor interested in consumer preferences or added value management. Members of the Sandveld Potato Grower Organisation (SPGO) however considered value added as an option to improve the profitability and sustainability of their operations. This case study is an account of the

realities, challenges and barriers that the actors in this supply chain encountered when they investigated the possibility of implementing a supply chain initiative.

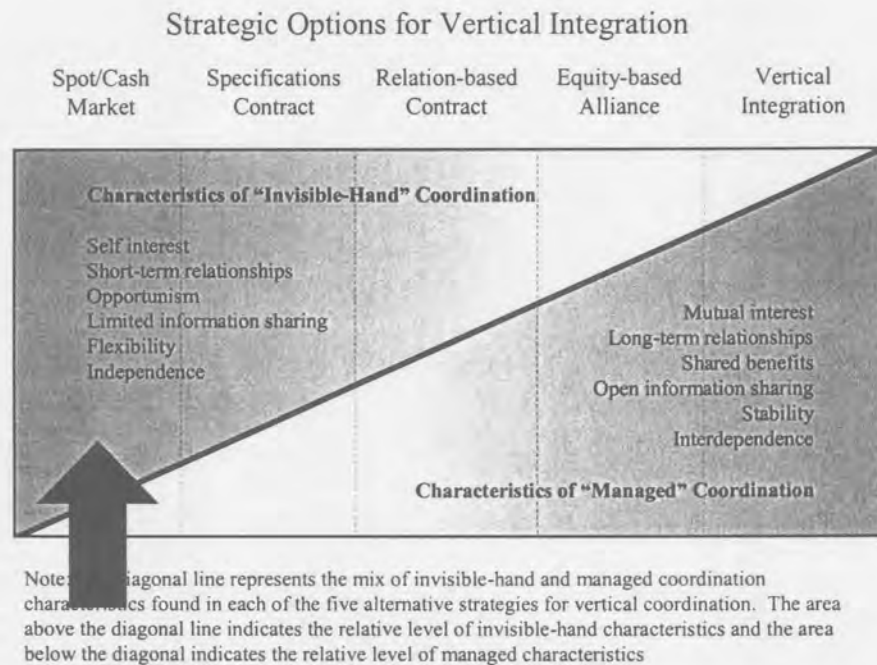


Figure 6.1: The position of the Sandveld potato governance structure on the vertical coordination continuum

Source: Peterson, Wysocki and Harsh, 2001

6.2 The potato industry in the Sandveld

Potatoes are the main farm crop enterprise for growers in the Sandveld region of the Western Cape Province in South Africa. More than 7 100 hectares of potatoes are cultivated annually in South Africa and the Sandveld potato production account for around 13% of the total production in South Africa (Table 6.1).

The Sandveld region is an arid plain with an annual rainfall of less than 300mm. In the west the plain borders the Atlantic Ocean and in the east the picturesque Sederberg Mountain range. The growers are therefore limited to potato production under irrigation (mostly centre pivot units) and extensive, low profit, livestock production. The average size of a centre pivot unit is 25 hectares. Because of a four-year fallow system to prevent the soil transfer of diseases, natural vegetation had to make way for potato production. Mostly there are four centre pivot units of fallow

land to every unit in production. Ground water through boreholes supply the centre pivot units with water from underground. The main source of underground water is a geological aquifer system that relays rainfall water from the mountain region in the east.

Table 6.1: The production of potatoes in the Sandveld region in comparison to the total production of potatoes in South Africa.

Item	Unit	1999 crop estimate	2000 crop estimate
Sandveld region	Ha	7 163	7 144
	Ton	234 818	210 358
South Africa	Ha	56 680	53 193
	Ton	1 743 839	1 589 042

Source: Crop Estimate and Report (2001)

The mean maximum summer temperatures vary - cooler along the coast and very hot in the inland areas. Due to the heat during December and January the production of potatoes has to be interrupted. Conversely, the mean minimum temperatures are warmer (mild) along the coast but very cold in the inland areas as indicated in Figure 6.2.

The region is characterized by very sandy soils with low water retention properties. The pH of the soil is below 5.5, which indicates high acidity. The organic matter content is very low (<0.3%) and the soil shows an increased sub-soil bulk density. The soil properties imply that 90% of the roots develop in the top 40cm of soil. Because of low water retention the Plant Access Water (PAW) is less than 20 mm and a high irrigation frequency is therefore needed. The soil has no buffer capacity with high associated risks of moisture stress and erosion. A high leaching potential and low nitrification are the main characteristics of the soil. Agricultural practices were adapted and developed around soil and climatic characteristics.

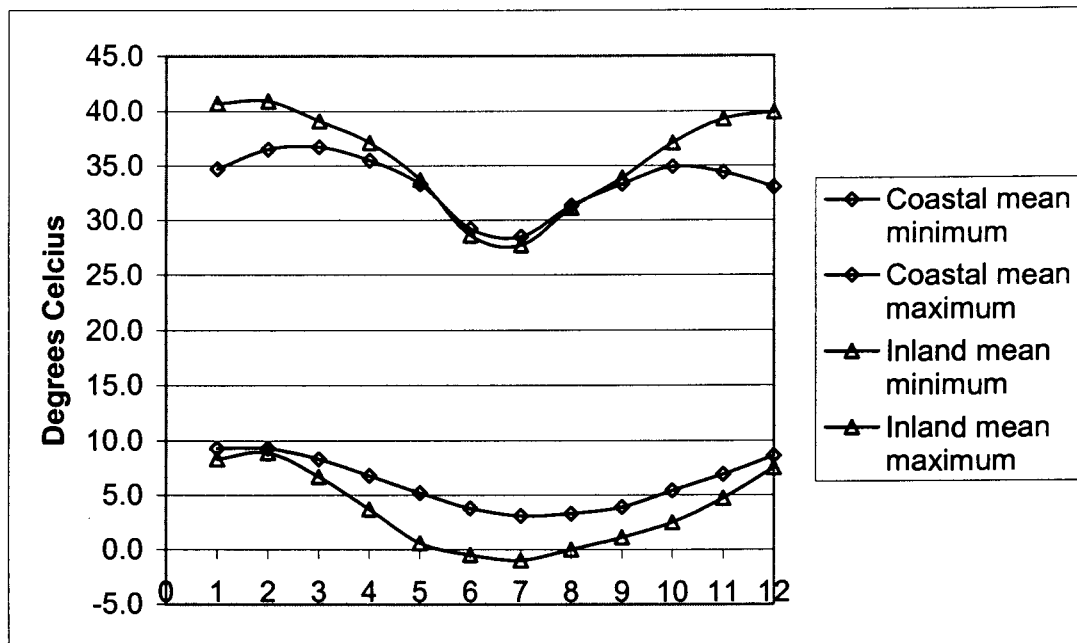


Figure 6.2: Average mean maximum and minimum temperatures for the coastal and inland region

Source: Agromet, 2002

6.3 Marketing Channels

The Sandveld potato supply chain system is depicted in Figure 6.3. The growers in the region produce ware and seed potatoes. Ware potato growers favour disease-free seed potatoes, making the Sandveld region an ideal seed potato production area due to its isolation from other potato production areas in South Africa and their potential diseases. The total South African production of certified seed potatoes was 131 604 tons in 1999. The Sandveld region contributed 58 401.83 tons or 44% to this total in that year. The contribution dropped to 34% in 2000 mainly due to leafminer infestation, illustrating the sensitive nature of seed potato production. (Crop Estimate and Report, 2001).

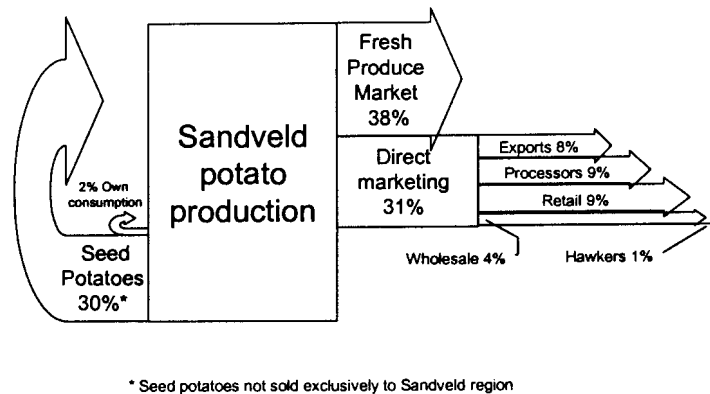


Figure 6.3: The Sandveld Potato Supply Chain (2000)

Source: Own figure, data from SPGO, 2000

Seed potato production account for only 30% of the total crop, as potatoes of a lower quality is usually sold as ware potatoes. Two percent of the crop is used for own consumption and the rest is marketed 'directly' or through the fresh produce market in Epping, Cape Town. According to an unpublished report (SPGO, 2000) 38% of the Sandveld ware potato crop was sold by market agents through the fresh produce market and 31% were sold by growers 'directly' to retailers, processors, wholesalers and hawkers. In the case of 'indirect' marketing growers deliver their potatoes to an agent at the fresh produce market. The agents facilitate the auction sale of the potatoes through private negotiation between themselves and a third party which can be a retailer, hawker, processor or exporter. The agents charge a commission of 5% and the grower has to pay another 5% to the marketing authorities of the Epping Fresh Produce Market. A National Potato Grower Association levy of 10 cent per 10kg pocket is deducted.

'Direct' sales (31%) generally entail the exchange of potatoes without the mediation of a market agent. Buyers approach the grower and an informal, medium- to long-term contract is usually concluded (with the exception of hawkers who buys sporadically from growers in the spot market). The growers sell 8% of the direct sales

to exporters. These potatoes are usually sold to multinational companies with industrial interests up the African coast, or holiday resorts on islands. Another 9% is sold to processors that process the potatoes into chips, crisps and peeled potatoes (mostly frozen). Four percent of the potatoes are sold to wholesalers who sort and pack it for retailers. Retailers and hawkers account for respectively 9% and 1% of sales. A hawker is defined as any informal business that does not have a brick and mortar establishment. Hawkers usually group together in order to buy product in larger volumes from the grower at lower prices.

The informal contracts which growers and buyers engage in range from a time, place and quantity commitment to special packaging requirements and price agreements by retailers. The contract prices are usually based on the fresh produce market price of Epping close to Cape Town e.g. the price of 1st grade potatoes on the day of delivery or the market price added a premium of 10% if prices are down or at a discount of 10% if market prices are higher. The best potatoes are mostly sold via the direct route as the buyers endeavour to secure the best potatoes in the market. Sandveld potatoes are of a high quality. Just more than 50% of the potatoes that are sold 'directly', in the Western Cape Province originate from the Sandveld region (See Table 6.2).

Table 6.2: Percentages of Sandveld Potatoes Sold Directly in the Western Cape in Comparison to the Total Direct Sales in the Region.

	Demand Western Cape (ton)	Supply Sandveld (ton)	Percentage (Sandveld)
Processors	83 760	29 830	35,6
Retailers	19 320	13 524	70,0
Traders and exporters	51 330	33 365	65,0
Hawkers	6 000	6 000	100,0
Total	160 410	82 719	51,6

Source: SPGO (2001:42)

Table 6.3: Potatoes quantities (all classes) produced and average price received on the Fresh Produce Market of Cape Town; 1996 – 2000.

Year	10 Kg	Rand per 10 Kg
1996	13 253 905	8.62
1997	13 123 160	9.13
1998	12 923 777	10.53
1999	12 766 538	9.83
2000	12 010 226	12.65

Source: SPGO (2001:36)

Anecdotal evidence indicates that the ‘direct’ marketing of potatoes is on the increase. More growers opt to move away from the discrete transactions in auctions to the longer-term relational exchanges that ‘direct’ marketing offers. In Table 6.3 it is clear that the total quantity offered on the fresh produce market has been on the decline since 1996, while the area under production has increased according to anecdotal evidence.

6.4 Drivers of change

The Sandveld Potato Growers Organisation became aware of the concept of supply chain management when representatives from the Department of Agriculture suggested it as an option to improve the situation of the growers. They called a general meeting involving all the actors involved in the potato marketing system with the help of the authors. The goal of the meeting was to identify and discuss the perspectives of the different actors. The analytical frame of reference used was derived from O’Keeffe, 1998. He identifies four features which inhibits effective co-ordination between supply chain actors:

- In commodity markets the sum of value created is fixed and the major issue is how it is divided among channel participants. This is a win-lose game and leads to **adversarial relationships**.
- Auction systems and regulated markets **isolate farmers** from the rest of the food system and farmers do not gain any insight into their customers, and why they act the way they do. Likewise processors have not needed to, or had the opportunity to, develop relationships with growers.

- Supply Chain Management does not remove the **volatile nature of prices and supply** – both quantity and quality – characteristic of agriculture. Price volatility puts pressure on the relationship.
- Interdependence is difficult to achieve owing to **size imbalance** between processors and farmers.

All of these features were observed in the initial meetings with the potato producers. The **adversarial relationships** that existed between the participants was particularly evident, taking the following statements as examples:

“Ever since man started raising crops – producing wealth – others have attempted to take that wealth away from him by taking his crops and giving him very little in return.” – statement by growers in invitation.

“We have lost control of our product. Everybody connected to the potato industry has the right to a profit margin, only we, the growers are expected to sell at prices below cost.”

“Growers have a lot of time to discuss their problems with you.”

“A grower will renege on a contract at the drop of a hat – they can’t be trusted and it is not worth the time to take them to court.”

The participants see the potato market as a commodity market with limited opportunities for product differentiation and price making. The primary reason is that the South African population is relatively poor and therefore price sensitive. The wealthier markets where opportunities for product differentiation exist are limited and the participants are therefore stuck in the battle for a share in the final value.

The adversarial relationships in the potato market also leads to excessive opportunistic behaviour, especially by the growers. The processors, exporters and retail buyers were especially unhappy with this situation indicating that growers renege on contracts when they observe the notion of a better price elsewhere. This

increases transactions costs associated with price- and delivery risks. Growers on the other hand maintain that they are under severe price pressure and that it makes sense to exploit every possibility to achieve a higher price. Growers and the rest of the players in the supply chain are therefore clearly operating in an adversarial and opportunistic system.

Auction and regulated markets tend to **isolate growers** from the rest of the supply chain. This was one of the most evident observations as the actors in the supply chain have never had a meeting of such a nature before. During the meeting it was observable how the participants developed an appreciation of each other's perspectives and positions. It became clear that growers are isolated from the needs of the market. Buyers indicated that growers are not supplying the correct cultivars and quality to the right markets. Growers indicated that they do not have enough information on prices, cultivars and quantities on the markets. They blamed the market agents for not supplying them with reliable marketing information and they therefore do not trust the price formation process either. The lack of information and co-ordination in the market causes growers to act in an unorganised way without an effective marketing and production strategy. Buyers indicated that it is important that growers should choose a specific market, be it seed, processing, ware or export, and focus on addressing the specific needs of the chosen market. The lack of information due to the isolation of the growers by the marketing system prevents growers from implementing effective marketing strategies i.e. identifying and serving specific market segments with specific products.

The **volatility of prices and supply** is and will remain a major stumbling block to a successful supply chain approach. The potato supply from the Sandveld region is relatively stable as most of the potatoes are produced under irrigation. The problem, however, emanates from the price volatility and -formation on the fresh produce market. Price volatility is induced by the influence of weather conditions on the supply from other production areas. The issue of price formation between the participants in the supply chain is a contentious issue. It is clear that there is a substantial trend away from the fresh produce markets (spot markets) due to the use of contracts especially between retailers, processors and the growers (Figure 6.4). The best quality ware potatoes are channelled to the retailers because of their high quality

standards, specifications and relatively higher prices. The consequence is that the price on the Epping Fresh Produce Market (which is the reference price for all the other channels) is based on the 2nd and low-end 1st grade ware potatoes delivered at the market. Therefore, because contract prices are usually linked to market prices on the Epping Fresh Produce Market, the low-grade potatoes sent to the spot market determine the price of potatoes in the ware potato market in the Western Cape Province. Potato growers argue that the prices for high quality produce are depressed in this way and thus they do not trust the price formation process.

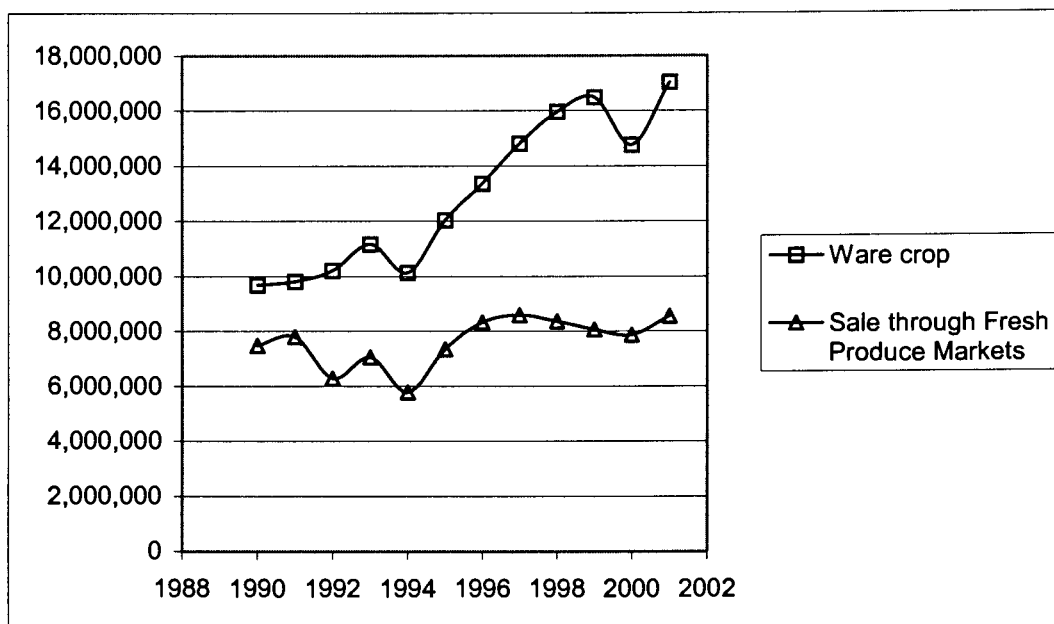


Figure 6.4: Ware production and delivery to the Fresh Produce Market from the Sandveld Region

Source: Potatoes South Africa, 2002

The **size imbalance** between the numerous ‘smaller’ farmers and ‘large’ buyers in the market is described by the participants in the chain as fragmentation on the production side. Fragmentation seems to have a double meaning, in that there is a perception of over-production in the market leading to intense competition, and a fragmentation of marketing strategies. This fragmentation is seen in contrast to the ‘big buyers’ who circumvent the auction market to contract their produce through individual negotiation.

Due to low wheat prices in previous years and the discovery of sustaining underground water resources many monoculture wheat growers in the southern part of the Sandveld region diversified into potato production. This trend pressurised supply on the potato market. An additional reason for the expansion of potato production is that new entrants can produce at reduced production cost over the short term as new fields that are not contaminated by potato pests and diseases yet the overheads for the new entrants are also relatively low as they still have existing enterprises aimed at the production of wheat. These new growers are therefore able to spread their overheads over a broader set of farming activities.

There is no effort of co-operation between the potato growers to market their produce collectively. Seed and ware potato growers in the Sandveld region still act in an individualistic and fragmented way and therefore find it difficult to market their potato as in sufficient quantities to establish a differentiated product of origin in the market. The growers however indicate that it is important to differentiate on a scale large enough to make an appreciable impact on the market through quality and consistency. In order to achieve this objective they will have to engage in a co-ordination system for both production and marketing i.e. a supply chain management system.

6.5 *Analysing the situation*

The three main barriers to supply chain formation are communication, opportunism and fragmentation. Communication between the participants is critical to identify opportunities for co-operation. Growers are isolated from the need of the consumer and the market. Without proper communication and knowledge the growers will not be able to innovate to establish grounds for effective co-operation with other chain participants. Opportunism is detrimental to supply chain formation as the participants cannot invest in long-term relationships. In an opportunistic environment participants are hesitant to invest in each other as this investment is lost when one of the parties act opportunistically. These long-term relationships are necessary for innovation to improve efficiency, exploit new markets and differentiate products. Opportunism is also closely linked to the fragmentation of the markets. Growers need to co-operate with each other and other participants in the supply chain to facilitate innovation.

Innovation is necessary to establish a competitive advantage for the Sandveld potato supply chain.

Table 6.4: The Sandveld Potato Growers Compiled the Following SWOT Analysis

<ul style="list-style-type: none"> • Strengths • Excellent quality • Consumers already prefer the Sandveld product • Potatoes can be produced throughout the year, which means that continuity is assured • Seed production areas – the best seed production areas in the rest of the world are also situated on the West Coast of continents 	<ul style="list-style-type: none"> • Opportunities • To bring back production and marketing discipline to the industry • To expand the potato seed industry • Sufficient uncultivated land • Export possibilities – opportunity to obtain a certificate of “product of origin”
<ul style="list-style-type: none"> • Weaknesses • Over-production – growers were not all in agreement as to whether there is indeed over-production • Too few cultivars • Poor infrastructure • Long distances from market(s) • Marketing – growers lose control over their product and bear all the risks • High production costs as a result of poor soil • Limited co-operation and trust among growers (growers are fragmented) 	<ul style="list-style-type: none"> • Threats • Losing market share – the Fresh Produce Market could lose its position as price making mechanism. The price on the market must be seen merely as a “price index” • Impact of AIDS on potato consumption • Resources – deterioration of water resources and indigenous vegetation • Fragmented growers (“the divider rules”) • Cash sales from production unit level – buyers use Fresh Produce Market price as reference and negotiate lower prices by insisting on discount for transport, commission to agents and statutory fees regarding the Fresh Produce Market • Market agents do not negotiate for the highest price but aim merely for a high turnover

From this it is clear that potential to deliver a unique and differentiated product to the market is great for “Sandveld potatoes”. Grower co-operation and trust relationships with other functions in the supply chain need to be cultivated.

6.6 Alternative governance structures for the Sandveld Potato Chain

The participants identified different collaboration strategies to address the problems facing the potato supply chain. These strategies are partial horizontal coordination, total horizontal coordination, and vertical coordination between some growers, processors and retailers. Each of the strategies implies different levels of governance and coordination between growers, processors and retailers.

- *Grower co-operation: Partial horizontal coordination between some growers*

The first strategy would involve coordinated cooperation between growers in the Sandveld region to promote a new characteristic or image of their products in order to achieve better negotiation power *vis-à-vis* downstream firms. Growers proposed to use specific attributes that are desirable in the market to gain a competitive advantage, for instance:

- The setting up of a potato brand with more specifications (quality and traceability guarantees, short time to the market...etc.);
- The concentration of commercial function in setting up a selling board, which could sell bigger quantities and ensure flow continuity to the processors or the retailers.

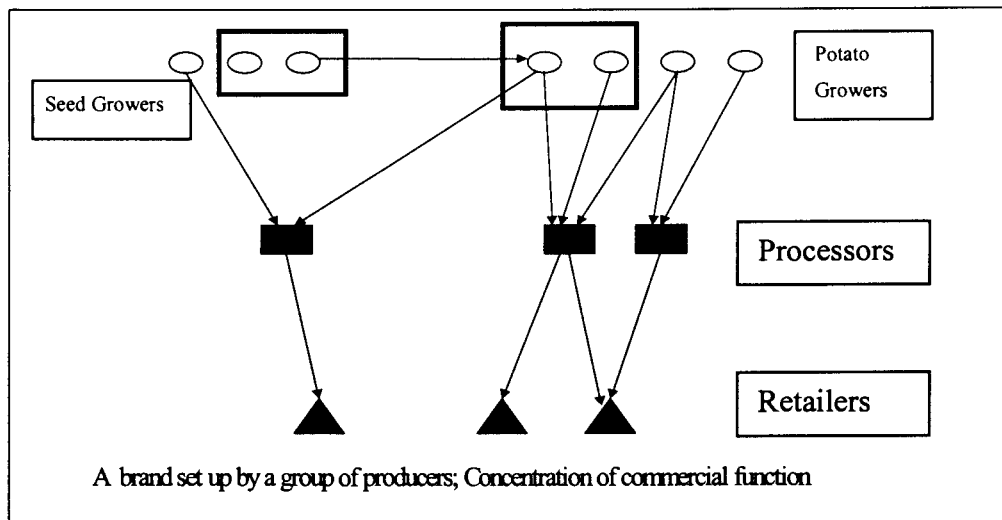


Figure 6.5: Partial Horizontal Coordination between Growers

- Grower cooperation – Full *horizontal coordination between growers*

Grower cooperation through full horizontal coordination implies that all (or most) the ware and seed potato growers in the Sandveld region coordinate to promote regional product identity, for example. This strategy could potentially allow the coordinating growers to control the supply to downstream firms and increase the negotiation power if the product is well differentiated from other regions.

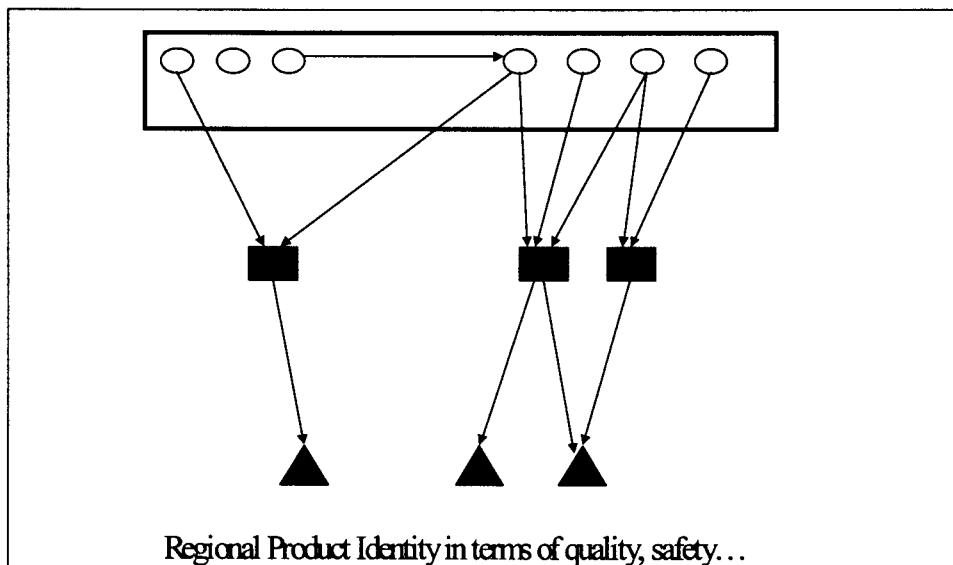


Figure 6.6: Total Horizontal Coordination between Growers

- Vertical coordination between growers-processors-retailers

Vertical coordination between growers, processors and retailers could set up tighter relationships between some growers, some processors and/or some retailers, based on specifications determined by downstream firms according to the targeted markets. Information sharing, logistic and transportation constraints, type of products, ordering policies and supply flexibility could be included in vertical contracts in order to create value at the chain level (by cost decreasing and/or by increasing the willingness-to-pay of the final consumer). Benefits could consequently be shared among the different stakeholders involved in the strategy.

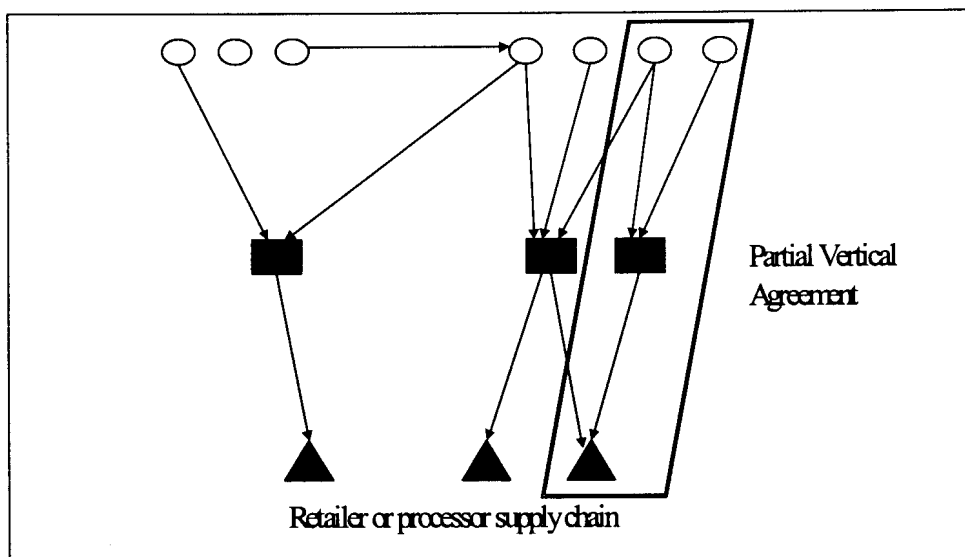


Figure 6.7: Vertical Coordination between Growers-Processors-Retailers

The choice of the strategy that the stakeholders have to follow depends on:

- the capacity of the growers to set up a better co-ordination between themselves;
- the possibility to promote new brands or a regional identity towards the final consumer, and of course the consumers' willingness to pay for this identity;
- the ability to create value through new practices at the production level or through a better mastering of the flows from upstream to downstream;
- the possibility to set up "good" contracts in order to give the right incentives among the different stakeholders and avoid opportunistic behaviours.

6.7 Observations and conclusions: Challenges to chain formation

From the analysis it is clear that the Sandveld Potato chain is still operating in the realm of low coordination and consequently low levels of innovation and trust. The relationships between the actors are opportunistic and short term in nature and characterised by self-interest, and limited information sharing. The different actors maintain their flexibility and independence. A supply chain management approach could improve the competitiveness of their industry by streamlining business activities. The potato supply chain is currently characterised by higher inventories to avoid out-of-stock costs for all the actors, as they do not trust the supply chain to deliver the right quality and quantity product at the right time. Order lead times are high and orders are variable which leads to price variability. There is also considerable distrust in the price formation mechanism. Growers feel that market agents are not giving them enough information on market conditions and are charging too much for their services. Market agents and growers observe that the best potatoes are contracted out to retail groups, exporters and processors. The price formation in the potato market of the Western Cape is therefore done on lower grade potatoes. The exporters, processors and retailers use the market price as reference prices for their contracts and negotiations with the growers which results in a lower price for all the actors in the industry. The level of innovation in the supply chain is much lower, and related to this, the reactivity of the chain to new changes and initiatives. The actors do not support each other or engage in joint development of initiatives to gain a competitive edge in the market because they are not assured that the innovation will be used to their advantage – i.e. actors expect each other to break the innovating relationship to benefit themselves in the market with the results of their partnership, in effect making the partnerships' innovations public knowledge. The service level in the supply chain is also low and the chain is not able to fulfil modern consumer demands like food safety, product of origin and organic production.

Differentiation and consumer preference: Growers are always faced with strategic options namely specialisation or diversification. Growers that opt for the specialisation option are essentially cost and production focussed to excel in the market by delivering product at the lowest price. Specialised growers usually deliver

a standard product at a standard market. These growers will not benefit greatly from a supply chain management approach except for price risk reduction. Growers that attempt to differentiate themselves from other growers by producing a superior product or a product with unique characteristics will benefit greatly from a supply chain management approach. The growers will have to adopt a more consumer-orientated approach. Innovation is one of the most important key performance areas to stay ahead in the supply chain game. Retailers are not really compelled to innovate to reduce transactions costs, as they are involved with the management of their stores and are historically inclined to opportunistic relationships with growers. Growers in organised supply chains that can offer the retailer or exporter better value will be assured of a market. Product differentiation lies at the basis of such innovation strategy and growers will have to find ways to differentiate their products, be it superior service, handling, coordination, product or consumer communication.

Grading and quality control: Most of the participants agreed that the quality (grading) system is adequate and that the implementation thereof is sufficient. The range of the quality system could possibly pose a problem. However, some of the participants indicated that they are not always assured of the quality in the bags. A quality guarantee scheme could be a first supply chain initiative if there is sufficient need for it in the market.

Information and intelligence: Growers will need more information from the market in terms of consumer needs and price formation. It is important that the emphasis should not necessarily be on more information gathering, but rather information sharing and intelligence creation. Innovation activities depend on information about the needs of consumers and buyers alike.

Data, information and more importantly strategic intelligence lie at the heart of the supply chain management approach. The world economy is in the information era and agri-enterprises will have to adjust to these conditions. Knowledge is still power and intelligence is the platform for innovating products and services that will give enterprises the competitive edge in the market. Four important areas were earmarked for intelligence creation to facilitate strategic direction in the industry namely market analysis, product specification, operation of the fresh produce markets and logistics.

Market analysis should provide information on the size and growth of the retail, processing, export and hawker market segments. Consumer trends and consumer reaction to price and income changes (elasticities) are key performance areas in this regard.

Governance systems: Successful supply chain initiatives in which potato growers play a significant role will depend on the ability of growers to organise in proactive groups which will address market value. Growers are responsible for the innovation – the business idea – around which the initiative should be organised. Marketing seems to be the most important challenge for grower organisation. Marketing initiatives, organised by the growers, should focus on business ideas instead of market manipulation which invariably fail in the long run. Therefore a value added service will be much more valuable than a cultivation restriction. The participants identified several initiatives that could be implemented, amongst others, regional branding, integrity and quality assurance, value creation in the supply chain to increase profitability, improved logistics and better customer service, centres of excellence and better economics of scale i.e. joint investment in expensive assets to achieve better economics of scale.

Market agents and growers alike will have to recognise the interdependence between the actors in the supply chain. This is not necessarily a disadvantage as cooperation that arises from this realisation can create a stronger supply chain. Market agents will have to augment their service to include growers and down stream buyers alike to justify their costs.

Auction markets: The participants also indicated that there is a need for markets to modernise their operation in order to enable all the users to compete with the modern facilities that some of the retail groups are erecting. The bureaucracy involved with government control of the markets causes slow decision-making and a non-dynamic business approach. Markets should improve their ability to deliver an efficient logistics service and sufficient facilities to house business activities.

Closely linked to consumer trends are the specifications required by these consumers. This is one of the most important areas for intelligence creation as this will give an indication where innovation efforts should be focussed. Consumer value and satisfaction will always remain the basis for continued market success and profitability and growers should play a leading role in providing products and services to their buyers that will, in turn, enable their buyers to achieve success in the market. Important aspects in this regard are product specification by consumers, services required by consumers from growers, logistical requirements, and the joint planning of production and marketing efforts.

Processor dominance and leadership: Processors are in the unique position to establish very efficient supply chains because of their close linkages to consumer markets and capital investment. Good working relationships between processors and growers is critically important to profitable supply chains. Processors and exporters must actively pursue good relationships with growers who, on the other hand, have a reciprocal responsibility not to engage in opportunistic behaviour. Growers who engage in long term relationships with processors will be rewarded with sizable, long term contracts and prompt payments. A supply chain relationship is essentially a partnership between the grower and the buyer which is built on mutual respect and benefit.

Fresh Produce Markets will remain an important marketing channel and price formation mechanism to the South African potato industry. It is therefore important to understand the workings of these markets. Aspects that deserve attention are the role of agents, price cycles and elasticities in the market, co-integration across markets, the size of consignments, and price formation.

Sources of competitive advantage: Logistics, especially the costs associated with logistics in a competitive industry are one of the most important sources of competitive advantage. Actors in the market should examine all the flows in the industry to identify unnecessary activities that could possibly waste money and effort. The location and size of storage and processing facilities, transportation costs and ordering processes are important aspects involved in logistics.

The realisation, that all the actors in the supply chain are mutually interdependent and need to focus on innovation to lower costs and increase consumer satisfaction, will facilitate a supply chain management approach in the Sandveld potato chain. The first foundation of a supply chain is value creation. The participants in the Sandveld potato chain need to identify attributes that will differentiate their product from other potatoes if they want to establish a supply chain. The differentiation should be based on factors that ensure higher consumer satisfaction and are difficult to replicate. Other factors like the capabilities and linkages and understanding between the organisations will also determine the success of supply chain formation. Ideally this can lead to further discussion where the participants can devise innovative strategies to ensure the implementation, sustainability and profitability of their supply chains.

**Chapter 7: Case study: Closer Vertical
Coordination in the South African Vegetable Supply
Chain: An Exploratory Analysis**

Chapter 7: Case study: Closer Vertical Coordination in the South African Vegetable Supply Chain: An Exploratory Analysis

7.1 Introduction

This case deals with a section of the South African fresh produce farmers which are engaging in closer vertical coordination with buyers, especially retail buyers, as an alternative to traditional fresh produce markets. These participants in the supply chain are using relational contracts to govern their transactions as indicated in Figure 7.1. This chapter explores the reasons why large scale commercial producers are engaging in these relationships. The factors considered by farmers and buyers in the fresh produce supply chain can be categorised in quality, financial, risk and cost considerations. The transience of product value due to the perishability of fresh produce necessitates minimised handling of the product. The fresh produce market increases the handling of the product, leading to a reduction of product quality. Producers avoid this by contracting directly to retail buyers. Producers are of the opinion that they receive more for their products by utilising these distribution channels. Risk is reduced through assured prices and markets and joint production planning and scheduling. Price fluctuations experienced in the fresh produce markets are also avoided through contracting with downstream actors in the vegetable supply chain.

Fresh produce markets have always been promoted as a fair and efficient marketing mechanism which protects farmers and consumers alike (Langley, 1990). In 1991 the HSRC investigation into vegetable marketing found that the majority of producers wanted to continue and/or extend their involvement in direct marketing. The reasons given were security of payment, lower marketing costs, better bargaining positions for producers, less handling and better quality (Human Sciences Research Council, 1991).

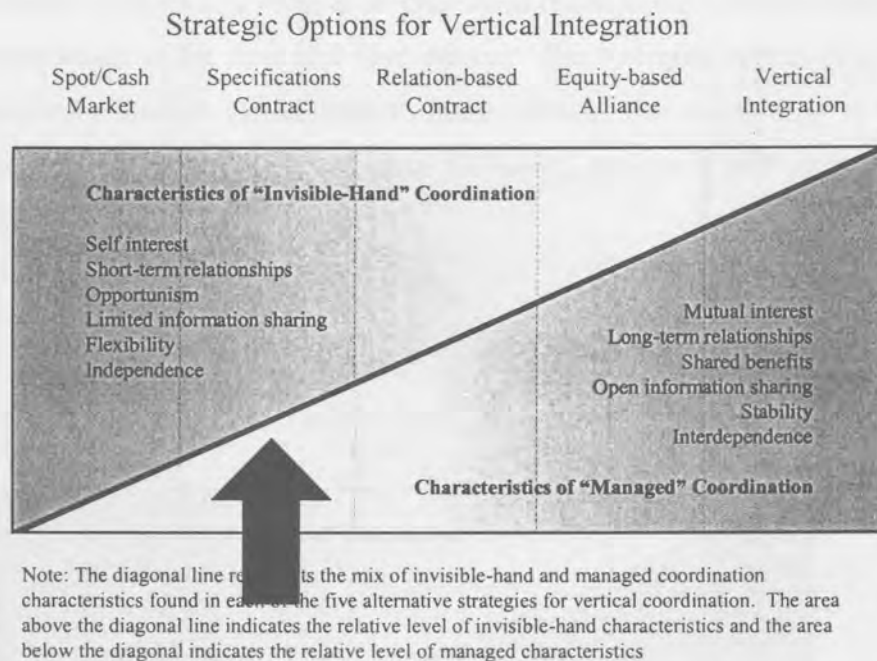


Figure 7.1: The position of the vegetable governance structure on the vertical coordination continuum

Source: Peterson, Wysocki, and Harsh (2001) An increasing number of South African vegetable farmers are engaging in closer vertical coordination with buyers through informal and formal contracts or direct marketing. This case explores the reasons why large scale commercial farmers are marketing a substantial quantity of their produce directly to retail groups. The increase in direct sales is largely the result of the unique characteristics of fresh produce and emerging consumer needs which call for closer vertical coordination among the actors in the supply chain. Traditional fresh produce markets are not able to address these specific needs effectively. The case will identify and discuss the reasons and opinions of farmers already in contractual relations and explore the transaction cost factors contributing to closer vertical coordination between producers and retailers.

7.2 An Overview of the South African Vegetable Supply Chain

The total vegetable production in South Africa amounts to about 3.6 million tons (Department of Agriculture, 2001). Farmers can sell their vegetables to several possible buyers. These are municipal markets (54%), direct sales (32%), processing

(11%) and exports (3%) (National Department of Agriculture, 2000). Industry sources contest the validity of these figures, reasons being discussed in section four (Van Deventer, 2001). Municipal markets and direct sales are the most important channels for local fresh vegetable distribution. The role of these are discussed in the next section.

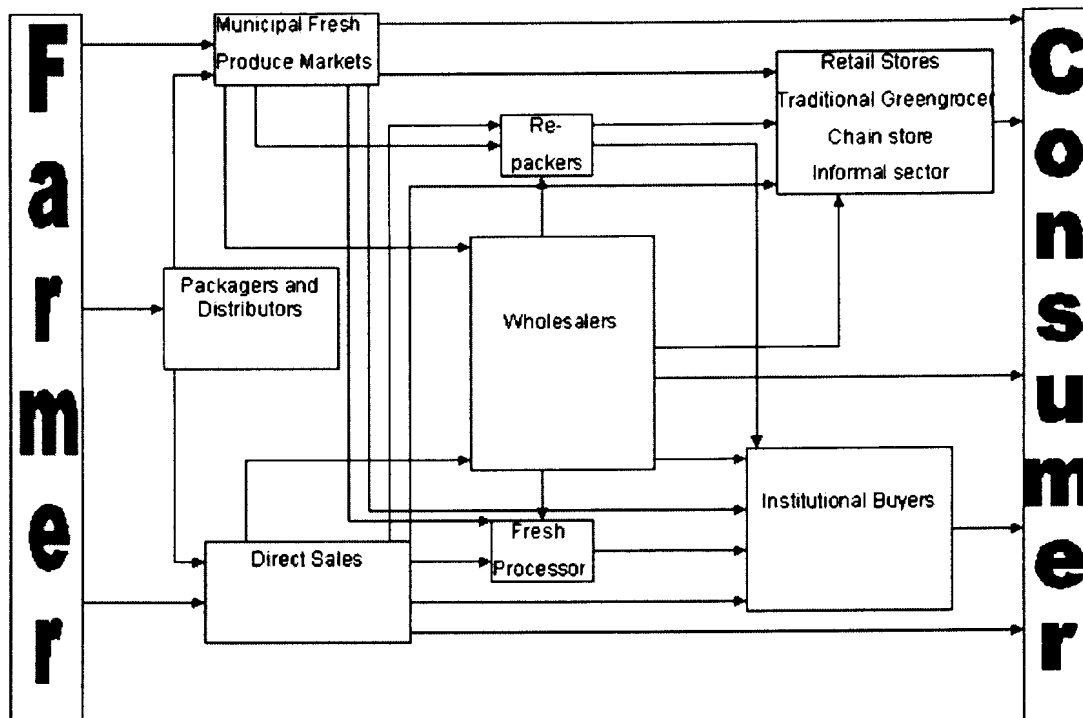


Figure 7.2: Schematic Representation of the Distribution Structure of Fresh Fruit and Vegetables in South Africa

Source: De Villiers and Van Deventer, 1990

Municipal Markets

There are 16 national fresh produce markets throughout South Africa and together these markets handle 54% of all fresh produce. The relative importance of each of the markets is shown in Table 7.1. The municipal market system came into existence in 1970 with the promulgation of the *Commission for Fresh Produce Act, Act 82 of 1970* (Human Sciences Research Council, 1991). In terms of the Act, a fresh produce market is defined as: ‘...a place erected or intended for the displaying for sale and the sale of fresh produce in public’.

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The markets are the property of the municipalities in which they are located, with the exception of Uitenhage and Nelspruit, which are privately owned. The local authority is responsible for security, maintaining and cleaning the facilities, general managerial tasks, and traffic control. The municipal authorities fund these activities by charging a levy (percentage of sales) from the market agents (Human Sciences Research Council, 1991).

Table 7.1: Market Share of the Various Fresh Produce Markets in South Africa

Fresh Produce Market	Market Share
Johannesburg	31.7%
Pretoria	15.5%
Cape Town	13.3%
Durban	9.7%
Springs	4.9%
East London	3.7%
Pietermaritzburg	3.7%
Port Elizabeth	3.3%
Other	14.2%

Source: National Department of Agriculture, 1998.

Auctions were the customary selling procedure at the fresh produce markets in the early 20th century. The clock system was used, where large quantities of fresh produce from a great number of producers were traded quickly under conditions of strong competition. However, the system was discontinued after a short period because sellers used predetermined reserve prices to obtain higher prices, auctioneers frequently offered only large volumes in an effort to auction the produce as quickly as possible and smaller buyers gradually disappeared from the market. The volumes moving through the market became too much, which contributed to the inefficiency of the auction process. The auction and buying process ultimately took too long (Human Sciences Research Council, 1991). Langley (1990) mentions a further disadvantage, namely that it was an expensive way of price discovery because both buyers and sellers had to be present at the auctions.

The clock system was replaced by the out-of-hand system by which prices were determined through private negotiation between agents and buyers. At present, out-of-hand sales are the only means of sale at national fresh produce markets. Each market consists of several market agencies that employ market agents. These agents act on behalf of the producers. Farmers take their produce to the market agents who sell the produce at the highest possible price through private negotiation. The farmer pays the agent a negotiable commission, which is usually around 5%, on the value of the produce sold.

Direct Marketing

Direct marketing (32% of all produce) comprises direct sales of fresh produce to wholesalers, retailers, hawkers, processors, institutional buyers and consumers without the mediation of the market (National Agricultural Marketing Council, 2000).

Two main groups of wholesalers operate in the fresh produce industry namely independent wholesalers outside the markets and wholesalers situated at the national fresh produce markets. The latter hire floor space from market managements and are subject to relevant local by-laws stipulated in terms of the provincial ordinances. The most notable by-law that distinguishes independent wholesalers outside the market from wholesalers at the market is the by-law which prohibits the latter from buying produce directly from the producers – particularly when the produce concerned is available at the specific market (Human Sciences Research Council, 1991).

South Africa has four major retail store groups, which include Shoprite Checkers (which also manages the Hyperama, OK and the “8 till late” stores), Pick and Pay (encompassing Pick & Pay Hyper, Rite Value, Foodhall), Spar (Kwikspar, Superspar) and Woolworth’s. Each of the retail stores manage a distribution centre that handles the procurement and shipping of fresh produce for the store (QCFresh, 2000). The retailer employ several produce buyers at each distribution centre. The produce buyers are responsible for meeting and negotiating with producers, liaising with store personnel, developing of merchandising and marketing plans, placing orders, administering price changes, and handling invoice problems. (McLaughlin, Park,

Perosio, and Green, 1999) The produce buyer negotiates an informal contract with the producer in terms of which the producer will deliver a specified product directly to the retailer's distribution centre.

A producer can deliver fresh produce to the final consumer through various different channels. National fresh produce markets and direct sales to retailers are two significant options available to producers. From the neoclassical economic perspective the market should be sufficient to guide producers in their production decisions by means of the pricing mechanism while protecting the producers from monopolistic behaviour by the retailers. The question why the direct sales arrangement exists therefore arises. This chapter attempts to explore these relationships in order to discover why they exist. In the next section a theoretical framework is proposed to explain the existence of both marketing channels.

7.3 Application of the theoretical framework to fresh produce supply chains

As discussed in Chapter 4 neoclassical economics consider transactions between firms as atomistic or independent. The exchange of product is therefore exclusively based on price, quantity and a rigid set of product classifications, standards or grades. These standards, classifications and grades constitute a robust framework in which buyers and sellers can exchange of commodities. Buyers can easily identify the product that they require and sellers can easily verify the justness of prices within the objective standards and grading framework. Producers are rewarded for producing the required composition of quantity and quality demanded in the marketplace which assures a constant supply of the product required by buyers. When consumer or buyer needs changes, standards, classifications and grades are adjusted accordingly (Milgrom and Roberts, 1992 and Hobbs, 1996).

However, the assumptions inherent in neoclassical economics restricts the ability of this powerful theoretical framework to offer insights into the behaviour of firms in the market place. Neoclassical economics assumes a perfectly competitive world where large number of competitor firms produce a homogeneous product under the same cost conditions, facing the same market demand curve. The assumption of perfect

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information and homogeneous products excludes information, search and quality assurance costs. No single firm can influence power in the market and attainment of a market equilibrium is a given. In this framework of analysis it is difficult to consider the establishment of relationships among the actors in the economic system as transactions are treated as if they occur in a frictionless environment. These assumptions are violated to a large extent in fresh produce markets. (Hobbs, 1996, Williamson, 1991, and Coase, 1992). As a consequence firms use closer vertical coordination as an alternative to discrete price-based transactions (Zuurbier and Trienekens, 2000).

A range of coordination modalities exist between firms. Mighell and Jones (1963:1) defined vertical coordination as “the ways of harmonizing the vertical stages of production and marketing. The market-price system, vertical integration, contracting, and cooperation singly or in combination are some of the alternative means of coordination.” The exchange between two firms is therefore always controlled by some kind of mechanism – be it price as in a spot market, a whole array of stipulations in a contract between the parties or the bureaucratic controlled specifications from one division to another in a vertically integrated firm (Hobbs, 1996).

The specific modality for a transaction is determined by transaction costs involved (Williamson, 1991, Hobbs, 1996, and Peterson and Wysocki, 1997). Transaction costs arise due to information asymmetry, bounded rationality and opportunism. Transaction costs arise *ex ante* and *ex post*. *Ex ante* costs include costs such as search for- and evaluation of- suitable partners for exchange, quality and other specifications, gathering information to use in the bargaining process, determining contractual terms and agent or middleman fees. These costs are also referred to as information and negotiation costs. *Ex post* costs occur after the transaction was concluded and refer to costs that are incurred in the monitoring and enforcement of the terms agreed on in the transaction. (Hobbs, 1996, Coase, 1937 and Williamson, 1991).

Uncertainty lies at the basis of information costs. Akerlof (1970) first discussed the effect of uncertainty on the market mechanism. In the neo-classical paradigm the firm

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does not care where the product comes from or what the buyer is going to do with the product. Akerlof (ironically) identified this as the essential difference between a financial market and a potato market. The repayment ability of an applicant and the application of money is very important to a financial institution, while a potato seller is not concerned what the buyer is going to do with the potatoes as the buyer is not concerned about the origin of the potatoes. The demands for food safety and quality assurance placed on the food system by modern consumers are changing this state of affairs drastically. The market for 'lemons' and the market for vegetables are displaying similar characteristics as consumers demand better quality and perceive risks included in the product that they buy. Uncertainty can be subdivided into four categories namely uncertainty over product quality, reliability of supply, price and finding a transaction partner (Hobbs and Young, 1999). Product quality is uncertain as the buyer cannot always determine product quality objectively. Insufficient cold chain maintenance will for example be expressed in reduced quality over time, but is relatively difficult to ascertain at the moment of the transaction. Reliability of supply in terms of the timeliness and quantity required by buyers is a problem faced by buyers. Retail firms need a constant supply of quality fresh produce to maintain a consistent offering to customers. This is not always possible at spot markets as buyers have reduced information on production and deliveries by farmers. Price uncertainty is faced by both sellers and buyers in the market. The volatility of prices in the market is usually a problem for producers as their income fluctuates and for retailers as they attempt to offer constant prices to consumers. Sellers may encounter problems in finding a market and buyers to find specific products on the market. Uncertainty increases the transaction costs of firms in the vegetable market.

The perishable nature of vegetables exacerbates the effects of transaction costs, information asymmetry, moral hazard and uncertainty. Perishability cannot be measured objectively which increases the uncertainty as discussed in the previous section. Products have to be moved to the market quickly and transferred to the buyer as soon as possible to avoid quality deterioration, leaving sellers unable to store the product in order to wait for favourable market conditions. (Hobbs and Young, 1999). The following characteristics of fresh produce that makes it susceptible to vertically

coordinated marketing or direct marketing (Mallen, 1967, HSRC, 1991, and Seitz, Nelson and Halcrow, 1994):

- high degree of perishability which require a rapid turnover, cooled transport and/or cold storage facilities,
- high mass with low unit-value ratio, which influences choice and transportation cost,
- significant difference in quality for the same product,
- production that, for climatic reasons, is restricted to areas and regions frequently far from markets,
- producers who generally specialise in the cultivation of a limited number of products, while the average consumer prefers a variety of fresh produce,
- additional tasks such as sorting, washing, grading, packaging, labelling, transporting, handling and displaying form part of the process of supplying a product, and
- a variable climate which caused production fluctuations which result in price variations from season to season, and even within seasons.

The unique characteristics of fresh produce and the production process in South Africa result in very high demands on price determination, the marketing process, the conducting of business at markets, the supply of products, the distribution structure and the actual distribution (HSRC, 1991).

7.4 Methodology

In order to explore the reasons for closer vertical coordination structured interviews were conducted amongst farmers that were already involved in direct sales to the retailers. Contact details for these were obtained from the retail groups. A population of fifty farmers were identified of which thirty were interviewed by means of semi-structured questionnaires.

The case study approach gained steady ground as a recognised scientific research tool in recent years (Sterns, Schweikhardt, and Peterson, 1998). Other way include experiments, surveys, histories, and the analysis of archival information (Yin, 1994). Case studies do not transfer knowledge in the traditional sense of stimulating lower-

order thinking skills. However, case studies have proved to be very successful in stimulating higher-order thinking skills e.g. stimulating discussion, promoting analytical thinking and encouraging readers to test hypotheses (Harling and Misser, 1998).

Case study research is more suited to the “why” and “how” questions in research (Yin, 1994). This questions addressed in this case are essentially related to the “why”, the reasons, producers are contracting directly with retailers in stead of using the market mechanism.

7.5 Motivation for engaging in closer coordination with retailers: perceptions and evidence

Fresh produce markets are still the most important distribution channel for most vegetable producers in South Africa as indicated in Table 7.2.

Table 7.2: Vegetable buyers from farmers: difference between National Department of Agriculture and own survey

Vegetable buyers	Dept. of Agric.	Survey
Processing	11 %	4.0 %
Hawkers		6.7 %
Fresh Produce Markets	54 %	23.6 %
Direct sales (Retail)	32 %	57.0 %
Export	3 %	8.7 %

Source: National Department of Agriculture (2000) and own survey.

It is clear from Table 7.2 that the respondents market most of their produce directly to the retail sector. The farmers indicated that they only shipped their inferior produce to the fresh produce markets.

The producers were asked to respond to a range of statements in order to determine their attitudes towards delivering their produce to fresh produce markets or directly to a retailer. The results are presented in Tables 7.3 and 7.4.

Table 7.3: Reasons for delivery/non-delivery to auction markets (National Fresh Produce Markets)

Reasons for delivery	Average*	Standard deviation
Money is assured through a trust account	2.00	1.47
Better price paid for produce	2.00	1.68
The market is fair/just way of doing business	2.42	2.11
Any volume of produce can be sold through the market	2.67	1.97
The market always takes all my produce	3.00	2.2
Retailers will cheat farmers if the municipal market didn't exist	3.08	2.21
Less product specifications	3.33	2.47
Less quality controls	3.69	2.42
More possible buyers for my produce	4.00	2.08
Reasons for non-delivery		
No fixed relationship with market agent	4.57	2.98
My product quality is better than municipal market quality	5.89	1.96
My products are not sold on time and the quality consequently deteriorates	6.25	1.16
Better prices when delivering to other market channels	6.25	1.75
Unexpected price fluctuations	6.67	0.73

* Likert scale: 1 = not important and 7 = very important.

The questions related to the auction markets are split into two categories namely the reasons for delivery and non-delivery to these markets. Producers still see the market as a vehicle to get greater exposure to possible buyers. It is interesting to note that the farmers do not attach great value to traditional reasons for auction markets namely security of payment through the trust account system, better prices and a fair way of doing business. The respondents are also notably neutral about the setting and maintaining of standards and grades by the market.

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Most interesting are the reasons for not sending produce to auctions markets. The importance of these aspects in the decision making of producers is reflected by fact that they have the highest values allocated to them in the entire survey – even higher than the reasons for direct marketing. The reasons for the direct marketing of produce can be categorised into risk, quality and price considerations.

Unexpected price fluctuations is the most important reason why producers are avoiding auction markets. Reducing price risk and uncertainty is one of the main reasons for vertical coordination (Bowersox, 1992). Other sources of risk are also of concern to the respondents. When farmers market directly to retail groups they engage in joint planning of production volumes and timing. This reduces the production risk and contributes to an assured market, which reduces market risk. Both these aspects are identified as very important.

Table 7.4: Reasons for delivering to a Retail Company (Direct Marketing)

Decision variable	Average*	Std dev
Reduction in transport costs	2.53	1.92
Reduction in packaging and product cost	2.53	2.03
Better market information from the buyer (more consumer information)	2.53	2.21
More market exposure for my private label product	2.71	2.08
I trust the retail company	4.00	1.69
Reduction in marketing costs by bypassing the municipal market	4.12	2.42
Credit finance from the retail company	4.24	2.58
Reduced production risk	5.06	1.71
I get an assured fixed price for my products	6.00	1.54
You are assured of a market	6.11	1.57
You can manage production volumes according to agreements/contract with company	6.17	1.46

* Likert scale: 1 = not important and 7 = very important.

It is also clear that producers are of the opinion that they get better prices for their produce through direct marketing in both sections of the questionnaire (reasons for delivery and non-delivery). Although prices are identified as important in the

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decision making process stable prices are relatively more important which is congruent with rational risk management where farmers attach relatively more value to stable rather than high prices.

The ability of the fresh produce markets to maintain produce quality is one of the most important reasons why farmers are engaging in direct marketing. The efficiency of the market i.e. the speed with which a product is sold, is of concern to producers as product quality deteriorates when it is left on the market floor for too long. Several respondents noted that they sent only their low grade produce to the markets. This is supported by the low ranking of product specification and quality control by the fresh produce markets.

Finally producers are not of the opinion that they save any costs on transportation, packaging and product costs through direct marketing. They do not feel that they receive more information about the consumer through closer contact with retail buyers. However, the needs of the consumer is translated and communicated to the producer through the joint production planning process.

7.6 Identifying the most appropriate governance structure

Earlier in this case it was indicated that transaction costs could explain the choice of governance structure for a transaction. According to Coase (1937) closer vertical coordination will be observed as the cost of using the market increases and firms attempt to minimise transaction costs. Williamson (1996) discusses frequency, uncertainty and asset specificity as determinants of governance structure. Hobbs and Young (1999) argues that the transaction costs are in turn influenced by the nature of the product. The nature of fresh produce causes quality uncertainty, price uncertainty, frequency of transactions and relationships specific investments.

Fresh produce buyers experience **quality uncertainty** due to the perishability of fresh produce. The quality is variable and not immediately visible as interruptions in the cold chain only shows up later when the product deteriorates at a faster rate. This problem becomes more complex as product differentiation becomes higher with different products requiring different storage conditions. **Supply reliability** increases

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transaction costs due to the perishability of fresh produce requiring frequent replenishment of stocks, the range of different products stocked and seasonality of supply. Both buyers and sellers experience increased **price uncertainty** in the marketing of perishable products, prices have to be determined for differentiated product lines, and especially when the quality is invisible (see Akerlof (1970) for a full discussion on pricing and quality uncertainty). Sellers experience uncertainty in **finding a buyer** due to product perishability, when they are marketing unique or differentiated products, and when they have implemented quality assurance programs which might not be immediately visible, and therefore remunerable, in fresh produce. Fresh produce also require frequent replenishment and therefore the **frequency of transaction** also increases. Retailers and producers engage in **relationship specific investments** to ensure product differentiation (e.g. distribution centres and unique packaging) and to assure quality. All these transaction cost drivers are exacerbated by the introduction of products with new characteristics demanded by consumers. (Hobbs and Young, 1999; and Zuurbier *et al*, 1996)

Asset specificity is an important determinant of governance or coordination structure (see 4.3.1). Four distinct types of relationship specific investments are identified by Joskow (1993) namely site specificity, physical asset specificity, human asset specificity and dedicated assets.

Producers were asked to identify their investments in the relationship with the retailers or developments which they incurred in coordinating with retailers. The results can be viewed in Tables 7.5 and 7.6. In Table 7.5 it is clear that farming experience – the ability to produce a good quality product – and good quality control programs are important to be able to achieve the higher standards required by retailers. Relationships with retailers and to be at the right place at the right time (another managerial ability) are also important to enable producers to deal directly with retailers. The human asset specificity involved in the relationship between producers and retailers is not relationship specific investment, but investment in general quality. Managerial capacity to deliver the required produce and acquired relational and production knowledge are important in the coordination of fresh

produce transactions. The investment in quality programmes however, is relationship specific since most of the retailers require specific programs.

Table 7.5 Important characteristics to deal directly with retailers

Factor	Average*	Standard deviation
Have more farming expertise than the other farmers	5.40	2.02
Have a better product than another farmer	4.96	2.19
Have more and better technology	3.43	1.83
Being in the right place at the right time	5.40	2.06
Know someone in the retail company	5.03	1.99
Have a quality control programme	5.13	2.30

*Likert Scale (1 Not At All, 7 Yes Definitely)

In Table 7.6 investments in dedicated assets are observable. Investments in storage facilities, quality control and other facilities were indicated by the producers. Hygiene and quality control programs are especially important to assure food safety and quality to consumers. Producers had to make investments in storage facilities to ensure that the cold chain is not broken in the transportation process.

The uncertainties and asset specificities in fresh produce transactions discussed above can be interpreted at the hand of the model proposed by Williamson (1996) depicted in Figure 4.4. Williamson proposes that enterprises have three distinct governance structures from which they can choose to minimise their transaction costs. As mentioned earlier, this choice is determined by asset specificity, frequency and uncertainty. Producers indicated that asset specificity associated with direct selling to retailers is higher than selling at the fresh produce market. Therefore the asset specificity would lie somewhere between k_1 and k_2 . The frequency of disturbance or uncertainty is relatively high, but apparently still low enough to still fall in the 'hybrid' governance mode.

Table 7.6 Dedication of financial resources due to closer vertical coordination

Investment	Average*	Standard deviation
Training	3.90	1.66
Quality programmes	4.77	2.01
Machinery/Equipment	4.42	2.29
New facilities excl storage	5.10	2.02
Labourers housing	3.26	2.21
Chemicals	3.90	2.23
Water quality	3.48	2.34
Storage facility and labourers hygiene	5.26	2.10
Social audit	3.23	2.41
HACCP/ISO 9001	3.58	2.14

*Likert Scale (1 Not At All, 7 Yes Definitely)

The Williamson model provides a lot of insight, but it does not expand on the type of hybrid mode of governance. As mentioned earlier, vertical coordination is a continuum ranging from spot markets to hierarchies or vertical integration. Mahoney (1992) proposes an expanded choice of organisational form as illustrated in Table 4.4. Mahoney uses three conditions to provide a framework in which coordination strategies can be predicted. These conditions are task nonseparability, task programmability and asset specificity. (See 4.3.2)

Traditional vegetable production and marketing falls into the category of **low task nonseparability**. The vegetables are graded according to well known standards and measures according to size, weight colouring and blemishes at the marketplace by independent personnel. Producers are rewarded according to the grade awarded to the produce and prevailing market conditions. However, new consumer demands for high quality produce, food safety, environmentally and socially responsible production practises and variety requires product characteristics beyond the traditional standards and grades (Boehlje, 1999; Drabenstott, 1995; and Zuurbier *et al*, 1996). These augmented product features cannot be clearly separated and objectively measured and therefore falls into the category of **high task nonseparability**.

Chapter 7: Case: Closer vertical coordination in the South African vegetable supply chain: an exploratory analysis

The agricultural production process can be classified as **low task programmable**. Although agricultural production processes are well established, the uncertainty of the biological nature of agricultural production makes input measurement uncertain and not amenable to monitoring. The issue of **asset specificity** is discussed earlier in this case and is accepted as somewhere between high and low.

According to the Mahoney framework the organisational form of vertical control could be a spot market, relational contract or clan. Mahoney's framework predict the governance structures of choice in the marketing of fresh produce. The tension that exists between the spot market and direct selling to retailers was apparent in all the discussions with producers. The retailers and producers interviewed prefer relational contracts due to the high nonseparability of the characteristics of their produce. Asset specificity is not high enough to induce clan formation. It is however interesting to relate this aspect to the observations by producers in Table 7.5 that 'knowing someone in the retail company' is conducive to closer vertical coordination with the company.

7.7 The nature and result of vertical coordination in the fresh produce supply chain

The effect on the risks perceived by producers is presented in Table 7.8. Vertical coordination with retailers serve to reduce price and investment risk for producers. They do not have to expose themselves to the vagaries of the marketplace where they are never sure of a good price or buyer. They plan their production schedules in coordination with retailers in order to assure a market for their produce. The producers therefore successfully minimise transaction costs related to uncertainty by means of closer vertical coordination with retail companies. This is however only part of the reason as e.g. higher prices and quality considerations are also important reasons.

Table 7.8 Perceptions on risk reduction through closer vertical coordination

Risk	Average*	Standard deviation
Price risk	5.33	1.61
Quality risk	3.30	2.10
Investment risk	5.27	1.66
Quantity risk	4.97	2.01

*Likert Scale (1 Not At All, 7 Yes Definitely)

The differences in the relationship producers have with market buyers and retail buyers are recorded in Table 7.9. It is clear from Table 7.9 that retail buyers have a more extensive relationship with their producers. The most important difference is that retail buyers engage in annual crop planning – discussion on delivery times and quantities – with producers. Producers reduce the risk of finding a buyer for their produce and retailers assure the reliability of their supply (timeliness and quantity). Retailers and farmers also discuss the quality and standards of the produce to be delivered. This reduces quality uncertainty for the retailers and price uncertainty for producers. Retail buyers visit producers on their farms and assist them with farming problems. The quality risk and especially the ‘invisible’ quality is reduced as producers and retailers discuss production practises. This kind of effort indicates investment in relationship specific human asset specificity. Retailers are also enlisting independent quality controllers to do on-site inspection of production practises. A higher incidence of written contracts is noted, but the result is lower than four. Further interviews indicate that this points to a informal written production and delivery plan that some retailers put on paper with their producers. This is however seen as an informal joint production and delivery plan and not an enforceable contractual commitment to buy.

Table 7.9 Relationship characteristics of closer vertical coordination

Decision Variable	Market Buyer		Retail Buyer	
	Average*	Stdev	Average*	Stdev
Only money exchange, we never hear from each other again	2.19	1.85	3.77	2.40
Strictly business, not friendly	2.69	2.24	2.67	2.02
Friendly, speak often about prices on the municipal market	4.34	2.50	5.19	2.10
Buyer often visits me on the farm. In addition, helps me with farming problems	2.10	1.85	4.87	1.50
Discuss quality and standards	3.81	2.51	6.16	0.93
Discuss delivery times and quantities (annual crop planning)	2.81	2.22	6.16	1.51
Written agreement/contract	1.10	0.75	3.97	2.59
Buyer owns a part of the farm	0.77	0.43	0.94	0.25

*Likert Scale (1 Not At All, 7 Yes Definitely)

McLaughlin *et al* (1999) lists the **advantages of contracts** in the fresh produce industry as:

- Greater price certainty for retail buyers and producers. Producers get clear guidance on the type of produce, quantity and quality required by the market. This arrangement is especially advantageous to producers in low-price years on the open market in case of fixed-price contracts.
- Better knowledge of the quantities to be sold in the short and long run. This aids field production planning for producers, harvesting and packaging for transportation and distribution centres as well as procurement and advertisement scheduling for retail category managers.
- Contracting may encourage large retailers to conduct long-term market and demand analysis for fresh produce, including advertising and promotional effectiveness. Large firms are more able to finance such investments.

The **disadvantages of contracting** are:

- Low production leads to low income for producers with fixed-price contracts. Retailers and consumers benefit in this case.
- When open market prices are substantially different from contract prices there will be a substantial incentive for one of the parties to find a way to avoid performance. Price discovery is difficult in contracts.
- Contracting might increase the price variability on spot markets when the volumes going through these markets are substantially reduced by contracts.

7.8 Conclusion

Economic theory suggests that enterprises will attempt to minimise their costs. These costs include the costs of coordinating with other firms in the supply chain – the transaction costs. Firms will therefore over time adopt the governance structure with the lowest cost. The survey represents the attitudes and trends observed in a significant part of the fresh produce market. There is a definite trend away from the traditional municipal fresh produce markets as a marketing channel for fresh produce to direct marketing of produce by means of contracts with retailers. The reasons for this trend is lower price and market risk, better quality produce due to less handling and better prices. The reasons for the existence of fresh produce markets are not regarded as important by the producers surveyed. Producers were neutral about aspects like protection against exploitation, fairness of doing business, setting and enforcement of standards. Improved coordination in the fresh produce supply chain remain the most important trend in the supply of fresh produce in South Africa.

This trend was tested against economic theory in the neo-institutional inquiry paradigm. Transaction costs are an important determinant of governance structure. Asset specificity, transaction frequency and uncertainty in the Williamsonian framework indicate that a hybrid form of governance can be expected. This is also clearly observed in reality. The transaction costs theory therefore sufficiently explains the application of contracts to govern transactions in the vegetable supply chain.

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The analysis was expanded at the hand of the Mahoney framework. Mahoney uses three conditions to provide a framework in which governance structures can be predicted namely task nonseparability, task programmability and asset specificity. Vegetable marketing transactions are found to be medium asset specific and low task programmable. The most significant insight from the Mahoney framework is that traditional vegetable transactions are low task nonseparable, while vegetables that satisfy new demands by consumers require transactions which are high task nonseparable. This also explains the trend from spot markets to relational contracts in the fresh produce industry.

This case finds that the reasons producers and retailers are engaging in closer vertical coordination are based in the transaction costs of using the market mechanism. New consumer demands and competitive strategies are increasing the costs of using spot markets. The trend towards closer vertical coordination confirms the insights from the neo-institutional economic framework. Producers and retailers are expected to continue this trend as they minimise their transaction costs over time to be more competitive.

**Chapter 8 Structural Change in Agribusiness: The
Case of Potgietersrusse Tabak Koöperasie (PTK)**

Chapter 8 Structural Change in Agribusiness: The Case of Potgietersrusse Tabak Koöperasie (PTK)

8.1. Introduction

This case represents the other extreme of the vertical coordination continuum namely that of vertical integration. Asset specificity and strategic considerations like increased control of the product downstream in the supply chain argues for the use of vertical integration governance structure. The asset specificity is related to physical assets required in the vertical integration process and human asset specificity in the tobacco marketing networks. The Cooperative had to make a substantial investment in processing capacity to integrate vertically. This investment is highly asset specific since it would be very difficult to sell or to reallocate the assets to other uses. The Cooperative also needed to acquire knowledge on marketing and buyers. This knowledge is human asset specific and difficult to generate internally. The best option was therefore to acquire these skills by introducing tobacco marketers as minority shareholders in the vertical integration. The position of the governance structure is presented in Figure 8.1

The South African agricultural industry is undergoing major structural changes, as is seen in the changes in product characteristics, production and consumption patterns, technology, the size of operations (Kirsten and Vink, 1999) and the relevance of "supply chain" or "added value" integration (Van Rooyen *et al* 2000). Tom Urban coined the phrase "the Industrialization of Agriculture" at the turn of the previous decade to describe similar changes in the American agricultural sector, whilst Zuurbier (1999) described similar trends in Dutch agribusiness. Agricultural industrialisation describes the trend towards economics of scale through the movement to larger production units and the increasing occurrence of vertical co-ordination and integration between the various stages of the food and fibre system i.e. the supply chain (Antonovitz, *et al* 1996). Boehlje (1996) defines industrialisation as the application of modern manufacturing, production, distribution and co-ordination methods to the food supply chain. The Council of Food, Agriculture and Resource Economics defines industrialisation of agriculture in Sonka (1995) as an increasing

concentration of farms and vertical co-ordination (contracting and integration) among the various stages of the food and fibre system. The emerging system is expected to be highly competitive in global markets, more efficient, more responsive to consumer demands, less dependent on government assistance, and more able to rapidly adopt new technologies.

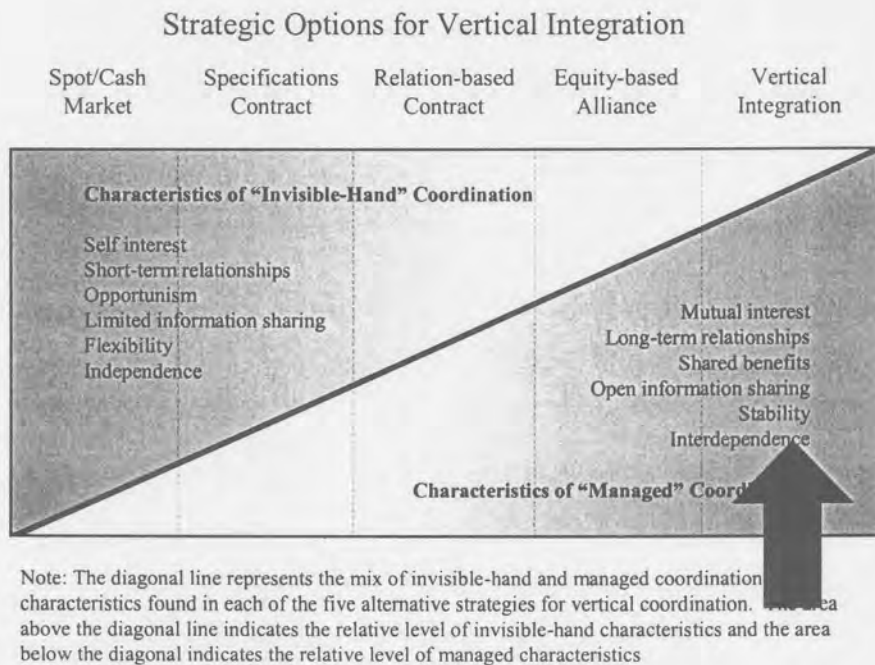


Figure 8.1: The position of the Aftobacco governance structure on the vertical coordination continuum

Source: Peterson, Wysocki, and Harsh (2001)

These trends have not yet been adequately researched by South African agricultural economists. The purpose of this article is therefore to (1) introduce the theme of structural change/industrialisation in South African Agribusiness and (2) explore, at the hand of a case study, the complexity of structural options and decision-making variables that managers have to face when considering vertical expansion.

The case study focuses on the vertical integration of the Potgietersrusse Tabak Koöperasie (PTK) to extend value adding by including marketing activities to their operations.

8.2 Background

The town Potgietersrus was established by the surrounding farming community in 1852, abandoned in 1870 due to disputes with the local population, and once again repopulated again in about 1886-1890. Various hardships such as “Runderpest”, the Anglo-Boer war and the Rebellion befell the inhabitants of the region, including the “Great Depression” of 1933 (PTK 1966). On 14 June 1933 forty-six farmers founded the co-operative to organise farmers to build up negotiation power “...om saam te staan en só bedingingsmag op te bou...” (PTK, 1966). Against this background it is clear that PTK was established in a time of social hardship to counter the effects of unfavourable economic and social circumstances facing agricultural producers and rural inhabitants. The co-operative was formed to support its members by extending their activities and control over the product from production to include assembly, grading, packaging and auctioning. Overproduction, variable supply, and low export prices - always the bane of the farming sector - had to receive attention by the new co-operative. In 1939 drastic measures were considered to limit the oversupply of tobacco. The co-operative requested the Department of Agriculture to prohibit settlers to produce tobacco and it was even suggested to burn a part of the export quota!

Over the next few decades PTK established itself as an effective producers cooperative under the cooperative act. The early 1980's, however, introduced substantial reforms in the agricultural environment (Van Rooyen *et al.* 1997)

The Board of Directors of PTK called a extraordinary general meeting on 4 December 1998 to discuss the formation of a joint marketing company. Increasing pressure in the marketing of tobacco in the free market environment, anti-smoking legislation, and the onslaught on the RSA tobacco industry were cited as the reasons for the initiative. More specifically the co-operative was experiencing rising input costs, stronger competition in the global marketing of relatively low volumes of tobacco in comparison to the total market and increasing unit costs. (PTK annual reports)

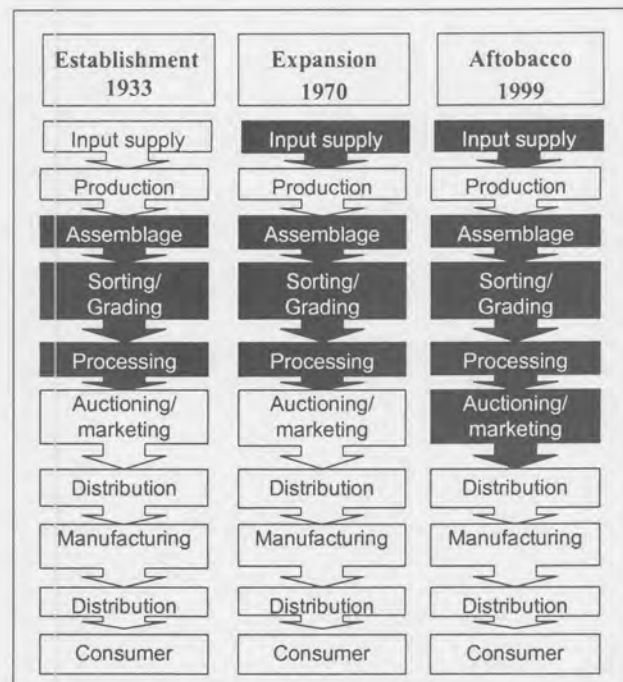


Figure 8.2: Integration performed by PTK

The Board of Directors proposed the establishment of a joint marketing company with international experts. The envisaged results of this action were (PTK Annual Report 1999):

- training and knowledge expansion of PTK personnel to international standards by international experts;
- assistance with development of tobacco production in South Africa and other Africa countries;
- aggressive co-operation and assistance with possible production expansion by PTK members and other producers; and
- most importantly the procurement of unprocessed tobacco from African countries for processing and packaging in the PTK plant.

PTK expanded its production facilities substantially in terms of this "supply chain" vision. Increased throughput in the expanded processing facility is important to reduce unitary production costs or to realise favourable scale economics in manufacturing. The success of the vertical integration or supply chain strategy is

therefore directly linked to the success of the expansion in processing and marketing capacity.

Important aspects of the operational agreements between PTK and the new marketing company were (PTK Annual Report 1999): (1) equally shared accountability and contribution by both partners; (2) PTK members are still contractually bound to production credit agreements to deliver their total harvest to the co-operative; (3) the marketing company must set up an agreement with PTK with regard to the packaging and processing of tobacco; (4) the marketing company is responsible for the marketing of the total production by PTK members whether in South Africa or not; (5) profit is shared equally and consequently to PTK members through dividends/bonuses after PTK reserves have been attended to; (6) tobacco from producers that are not members of PTK can also be procured for processing and packaging by the PTK processing plant; and (7) separate agreements are applicable for tobacco processed by PTK for PTK members and processed by PTK for other suppliers.

A new company, Aftobacco (Pty) Ltd, was consequently set up with two tobacco traders as partners. The tobacco chain and the different integration by PTK are indicated in Figure 8.2.

8.3 Application of theoretical framework to PTK case

Williamson (1999) identifies four levels of research relevant to the economic inquiry into institutions. The first level deals with the informal institutions, traditions and norms that govern society for which social theory is of particular relevance. The second level address the institutional environment i.e. the 'rules of the game' for doing business, for which the economics of property rights and positive political theory are generally applied. Thirdly, governance structures related especially to the way firms align governance structures to transactions is analysed at the hand of transaction cost economics. Finally, neo-classical economics and agency theory is used to explain and predict the allocation and employment of resources within the firm. As noted earlier the objective of this article is to explore the governance

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structures of firms in the agribusiness complex, which would specifically relate to the third level of economic inquiry in institutions.

Vertical integration can be defined as the consolidation of two successive production processes in which the output of the upstream stage is used as one intermediate input in the downstream stage. This consolidation removes the need for contractual and open market exchanges between upstream and downstream firms. These exchanges are replaced by internal exchanges within the consolidated firms. Such a vertical integration implies ownership and complete control over neighbouring stages of production and distribution. Various degrees of vertical co-ordination exist between the extremes of vertical integration and an open market. (Antonovitz *et al* 1996)

From a conceptual point of view it is first and foremost important to understand the incentives for structural change in the tobacco industry. Industries integrate vertically for various reasons. Cole in Mallen (1967) identified thirteen advantages to vertical integration for the enterprise: additional profit margins; decreased marketing expenses; stability of operations; certainty of materials and supplies; better control of product distribution; gratification of personal ambition; quality control of produce; prompt revision of production and distribution policies; better inventory control; ability to apply brand names to items produced and to enjoy the advantages thereof; opportunity for increased research facilities; greater buying power; and the ability to secure better trained personnel. He added that lower prices, maintenance of quality and better servicing of products would be the benefits that would accrue to the consumer through vertical integration (Cole in Mallen, 1967).

Ward (1997) sorted the motives for vertical integration into seven classes: decreased transaction costs; decreased risk and uncertainty; assured input or output supplies; corrected market failures; countered market power at an adjacent stage; created or extended market power; and avoidance of government restrictions, regulations or taxes.

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Baumol (1997) limits the explanations for vertical integration to three basic motives: technical economics of scope; economics of internal production resulting from market failure; and the pursuit of aggrandisement or monopoly power

Secondarily, it is important to understand how the firm integrates vertically. As already indicated various degrees of vertical integration exist between the open market and total integration. However, it is not possible to explain the eventual structure at the hand of a single theory (Boehlje, 1999). Various disciplines, such as, value-chain analysis; economic theory, including transaction cost and principle agent concepts; strategic management and organisational learning; and negotiation/power, trust, and performance incentives, make valuable contributions to explaining vertical integration models. Transaction cost and strategic management theories are particularly relevant to the Potgietersrusse Tabak Koöperasie and were addressed in Chapter 4.

According to strategic management theory governance structures are determined by (a) internal considerations of costs, technology, risks, and financial and managerial resources and (b) external competitive considerations of synergies, differentiation, and market power and positioning (Harrigan in Boehlje, 1999). Harrigan (1983) identified bargaining power, strategy objectives, and industry traits (competitive position) as relevant to vertical integration strategies and proposed the following conceptual model for predicting vertical integration strategies within established industries:

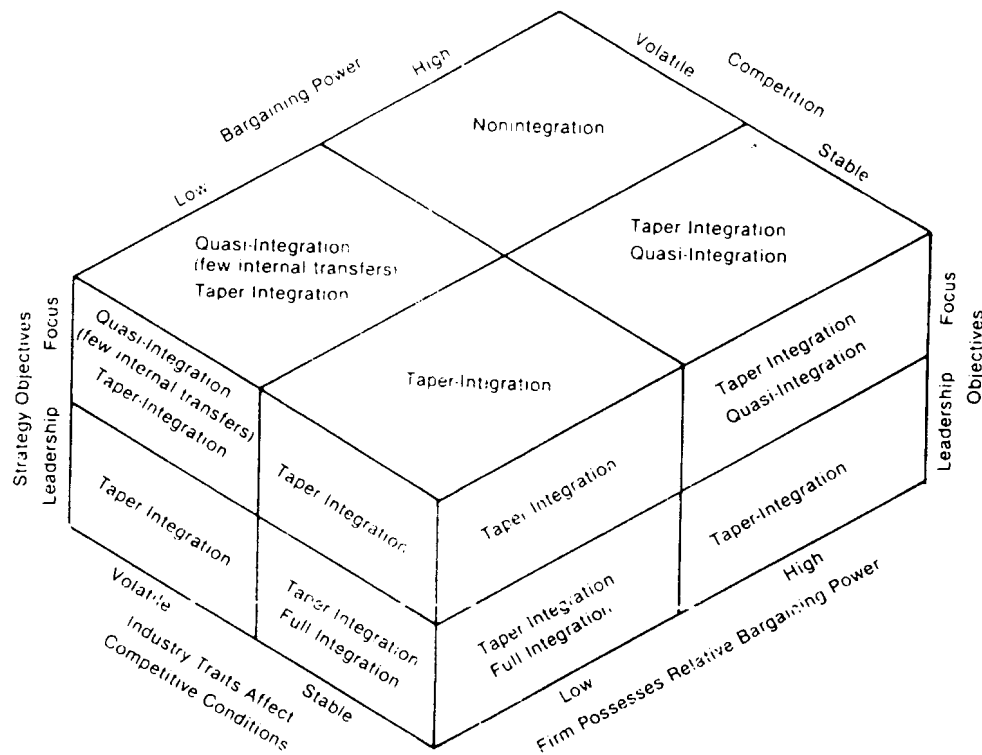


Figure 8.3: Illustration of the Strategy Framework for Vertical Integration within Established Industries

(Source: Harrigan, 1983)

8.4 Tobacco Agribusiness: Application and Observations

PTK embarked on the road of vertical integration to secure additional profit margins through decreased marketing expenses, higher throughput in the processing plant, and expanded markets.

Marketing expenses would be addressed in several ways. Technically the firms would avoid the costs incurred when delivering the tobacco to the auctions by delivering it directly to the buyers. These savings would be expressed in a competitive price position for the companies on the basis of reduced costs in the supply chain. The firms would be able to extract first mover, information and flexibility advantages from improved knowledge of both the (international) market information and (on-farm) supply conditions by linking the intelligence systems of producers and traders in the same company. Information advantages would also counter the effects of market failure. At the manufacturing and auctioning stages of

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the tobacco chain oligopoly to monopolistic conditions did and still does exist. The initiative would counter market power in adjacent levels by efficiently addressing niche markets with a specialised product.

Ensuring a higher throughput for the processing plant would be imperative to extract technical economics of scale. The marketing company could reduce risk at the input and output sides of the processing stage by ensuring higher and more secure levels of product and thus ensuring high and constant delivery volumes that are required by manufacturing firms. The output of the firm would also be assured with a market to avoid inventory risk associated with non-sales of stock.

Expanded markets beyond South Africa could provide new marketing opportunities to PTK. However, when we mention expansion of markets one has to consider the aspect of aggrandisement or efforts to establish monopoly powers as mentioned by Baumol (1997). The question therefore: Is the vertical integration initiative an investment in managerial ego or is it based on sound decision making principles? Realistically one has to assume that there would always be a measure of managerial ego involved in these kind of decisions.

The vertical integration venture would also provide opportunity for better coordination between the market and the farmers. Information exchange would therefore be facilitated in the organisation leading to improved flexibility to realise market opportunities. Venter (1999) indicated that various initiatives have been launched in the South African tobacco industry to amalgamate some of the tobacco co-operatives.

The tobacco produced by PTK members is air cured in contrast to the more prevalent flue (oven) cured tobacco. The market perceives air cured tobacco as easier to handle due to its leathery texture and more aromatic particularly for pipe tobaccos. It therefore makes sense to strive to service niche markets with a niche product through implementing systems which do this as efficiently as possible. In this light it is clear that more advantageous scale economics could be realised, but PTK opted for the niche approach, while realising that in this process scale economics must be realised.

Chandler emphasised that structure follows strategy, and the management and directors of PTK had to identify an efficient structure to realise their objectives as efficiently as possible. From a transaction cost perspective PTK faced high asset specificity. An investment in tobacco grading, sorting and processing equipment was not transferable. Due to the location and socio-economic circumstances in the town of Potgietersrus any fixed infrastructure of the size and nature necessary to realise economics of scale and scope, would also have to be highly specific since there is no market in the town for fixed infrastructure of this nature. It is therefore clear that investment in the initiatives of PTK would be highly asset specific. As a consequence the risk associated with these investments would increase accordingly.

The transactions in the supply system are highly programmable due to their repetitiveness. The transactions can actually be facilitated through a low input system like an open market, which has been the system for the marketing of tobacco to date. A measure of uncertainty exists in regard to the nonseparability of transactions between the grading, processing and packaging functions and the marketing function.

The value added by sorting and grading is clear and relatively easy to quantify. The value added by marketing is not that easy to quantify, and varies according to the success of the enterprise. The division of the benefits of the initiative is therefore problematic.

A joint venture or vertical ownership is the most efficient governance systems to facilitate the tobacco market chain for a niche market as indicated in Table 8.1. The management also has to take the strategic environment into account in terms of strategic objectives, bargaining power, and competition in the industry.

PTK leadership opted for a strong strategy focus on the niche marketing of air-cured tobacco. The bargaining power of PTK is low in the industry since it is closely linked to the production of tobacco which takes place in a nearly perfect market. Bargaining power will increase as the initiative develops, but it will remain essentially small

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Tabak Koöperasie*

within the global tobacco market. Since the tobacco market is mature the competitive conditions in the industry is stable.

Given these factors it would have made sense to implement taper integration as a vertical integration strategy (Harrigan 1983). Taper integration means that the firm would produce a portion of its requirements internally but purchase the rest on the open market. Taper integration would give the firm the advantage of full-capacity utilisation through fully utilising its own production, while external suppliers would be approached if excess capacity exists. (Harrigan 1983) This is also thus the governance structure that PTK implemented.

Chapter 9 Conclusions

Chapter 9 Conclusions

9.1 Introduction

The three objectives of this thesis were to elucidate the nature and extent of the emergence of supply chain management as a key performance area in South African agribusiness; to describe the manifestation of these trends in the agricultural sector; and to understand and explain the emerging governance structures in these supply chains.

The first objective was achieved by implementing a national survey on the nature and extent of the emergence of supply chains, future strategies and the drivers of these strategies in South African agribusinesses. The results of this survey also served to ensure the face and construct validity of the case studies. The case study methodology was used to address the second and third objectives namely to explain the manifestation of these trends in supply chains and to elucidate the governance structures employed in the process. The case studies were used to explain the “why” and “how” of emerging supply chains in the South African agricultural sector. The case study methodology was used since it is successful in stimulating higher-order thinking skills such as stimulating discussion, promoting analytical thinking and encouraging analysts to test theory against reality in line with the constructivist approach used in this thesis.

Three case studies were used to explore emerging governance structures in agricultural supply chains. These case studies focused on the marketing of potatoes, vegetables and tobacco. The case studies were specifically chosen to represent three examples along the vertical coordination continuum namely; market (potatoes), contracting or hybrid (vegetables) and hierarchy or vertical integration (tobacco).

The survey and the most important findings from the case studies are reviewed in this chapter.

9.2 The emergence of supply chains in the South African agribusiness complex

South African agribusiness managers were surveyed to identify the strategic direction of their businesses. The survey addressed the strategic direction, preferred present and future coordination mechanisms, strategic focus, the future shape of the agro-food industry and the major factors driving these trends.

South African agribusiness companies favour the market penetration and market development strategies. They will use current products to improve their position in current markets and also develop new markets for their current products. Agribusiness managers indicated that they will do this in cooperation or partnership with other companies (47%), or based on their own competencies (43%), or by merging with other companies (8%). This indicates a clear trend towards improved coordination between participants in the agricultural sector.

The current coordination mechanisms of choice are specification contracts and spot markets. In future specification contracts will decrease in importance, but still remain the most popular coordination mechanism. Relations-based alliances will surpass spot markets in importance. Equity-based alliances will also increase in importance in this trend while vertical integration will decrease in importance. There is a definite trend away from the spot market (invisible hand coordination) towards managed coordination structures. This implies that South Africa agribusinesses are moving away from the characteristics of the 'invisible-hand' coordination such as self interest, short-term relationships, opportunism, limited information sharing, flexibility and independence in favour of the characteristics of 'managed' coordination. The characteristics of 'managed' coordination are mutual interest, long-term relationships, shared benefits, open information sharing, stability and interdependence. The spot market is the 'cheapest' and most uncomplicated transaction governance structure due to the external control mechanism. The spot market becomes very 'expensive' when the opportunity costs of lost value is considered due to the misalignment of processes. When firms move up on the coordination continuum they incur coordination costs. They will only do this if the cost of coordination error or coordination benefit is higher than the coordination costs incurred. This indicates that South Africa

agribusiness intend to build more 'value' into the chain which needs to be protected by higher order governance structures.

Managers agree that the most important feature in the shape of the future agrofood sector will be electronic markets. This is against expectations as electronic markets could represent a particular innovation of the spot market, which are not regarded as very important by agribusiness managers. The managers indicated that electronic markets represent a globalisation of local spot markets which will change the nature of local markets significantly in future. Electronic markets are followed by a host of expected features which all indicate a strong trend towards supply chain formation and better coordination in the agribusiness sector. These features are vertically integrated supply chains, mergers, acquisitions and collusion between companies, more direct marketing from farmers to consumers and closer cooperation between local agribusiness and international commodity trading organisations. South African companies attached less importance to the impact of company size and the impact of global companies. This is ascribed to the importance of SMME's in developing economies. Local markets are not perceived as large and attractive enough to attract large numbers of global companies either. These perceptions are however already challenged by the presence of multinationals in the South African agribusiness sector.

The major factor driving the South African agrofood sector is company competencies. Local agribusiness are looking inward to improve their competencies to address new markets and face international competition. Changing consumer needs and information and communication technology follow company competency as the most important drivers in the agrofood sector. Supply chain formation and coordination are regarded as important drivers by agribusiness managers, especially coordination to ensure quality and to meet new consumer demands. These drivers will become more important as agribusinesses realign their strategies to focus on value-adding as a source of competitiveness. Value-adding strategies in the highly competitive food industry go beyond the traditional production, technology and product orientation to a service and quality orientation that encompasses customer and societal satisfactions, such as environmentally and socially responsible production practices. The low priority of factors such as environmental legislation and liability (ecology) and

economic empowerment (equity) which could be important aspects of social accountability in South African supply chains need urgent attention.

South African agribusinesses are still primarily commodity, production and process oriented. This is evident from the significance of, amongst others, electronic markets, focus on company competency, and the power drive. A significant trend towards customer-centred value-adding is however observable. These value-adding initiatives are driving the closer vertical coordination observed in the agrofood complex.

Commodity markets will increasingly be dominated by large multinational companies with significant scale and scope advantages. South Africa agribusinesses will be challenged to build their competitive advantage on product differentiation. Product differentiation is based on creating unique products which appeal to consumer needs. The emerging importance of societal values present various opportunities in this regard.

9.3 The Sandveld potatoes case study

The Sandveld potato growers find themselves stuck in a highly competitive commodity market with associated low profit margins. This case serves to illustrate the drivers for change and challenges to chain formation from the perspective of the potato producers. The whole argument can be related to the strategic choice between focus or differentiation that every enterprise has to face. The Sandveld potato producers are operating in a commodity market which requires a focus strategy. As mentioned earlier, the spot market is characterised by self interest, short-term relationships, opportunism, limited information sharing, flexibility and independence. The producers are not content to remain in the commodity market and should therefore differentiate the product that they provide to the market.

Important insights from this case are firstly, that the production and marketing of undifferentiated, homogeneous commodities are characterised by low asset specificity, low task programmability and low task nonseparability. The framework of analysis indicates that a spot market is the most efficient governance structure for the marketing of a commodity. The Sandveld producers are currently using a commodity approach in the production and marketing of their potatoes. The second

insight indicates that, in order to escape from the commodity market, the Sandveld potato producers will have to identify and add value to their product. Consumers must be willing to pay for this value and it must be relatively difficult to duplicate this value. This value will increase mutual interdependency among certain actors in the market, which is the basis of chain formation. If they cannot create such value, a market structure with closer relationships between the participants will remain the optimal governance structure. The third insight is into the factors which inhibit supply chain formation namely adversarial relationships, farmer isolation, volatile prices, and size imbalances between the participants.

Sandveld potatoes, like most agricultural products, are sold on commodity markets. The value created in a commodity market is fixed and auction systems are limited in their capacity to facilitate product innovation or differentiation. Innovation and product differentiation cannot be sufficiently guided nor rewarded in an auction market. Therefore, in the auction market, buyers and sellers compete for a fixed sum of value. This results in an opportunistic win-lose game characterised by adversarial relationships between participants. These adversarial relationships tend to isolate farmers from the rest of the supply chain. Traders also use this isolation as part of their bargaining power since it reduces the selling options available to potato producers. Cooperative innovation, to create products that will improve the competitive position of firms, is very difficult in such an environment. Isolated producers cannot implement and design effective marketing strategies either. The volatility of prices and supply in combination with opportunistic behaviour and adversarial relationships reduces the chances of establishing successful supply chain relationships. The volatilities increase uncertainty in the enterprises, requiring risk avoidance behaviour like higher stocks. Price fluctuations also increase the incidence of reneging on contracts as participants find better prices on the volatile spot markets. The size imbalance creates a power imbalance in the negotiations between participants in the potato market. This leads to an information imbalance, but also to more bargaining power for the buyers. The buyers will therefore have to coordinate with a big number of producers to initiate a supply chain. The sheer number of negotiations and partnerships leads to excessive coordination costs and buyers are not prepared to engage in a supply chain approach as a result.

It is clear that if the Sandveld growers still want to depart from the commodity market. They will have to follow a differentiation strategy to achieve this. The possibility of implementing a differentiation strategy decision depends on four factors:

- The first is the capacity of the producers to improve the coordination amongst themselves. This will reduce the coordination costs with the next level of the marketing system.
- The second is the possibility to promote new brands or regional identity to the final consumer and, more importantly, the willingness of consumers to pay for this identity.
- The third factor is the ability of the participants to create value for which consumers are will to pay by realising opportunities for improving production and logistical processes in the supply chain.
- The final factor is the prospect of setting up contracts between the participants which will give the right incentives to the different stakeholders to elicit the desired actions and to avoid opportunistic behaviour.

The key to supply chain formation lies in the creation of non-replicable value which consumers are willing to pay for. In the process of producing non-replicable consumer value mutual interdependency amongst participants will be created which will facilitate supply chain formation. Three systems for improved coordination are identified, namely partial horizontal coordination between some growers, full horizontal coordination between growers and vertical coordination between growers, processors and retailers.

Applying the analytical framework to the supply chain governance of the commodity potato market shows that spot markets will dominate. Transactions in potato marketing, especially at producer level, are characterised by low asset specificity, low non-separability and low task programmability. The spot market leads to the undesirable market conditions extensively discussed in the case. However, spot market transactions are the optimal governance structure for transactions in the commodity potato market as predicted by the framework of analysis. If potato producers want to establish a supply chain the first and most important aspect they

will have to address is the creation of non (or difficult)-replicable consumer value. Opportunities for value adding could exist in assured quality, origin, continuity and cultivar selection. This will increase the asset specificity and, as a consequence, the mutual interdependence of the participants in the market. An increase in asset specificity will form the foundation for the use of a hierarchy in the Williamson framework or a long-term contract in the Mahoney framework. However, the improvement of the processes and flows in the supply chain can only be improvements in efficiency and not value-added as such. Most of these improvements can be achieved through better coordination between buyers and sellers in the spot market and it is not necessarily efficient to move to the next level of in the coordination continuum.

Most potatoes and vegetables are sold on the national fresh produce markets as commodities. The next case illustrates how some vegetable farmers and retailers departed from the commodity system by implementing a differentiation strategy based on consumer needs.

9.4 The Vegetable case study

The second case focused on the use of informal contracts between vegetable producers and retailers. Consumer demands and retailer competitiveness were the most important drivers for chain formation in the vegetable sector. The most important insight from this case was that a spot market would be the most appropriate governance structure from a pure transaction cost perspective. However, when new consumer demands for product safety and quality were introduced to the transaction characteristics, the spot market was unable to facilitate the increased information requirement. The individual contribution to the final product was difficult to measure and reward in a spot market setting. Agency theory was used in combination with transaction cost theory to explain why relational contracts were the most appropriate governance structure. This case illustrated how retailer strategies, which are derived from consumer demands, drive the process of chain formation. Product characteristics, especially the perishable nature of vegetables, also played an important role as the retailers had to provide sufficient incentives to farmers to modify their behaviour in terms of quality control and assurance. An informal contract is the most efficient governance structure for this type of transaction. The vegetable case

study illustrates the use of hybrid governance structures or, more specifically, relational contracts between vegetable producers and retailers.

Consumer demands and the intense competition between retailers are the most important drivers for change in the vegetable industry. Retailers attempt to draw customers with wider offerings of high quality fresh produce at competitive prices on a year-round basis. To achieve this they had to implement efficient procurement systems to assure quality, continuity of supply and quantities. Technology, especially cold chain management and cultivar choice, enables producers and retailers to assure a continuous supply of high quality fresh produce.

The characteristics of fresh produce are an important consideration in the choice of governance structure. The perishability of fresh produce and the use of appropriate production practises are not immediately visible or measurable. The quality or 'freshness' depends on the maintenance of the cold chain in delivering the products to the distribution centres. Appropriate use of chemical agents to control pests on vegetable farms is important to consumer health and cannot easily be objectively verified in the marketplace. As mentioned earlier, retailers are interested in ensuring a constant flow of the required quantity and quality of produce along the supply chain. They experience uncertainty in using the National Fresh Produce Markets as they cannot always be assured of the required supply. To counter these challenges they engage in informal relationships with certain producers. Producers and retailers coordinate the supply (quantity, quality and variety) of vegetables by improving the information flow in the supply chain. The producers and retailers cooperate to improve the competitiveness of their supply chain by assuring a constant supply of high quality fresh produce.

Vegetable transactions are conducted frequently due to the perishable nature of the products. The asset specificity associated with vegetable production is also low. Vegetables are sold on the market every day with no reciprocal investments required between the participants in the transaction. A relatively higher level of asset specificity is observable where producers implement specific quality, training, manpower and human development programs required by the retailers. Uncertainty is also relatively high in the vegetable market due to supply fluctuations. The

Williamson framework would predict a market governance structure for procuring vegetables. However, as pointed out in the chapter four, agency theory makes an important contribution to the choice of governance structure. Two new factors are introduced namely task programmability and task separability. Vegetable farming is low task programmable due to the biological nature of the production process. Producers face constantly changing production conditions and have to adapt their processes accordingly. Traditional vegetable production and marketing is low task nonseparable because objective standards and grading at the marketplace address the information requirements of buyers and sellers. Consumers and consequentially retailers are concerned about the quality, continuity of supply and production practises used in vegetable production. Spot markets are not able to facilitate this kind of information exchange as transactions are conducted on price alone and along limited grades and standards which do not reflect the information required. These factors are not easily measurable and it is difficult to reward individuals for desirable behaviour or to monitor shirking. The required transaction is therefore highly nonseparable. The result is therefore, using the Mahoney framework, that a relational contract would be the most efficient governance structure to facilitate this kind of transaction. A relational contract facilitates production and procurement planning and assures quality and production practises in order to improve the efficiency and competitiveness of the supply chain created between the vegetable producers and retailers.

The trends observed in the vegetable sector are expected to intensify over time. Retailers will continue to invest in closer relationships with producers. Total quality management of all the production processes will increasingly be enforced through certification systems such as EurepGap. Price competition will still continue, but non-price factors such as societal values will become more important in future.

9.5 The Potgietersrusse Tabakkoöperasie case study

The final case focused on vertical integration in the form of a taper integration into the tobacco supply chain by the Potgietersrusse Tabakkoöperasie. Strategic considerations such as market power and position and lower unitary costs of production are the most important drivers in this case. The asset specificity of the required investments is the most important determinant of the optimal governance structure. The envisaged expansion of processing and marketing capacity required

substantial investment in highly asset specific investments. The cooperative therefore had to decrease its exposure to market uncertainties by vertically integrating into the downstream processes of processing and marketing. This case illustrates the importance of managerial strategy as the driver for the establishment of a supply chain. The importance of asset specificity in the choice of governance structure is apparent in this case.

Vertical integration or a hierarchy is discussed as the most efficient governance structure for the marketing and processing of air-cured tobacco by the Potgietersrusse Tabakkoöperasie (PTK). The members of the PTK produce a substantial quantity of air-cured tobacco as opposed to the more common practice of flue curing tobacco. Air-cured tobacco is easier to handle and more aromatic which makes it suitable for pipe tobaccos. The cooperative wanted to control the marketing of their product in order to improve the profitability of its members. The main reasons cited by the board of directors and management were rising input costs, stronger competition on international markets, rising input costs and relatively low volumes which translated into low bargaining power. A further reason was that the cooperative wanted to expand its market knowledge through closer coordination with the buyers further up the tobacco supply chain. More information will enable them to better plan the marketing and positioning of their product. The deregulation of tobacco marketing in the early 1990's opened up new opportunities to the cooperative. The strategy of the cooperative was to get involved in the next stage of the value chain namely the marketing or auctioning of their product to the manufacturers. The decision was therefore whether the cooperative should sell its product on the auction market or to sell the product directly to the manufacturers.

The increase in product and information flow will enable the cooperative to reduce overhead costs and gain a better understanding of the market. The processes and activities at the selling level are programmable and separable, but highly human asset specific as strong seller-buyer relationships are established over time. The increase in processing capacity is also highly asset specific. This is due to two reasons namely the specificity of the tobacco sorting and processing equipment, but more importantly the specificity of investing in factory space in the town of Potgietersrus. The town is small with a small industrial and manufacturing sector. It would therefore be difficult

to transfer ownership of these assets to another enterprise. Given these circumstances the most efficient governance structure according to the Mahoney framework would be a joint venture or vertical integration.

In the PTK case, strategic theory explains why the cooperative did not engage in full vertical integration. A taper-integration approach was followed to ensure that members will always be guaranteed of a market. A taper-integration implies that the excess capacity would be filled up with tobacco procured from other sources. This governance structure was primarily motivated by the focus objective of the cooperative's leadership. The cooperative wanted to serve and focus on the pipe tobacco niche and were aligning their resources and control over their resources in such a way to address this market as efficiently as possible. The industry is relatively stable since international demand is stagnating due to anti-smoking campaigns. A stable environment is conducive to fixed investments as opposed to a volatile environment, which would discourage large fixed investments. Finally, the relative bargaining power of the cooperative would be low in the international tobacco market because its production volumes are low in comparison to the total market.

PTK performed the taper integration by establishing a new company (Aftobacco) in partnership with two tobacco merchants. The cooperative owned a controlling share in Aftobacco. In this way they combined the tobacco merchants' marketing knowledge, required to sell their product, with their specialist knowledge on raw material procurement. The combination of these factors in a hierarchy improved the efficiency of the supply chain and the competitiveness of the participants in the chain. The critical variable in this case was the asset specificity of the processing equipment and physical infrastructure required for the venture. PTK had to establish more control over the marketing of the product to ensure sufficient return on investment as there was no other way to recover their investment due to the asset specificity. The human asset specificity of marketing networks also played an important role. PTK had to acquire these skills through acquisition as this knowledge (marketing networks) is difficult to generate. The strategy of taper-integration therefore made sense as it reduced the uncertainty associated with asset specific investments.

Consequential to the writing of the case the other shareholders in Aftobacco walked out on the venture. Although this was not studied in detail it seems that the most important reasons for the breakdown were related to interpersonal differences and misalignment of goals between the two companies. Apparently the most significant event was the appointment of a new manager at PTK who had new ideas on the management of the Aftobacco venture. The cultural differences, emphasised by statements from farmer members of the PTK board such as: “*The Aftobacco people do not work. They are never in their offices*” led to difficulties in the formulation and implementation of goals between the different stakeholders. Perceptual differences about the nature of the arrangement led to strategic and management misalignment. The co-owners in Aftobacco saw the arrangement as a joint venture while the PTK board, with the majority of shares, approached the venture as vertical integration. This led to considerable friction about the structures of authority, reporting and accountability between the two organisation. In this case the governance structure was theoretically sound, but the interpersonal and inter-company dynamics thwarted implementation of the envisaged structure. This event emphasises that the factors involved in successful supply chain management are vastly diverse, but significant.

9.6 Contribution of this study

This research was motivated by the apparent inability of the current positivist paradigm used and neoclassical economic instruments employed in agricultural economic research to explain the emergence of supply chains and the evolution of related governance structures in the agricultural sector (Doyer and van Rooyen, 2001). A constructivist paradigm was adopted in this study and as a consequence the methodology was hermeneutic and dialectical as opposed to experiments based on hypotheses used in the positivist paradigm. New Institutional Economics was used, although not exclusively, as the principal theoretical base of this study to understand and reconstruct the factors faced and the decisions taken by managers in governance structure choices.

This study contributes to the emerging body of agribusiness and supply chain management research in South Africa. The most important drivers of change and the future shape of the agrofood industry is described in detail. The emerging governance structures for vertical coordination are described and explored, creating a firm basis

for further study. This study did not attempt to create theory, but rather to apply and test different theories to explain the emerging governance structures in South African supply chains. New Institutional Economics proved to be useful in elucidating a substantial part of the research problem and is an important addition to the research arsenal of South African agricultural economists. The theory will grow in stature as challenges related to supply chain management in the agrofood complex attract the attention of more researchers.

Governance structures in agribusiness management and, in particular, to manage the supply chain deserve more attention in future. The importance of governance structures is clear from this study. It was shown that efficient governance structures can play an important role in enhancing the competitiveness of the agrofood sector. These structures should also be researched in combination with the positivistic paradigm in order to model and quantify some of the effects identified in this study. Agricultural economists should understand governance structures and especially their function in facilitating and creating consumer value. This will become more important as consumer value becomes less tangible. Supply chain governance structures will be challenged to trace and assure value in transparent supply chains.

The research philosophy presented an suitable way to approach research in supply chains. The application of the case study methodology enabled the incorporation of a range of complementary theoretical constructs in order to explain and understand the complexity of supply chain governance. Case study methodology also enables the researcher to introduce a wide range of observations to understand the context in which supply chains and governance structures are implemented.

This study contributes to the management of marketing and supply chains in the agricultural sector. The findings will provide a greater insight into the factors influencing the choice of governance structure. This will enable managers to reduce the cost, improve the efficiency and consequently enhance the competitiveness of the participants in the supply chain. Coordination, collaboration and supply chain management will become increasingly important in the agricultural sector. This study represents a new approach to analyse the complex interrelation of firms and supply chains that compose the South African agrofood complex.

9.7 Conclusions and observations for the future

Supply chain management is emerging as a key performance area for South African agribusiness managers. Supply chain research, and especially the governance aspect thereof, is strongly related to management sciences. As such, it involves many interrelated factors and disciplines to analyse and explain these factors. It is impossible to take account of the whole diversity of factors related to the governance of supply chains. However, the researcher is challenged to include and explain as many of these factors as possible. The constructivist approach to this research proved to be helpful to reconstruct and understand the challenges and factors management faced in the implementation of supply chains in their respective industries.

This study has shown that supply chains will be an important feature in the agribusiness landscape of the future. South Africa agribusinesses are currently in an inward looking phase in order to improve their ability to compete in current and new markets with new competitors. All indications showed that these businesses are already emerging from this phase to focus on expanding their market presence and power based on value-added products. They will do this in cooperation and coordination with other participants in the agricultural supply network, indicating the emergence of the supply chain management approach. The choice of governance structure is especially important as this structure facilitates the transactions in the supply chain.

A six step decision framework for choosing an appropriate governance structure in a supply chain system is proposed for further study and practitioners. This model is analogous to the framework of analysis used in the study. The notions of competitiveness and the need for supply chain performance are inherent to the decision framework. The six step decision framework is:

1. *Identify and analyse the drivers of change.* Agribusiness managers must be constantly aware of the implications (opportunities and threats) of consumer behaviour, competitive behaviour of other firms, technological innovations, changing supply structures and societal values on their strategic and market positioning.

2. *Choose a strategy and objectives.* The overall and specific strategies should be identified based on the analysis of the drivers of change. These would include goals and objectives, product:market and competitiveness strategies. Overall strategies can be cost leadership, differentiation or focus strategy. Specific strategies (on product level) should be identified to realise the overall strategy e.g. reduction of stock levels or assurance of environmentally friendly production practices.
3. *Determine the required supply chain processes to realise strategy.* The operational implications of delivering the product attributes required by the strategy, should be clearly identified. Environmentally friendly production practises will, for example, require the control of producer and processor compliance, and increased information flow to assure certification and traceability.
4. *Identify and analyse the characteristics of the required transactions to facilitate the supply chain processes.* The transactions analysis is based on the frequency of the transaction, investments required related to the transaction and asset specificity of these investments, uncertainty, individual behaviour, opportunism, trust, information asymmetry, bounded rationality, incentives, power, task programmability and task separability.
5. *Identify the optimal (most profitable) governance structure to facilitate transaction.* Given the transaction characteristics identified in step four, the optimal governance structure can be identified to facilitate the transaction and supply chain performance. This is basically a cost-benefit analysis of the consumer willingness to pay for the product attributes delivered by the supply chain (which is also the opportunity cost of non-delivery) versus the costs of coordinating and controlling the transaction.
6. *Evaluate the implementability of the proposed governance structure.* In reality governance structures evolve over time and there are many barriers that have to be overcome. Suitable partners must be identified, enough capital must be available for investments in the transactions and the ability and motivation of management to manage the supply chain across firm and functional boundaries.

There are some important assumptions in this decision framework that will require more research in future. The first is the assumption that all required transaction characteristics within a supply chain approach can be facilitated by some kind of governance structure. Some transaction characteristics can be illegal or immoral for example collusion and cartels. The possible governance structures will therefore be limited by formal and informal institutions. An important aspect that will require attention is the legality of supply chain governance structures in terms of the Competitions Act as it applies to vertical and horizontal coordination. The second inherent assumption in the framework is the causal linearity of the framework. In reality managerial decisions are complex processes introducing and evaluating various aspects at the same time.

Consumer behaviour and satisfying consumer needs are the foundation of competitiveness. The agricultural sector and agribusiness are continually challenged to create customer value in order to maintain and improve their competitiveness. South African agribusiness firms will increasingly do this in cooperation with other participants in supply chains. However, South African agribusiness firms will still have to expand their notion of competitiveness to include emerging societal values such as the environment and ethics. They will have to include these factors in their chain processes in order to compete with multinational companies which are already including these values.

The governance structure in a supply chain is of special importance since this is the structure or institution which facilitates the effective implementation and operation of the other chain dimensions. Supply chains are important in logistics and information flows, but even more important in the value creation process. As the concept of consumer value extends beyond physical product characteristics the value-added will become less tangible and nonseparable. This will drive supply chain formation and require governance structures that can assure sustainable and accountable practices in transparent supply chains and provide participants with the necessary incentives to implement these practices.

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