THE ROLE OF CONTRACTUAL RELATIONSHIPS IN THE PERFORMANCE OF SUPPLY CHAINS: THE CASE OF THE SUGAR INDUSTRY IN SWAZILAND

by

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DEDICATION

To my family and friends

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Degree:	PhD
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ABSTRACT

The purpose of this study is to investigate the role of relational factors in the performance of the sugar industry supply chain in Swaziland. In this study a supply chain is conceptualised as a series of connected activities concerned with planning, coordinating and controlling the production of sugar, starting with the production of sugarcane by farmers, through processing by the millers and finally delivery to the consumer. Thus it can be broken down into units, beginning with the cane growers who provide sugarcane to millers, who process it into sugar and pass it on to the Swaziland Sugar Association, which then markets it on behalf of the farmers and the millers.

This study has posited that social factors play an important role in the performance of smallholder cane growers in their relationship with millers, and hence the performance of the sugar supply chain. These factors are embedded in the behaviour of the units that form the supply chain and are important in enhancing the performance of the supply chain. In testing the hypothesis, descriptive and multivariate analyses involving regression analysis and

structural equation modelling, were used on a sample of 124 smallholder cane growers and 3 millers.

The results suggest that the performance of the sugar industry supply chain is influenced by two categories of factors: (1) those that relate only to the smallholder farmers, such as transport costs, amount of irrigation water, percentage changes in their production quota, distance between farmers' production sites and the mill, value of assets per ha, yield per ha, and sucrose content; and (2) those that relate to the smallholder farmers' relationship with millers, such as dependence on the millers, perceived poor cooperation between farmers and millers, lack of goodwill trust, and perceived opportunistic behaviour practised by millers.

The results agree with *a priori* theory that trust, cooperation, commitment and the absence of opportunistic behaviour are essential elements for a successful relational exchange. The study suggests that a relationship founded on trust and mutual respect is more likely to succeed than a relationship of convenience supported by legal contingencies. Therefore, a supply chain that is characterised by trust, physical and psychological commitment as well as cooperation between parties within the supply chain is important in providing mutual benefit and good relationships.

Several implications can be made from this study: Firstly, theoretically there is a need for more research incorporating elements of social capital in supply chains in order to establish a consensus in the conceptualisation of the different constructs and their measures. Secondly, both cane growers and millers need to focus on initiating, signalling and disclosing their behaviours in an effort to improve their relationship with each other. Cane growers and millers need fair practises, sense of integrity, effective communication, commitment and shared purpose. These conditions would facilitate the development of trust, reduce opportunistic behaviour and promote cooperation. This would improve the performance of the sugar industry supply chain. Finally, the Swaziland Government needs to create a macroeconomic environment that is conducive to creating cooperation between smallholder farmers and the private sector. This could be accomplished through: (1) a policy that ensures that the legal framework is favourable to business relationships, such as well-defined legal and regulatory measures that govern business relations and transactions; and (2) providing support for enterprises and encouraging creation of efficient, flexible and independent farmers' associations and cooperatives that are based on economic objectives.

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CHAPTER ONE

INTRODUCTION

1.1 CONTRACTUAL RELATIONSHIPS IN AGRIBUSINESS

Contractual relationships today form the backbone of the agribusiness market structure. This is shown by the marked increase in the number of closer and well-defined relationships between firms with the aim of engaging in long-term business relationships (Achrol, 1997). Contractual relationships in this study refer to an agreement or an option to an agreement under which there is an exchange of goods, services or money between parties to the agreement. It encompasses the contractual terms governing a relationship and comprise of relationship, risk apportionment, division of responsibilities, and the reimbursement mechanism (Cox and Thompson, 1997). It is a form of vertical coordination, where vertical coordination is broadly defined as various methods used to manage vertical stages in a supply chain. The three main types of vertical coordination include the spot market, contracting (production and marketing) and vertical integration (Frank and Henderson, 1992; King, 1992; Williamson, 1975; Barry *et al.*, 1992; Sporleder, 1992). Contracting may involve the processing firm committing itself to purchase a product from the supplier at a price formula established or negotiated in advance of the purchase.

A firm decides on the activities it would include in its domain, based on the associated transaction cost efficiency (Williamson, 1981). In the event that a firm would increase the transaction costs by including more activities into its organisational domain, then a well-managed contractual relationship becomes the best option that lends considerable control to the firm's critical activities (Weitz and Jap, 1995; Dwyer *et al.*, 1987).

The most important aspect of a contractual relationship is its continuity. Therefore, a firm is judged by its ability to sustain itself and grow, despite changes in the environment. Hence, understanding business continuity in contractual relationships is indispensable in determining the behaviour of the partners in a supply chain (Anderson and Weitz, 1989). Milgrom and Roberts (1992) argue that the core unit of a business relationship is an exchange. However,

an exchange alone is not enough to provide clear linkages and the basis for relationship evaluation. Social factors also play a role in the exchange process. This study attempts to investigate the relationship of the cane growers and millers in the sugar industry in Swaziland and the impact of social factors on the performance of the industry supply chain.

1.2 CONTRACTUAL RELATIONS IN THE SWAZILAND SUGAR INDUSTRY

The sugar industry is the backbone of Swaziland's economy, with annual revenue exceeding R1440 million (US$ 160million). Therefore, the economy of Swaziland is to a great extent based on the sugar industry. In terms of national income accounting, cane growing is regarded as an agricultural activity, while sugar processing is classified as an industrial activity. In 1999, cane growing contributed 56% to the total agricultural output and 37% to the total agricultural wage employment. During the same season, sugarcane milling contributed 25% to the total manufacturing output and 27% to the total manufacturing wage employment. The sugar industry as a whole contributed 18% to the national output, 22% to private sector employment and 15% to national employment, while sugar exports contributed 16% to total exports (UNCTAD, 2000). The total contribution of the sugar industry to the economy is estimated at over R 900 million and exports to international markets are valued at more than R 500 million, or one third of all export earnings (UNCTAD, 2000).

When contrasted with other sugar industries around the world, most of the sugar industries of Southern Africa, including Swaziland, are unusual in that there is a high degree of vertical integration between farming and processing, the most notable exception to this being South Africa. Moreover, although some sugar industries have taken steps to increase smallholder participation, the contribution of these smallholders, though often large in terms of numbers is generally small in terms of sugarcane production (Todd, 2001). Among the major sugar-producing countries in Southern Africa, smallholders play the largest role in Mauritius (producing around 25% of sugarcane by volume), Zambia (20%) and South Africa (15%). In Malawi, Swaziland and Zimbabwe, they account for less than 5% (Todd, 2001). Nevertheless, there are some important characteristics of the sugar production process that enhance the potential for smallholder participation in the farming sector. These stem from the need for a very close working relationship between growers and processing firms. Both farming and processing are economically viable only if sugarcane is processed within a radius

of 50 km of the farm and within a couple of days of being harvested. As a result, one cannot exist without the other, and usually, this arrangement works very well. Some smallholder farmers, for example, combine their plots and farm them as larger units.

Smallholder farmers are usually attracted to growing sugarcane, rather than alternative crops for reasons other than pure economic return. These reasons include:

- The fact that farmers do not have to market their product (sugar is sold by the Swaziland Sugar Association (SSA))
- Access to credit (which is either provided by or channelled through the mill) and
- The provision of extension services by the industry, and also by the Government in the case of Swaziland.
- Enhanced access to the EU sugar market provides opportunities for Swaziland to expand its sugarcane production area and thus encouraging greater smallholder farmers' participation in the sugar industry.

1.3 STAKEHOLDERS AND INSTITUTIONS IN THE SUGAR INDUSTRY

1.3.1 An overview

There are three main participants in the sugar industry, these include the Swaziland Sugar Association, the millers (Mhlume, Ubombo (Bigbend), and Simunye sugar mills) and the cane growers. The Swaziland sugar industry is regulated by the Swaziland Sugar Association (SSA) as mandated by the Sugar Act of 1967[1]. The SSA regulates the functions of the industry, while the millers are responsible for producing sugar and the cane growers for producing sugarcane and delivering it to the mills.

Apart from producing sugar, the millers also own sugar estates from which they produce sugarcane (UNCTAD, 2000; Westlake, 1995).

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[1] The Sugar Act itself consist of 16 paragraphs, paragraph 3 and 5 define the Swaziland Sugar Association and its functions: " *There is hereby established a body corporate, to be known as the Swaziland Sugar Association, which shall be capable of suing and being sued in its corporate name and of performing all such acts as prescribed from time to time in its constitution and as are necessary for, or incidental to, the carrying out of its functions under the Agreement and under this Act*".

Historically, cane production and sugar processing have been vertically integrated in mill-cum plantations. Out-grower activities have never had a significant role in the history of the sugar industry in Swaziland. However, gradually large private farmers and smallholder farmers have started to play a greater role in the Swaziland sugar industry. A quota or a licence is required before a farmer can grow sugarcane. Each grower's delivery quota is set by the Swaziland Quota Board, which is a component of the SSA. The Quota Board consist of 10 members composed of three growers' representatives, three millers' representatives, three other members nominated by the Minister for Enterprise and Employment, and a chairman nominated by the SSA. The quota in effect represents a contract between the grower and the miller. Growers are required to provide the full amount of their quota to the mill to which they are attached and the mill in turn is required to accept all cane delivered to it up to each grower's quota. In essence the contract is limited to the amount of sucrose indicated in each farmer's quota. It is however, silent about the price to be paid for the sucrose, as that is determined by the SSA. The contract is enforced through the rejection of cane or withdrawal of the quota for those who fail to meet the standards set out in the Sugar Agreement of 1967[2] (SSA, 2001) as well as through price discrimination between quota cane and segregated cane. Quota cane refers to the amount specified in the quota and segregated cane is any cane beyond that specified by the quota.

Under a previous arrangement, quotas were divided into "A" and "D" groupings, where the "A" quota was the confirmed quota held by a grower allocated on the basis of previous performance, which could be reduced only by failure to produce the required total in two out of three consecutive years, whilst the "D" quota was an additional amount allocated to new growers to be converted into "A" quota over a period of years depending on the performance of the grower. This system has since been phased out and a single quota structure adopted from the 2001/2002 season. The aim of the quota system is to ensure that the miller can handle the crop, that the grower has water to grow a disease-free crop, has land or the right to use the land, and that he/she is conversant with the rules of growing sugarcane and the relevant legal obligations (UNCTAD, 2000). These rules are applicable to millers too since

[2] The Swaziland Sugar Industry Agreement is introduced in paragraph 6 and states "*The Agreement.... Shall be binding upon all millers, growers, miller-cum-planters, refiners, and any other persons engaged in any aspect of the sugar industry*".

they also grow sugarcane. Table 1.1 shows the amount of sugarcane grown in each mill area and the proportion grown by millers and by growers for each mill area.

Table 1.1: Cane production by milling companies and growers (in 1999)

Mill Area	Mill Co. (tonnes)	Growers (tonnes)	Total (tonnes)	Mill Co. (%)
Ubombo	727,534	811,491	1,539,025	47.27
Mhlume	816,714	446,832	1,263,546	64.63
Simunye	923,729	125,390	1,049,119	88.04
National total	2,467,977	1,383,713	3,851,690	64.08

Source: UNCTAD (2000)

Growers can produce and deliver more sucrose than provided for in their quota, but for deliveries over and above their quota they are paid a "segregated price", which is a price lower than the price for quota sucrose. Normally, growers retain their quota, which is carried over to the following year. However, when a grower fails to deliver his allocated quota for two consecutive years he risks a reduction in his quota to the highest average level recorded in those two years. In most cases additional quota becomes available for allocation either as a result of an increase in the global quota, which is the quota for sugar marketed in the preferential markets, or as a result of quota reduction because of delivery defaults by other growers.

1.3.2 Distribution of proceeds between the sugar industry's stakeholders

In accordance with the Sugar Act of 1967 the SSA operates a pooled payment system in which the annual revenue earned from the sales of sugar is distributed to the millers and growers after deducting the industry obligation costs. This system of pooling revenues ensures that the payment per tonne of sugar produced by millers is not affected by the timing of their sugar production. It also ensures that payment to the growers, per tonne of sucrose delivered, is not affected by the timing of deliveries of cane through the season. Through the pooling system both millers and growers benefit from the best prices the industry receives from its preferential markets.

The SSA divides the total net payment to the mills according to quota sugar and segregated sugar. Quota sugar is sugar produced during the year to the maximum aggregate of all quotas attached to the mill (the amount of brown and white sugar the mill should produce) plus any quota shortfall reallocated from another mill. The price the millers and growers receive for producing sugar and for producing sugarcane respectively is determined by the Sugar Association, which after identifying and projecting all the revenue from the sale of sugar and sugar by-products, such as molasses, and deducting all industry obligations it then passes the remainder to millers and growers. Millers and growers however, negotiate the ratio of the price split for sugarcane processing and production. The price split for the 2001/2002 season was set at 67.5 percent to growers[3] and 32.5 percent to millers (Table 1.2). Millers are paid on the basis of their sugar output and payments are made a week after production. The millers in turn, pay the cane growers based on the amount of sucrose extracted from their cane. They are paid a week after delivering their cane to the mill. These payments are financed through a commercial bank overdraft since the season's sugar would not yet have been sold.

Table 1.2: Percentage price split between cane processing and production (1996-2001)

Season	Cane processing (%)	Cane production (%)
1996/97	35.0	65.0
1997/98	34.0	65.5
1998/99	34.5	66.0
1999/00	33.5	66.5
2000/01	33.0	67.0
2001/02	32.5	67.5

Source: Revised Sugar Act of 1967 (2001)

[3] Growers in this case refers to cane growing farmers and cum-mill planters

1.3.3 Representation of cane growers and millers in the sugar industry

The Swaziland sugar industry is highly regulated by the Swaziland Sugar Association, which derives its structure from the Sugar Act of 1967. The Swaziland Sugar Association is made up of twelve members from the Swaziland Sugar Millers Association (SSMA) and twelve members from the Swaziland Cane Growers Association (SCGA). The two bodies are of equal status, and hence are both represented in the council of the Sugar Association, which administers the business and affairs of the Association. The functions, powers and duties of the Swaziland Sugar Association are set out in the Swaziland Sugar Industry Agreement.

The Swaziland Sugar Quota Board, which is responsible for allocating sucrose quotas to producers, is made up of millers, growers, and independent members who have no interest in the sugar industry. In allocating production quotas, the Board has to be satisfied that those requesting quotas have access to suitable land and that they have a permit from government to draw irrigation water. This ensures that growers do not reduce production in response to a drop in prices. It also ensures that production does not exceed what the industry views as the potential demand at economic prices.

Each mill has a mill group committee, which consists of an equal number of representatives from the miller and growers attached to that particular mill. The mill appoints miller representatives, while the Swaziland Cane Growers Association appoints the cane growers' representatives. Although the mill group committee is accountable to the SSA it is financed locally in a manner agreed upon by growers and the mill representatives. One of the responsibilities of the mill group committee is to determine the quality standards of cane delivered to the mill to which growers are attached. If for any reason a grower delivers cane that does not comply with these standards, the relevant mill group committee is entitled to reduce payment for cane produced by the defaulting grower(s) and pay the amount deducted to the other growers attached to the mill pro rata to the production of the remaining growers (Sugar Act, 1967).

The mill group committee is also charged with the responsibility for making estimates of the quantity of cane that will be produced by each grower attached to the mill, in its area, during each season and to convert such estimates into tonnes of sucrose. The grower has to supply his mill group committee with the accurate information it requires otherwise the mill group

committee has to make estimates. This information would include area of land available for cane production, estimated tonnage of cane, area of land under cultivation in the current year and any area still to be planted (Sugar Act, 1967; UNCTAD, 2000).

If there appears to be a shortfall in the amount of sucrose quantity a grower is supposed to deliver to the mill and the deliveries estimated by the mill group committee, the committee has a right to aggregate all such shortfalls and re-allocate the total quantity of the shortfalls among those growers who have surpluses that year, pro-rata to the quotas of these growers. However, such allocation should not be in excess of the surplus of any of the grower's quota. In order to enable the shortfalls that are re-allocated to be fulfilled during the season (under consideration by the growers with surpluses, to whom they are re-allocated) every grower has to render to his mill group committee a final estimate as per set date six weeks prior to the estimated closing of the season, at which point the surpluses and shortfalls are finally established by the mill group committee for the season under consideration. Every grower is obliged to nominate the fields to be harvested, when rendering their final estimates and also harvest and deliver all cane from these fields to fulfil the final estimated to be delivered.

In the event of re-allocation of shortfalls resulting in the exhaustion of surpluses for any mill group area, the mill group committee must advise the SSA of any shortfall still remaining. The SSA then re-allocates this shortfall amongst all other mill groups who have surpluses remaining after the exhaustion of their shortfalls in the proportions that the totals of all quotas deliverable to each mill bear to one another to a maximum in each case of the recipient's surplus.

1.4 ISSUES AND CHALLENGES IN THE SWAZILAND SUGAR INDUSTRY

1.4.1 Socio-economic issues

A perception of unfairness exist in regard to the relationship between cane growers and millers. Farmers feel that they are competing with millers since millers not only process sugar, but are also involved in cane production. Hence, they are paid for both activities while growers are only paid for the production of cane. Through discussions with cane growers, it became evident that they would be more comfortable if millers would concentrate on the

processing activities and leave the production of sugarcane to the cane growers. This implies that as long as millers still have their own estates, farmers will feel insecure in their relationship with millers.

During discussions with farmers, it was observed that farmers perceive an element of competition between themselves and the millers. This perception could be a result of unaligned goals, with each trying to maximise their own goals. While the millers' objectives would involve profit maximisation, maintaining their monopolistic status and power, the smallholder cane growers would want to increase their income through the sale of sugarcane, maintain a food supply source, improve their standard of social services, ensure maximum utilisation of their resources and minimum exposure to risks, crop failure and imposed authority by the processing firm (Baumann, 2000). Participants in any supply chain like the sugar industry need to realise that as important as it is to achieve economic objectives within the relationship, it is also important to ensure that there is continuity in the relationship and strengthening of factors that are crucial to the improvement of the relationship because these complement each other and facilitate better performance throughout the supply chain.

Ideally, trust and good intentions should characterise the relationship between exchange partners. However, in practise exchange partners do not always behave in this manner and attempt to exploit their exchange partners through opportunism (Williamson, 1985). Some farmers complain that at times the millers deliberately record low levels of sucrose in their cane and view this as a strategy to reduce the amount to be paid for cane delivered. However, the sugar industry does allow farmers to cross check the laboratory tests of their cane sucrose content if they have any suspicions of this kind. This suspicion by farmers implies that they have no confidence in the millers. This fear of being cheated by the millers implies that their trust in the millers is limited. By verifying their results, they incur more costs in terms of time and money used when travelling to the mill or making phone calls. In line with Moorman *et al.* (1993), trust in this study is defined as ``a willingness to rely on an exchange partner in whom one has confidence". Trust is a multi-dimensional construct, which includes reliability, integrity, competence, honesty, fairness, responsibility, helpfulness, and confidence (Moorman *et al.*, 1993; Morgan and Hunt, 1994). Macneil (1978) described the firm as a bundle of contractual relations, while Klein, Crawford and Achian (1978) argue that contracts and social elements are equally important in an exchange relationship, such as the one

between cane growers and millers. Therefore, trust forms part of the social elements in a contractual relationship.

Opportunistic behaviour increases transaction costs and negatively affects trusting relationships (Morgan and Hunt, 1994) and cooperation. It directly violates the norms of reciprocal relationships. When farmers perceive opportunistic behaviour practised by the millers, their ability to trust and spirit of cooperation is reduced. Thus, they would try to find means of counteracting this opportunism. Anderson and Narus (1990) defined cooperation as ``similar or complementary coordinated actions taken by firms in an interdependent relationship to achieve mutual or singular outcomes with expected reciprocation over time." Cooperation represents the willingness by farmers and the millers to extend their exchange beyond basic transactions, and towards building a relationship (Nielson and Wilson, 1994), which is a precursor for continued exchange (Moller and Wilson, 1988). The CEO of the SSA, Dr. Matsebula, indicated during the launching of a smallholder growers competition in April 2002, that for smallholder cane growers to develop, they should not only be familiar with the constitution, rules and regulations of the sugar industry, but should also strictly abide by them. He argued that "Flouting the rules places at risk other growers and the sugar industry as a whole. It also increases enforcement costs, which fall even on the innocent members of the industry. Flouting the rules and regulations is to be discouraged in the strongest terms." He noted that there are many areas of cooperation in the sugar industry like that of sharing experiences and information (Swaziland today, 2002).

UNCTAD (2000), in a study on the policies for small-scale sugarcane growing in Swaziland, points out that farmers on Swazi Nation Land (SNL) are still subsistence and have minimal education, and thus unfamiliar with modern business practises and commercial agriculture. Although the sugarcane extension specialists provided by the Swaziland Government in conjunction with the industry's extension service provide assistance to smallholder farmers on production and crop husbandry, they are still not commercially oriented. This implies that smallholder cane growers still lack commercialisation skills (which involves more than just the marketing of output and product choice, but encompasses decisions on input use, which are based on the profit maximisation principle). Commercialisation skills in agriculture refer to the ability to move from subsistence-oriented to market-oriented patterns of production and use of inputs.

One characteristic of sugarcane farming is that harvesting must be done according to a schedule that allows all growers the possibility of delivering a predetermined daily quantity during the crushing season. Therefore, the lack of experience and business skills by smallholder cane growers result in misunderstandings and conflict when it comes to enforcing the necessary disciplinary action on defaulters. This happens because the methods used to draw up the delivery schedules by the different participants in the industry are not understood by these growers (UNCTAD, 2000). For example, some farmers fail to comply with the industry's agreement of implementing disease control measures because of the high costs involved. When the mill rejects the cane from such farmers as per instruction by the SSA, farmers tend to regard such discipline as an unfair treatment by the mill. This is further confirmed by farmers complaining of not being allowed to deliver their cane at the start of the season, while others want to deliver all their cane in the middle of the season when the sucrose content is high. However, a rateable mechanism has been devised, whereby each farmer is allowed to have repetitive deliveries throughout the crushing season. This makes the growers to go through all the stages of change in sucrose content as the season progresses.

1.4.2 Economic issues

The success of any supply chain depends not only on the formal governance mechanisms, but also on the level of cooperation that exists between the individuals that make up the supply chain links and the economic returns realised by each individual. All chain participants are expected to work towards achieving a common goal. The farmers and the millers' ownership steps in the sugar supply chain occur in different combinations. At every change of ownership along the value chain, competition occurs for returns between farmers and millers, thus resulting in "pricing of value added" to be negotiated. This involves the negotiation of the farmer's cane input versus the miller's manufacturing input.

Smallholder cane growers complain of an unfair distribution of the sugar industry's proceeds from sugar by-products. They argue that they are paid only on the basis of the cane they deliver, when in fact they are also entitled to the proceeds from by-products, such as molasses. Although the distribution of the industry's proceeds to farmers and the millers is based on an agreed formula, the formula allows farmers to only obtain proceeds from the resulting sugar stream. Outputs containing residual sugar after mill processing, like molasses and bagasse (fibrous remainder of cane after processing sugarcane) for instance are treated as

the property of the mill. Bagasse is regarded as an un-priced fuel source and the mills use it for the generation of mill processing steam and electricity in the mill.

Economically, if millers were to operate the whole industry without out-growers, there would be no competition and essentially each stage in the value chain would be treated as a cost centre. Similarly, if the whole industry were in the hands of the farmers, value-adding stages up to the marketing of sugar would be treated as cost centres. Therefore, the farmers would like to have their value added share, priced during the transfer of ownership of the cane using a payment formula instead of a distribution of the surplus after the sale of the product. Farmers consider this distribution of proceeds as unfair, and regard millers as being opportunistic. By-products, for instance, have some economic value, but are used by millers without paying anything to the cane growers. Opportunism is defined as self-interest seeking with guile and it includes misrepresentation, manipulation, cheating, and deception (Anderson, 1988; John, 1984). The essence of opportunism is the element of deceit (Williamson, 1985). However, self-interest seeking without guile such as hard bargaining or intense disagreement is not considered opportunism (Provan and Skinner, 1989). A firm is more likely to behave opportunistically when its exchange partner is dependent on it (Klein *et al.*, 1978; Provan and Skinner, 1989; Williamson, 1985), when the firm has made a smaller commitment to the relationship than its partner (Gundlach *et al.*, 1995), when a high degree of environmental uncertainty exists, and when monitoring efforts by the exchange partner are insignificant (Stump and Heide, 1996).

1.4.3 Transaction costs issues

Sugarcane must be processed within 24 hours of harvesting to avoid a loss of sugar sucrose content due to decomposition and the subsequent production of degraded products. This limits the distance that a mill can be located from a farm section or out-grower (Rabobank International, 1999). Rabobank International argues that usually the distance between the mill and the farm should not exceed 25km. However, in the case of the Swaziland sugar industry some cane growers are situated up to 100 km away from the mill. The issue of distance between the mill and the farmers does not only affect the quality of the cane but it also influences the costs of transporting the cane to the mill. Even if farmers were to experience the same transport costs per tonne, the difference in distance would result in differences in the farmers' profits. The Swazi observer (2000) reported that apart from huge debts as a result of

expensive seed and sugarcane operations, smallholder cane growers complain of high transport costs by transporters. This is more serious for those farmers further away from the mills.

Challenges in the sugar industry include, among other things, understanding each participant's goals, roles, avoiding the use of power, and ensuring smooth flows of sugarcane and money up and down the supply chain, as well as valuing the role of social capital in the relationship. The inherent conflicts in the sugar industry result from perceived opportunism, and limited trust and cooperation between millers and cane growers. One of the main problems facing the sugar industry seems to be a lack of goodwill trust in the millers and dissatisfaction by cane growers resulting from (1) perceived unfair pricing systems for sucrose, (2) perceived unfair value sharing on sugarcane by-products, (3) misunderstanding of rules and their enforcement in the industry, 4) lack of skills and information, and (5) conflicting objectives of cane growers and the millers. The industry is also faced with a wide dispersion of production areas for smallholder farmers, which contributes to the total costs incurred by the farmers, hence affecting their profit margins as well as the performance of the whole supply chain.

1.5 BACKGROUND AND THEORETICAL SETTING OF CONTRACTUAL RELATIONSHIPS

1.5.1 Theoretical positioning of the study

This study's intellectual point of departure is based on Williamson's transaction costs economics (Williamson 1975, 1979). In line with Coase (1937), Williamson explained the existence of firms in terms of comparative cost advantages, regarding transactions as the basic unit of analysis. Vertical integration was then considered as a solution to the organisational problems posed by transaction costs. Transaction costs can occur in several arrangements, from the simple acquisition in spot markets to vertical integration. In a continuum between the two structures arise hybrid forms of contracts. According to Williamson (1985) when specific assets are low, the spot market is the efficient governance structure as it possesses minor transaction costs, while for medium specific assets the hybrid forms are more efficient, and in highly specific assets the hierarchy or vertical integration is more advantageous.

Williamson (1991, 1996) argues that the costs of governance in a market, hybrid forms and hierarchy structures are non-decreasing functions of asset specificity. Hence, it is important to choose the governance structure with the lowest governance or transaction costs[4]. Williamson (1991) argues that since it may not be possible to adapt hybrid forms in disruptions without mutual agreement between parties, hybrid forms are therefore not appropriate for transactions with frequent disruptions. Developing this idea further, Menard (1996) argues that the key idea is a strong enough bilateral dependence to require close coordination, but not strong enough to induce full integration. Therefore, the purpose of hybrid forms is to manage the lock-in situation originating from the existence of specific assets and appropriable quasi rents.

The resource dependence theory argues that because organisations cannot generate all the resources they need, they are bound to rely on their environment (other organisations) for resources (Pfeffer and Salanick, 1978). According to this theory, organisations depend on other organisations and the patterns of this dependence tend to produce inter-organisational power, which influences the organisational behaviour. Anderson and Narus (1990) contend that dependent firms will accept direction and changes as requested by the dominant partner in order to sustain the relationship and that the dominant firm will direct actions that will achieve its individual preferences over those acceptable to both parties. Johnson (1999) argues that a firm's deliberate choice to work within what could be considered a negative structural constraint (dependence) may generate positive consequences. Weitz and Jap (1995) supported this argument by proposing that dependent relationships may exhibit relationship norms, counteracting the need for controlling behaviour. Therefore, the impact of dependency on the performance of relationships is likely to be related to the degree that hierarchical governance structures are implemented through relational governance mechanisms (Heide and John, 1992).

Although resource dependence theory is appropriate for many types of interactions, it is based on conflict and power, assuming that goal conflict is inherent in the relationship. However, there have been difficulties explaining long term relationships resulting from coordinative behaviour based on social mechanisms such as trust. Exchange partners can rely on cooperation, collaboration, and coordination instead of power, influence and control. Morgan

[4] The different approaches to the governance of contractual relationships are discussed in detail in Chapter two

and Hunt (1994) argue that the presence of relationship commitment and trust is central to successful relationship marketing, not power and its ability to condition others. Similarly, Weitz and Jap (1995) argue that the use of power as a coordinating mechanism is limited to asymmetric relationships, whereby one party is more powerful than another. Thus, proponents of transaction cost theory criticize resource dependence theory for its focus on descriptive issues and its failure to examine the efficiency implications of various structural arrangements (Heide and John, 1990).

According to classical transaction cost economics (TCE) relations are characterised by specific investments that create dependence and vulnerability to opportunism (Williamson, 1985). The transaction cost theory assumes that participants are frequently inclined to opportunism, which is self-interest seeking with guile. However, the TCE does not assume that all participants are opportunistic. Williamson (1975) argues that since it may be costly to distinguish ethical participants from opportunistic ones, entering into an economic exchange where significant investments in specific assets are placed at risk, it tends to expose the parties to the risk of opportunism. Parties may try to reduce the risk of opportunism ex-ante through contingent claims such as non-performance penalties, and auditing provisions as deterrents and or through the creation of hostage investments or by bonding their firms through co-specialised assets and bilateral dependence (Deeds and Hill, 1998). Opportunism occurs when one or more of the partners in a relationship find it to their advantage to maximise their individual returns at the expense of the other partner. Thus, any action or structures, which reduces potential benefits of either partner resulting from opportunistic behaviour, will also reduce the incidence to opportunism in the exchange relationship. Therefore, TCE advocates for formal structures as means to counter opportunism (Williamson, 1985).

The conflicting goals of cane growers and the millers are addressed in Besanko *et al.* (2000), who contend that an agency relationship arises when one party referred to as the 'principal' (the miller) passes obligations to another agent (the cane grower). In protecting the interests of the principal, there is a need to align the agent's interests with those of the principal in order to discourage the agent from shirking. However, Besanko *et al.* (2000) argue that using contracts to rationalise the principal's and the agent's interests, is not a complete solution to the agency problems, because of moral hazards and adverse selection. They point out that

culture is one of the factors that need to be considered in the development of efficient agency solutions.

In contrast to transaction cost theory, relational contracting views economic exchanges as taking place within the framework of historical and social context (Deeds and Hill, 1998). It views enforcement of obligations to be a result of the mutuality of interest of the parties in the exchange (Heide, 1994). It is argued that relational contracting implies that the cost of coordinating exchange is a function of both the actual type of structure underlying the transaction and the process by which the exchange partners interact. This is because, if in the process of renegotiation the negotiations become difficult, tends to increase the ex post negotiation costs, which in turn offsets the flexibility advantage of relational contracts. It assumes that the governance of relational exchanges is best achieved through the use of normative processes in which parties to the exchange adopt certain norms and values (Heide, 1994). Relational contracting operates in a bilateral system in which the goals and benefits of the exchange can be achieved through joint action. Therefore, the healthier the relationship the stronger the deterrence of opportunism (Deeds and Hill, 1998). This study therefore adopts the relationship centred approach to analyse contractual relationships between smallholder cane growers and millers.

1.5.2 The importance of social structures in relational exchange

In business practise, firms have frequently made deliberate attempts to establish stronger relationships with suppliers and customers. As a way of reducing costs, increasing efficiency, improving quality and technology, and enhancing competitive advantage, many firms are moving away from traditional "arms length" business relationships and are forging closer and more collaborative ties with supply chain partners. Spekman (1988: 75) argues that "competition from offshore producers, technological innovations, and shortened product life cycles have changed buyer-seller relationships. Traditional arms length contractual relationships no longer suffice, but closer collaborative approaches are needed." Anderson and Weitz (1989) argue that the development of inter-organisational relationships is an approach that combines the advantages of vertically integrated distribution systems (control, coordination and information processing) with the advantages of systems utilising independent chain participants (flexibility, scale economies, efficiency and low overheads). However, inter-organisational relationships come with associated costs and risks.

Smallholder farmers are generally considered to be dependent and vulnerable in such relationships because of significant resource inequalities, opportunism and the abuse of asymmetric power advantages to expropriate proprietary assets and obtain concessions from the other partner (Barringer, 1997; Williamson, 1985).

Despite the positive contribution of smallholder cane growers to the sugar industry, for example some of them records of high yields and high sucrose content, the shortcomings in the understanding of their relationship practises and performance, as well as the lack of consensus on the probable implications of relationships between smallholder farmers and large multinational firms, like the millers, suggests that there is still a need for empirical research concerning the relationship between smallholder farmers and large processing firms. Ellram (1991) stated that as more firms enter into a relational exchange, a guide is needed to help the firms to develop and implement their relationships. Heide (1994: 74) contends that ".... on the basis of the existing literature, it is not clear what specific conditions favour bilateral governance over other forms of governance". However, research on inter-firm relationships implies an assumption that partnerships are successful when used in appropriate circumstances and environmental conditions.

The use of contracts to govern transactions between supply chain partners limits the behaviour of the parties substantially, by reducing their flexibility and not allowing them to benefit from market changes. This study proposes that the development of relational exchanges between supply chain participants is an appropriate strategy for smallholder farmers. This is even more rewarding when undertaken under appropriate facilitating conditions. These can be created by social control mechanisms like trust and cooperation.

Cannon *et al.* (2000) have found that increasing contractual specificity and details is not effective in promoting performance in a study including measures of efficiency and effectiveness in exchanges involving high levels of transactional uncertainty. It has been found that inter-firm relationships do not to provide direct financial benefits for small businesses in environments with highly competitive output markets (Gales and Blackburn, 1990). Achrol and Gundlach (1998) argue that firms who are willing to play by the rules of mutually oriented cooperative relationships are able to share vital information and innovations, spread their risks by developing coordinated strategies to meet environmental

contingencies, benefit jointly from opportunities presented to the social group, and are assured of relatively stable supply and demand markets.

The issue of trust has received much attention in social science (Fukuyama, 1995; Bradach and Eccles, 1989; Wilson and Kennedy, 1999; Gambetta, 1988) and economists have long recognised the critical role of trust in economic performance (Slemrod and Katuscak, 2002). For example, Arrow (1972) points out that "virtually every commercial transaction has within itself an element of trust, certainly any transaction conducted over a period of time. It can be plausibly argued that much of the economic backwardness in the world can be explained by the lack of mutual confidence". In high trust societies, individuals need to spend less time and resources protecting themselves from exploitation in economic transactions (Slemrod and Katuscak, 2002). Williamson (1993) argues that it is impossible to reliably judge possible limits to other people's opportunism, and that trust does not yield a reliable safeguard. He further points out that if trust goes beyond calculative self-interest, then it yields blind, unconditional trust, which is not wise and will not survive in the market. Since one has no reliable ex-ante knowledge of whether and when opportunism will occur, one should employ safeguards against this opportunism. These safeguards would constitute a formal control mechanism. It is the use of such hard formal control mechanisms that leads to the criticism of transaction cost economics.

From a sociological point of view, trust is viable without necessarily being unconditional or blind and can be an important element of formal control in the mitigation of relational risks (Nooteboom, 1996). Trust can be based on the social norms of reciprocity or obligation, personal bonding, and routine behaviour. This can yield voluntary compliance to an agreement that goes beyond self-interest. As a result of partners voluntarily refraining from opportunism, trust enables a jump between expectations that reasoning and experience alone would not permit. This goes beyond formal control mechanisms. Trust does not necessarily entail the absence of conflict, but it facilitates the reduction of threat resulting from conflict. The joint solution of conflict can deepen trust in several ways. First, it may yield learning, which confirms the value of the relationship and increasing mutual commitment. Second, the fact that problems are being solved, in itself, reduces perceived risk in the relationship (Nooteboom, 1996)

Sako (1992) analysed the role of trust in electronic industries in England and Japan. In her study, she extended the transaction cost theory of Williamson, by proposing that exchange relations involve trust. She concluded that party firms in England are developing more cooperation in their exchange, which were similar to what she termed obligational contractual relations. Sako (ibid.) emphasised the importance of the parties' perceptions of the past and future relations and the supporting role of informal links in an exchange relationship.

1.5.3 Trust and performance in contractual relationships

Most contractual exchanges tend to emphasise the contract-centred view of contractual relationship, but both contract and relationship centred views are regarded as essential by the relational exchange theory. The contract plays the role of a safeguard in case insoluble differences arise and the relationship fails (Nooteboom, 1996). The contract is most important at the beginning of the relationship. However, once contracted, there is an expectation of a shift of emphasis and the relationship is expected to be sustained through a mutual orientation. Therefore, a complementarity of the contract and relationship centred view is an ideal one for the sustainability and performance of the exchange relationship between farmers and the millers.

Inherent conflicts between millers and cane growers could be managed at three levels. First, is the complementarity of strengths, which forms the basis for the relationship and intrinsically provides a common interest. Second, the contractual mechanism which refers to the formal documents governing the relationship, and thirdly, the informal and normative coordination mechanisms, which result in flexibility and compromise. Heide and John (1992) emphasise that when structural and social mechanisms function effectively, contractual mechanisms become less important. In a sense a contract provides certain decision rights, while relational norms provide a safeguard against exploitative use of these rights. A concomitant to these rights are the responsibilities outlined in the contract, while trust provides the expectation that such responsibilities will be met.

While large multi-national firms may reap benefits from contractual relationships with smallholder firms with financial cognitive limitations and fewer strategic options (Gales and Blackburn, 1990), such relationships are frequently accompanied by problems of instability, poor performance and collapse. Garnesy and Wilkinson (1994) noted that often small firms

partnering with large corporations find themselves locked into a path shaped by the needs of their powerful corporate partners which reduces their capacity to adapt their strategy to changing circumstances. The transaction costs theory points out that it is imprudent to assume that parties in an exchange will forgo opportunistic behaviour and as a result of this firms have to safeguard their investments from the possibility of relationship termination and perceived opportunism.

In practise, though smallholder farmers are in contractual relationships with the large corporations (for examples the smallholder cane growers and the millers), smallholder farmers indicate perceived vulnerability, inability to trust the millers and unwillingness to relinquish control as common features, which impact the performance of their relationship with the millers. The access to scale economies, stable input and output markets, greater flexibility, learning opportunities and improved competitive position might encourage millers and smallholder cane growers to move towards a closer relationship. However, the question of trust and commitment are important to the relationship maintenance, cooperation and satisfaction of both smallholder farmers and millers. These factors also become important sources of the relationship strength.

Given the evidence of smallholder farmers' concerns of vulnerability to the power of the millers (as indicated in Section 1.4.1) and the sensitivity of the sugar industry, this investigation of the influence of social factors on the performance of smallholder cane growers, their relationship with millers, and hence, the performance of the sugar industry supply chain is very important. As Mariotti (1999) puts it "the weakest link in the most advanced supply chains is not technology, not software or hardware, but people…or rather the level of trust between the people who must cooperate and collaborate to get results." Bonama and Zeltman (1978) stated, that in their discussions with purchasing managers and others intimately involved in the marketing area, they found that the major factors influencing the industrial purchasing decisions are social ones, but not rational-economic ones. Relatedly, Bonama and Johnston (1978) argue that the most important variables in a dyadic analysis are the relational variables between the two parties, for example trust and cooperation. Spekman (1988) points out that philosophically, inter-firm relationships can be built only if trust and cooperation exist between the buyer and the supplier.

Trust has long been thought to be important to organisational success (Davis *et al.*, 2000). The top managers' general trust does not only affect his or her actions, but also plays an important role in shaping trust in the whole organisation (organisational trust). It thus affects organisational operation and performance in two ways: both between and within organisations. Within organisations, researchers have argued that the level of trust affects organisational structures, processes and performance (Bromiley and Cummings, 1992; Creed and Miles, 1995). Bromiley and Cummings (1992) argue that trust reduces transaction costs, optimal expenditures on control, monitoring and other kinds of transaction costs that should be partially a function of the probability of opportunism, which in turn depends on the level of trustworthy behaviour in an organization. They suggest that the level of trust and trustworthiness in organisations affects their structures, processes, and performance. Creed and Miles (1995) provide a conceptual framework that explores organisational trust through the personality and behaviours of managers. They suggest that trust affects the firm performance. The failure to meet minimal trust requirements can result in performance failures or in costs associated with additional controls substituted for trust.

In terms of inter-organisational relations, Sako (1998) concludes that inter-organisational trust may enhance business performance in a number of ways. These include (1) reducing transaction costs, mainly resulting from a reduced need for contractual or monitoring devices, (2) investment with future returns, and (3) continuous improvement and learning. She found that mutual trust between a customer and a supplier organisation is conducive to good supplier performance and that this positive link is stronger for goodwill than for other types of trust. Barney and Hansen (1994) suggest that trust can be used to create and maintain competitive advantage in firms and improve their performance.

The question of whether trust enhances organisational performance receives conflicting answers in the available literature. Williamson (1993) claims that trust has no role to play at all. However, within organisations, England and Lee (1974) found that the relationship between the success indices and manager's trust is significantly negative for America, Australia, and India. Between organisations, Kern (1998) argues that in certain circumstances trust is connected with sub-optimal performance. Lane (1998) suggests that the majority of organisational scholars connect trust with highly positive effects on performance. The inconsistence in the literature on the effect of social control measures like trust motivates this study.

The sugar industry is characterised by numerous specifities, such as production site location, physical assets, human assets, dedicated assets specificity and time specificity (Williamson, 1991; Marino and Machado, 2000; Rabobank International, 1999), which makes it obvious that the spot market would not be ideal as it cannot fulfil the necessary requirements. Similarly, vertical integration would have problems with supply deficiencies and high costs. Therefore, long-term contracts allow the production and division of an activity's risks to be planned beforehand. Since these governance structures are complex, long-term contracts tend to coordinate the growers and the millers in that it allows for long range strategic planning to be made. The high frequency of transactions between growers and millers creates an incentive for both parties to reduce transaction costs. Hence, negotiated amounts, quality of the sugarcane, location of production sites, frequency and reputation of the millers and cane growers become very important elements in the performance of the sugar supply chain.

Sugarcane producers have to stay with the firm, to which they are allocated, thus leading to a relation of dependence. On the other hand the milling company has to deal with smallholder producers whose volumes may collapse, with the exception of pooling producers. Hence, with sugarcane being costly to produce, demanding highly specific investments and the length of time required before harvesting, it becomes imperative for the cane growers and the millers to maintain their interdependence and their long-term contractual arrangements. Therefore, empirical research is required to establish the role of these contractual and social mechanisms in enhancing the performance of the smallholder cane growers and millers in the sugar industry chain.

The relative importance of the different types of mechanisms governing contractual relationships is still being debated, as there are variations in importance across situations. As a result there is little consensus on the importance of trust as a governance mechanism in relationships. Williamson (1994) identifies an exaggerated emphasis on the use of legal courts by institutions of the state instead of parties resolving disputes by themselves. Deakin *et al.* (1997) on the other hand observe that there is wide consensus to the effect that institutions of contract law are largely marginalized in the processes of business contracting. In line with economic literature, Klein and Leffler (1981) and Klein (1996) argue that contracts are not enforceable by government or any third party, while advocates of contract law argue in favour of the law and legal institutions playing a major role in contractual matters.

Macaulay's (1963) findings in his seminal paper are credited for introducing a new view on the role of contracts, and his preliminary study is the most cited in contractual studies. Very few studies focus on the different transactional strategies, the exception being Fafchamps (1996, 1997) and Fafchamps and Minton (1999), who analysed the enforcement of commercial contracts in Ghana and Zimbabwe and the importance of relationships for traders in Madagascar. Therefore, there is a need for studies on specific markets and specific contractual practises.

This study will provide an overview of the governance of contractual relationships in the agricultural supply chains focusing specifically on the sugar industry in Swaziland. Emphasis is placed on the significance of social factors as self-enforcement mechanisms in promoting the performance of relationships between millers and smallholder cane growers. This study uses a relational paradigm to analyse the contractual relationship in the sugar industry supply chain.

1.6 HYPOTHESES

The main hypothesis of this study is that supply chains that are characterised by social factors such as trust, commitment, and cooperation perform better than those characterised by opportunistic behaviour and lack of trust. These social factors are embedded in the behaviour of the units that form the supply chain and they are important in enhancing the performance of the supply chain.

The following are the specific hypotheses to be tested in this study:

- Social factors such as trust are important mechanisms that can complement formal governance mechanisms in exchange relationships between smallholder cane growers and millers.

- Smallholder cane growers' perceptions of their relationship with the millers can be explained by the detailed relationship structure outlined in Chapter three (Figure 3.3).

- The lack of trust between cane growers and millers, the cane growers' perceptions of opportunistic behaviour by millers as well as perceived poor cooperation, compounded by lack of skills, knowledge, and proximity to the mills tend to have a negative impact on the cane growers' performance, and hence the performance of the whole supply chain.

1.7 JUSTIFICATION

Although contracting between smallholder farmers and processing firms has been in place for a long time and is of economic benefit to both parties (Rhodes Grimes, 1992; Kleibenstein and Hillburn, 1992; Zering and Beals, 1989, 1990; Clap, 1994; Goldsmith, 1985) early research in agricultural contracts focused mainly on the economics of contracting (Glover, 1994; Goldsmith, 1985) and ignored the structure of social relations within contracts (Levin, 1988). However, it is only recently that the focus has broadened to include both economic and social aspects of contracting. Social aspects of contracts focus on measuring the effectiveness of the relational contract within the supply chain system by investigating its conflict resolution, inter-firm cooperation, the role of trust, the balance of power in the relationship and the satisfaction of the participants in the supply chain. However, very little empirical information is available on the factors that affect the quality of the relationships between smallholder farmers and the processing firms. This section provides the conceptual and empirical justification for this study.

1.7.1 Conceptual justification

Given the wide range of research conducted on relationship exchange, both in marketing and management, one would expect a consensus in the concepts used in relational studies. However, most definitions are still broad and without clarity. Other studies (Sako, 1998; Fukuyama, 1995) indicate that the use of formal contracts is not enough to discourage opportunistic behaviour among parties in an exchange relationship and subscribe to the inclusion of implicit non-written contracts that make use of social norms. However, it is still not clear how these contractual relationships should complement the formal written contracts.

1.7.2 Empirical justification

According to Fukuyama (1995) the link between trust and business performance is plausible, however not proven. In business strategy, trust between organisations focuses on the possibility of using it to create competitive advantages (Barney and Hansen, 1994). Sako (1998) points out that though there are plenty of theoretical explorations on the link of trust and performance, empirical studies in this area are rare. Sako (ibid.) continues to say trust can adapt to unforeseen circumstances. Therefore, trust reduces transaction costs, allows investments to increase returns since investments themselves are considered a measure of performance, and trust between buyer and seller is a relation-specific skill that is developed with time. She argues that trust does not only lower transaction costs and increase net benefits from investments, but it also gives rise to rapid innovation and learning.

Artz and Brusch (2000) point out that, while studies have demonstrated the viability of relational contracting in influencing performance and maintaining relational exchange, none of these directly examined inter-firm bargaining or transaction costs or applied it to agricultural supply chains. The main reasons for this include, that instead of one or two governance regimes, relational governance involves a continuous range of relational norms. Exchange partners usually develop relational norms with the intent of minimizing bargaining costs resulting from asset specificity and uncertainty. The issue of greater relational norms in lower bargaining costs for firms with the same level of specific assets and uncertainty is an empirical question (Artz and Brush, 2000). There is still a lack of research on the relationships of farmers and processing firms in the agricultural supply chain. Hence, there is a need to investigate the role of the social properties of the parties in the exchange. A study of this nature is necessary to identify the factors affecting the performance of cane growers, and hence the sugar industry supply chain, and determine the role of social factors in enhancing the relationship and the performance of the supply chain participants.

This study attempts to bring to light the quality of the relationship between smallholder farmers and processing firms and the importance of social factors in enhancing the relational exchange performance. The study will be of practical benefit to sugar millers (through developing a series of "lessons of best practise" for the development of contractual and business relationships and organisational and supply chain structures), cane growers, policy

makers and the SSA (by presenting appropriate recommendations for future market restructuring and regulation).

1.8 OBJECTIVES

This study is concerned with the relationship of smallholder cane growers and the millers in the sugar industry supply chain in Swaziland. It attempts to identify and analyse the factors affecting the performance of the smallholder cane growers and their exchange relationship with millers, and hence the performance of the sugar industry supply chain. The study further models the relationship of the farmers and the millers based on the perceptions of the farmers.

The specific objectives are:

1. To identify the role of social factors in the cane growers' and millers' exchange relationship.
2. To identify factors influencing the performance of cane growers, and hence, the whole sugar industry supply chain.
3. To model and evaluate the contractual relationship between cane growers and millers.

Therefore, the study aims at quantifying intangible behavioural assets like trust and cooperation as well as determining their importance as governance mechanisms in enhancing performance in the agricultural supply chains.

1.9 METHOD OF ANALYSIS

The study utilises several methods to test the stated hypotheses. In the first instance, descriptive statistics were employed to describe the nature of the relationships between millers and cane growers. Secondly, multiple regression analysis was applied to determine factors affecting the performance of the smallholder farmers. Lastly, hierarchical regression and structural equation modelling (SEM) estimations were used to test the conceptualised model of cane growers' and millers' relationships.

1.10 DELIMITATIONS OF THE STUDY AND ASSUMPTIONS

The focus of the study is on the smallholder sugarcane farmers and millers in the sugar industry in Swaziland. The smallholder cane growers only account for a small amount of production compared to the total cane produced in the country. This is because of the complicated nature of long-term contracts in an environment where the smallholder firms having different and diverse objectives to large-scale cane growers, which all things being equal have to be aligned with the objectives of the industry as a whole. The study focuses on the relationship between smallholder cane growers and millers and its influence on their performance as contractees and contractors, respectively, and also as participants in the supply chain.

1.11 ORGANISATION OF THE STUDY

This study is organised into seven chapters. Chapter two discusses the literature review on contractual relationships. Chapter three presents the theoretical and conceptual framework and also proposes a model of the relationship between cane growers and millers. The methodology followed in conducting the study is presented in Chapter four. It includes the different types of analyses and their justification in the study. Descriptive results of the study are presented in Chapter five, while the model estimations are discussed in Chapter six. Finally, Chapter seven presents the discussion, conclusions and implications of the study.

CHAPTER TWO

CONTRACTUAL RELATIONSHIPS IN AGRICULTURAL SUPPLY CHAINS

2.1 INTRODUCTION

In an ideal world, there would be no need for contracts, as contracting parties would be able to foresee the future exactly and be able to describe it properly and negotiate about it in order to both understand it in the same way. Consequently, they could be able to write their plans down in such a way that a third party could be able to understand the meaning of the agreement in case there is a need to enforce the contract fulfilment (Hart, 1995). However, since that is not the case in the real world, contracts are indispensable in order to reduce the risks inherent in the governance of a procurement process. Milgrom and Roberts (1992) argue that motivation problems arise only because some plans cannot be described in a complete enforceable contract. Macneil (1978) characterised contracts by norms, such as (1) permitting and encouraging participation in an exchange, (2) promoting reciprocity, (3) reinforcing role patterns appropriate to the various kinds of contracts, (4) providing limited freedom for exercise of choice, (5) effecting planning and (6) harmonizing the internal and external matrices of particular contracts.

Contracts in an expanded and incomplete sense, are found everywhere in agriculture and are extremely heterogeneous in form. Simple market specification contracts or future-purchase agreements (typically determining price, quantity, and times of delivery) are common between growers and processor (Sporleder, 1983). However, contract farming or contract production is different from simple multiplicity of marketing or labour contracts. Contract farming involves relationships between growers and private or state enterprises that substitute for open-market exchanges, by linking nominally independent family farmers of widely variant assets with a central processing, export, or purchasing unit that regulates in advance price, production practises, product quality, and credit. The all-encompassing definition of contract farming is the one by Roy (1972) "those contractual arrangements between farmers and other firms, whether oral or written, specifying one or more conditions of production and marketing of agricultural product" (Roy, 1972: 3).

The study draws from new institutional economic theories such as transaction costs and relational contracting theory; behavioural theories such as social exchange theory and equity theory; finally, economic/behavioural theories, which include political economy theory and resource dependence theory.

In marketing literature, exchange relationships have been regarded as discrete, independent transactions that ignored the core of marketing (Dwyer *et al.*, 1987; Morgan and Hunt, 1994; Webster, 1992). Many exchanges in the market were supposed to lead to profit and the objectives were to speed up the transaction and increase the value of the transaction (Webster, 1992). It was until 1980 when Macneil (1980) criticised the view of regarding exchange as discrete and not recognising the importance of relationships between the buyer and the seller.

Macneil (1980) argues that the neoclassic microeconomics assumption of profit maximization is only relevant in the context of discrete exchanges and observed that discrete exchanges are rare in modern marketing exchanges (Weitz and Jap 1995; Sheth and Parvatiyar, 1995). It is worth noting that there is a distinction between discrete exchanges and relational exchanges. Discrete exchanges are separated from everything else between exchange partners before, during and after the exchange (Frazier *et al.*, 1988; MacNeil, 1980). Hence, a discrete transaction is evaluated independent of any preceding and succession transactions. Therefore, they are one time utility-driven exchange of value between parties with no prior subsequent exchange (Webster, 1992; Weitz and Jap, 1995; Morgan and Hunt, 1994). In contrast, a relational exchange is based on the history of previous exchanges and anticipated future exchanges. A relational exchange is not assessed in isolation, but as a continuation of exchanges based on past exchanges (Dwyer *et al.*, 1987). Thus, the relationship of cane growers and millers in the sugar industry should incorporate past experiences and future expectations.

Since relationships in commodity exchange have evolved from business to business, a study of the theories underlying exchange relationships is more relevant for the further development of conceptual and empirical efforts in the supply chain relationship domain. Bennets (1996) argues that a debate on the roots of relationship marketing would benefit its further theoretical development and guide empirical research. The objective of this chapter is to provide a guiding framework for determining contractual constructs most relevant in a supply chain relationship. This chapter reviews literature on the motives for firms to vertically coordinate

their exchange activities with other firms up or down in a supply chain. Different theoretical and empirical studies focusing on the exchange and performance of relationships are part of this chapter. Since the choice of a particular theory implies the choice of a particular construct to be investigated, the review of the literature in this chapter forms the basis for determining which constructs to include in this study.

2.2 SUPPLY CHAIN COORDINATION AND ITS MOTIVATION

Vertical coordination is the alignment, direction and control across segments of a production or marketing system. Vertical coordination can be achieved by vertical integration, which is the direct acquisition and control of segments otherwise linked by open market transactions, or through formal contracts between otherwise independent firms. In a continuum of vertical coordination, there exist open markets or open production at one end, which use price as the primary coordinating mechanism. At the other end of the continuum is complete integration as an exchange arrangement, which provides hierarchical decision-making within a firm to resolve coordination issues across a market (Williamson, 1975). Within the continuum there are several other forms of vertical coordination including relational contracting. Figure 2.1 presents the continuum for vertical coordination. It identifies five major categories of vertical coordination. At one end are the characteristics of "invisible hand" coordination and "managed" coordination on the other. According to Peterson and Wysocki (1997) "invisible" hand coordination allows individual economic actors to follow their self-interests and pursue exchange relationships, which are short term, opportunistic, limited to information sharing, flexibility and preserving the participants' dependence. "Managed coordination" is built upon mutual interest of the parties involved in the exchange relationship, which is long-term, share benefits, open to information flow, stable, and interdependent. This study is concerned with a mixed type of coordination that falls between the two extremes.

Figure 2.1 suggests that as strategies move from left to right, coordination shifts from being dominated by "invisible hand" through a mix of "invisible hand" and "managed" characteristics to one dominated by managed characteristics. The three strategies in the continuum are characterised by a change in the mechanisms as coordination changes along the continuum. Unlike the spot market, relational exchange involves sharing of risks and benefits emanating from the relationship. In relational exchange the parties agree to work closely

together, but still maintaining their separate identity. The most coordination mechanisms in this strategy are based on mutual control as a result of mutual trust. Relational exchange falls between contracts and vertical integration, and hence it contains characteristics of both strategies.

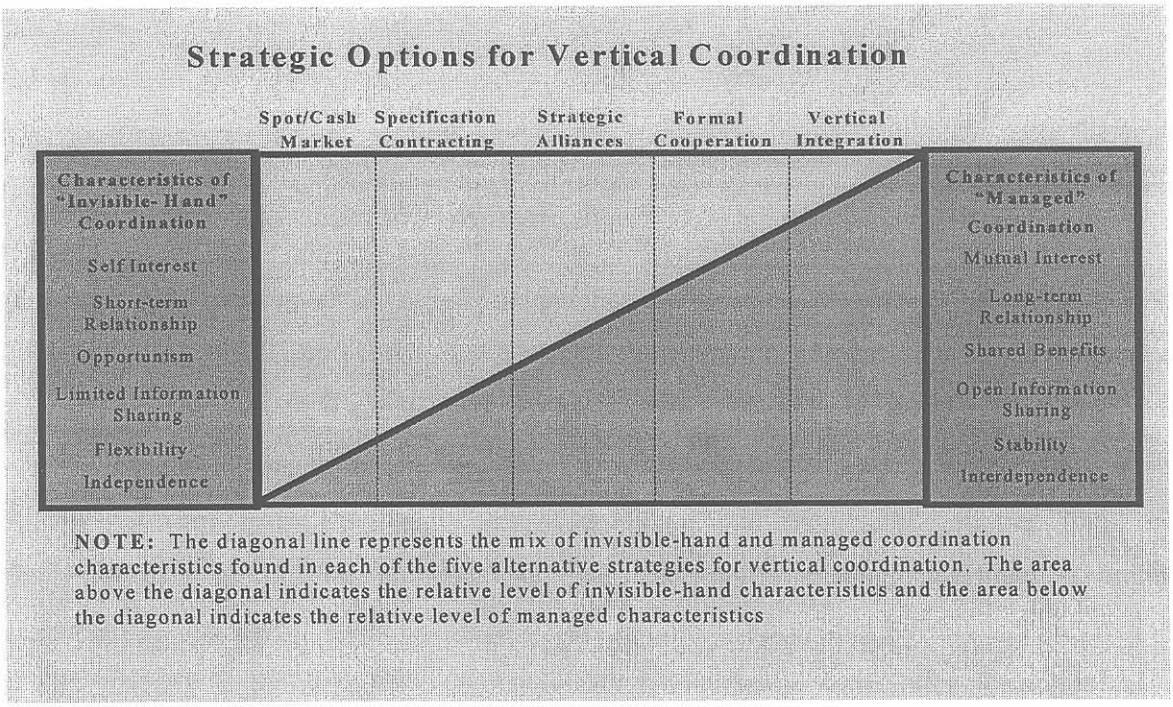

Figure 2.1: The vertical coordination continuum

Source: Peterson and Wysocki (1997)

Mighell and Jones (1963) assert that there is no single theory why firms integrate or coordinate via contracts, instead there are many economic and non-economic considerations used to explain vertical coordination. Among these are reducing risk, uncertainty and costs, improving management, improving market position, gaining bargaining power, developing new technology, and obtaining finance. Barkema (1993), building on Mighell and Jones' (1963) seminal paper, emphasises the need for the food system to quickly adjust to changes in tastes and preferences. Barkema's argument is that the emergence of contracting and integration has created new communication methods that increase the ability to transmit consumer demands to food producers. As a result, markets are shifting from external coordination towards vertically coordinated contracts and integration. Boehlje and Schrader (1998) stress the need for more precise quality control in specially designated products, flow scheduling and capacity utilisation to control costs, reduction of exposure to input and product sales price risks, as well as food safety concerns that strain the ability of spot markets to

coordinate the food chain. As an alternative to the spot market, other options such as contracts are being used. This provides a reason for relationships between supply chain participants like the cane growers and millers to become more personal than in an open market situation.

2.2.1 Factors affecting supply chain coordination

The motivating factors to vertical coordination include transaction costs and these costs factors are; related uncertainty, input supplier concentration, asset specificity, and scale economies (King, 1992; Barry *et al.*, 1992; Frank and Henderson, 1992; Featherstone and Sherrick, 1992). Barry *et al.* (1992) argue that transaction costs must be considered when discussing the motivation for increased vertical coordination. As firms invest in more specific assets and produce more specialised products, they are likely to incur greater opportunity costs if there is a need to use those assets elsewhere. Such transaction costs tend to create a tendency towards more long-term contracting and vertical integration. This is typical of the sugar industry supply chain, which is characterised by asset specificities in terms of machinery, equipment, location and human capital. Sporleder (1992) argues that asset specificity may be viewed as a necessary but not a sufficient condition for vertical integration. He further argues that when asset specificity is part of the firm's situation, managers may consider sourcing through open market, but because of the lack of control against risk or lack of safeguards against quasi rents exploitation and opportunism, they are compelled to vertically integrate. This may provide powerful incentives for entering into contractual or integrated procurement as a substitute for spot markets (Sporleder, 1992).

Lorange *et al.* (1997) identified four main generic motives for firms to enter into contracts: defence, to catch up, to remain or to restructure. A defensive position is normal when the product or business is a core or of importance to the firm's portfolio and where the firm is a leader in the particular business. Such firms want to get into contracts because they want additional access to new competencies, to markets, to technology or to specific resources in order to sustain their competitive advantage over time. For example, sugarcane processing is a core business for the millers in the sugar industry. Thus, contracting out-growers is a means of improving their competencies through low costs of production, since farmers bear all the costs of producing and transporting sugarcane to the mills. The catch-up motive on the other hand occurs when the business is still a core in the firm's portfolio, but more of a follower in

the business segment. The use of contracts in this case should strengthen a firm's competitive position, hence helping it in becoming a leader. The motive to remain in business is a result of a business playing a peripheral role in the portfolio of a firm, but the firm is a leader in its business segment. Therefore, the main motive for a contract in this firm is to remain in business. The contract could also be used to gain maximum efficiency out of a firm's position, given the limited corporate attention a peripheral business can get. Finally, if a firm is a follower in the business area and if the particular business plays a peripheral role in its portfolio, the main motive for a contract is often to restructure the business.

2.2.2 Coordination in agricultural supply chains

Contractual arrangements in poultry, swine, fruits, vegetables, cotton, and sugar industries are examples of vertical coordination achieved through contracting rather than through expanded ownership and control (vertical integration). The question of what is being coordinated arises when one examines the extent and nature of vertical linkages. At the producer first handler level the sources of risk include price, quantity, quality, and timing of delivery (including storage and inventory). For example, sourcing sugarcane from smallholder farmers by millers include managerial decisions regarding the quality of the sugarcane to be processed, the optimal quantity for the mill to process given its complement of machinery, labour, and location, the timing of deliveries to the mill along with the quality control and perishability aspects of the sugarcane. Risk is inherent in all of these decisions and the exchange mechanism chosen for sourcing can directly influence managerial control and firm risk exposure (Sporleder, 1993).

Vertical coordination via production contracts has many advantages. For instance, it reduces many transaction costs otherwise borne by independent farmers and allows for economies of scale in production and marketing. Drawing from the livestock industry, the need to establish separate contracts for each input and output is reduced with contract farming, while in the case of pig and poultry industries the integrated contractor provides the grower with feed, veterinary supplies, and the stock. This suggests that contractors can influence output through their actions (Laura, 1994; Hillburn, 1993). Thus, the modification of the standard principal-agent framework. The price of the commodity is also determined in the production contract. Under a contract farming arrangement, the grower is primarily responsible for providing only the infrastructure and labour. Consequently, the capital outlays of the contractee are also

reduced relative to independent production. The contractor may also assist the farmer in securing a loan for his or her production facility. Finally, since the contract farmer no longer faces input or output price fluctuations, the variability of his income is greatly reduced. However, the farmer is still subject to variation in other input prices such as water and fuel. These advantages make contract farming a more attractive and efficient means of production than independent production (Laura, 1994).

2.2.3 Contracts as means of coordination in agricultural supply chains

The increasing instability in market requirements imposes reactivity and flexibility on agricultural firms and necessitates the development of new organisational forms in the agro-food chains. In this context, the mastery of the produce flows from the supplying areas to the factories and from the factories to the market seems to be the determining factor for efficiency within the supply chain. However, within the supply chain there are various elements that should be taken into account in order to accommodate these changes; for example, industrial capacities, production risks, and diversity of farm structures. Thus, finding organisational solutions that satisfy each firm's objectives and constraints is not that easy. As a result, Solar and Tanguy (1998) point out that it is not easy to design and set up contracts between farmers and commercial firms. The major question, therefore, since joint decision-making by two firms is believed to have a synergistic effect by yielding high profits for a distribution channel (McGurie and Staelin, 1983; Eliashberg and Stainberg, 1987), how then can these joint decisions be induced? How can the different entities within the supply chain system share information and knowledge to improve the relationships? Glover (1987) is emphasised that the relationship between processing firms and growers is a dynamic one, and that firms frequently offer favourable terms to growers in the early stages of an operation in order to attract suppliers, but are unable to sustain those terms in the long run. If a contractual arrangement that was initially favourable to growers deteriorates, farmers tend to be "locked in" by debt, specialisation, relationship specific investment (RSI), or disappearance of other markets. Hence, it becomes difficult to extricate themselves from the situation (Glover, 1987).

Contract farming is an organisational arrangement that allows firms to participate and exert control over the production process without owning and/or operating the farms (Runsten and Key, 1996). Different reasons for contracting suggest different types of contracts and different types of governance structures. Williamson (1979, 1991) identified three classes of

contract law; classical, neoclassical, and relational contracting. Classical contract law deals with definitive contracts. They are complete contracts such as might be traded on an exchange. The emphasis is on legal rules, formal documents and self-liquidating transactions. The neoclassical contract on the other hand involves long-term contracts executed under conditions of uncertainty. The contracts do not cover all contingencies. Since appropriate adaptations will not be evident for many contingencies until the circumstances materialize, therefore to maintain flexibility a range of processes and techniques including arbitration are used to maintain the needed flexibility. Relational contracting encompasses an adjustment process of a more thoroughly transaction-specific, ongoing administrative kind of exchange relationship (Williamson, 1979). The reference point is not only the original agreement, but also the entire relationship between the parties over time; for example contracts between growers and processors.

In a descriptive sense, contract farming as a distinctive labour process is defined by three broad attributes (Watts, 1994). First, a forward market contract for a specific product is agreed to by a grower (who typically controls the means of production and labour power in some way) and a buyer-processor or contractor. There is no presumption that the contractor must be an agent of an international agribusiness. Contractors may be local merchants or the state. Both parties (contractor and contractee) commit themselves to buy and sell at specified volumes and/or hectarages, though the completeness, duration, and specificity of the contract vary considerably. Second, a systematic link exists between product and factor markets. Purchase commitments rest in some determinate way on the provision of inputs, services, and supervision to growers who may or may not be organised. Contractually linked markets generate a division of labour and farm management as well as differential forms of autonomy and subordination. There is no presumption of market destination, and hence the crop may be destined for local or foreign markets with or without processing. Third, production price and market risks are subject to differential allocation. Crop-share contracts without price determination share production risk between the contractor and the grower, while in price-specified contracts the grower is bound by a piece-rate system in which he or she bears production risk but none of the price risk (Watts, 1994). Watts argues that contract production presupposes some form of regulation, control, and fashioning of the labour process by the contractor's relations that are practically and ideologically central to the production system. Hence, it represents quite distinctive (if locally varied) social relations of production

in which independent commodity producers are subordinated to "management" through distinctive labour process.

2.3 GOVERNANCE STRUCTURES IN AGRICULTURAL SUPPLY CHAINS

2.3.1 An overview

Mighell and Jones (1963) are traditionally credited for being the first to focus on vertical coordination within agriculture. As they saw it in 1963, agriculture was beginning to witness an economic innovation of organisational design that could impact the industry more than future technological innovations. They called the new organization methods vertical coordination, and included under that term all ways in which the vertical stages of production are controlled and directed. One of the subsets of coordination to be introduced was vertical integration, which they defined as the vertical structure associated with internal coordination where two or more stages of production join together in one firm.

Barry *et al.* (1992) recognised the theoretical developments in governance structures and reviewed the economic organisation and financial structure of agricultural firms with respect to transaction costs, agency relationships, and contracting. They argue that instead of firms trying to capture monopolistic rents, more attention should be paid to agency relationships, contracting, transaction costs, the boundaries of a firm, and the linkages between vertical coordination and a firm's financial structure. They suggest that as vertical linkages expand between participants in the agricultural supply chains, firms will seek to keep agency costs of exchange low in order to ensure business success. These agency costs will be incurred while each firm attempts to structure, administer, and enforce contracts that closely align the interests of both the principal and the agent (Barry *et al.*, 1992).

Coordination of contractual relationships in the presence of specific assets is usually addressed in the literature on vertical integration or long-term contracts, for instance in Klein *et al.* (1978) and Williamson (1985). Existing literature on contracts still has gaps in terms of explaining the stability measures of contractual relationships and stability in this study refers to the frequency with which parties maintain their contracts when alternatives are available. The stability of contracts is more relevant in the case of agricultural supply chains, the reason

being that the agricultural industry is faced with institutional and organisational changes. The issues of food safety and specific quality attributes are more important today than in the past as a result of the institutional environment and institutional arrangements. At the institutional environment level, liability related to consumer rights tends to impose the design of new mechanisms to coordinate the entire supply chain, whilst at the institutional arrangement level contractual relations link different specialised agents throughout the chain. Therefore, processing firms have incentives to cooperate, share common goals and developing specific tacit knowledge in order to assure specific level of product quality supply by producers.

Langlois and Foss (1998) correctly argue that the literature is in agreement with the fundamentals that in addition to production costs, consideration should be made to transaction costs in explaining institutions like the firm, as presented by transaction cost economics (Williamson, 1979, 1985) or the economics of organisation (Milgrom and Roberts, 1992). Langlois and Foss (1998) point out that firms and other institutions are alternative bundles of contracts, which are arguably understood to be efficient mechanisms for creating and realigning incentives. But, transacting itself is loaded with hazards and the problem of organisations is to create governance structures that will constrain the unproductive rent-seeking behaviour due to imperfect information. The main idea is to literally reduce all problems of economic organisation to problems of incentive-conflicts assisted by imperfect information.

The observation of different strategies in the agribusiness industries today is an indication of the growing importance of quality-related aspects, and hence the need to design stable contractual relationships among different and specialised agents in the agricultural supply chains. Agribusiness systems are characterised by a high level of asset specific investments, changing quality standards, food safety concerns, time specifications, specific legislation protecting consumer rights, and environmental awareness. Hence, it makes it more difficult to rely on autonomous adaptations (Zylbersztajn and Farina, 1999; Zylbersztajn, 2001).

2.3.2 The concept of governance

A wide range of governance modes has been described in the literature. A governance structure is an inter-organisational framework within which the integrity of a contractual relation can be decided (Williamson, 1985). When circumstances permit opportunism, a

governance structure should be considered as a means to reduce opportunism to an acceptable level, since total elimination is impossible. Most governance structures impose varying economic or social costs of opportunistic behaviour. In exchange, governance structures have been shown to be critical context variables that shape each party's behaviour, perceptions, and choices in systematic ways (Boyle *et al.*, 1992). The sugar industry in Swaziland established the SSA as a governing body and it is its responsibility to discourage opportunistic behaviour by either cane growers or millers.

Gereffi (1999) defines the governance structures of value chains as authority and power relationships that determine how financial, material, and human resources are allocated and flow within a chain. He distinguishes two main types of commodity chains, the producer-driven and the buyer-driven supply chains. Producer-driven commodity chains are typical of capital and technology intensive industries, where barriers to entry are greatest in production and the development of core technologies:

> "Producer-driven commodity chains refer to those industries in which transnational corporations (TNCs) or other large integrated industrial enterprises play the central role in controlling the production system (including its backward and forward linkages)" (Gereffi, 1994: 99)

This is the most characteristic of capital and technology intensive industries like the sugar industry.

Some agro-food industries display the characteristics of producer-driven chains, for example, fruits, vegetables, cotton, and sugarcane. Processing firms of these commodities would source produce from independent growers or use their own farms and plantations, and they would sell their produce through a wide range of outlets. But the responsibility for developing and promoting the product rest with them.

In contrast, buyer-driven chains are governed by companies that market the product other than the ones that make it.

> " one of the main characteristics of firms that fit the buyer-driven model...is that frequently these businesses do not own any production facilities. They are not 'manufacturers' because they have no factories. Rather, these companies are 'merchandisers' that design and/or market, but do not make the product they sell. These firms rely on complex tiered networks of subcontractors that perform almost all their specialised tasks" (Gereffi, 1994: 99).

Hansen and Morrow (1999) define governance mechanisms as arrangements or policies that boards may use to align the interests of members and the actions of management with the interest of the members; for example, the use of bonus plans, approval policies, human resource policies, and commodity grading systems. They argue that too many governance mechanisms may lead to over-governance, while too few governance mechanisms may result in under-governance. Both over-governance and under-governance may result in misalignment of the members and management interests. Hence, the use of any governance mechanism is crucial to the success of a relationship in trying to meet the desires of the supply chain participants. In the Swaziland sugar industry, the SSA approves and ensures both millers and cane growers adhere to the policies of the industry. The SSA also runs an annual competition for smallholder cane growers, where they give prizes to those farmers who obtain high yields per ha and a high sucrose content. This mechanism encourages smallholder farmers to effectively participate in the sugar industry.

Humphrey and Schmitz (2002) refer to the concept of governance in value chains as the inter-firm relationships and institutional mechanisms through which non-market coordination of activities take place within the supply chain. The co-ordination is achieved through setting and enforcement of product and process parameters to be met by actors in the chain. They argue that the concept of governance is central to supply chains, and hence a chain without a governance mechanism would be like a string of market relations. Governance can be exercised in different parts of the same chain in different ways.

2.4 APPROACHES TO THE GOVERNANCE OF CONTRACTUAL RELATIONSHIPS

2.4.1 Transaction Cost Approach

The transaction cost approach started with Coase (1937) in an article explaining the existence of a firm. Coase points to the costs of using the price mechanism in exchange markets. These costs, referred to as transaction costs, include costs of writing, executing, and enforcing the contracts (Williamson, 1975). He argues that firms are established to minimise these transaction costs of exchange (Rehber, 2000). Williamson (1979, 1985, 1989, 1996) expanded the definition of transaction costs to include the behavioural assumptions of opportunity and bounded rationality of economic agents (Rehber, 2000) and sought to understand how differing governance structures coordinate vertical transactions.

Williamson's approach argues that the adoption of different governance structures is motivated by an attempt to minimise transaction costs, but maximise benefits. The transaction costs approach attempts to predict the characteristics of transactions that firms could vertically integrate at lower costs than relying on open-market governance (McFedtridge, 1994). The transaction costs approach is widely used as a theoretical basis to suggest the existence of the different types of vertical coordination that have developed in the agro-food sector. However, the costs and performance of the different coordinating mechanisms depend in part on the incentives and relationship of the transacting parties (Rehber, 2000). Williamson (1979) referred to the set of institutional arrangements within a transaction as governance structures. The governance structure is a function of three general characteristics of the transaction and the industry. Mahoney (1992) identified these characteristics as (1) asset specificity, (2) task programmability and (3) task seperability, while Williamson (1985) classified transactions in terms of uncertainty, frequency and asset specificity[5].

Those transactions that require an extremely high level of specific investments are termed 'idiosyncratic' transactions. One type of idiosyncratic investment is the requirement to purchase specialised capital in order to produce a particular good. For example, the supplier

[5] Williamson (1989) identifies four types of specificity; site specificity, physical specificity, human capital specificity, and dedicated assets.

may purchase a specialised asset for production of a uniquely designed product. After purchasing the asset, the supplier becomes locked into a relationship with the buyer because the asset can only be used in the production of the specialised product. The buyer is also locked into a relationship with the supplier because the cost of finding the specialised output elsewhere is high since no other firm is making the needed investment in the specialised asset. Overall, this investment allows the two firms to proceed with the contract renewals and alterations at a faster pace because they understand each other better. Therefore, supply chains with idiosyncratic investments like that of the sugar industry need to feature personal trust in their relationships in order to survive greater stress and display greater adaptability in the business environment.

Williamson (1979) categorised the frequency of transactions and level of specific investments into subgroups. Frequency of transactions was divided into one-time, occasional, and recurrent categories. Investments were described as non-specific, mixed, and idiosyncratic. Because one-time transactions are rarely observed, occasional and recurrent transactions were analysed across all types of investment. In analysing these categories, Williamson found that traditional open markets are the appropriate governance structure for non-specific transactions of both occasional and recurring frequency. With recurring transactions, parties to a transaction only have to decide whether or not to continue their relationship. There is also little transactional cost to switch to an alternative partner since no specific assets are required and the market is full of homogeneous and well-defined standard suppliers. If transactions are only occasional, agents cannot rely on their personal experiences alone to guard against opportunistic behaviour by partners, but they also rely on rating services or the personal experiences of others. In both frequency sections, market alternatives (abundance of suppliers or buyers) guard against opportunism by the counter party. Efforts to sustain a particular relationship are not made because the relation is not independently valued.

When transactions demand mixed or idiosyncratic investments and are occasional in nature, contracting with arbitration agreements is the appropriate governance form. Parties in this situation have a strong desire to see the contract through due to specialised investments already made. If either party reneges on the contractual agreement, the supplier would produce lower value products compared to specialised ones and the buyer would incur higher costs finding a new supplier of the specialised product. Setting up contracts to guard against opportunism in these situations is costly and traditional market governance cannot sustain

those agreements. Therefore, the assistance of a third party (arbitration) is relied upon to settle conflicts instead of legal action. More advanced governance in the form of agreements and coordinated efforts are too costly, since the frequency of transactions is only occasional (Williamson, 1985). For recurring transactions demanding mixed or high levels of transaction-specific investments like the sugar industry, relational contracts and vertical integration are the appropriate governance structures. The non-standard nature of exchange means reliance on open markets is hazardous and their re-occurrence makes it worthwhile to use specialised governance structures. Partnerships and relational contracts are examples of bilateral structures in which the identity of each firm is important (Bryant and Colledge, 2002)

Bilateral structures are assigned where asset specialisation is less than idiosyncratic, but transactions occur frequently. This type of governance may be favoured over complete integration because economies of scale can be achieved through outside suppliers, or greater control over cost of supply can be accomplished. However, problems arise when the transaction has to be adapted or contractual negotiations are made. Since the problems cannot be foreseen, these adaptations must be made by mutual agreement and therein rests the potential for conflict. Both parties want to see the agreement continued when adaptations are needed because they would lose their transaction specific investments in highly specialised capital. However, both firms want to see their individual profit streams being immune to change due to adjustment of a negotiated agreement. In order to successfully accomplish needed adaptations, the parties need to have a way of identifying acceptable dimensions for adjustments. These guidelines include recognising the hazards of opportunism and how it varies by type of adjustment, restricting adjustments to where those hazards are low, and performing adjustments with an attitude that is conducive to a long-term relationship (Williamson, 1979).

As recurring transactions become more idiosyncratic, vertical coordination is more likely. Investments become more specific, and the opportunity cost of using those investments elsewhere decreases. Incentives for trading with a partner tend to decrease and the buyer can recognise the economies of size as easily as the outside supplier. At that point, the question centres on choosing the organising mode with the best adaptive properties. With vertical integration, adaptations can be made without having to consult, mediate, or change inter-firm agreements, where costs of change may be high. Price adjustment is more complete under internal organisation because ownership occurs on both sides of the transaction and joint

profit maximisation can be assumed. Likewise, quantity adjustments can occur at any needed frequency to maximise the joint gain of a transaction. For example, vertical integration of millers as cum-planters as well as processors allows them to adjust to changes in the delivery schedules. For instance, if farmers fail to deliver cane as scheduled, millers are able to supply cane from their own fields in order to keep the mill operating because it is a highly specific investment. Uncertainty is the final dimension of transactions that influences governance structure. Non-specific transactions have little value for continuity since new relations can easily be arranged. Uncertainty does not alter that fact, so open market exchange continues and laws govern all transactions regardless of the level of uncertainty. For mixed or idiosyncratic investments, uncertainty is important because parties have a larger stake in working out mutually agreeable contract terms. As uncertainty increases, vertical integration replaces bilateral governance in recurrent transactions (Williamson, 1981). Table 2.2 shows the features of governance structures for different transaction types.

Table 2.2: Features of governance structures (derived from Williamson, 1981)

<table>
<tr><td>Investment type</td><td colspan="2">Frequency</td></tr>
<tr><td></td><td>Occasional</td><td>Recurrent</td></tr>
<tr><td rowspan="2">Non-specific</td><td>• market governance (classical contracting)
• less reliance on previous experience
• reputation governed by market</td><td>• market governance (classical contracting)
• greater reliance on past experience and relationship that has developed
• reputation through direct experience</td></tr>
<tr><td colspan="2">• Market alternatives protect each party against opportunism by an opposite
• Concentrated efforts to sustain the relation are not made because the relation is not independently valued</td></tr>
<tr><td>Mixed</td><td>• stronger incentive to see contract through to completion: not so easy to obtain a replacement
• cost of transaction-specific governance structure is prohibitive but market governance provides no incentive to sustain relationship
• mechanisms to resolve future disputes are introduced e.g. third party assistance
• trilateral governance (neo-classical contracting)</td><td>• greater incentive to sustain the relationship
• primary reliance on market is unreliable
• the cost of a specialised governance structure can be recovered
• bilateral l structure where autonomy of the parties is maintained (relational contracting)</td></tr>
<tr><td>Idiosyncratic</td><td>• as mixed occasional
• there is a transition to a unified structure as the transaction becomes more idiosyncratic</td><td>• as mixed recurrent but bilateral structure is replaced with unified structure (relational contracting)</td></tr>
</table>

Source: Bryant and Colledge (2002)

Though the transaction cost approach has been widely used in explaining vertical coordination, there are still debates whether it is the correct theoretical framework for analysis. The primary concern involves empirical support of the theory. While some empirical investigations have been undertaken, the results have been mixed because transaction costs are hard to identify and measure. Work by Frank and Henderson (1992) and Hobbs (1996) claim support for transaction costs as a reason for certain vertical structures, while others such as Fahlbeck (1996) finds little evidence. Some scholars (Milgrom and Roberts, 1992) and others have attempted to incorporate new assumptions to Williamson's classification and critiqued the classification for oversight (Zajac and Olsen, 1993). Those critiquing transaction costs approach argue that it tends to focus on single transaction as a unit of analysis and it does not focus on the dynamic evolution in the relationships (Heide and John, 1988). Nooteboom (1995) argues that the two gaps in the transaction costs approach are the lack of dynamism and absence of the role of trust, where opportunism is a threat. This is the aspect that will form the main issue for this thesis.

2.4.2 The Agency Theory Approach

The agency theory is an alternative framework for analysing governance structures and control activities. Two main branches of agency theory are identified in the literature; the principal-agent theory (Holmstrom, 1979) and positive agency theory (Jensen and Meckling, 1976). Principal-agent theory is concerned with designing optimal contracts between two parties with organisational form exogenous to the solution (Mahoney, 1992). The majority of principal-agent research centres on developing models under a range of quantitative variables and defining the optimum contract solutions (Sauvee, 1998). The positive agency theory focuses on the organisation and function of the firm, which is defined as a nexus of contracts (Jensen and Meckling, 1976; Zylbersztajn and Farina, 1999). The primary function of the firm is to exploit the advantages of teamwork among its multiple agents, while controlling agency costs. Therefore, the positive agency theory attempts to explain the coordination and functioning of a firm based on a range of variables that include agency costs.

The basic principal-agent problem seeks for the optimal contract, which maximises the principal's expected utility given that; (1) the agent will act in a manner to maximise his utility given the conditions of the contract, and (2) the agent is willing to accept the contract. However, the main impediments in designing a contract include adverse selection and moral

hazard problems. These problems are a result of information asymmetries between the contracting parties. Adverse selection occurs when one party is better informed than the other about the transaction (Sauvee, 1998). An agent with superior information can hide such information decisions and the principal can hardly check if the agent uses his information in a way that best serves the principal's interests. The main challenge is the trade-off between the incentives to work efficiently and the agent's incentive to hide private information. For example, adverse selection would occur if a farmer contracted with a miller for regular deliveries of cane at specific times and knew in advance that he would most likely not be able to deliver all the cane required in a timely manner. The farmer may purposely burn more cane than he is supposed to deliver in a particular week and then report a "run away fire", so that he can deliver more cane than scheduled.

Moral hazard on the other hand refers to the lack of effort, shirking or opportunism of the agent as a result of the task not being completely observed (Sauvee, 1998). The agent's effort to perform the task cannot be monitored or observable by the principal. Hence, the agent has an incentive to provide an inoptimally low effort. The principal wants the agent to provide an optimal effort, thereby increasing the likelihood of a favourable outcome, but effort is a disutility to the agent. For example, a farmer not following an agreed upon management specification while raising sugarcane, such as not weeding and controlling diseases because he minimise production costs, or he may increase his production area beyond the area under contract. The challenge with moral hazard is the trade-off between risk sharing and the appropriate incentive for the agent to provide the optimal effort. Thus, for the risk averse agent, like the smallholder farmers, a high degree of risk sharing implies a welfare loss, while a low risk sharing encourages the smallholder farmers not to perform efficiently (Bech and Pedersen, 2001).

Eisenhardt (1985) depicts the principal-agent problem in terms of measurement and control over the agent's actions. Two situations exist, one with complete information, where the principal can observe the agent's behaviour; and another with incomplete information, where the agent is aware of their own actions, but the principal is not. In the case of complete information, a behaviour-based contract is optimal because the principal is fully aware of the agent's actions. When incomplete information exists, the principal cannot reward the agent based on his behaviour since it was unconfirmed and the agent may shirk. In this case, the agent cannot be trusted to fulfil obligational duties (Eisenhardt, 1985).

Faced with incomplete information, the principal has two primary options. The principal can make investments in behaviour monitoring devices or the principal can reward the agent based on outcomes like profitability. When rewarded on outcomes, an agent may face outcomes not completely dependent on his own efforts. For instance, the principal may make a profit despite poor performance by the agent, or may not make a profit even though the agent performed very well. Where the principal faces incomplete information, the control strategy of the agent becomes a function of monitoring costs and uncertainty.

Generally, the principal-agent theory is criticised for its assumption about information availability to both parties and their capacity to use this information. The principal and the agent may not be aware about the exact state of nature that prevailed in their relationship, but they will always be aware of every state that could conceivably occur in the future and of the relative frequencies of all states (Sappington, 1991). The implication is that it is possible to design a contract that takes all possible states into account and the incentives can be aligned ex-ante, but ignoring ex-post monitoring of contracts. The theory also assumes that parties communicate their assessment of the environment without costs and they can incorporate all anticipated and unanticipated events in their contract.

The principal-agent theory tends to focus on complete contracts, assuming super rationality of parties. It concentrates on an isolated, independent, voluntary bilateral agency relationship and not considering organisational structure. Furthermore, the theory lacks the precise description of the principal in question, whether its commercial or non-profit principal. It just assumes a stereotype type of principal and ignores the necessity of long-term agency relationship. Hence, the transaction cost theory is the most appropriate in analysing contractual relations (Sappington, 1991).

2.4.3 The Resource Dependence Approach

Resource dependence theory focuses on the environmentally driven aspects of organisations. Since organisations cannot generate all of the resources they need, they must depend on their environment (other organisations) for other resources (Powers, 2001). Pfeffer and Salanick (1978) indicated that only 10 percent of an organization's performance is determined by internal factors and the rest is externally motivated. The resource dependence theory holds that goals are not necessarily the driving force behind what happens within organisations.

Pfeffer and Salanick (1978) suggest that organisations alter their purposes and domains to accommodate new interests, sacrificing parts of themselves to avoid some necessary interests and become involved in activities that are far from their stated central purposes. It is believed that instead of changing their structure or strategy in order to meet changing demands, organisations opt to change their goals to accommodate available resources (Powers, 2001).

Resource dependence theorists argue that organisations must rely on other organisations for the resources they cannot provide themselves. In the past, dependence had been regarded as having a negative impact on relationship outcome. However, recent research indicates that a positive impact exists in inter-firm dependence (Johnson, 1999). Positive outcomes, such as technology access, information flows and cost savings can be achieved under relationship dependency. Emerson (1962) described dependence as the extent to which (1) each party's reward or motivation is reliant upon the reward or motivation received by the other party, and (2) the reward or motivation exceeds what would be available outside the relationship.

The lack of self-sufficiency with respect to acquiring and developing resources by firms lead to dependence and introduces uncertainty in the party's decision-making environment (Varadarajan and Cunnigham, 1995). The dependence of one party is somehow tied to the power of the other partner. When one partner controls resources that are needed by the other partner, the latter becomes dependent upon the controlling party (Dwyer *et al.*, 1987; Wilson, 1995). It is argued that dependence exchange partners may wish to regain control and influence their power balance by acquiring and defending a secure and adequate supply of critical resources or by developing substitute sources, which can reduce their dependence (Arndt, 1983). For example, the establishment and maintenance of sugarcane estates by the millers is viewed as one way to reduce their dependence on the out-growers. Hence, they maintain some power over cane growers.

Dependence theory suggest that partners become more dependent upon each other as; (1) outcomes from an exchange become more important (criticality), (2) the magnitude or the proportion of trade with one partner increase (quantity), (3) the business is concentrated with fewer partners (replaceability), and (4) it becomes more difficult to locate potential alternative exchange partners (slack) (Krapfel *et al.*, 1991). According to Heide and John (1992), power dependence theory suggest that an exchange partner's investment in specific assets may constrain its ability to acquire control and may even transfer this control to the receiving

partner. Relatedly, Krapfel *et al.* (1991) argue that resource dependence points at the dangers of increased dependence in terms of increased strategic vulnerability. Thus, improper screening of exchange relationships may leave exchange partners worse off than if they had engaged in looser arm's length relationships. Exchange partners peacefully co-exist and interact cooperatively as long as there is balance of power between them. However, if there is power imbalance, conflicts and dysfunctional conflict become prevalent (Dwyer *et al.*, 1987; Anderson and Weitz, 1989). The power-vested partner will tend to exploit the other partner, and hence the latter will be dissatisfied with the relationship (Anderson and Narus, 1984; Anderson and Weitz, 1989; Ganesan, 1994; Varadarajan and Cunningham, 1995).

Although resource dependence theory is appropriate for many types of interactions, it is based on conflict and use of power. It assumes that goal conflict is inherent in the relationship. However, it has difficulties explaining long-term relationships resulting from co-coordinative behaviour based on trust. Exchange partners can rely on cooperation, collaboration, and coordination instead of power, influence and control. Morgan and Hunt (1994) argue that the presence of relationship commitment and trust is central to successful relationship marketing, but not power and its ability to condition others. Similarly, Weitz and Jap (1995) argue that the use of power as a coordinating mechanism is limited to asymmetric relationships, whereby one party is more powerful than the other. Thus, proponents of transaction cost theory criticise resource dependence theory for its focus on descriptive issues and its failure to examine the efficiency implications of various structural arrangements (Heide and John, 1990). As a result they advocate augmenting transaction cost analysis and descriptive insights from power dependence theory.

2.4.4 Relational Contracting Approach

Relational contract is based on contract law, which applies the legal rights of exchange parties and guides the planning and conduct of exchange relationships. It views exchange as composed of single, independent and static transactions. Though modern contract law tries to incorporate dynamic intermediate and long-term exchanges, it refers to exchange planning and contract information, adjustments to existing contract relationships, and resolution of contractual conflict. It is however, characterised by theoretical inconsistencies in explaining modern exchanges.

Macneil (1980) proposed relational contract as a conceptual framework that is able to capture the dynamics that underlie the nature of exchange relationships as well as the belief that structures and activities are necessary for successful exchange relationships. Macneil distinguished between intermediate types of exchanges, discrete exchanges and complete internalisation of exchanges (Gundlach and Murphy, 1993). They referred to the intermediate forms of exchange as 'contractual ways of exchange' or 'relational transactions' in which the exchange parties are still independent, but at the same time coupled with weak or strong contractual agreements. They argue that pure reliance on the law mechanism can be costly in terms of resources and time, that unforeseen circumstances can affect the exchange relationship and demand extra legal governance mechanisms (Nevin, 1995). In line with this, Macneil (1980) defined the concept of contract broadly, as a relationship between exchange parties who expect to sustain their relationship into the future.

Relational contracting theory describes the types of contracts in terms of the norms they share. Norms are considered as expectations about behaviour that are at least partially shared by a group of decision makers (Dwyer *et al.*, 1987; Heide and John, 1992; Weitz and Jap, 1995). The main property of relational norms is their prescription aimed at maintaining a relationship and their rejection of behaviour, which promote individual goal seeking (Heide and John, 1992) like opportunism. During the exchange process, buyers and sellers tend to establish norms that did not exist before the exchange started (Dwyer *et al.*, 1987). Contracts can either be based on traditional promises of contract law (promissory norms) or more on relation based promises (non-promissory norms). However, Macneil (1980) argued that formal contracts regulated by promissory norms play a minimal role in most relationships, rather it is the set of understandings among exchange partners or the implicit contract guided by non-promissory norms that substantially affects relationships (Anderson and Weitz, 1992).

The relational contracting theory approach seems to address the criticisms of transaction cost theory by incorporating social dimensions of exchange and making clear that hierarchical relationship governance mechanisms are not the only mechanisms available. Although relational contract theory is criticized for its failure to prescribe the optimal types of governance mechanisms to deal with specific characteristics of the exchange, it offers a valuable complement of the transaction cost approach. Hence, this study applies relational contract theory to investigate the role of contractual relationships in the performance of the

sugar industry supply chain in Swaziland. The emphasis is on the relationship between smallholder farmers and the millers.

2.5 A SHIFT IN THE GOVERNANCE STRUCTURES OF AGRICULTURAL SUPPLY CHAINS

2.5.1 From market governance to relational governance

Earlier literature on food chain coordination focused on market coordination, which used the price as a coordinating mechanism. This is the focus of the study by Davis and Goldberg (1957) and the followers at the Harvard School. The literature on contractual coordination applied to agro-food systems replaced the price-based approach, and has since grown steadily both theoretically and empirically. With different degrees of quantitative formalisation the literature discusses the process of industrialisation of agriculture, introduces the classification of coordination based on the degree of control the agriculture industry has over the farmer (Jones, 1971; Sporleder, 1992). Lawrence *et al.* (1997), studying the hog industry in the USA, discuss the relationships between pig farmers and the processing industry. They stress the role of risk and quality as the motivation for governance through contracts. Henderson and Frank (1998) and Barkema (1993) deepen the discussion on contracting by presenting a classification of vertical coordination structure in USA agriculture.

Other authors, such as Menard (1996) and Brousseau and Codron (1997), argue that quality strategies pose two coordination problems, which lead to the shift in governance structures; (1) the need for control over those stages of the productive process that are not operated within the company, and (2) difficulties involved in evaluating the information relevant to the process of purchasing inputs that are needed for production. Therefore, to solve these problems, it becomes necessary for firms like the milling companies to adopt governance structures that; (1) offer greater control over the steps of the cane production process, which are not under the hierarchical command of the mill, and (2) allow for observation and evaluation of the information necessary for the transaction. As a result of quality strategies, millers do not just have to purchase their sugarcane from farmers, but need to get the right quality of sugarcane. This then leads to a series of governance structures that ensure they get

the necessary quality. Zylbersztajn and Farina (1998) referred to this condition as a strictly coordinated supply chain systems.

The convergence of the literature is on the motivation for governance through contracts, as a replacement for governance through markets, as a result of risk management and contractual hold-up in the presence of specific investments. Sporleder (1993) argues that in situations where there are less possibilities of hold-up, weaker control mechanisms need to be considered. This suggests a shift from product to process, then to relations mechanisms, which are characterised by a commercial relationship that assumes equal importance compared to the legal agreement, significant sharing of benefits and burdens, greater interdependence, and bilateral and unified governance. In a similar approach, Soler and Tanguy (1998) discuss the incentives present in the French wine industry. They argue that the common element of the world wine industry is the increasing interdependency between grape growers, wineries, and distributors. This suggests that parties in a contract need to consider a governance structure, that is not only based on the legal agreement, but also on their social relations.

2.5.2 The evolution of relational exchange

The trend towards globalisation, fast technological advancements, and the increasing instability and uncertainty of the competitive and uneven arena contribute to the growth of complex organisations, as well as the environment in which they operate. As a result, organisations have become difficult to manage as both physically and cognitive expertise are required because of relatively scarce resources. In an attempt to secure scarce resources and maintain necessary flexibility to cope with the changing environment, organisations have explored the strategic use of the social structures in which they operate, through the development of inter-organisational relationships (Gulati, 1995, 1998).

Prior to the 1990s management studies were limited in terms of focus, especially on the role of relationships that organisation have with other participants. This resulted in the lack of information on the impact of the interplay the actions of the other players have on the outcomes of the organisations. The limited focus was mainly attributed to two main perspectives; under-socialised and over-socialised views of economic actions, which assume atomisation of participants that logically lead to reduced roles for social structures. While the

under-socialized perspective derives its atomised view from the narrow definition of the participants' goals (in terms of self-interest pursuit), the over-socialised view obtains its atomisation from the assumption that correct behaviour (for a certain actor, with a certain role, in a certain environment) has been internalised by the individual (or organisation), thus leaving little room for the influence of ongoing social relationships (Granovetter, 1985).

As from the 1990s a trend towards relational exchange has been observed. There has been an increase in studies on supply chains and networks (Powel and Smith-Doerr, 1994; Lazzarini *et al.*, 2001). Recently, more attention is paid to the construct of embeddedness, as introduced by Polanyi (1944), but later by Granovetter (1985), who referred to the concept of embeddedness as the degree to which an actor (individual or organisation) is involved in a social system and how, in turn, this level of involvement affects (or is affected by) its behaviour. Many studies focusing on the role of organisational embeddedness in influencing economic action, such as organisational performance and alliance formation, confirm the role of social structure and the degree of embeddedness in determining the performance of an organisation (Granovetter, 1985, 1992; Uzzi, 1996,1997).

Two views are identified in contractual relationships: the contract-centred view and the relationship-centred view. Opportunism is a key concept in the contract-centred approach (Hakanson and Johanson, 1993; Johanson and Mattson, 1987) and in relational contracting theory (Macneil, 1980; Macaulay, 1963). In the relationship-centred approach the emphasis is on trust as a crucial concept in understanding inter-firm relationships. Heide and John (1992) following Macneil (1980) identified three dimensions of relational exchange: flexibility or willingness to make adaptations, proactive information exchange, and solidarity or high value placed on the relationship. This relationship-centred view takes a cooperative approach towards inter-firm interaction and it centres on the quality of the relationship.

Madhok (1995) suggests two aspects of inter-organisational exchange, the identity of the participants in the exchange and the activities to be coordinated and resources to be exchanged (Hakansson and Johanson, 1993). Johanson and Mattsson (1987) criticised Williamson's TCE for taking a short-term view of inter-organisational exchange and a negative view of human nature. In line with the relationship centred approach, a relationship is a potential asset to be developed over time through interactions. Investment in the relationship process is therefore a form of long-term investment, where cooperation yields

high returns and enables the firm to benefit in future from mutual adaptation (Johanson and Mattsson, 1987).

Granovetter (1985) refutes Williamson's (1975) thesis that institutional form matters are highly relevant in an exchange relationship. He argues that it is the nature and the pattern of interaction in a governance regime as a result of social properties that is the source of efficiency, instead of the intrinsic institutional properties. The main criticism of the contract-centred view is that it concentrates narrowly on economic aspects of exchanges and neglects the social context within which the relationship is embedded.

The pre-occupation with cost minimisation within an exchange relationship tends to devalue the benefits from the relationship and fails to recognise the potential for effective reduction of associated costs through social mechanisms (Madhok, 1995). Although Williamson (1985, 1991, 1996) recognises the importance of social aspects of inter-organisational interaction, he however expresses some reservations about the extent of the importance and under appreciates the value of normative mechanisms (Madhok, 1995). In line with the relationship-centred approach, the sole emphasis on the contract is not adequate to ascertain desirable action by the other partner apart from the minimum action required by the contract. Therefore, there is a need for supplementation by positive atmosphere revolving around trust within which the exchange is conducted. While the contract-centred approach attempts to reduce uncertainty and manages information flow through formal and legal forms of the transaction, the relationship-centred approach attempts to do the same through social processes underlying the transaction (Johanson and Mattsson, 1987).

Madhok (1995) argues that in order to understand inter-organisational relationships, it is useful to view them as having two dimensions; the structural and social dimensions. The structural component refers to the complementarity of the resources contributed and it provides the basis for the exchange and the potential for value creation. The social component on the other hand refers to the intrinsic quality of the relationship itself, which has an impact on the nature of the exchange. Jarillo (1990) argues along the social component that it is neither pure market nor pure hierarchical relations that is critical for sustaining a relationship, but trust. Trust creates a common interest and shared expectations, which then facilitates the tolerance of both partial goals, conflict and temporary periods of inequity within

relationships, since each interaction may not be equally satisfactory to both parties but as long as they are satisfied with the general pattern of the relationship.

Despite many calls for research on organisational forms falling between traditional open markets and complete vertical integration, limited agricultural economics literature exists. The small number of research studies dealing with relational contracting or similar organisations has been mostly qualitative in nature. Researchers have moved towards defining contracting, providing reasons for their existence along the agricultural production and marketing chain, and extracting from the strategic management literature information on how to choose partner firms.

Den Ouden *et al.* (1996) point at specific market and production characteristics of agricultural food chains as additional motives for relational exchange formation. These characteristics include:

- Perishability of many products; variability of quality and quantity of supply of farm-based inputs due to biological variation, seasonality, random factors connected with weather, pests, or other biological hazards.
- Differences in lead-time between successive stages.
- Complementarities of agricultural inputs, meaning that they are available in joint packages only
- Stabilisation of consumption of many agricultural products.
- Increased consumer attention concerning both product and method of production.
- The fact that the internal quality of the raw material is the highest quality attainable for fresh products such as meat, and
- The need and availability of capital, especially at the primary farm stages.

The perishability of fresh produce increases the demand for timely marketing outlets or processing. Therefore, assured market access is imperative to suppliers of perishable products like sugarcane. The existence of capital-intensive production facilities make coordinated and continuous supply inputs necessary to recover costs and differences in lead-time between stages require efforts to match these to each other (Den Ouden *et al.*, 1996).

In most supply chains, each successive stage takes the services and inputs of the previous supplier and reassembles or otherwise adds value to pass on to the next stage, ultimately the final consumer. Therefore, the long-term viability of the relationship depends on the long-term customer satisfaction in the next production level. In the sugar industry, both the miller and the farmer need to be satisfied in their relationship on the basis of cane quality and quantity for the miller and for the grower. It relates to the payment rate, system and risk-sharing performance as well as the overall relationship.

The ability to satisfy partners in an exchange relationship depends in large part on making sure the risks and rewards are present for all partners to have an incentive to make the partnership work. Each partner needs to pursue a mature, long-term orientation towards sharing profits, especially if partners have to share in risk exposure. When the profit sharing is on a long-term basis, a partner's loyalty to serve and drive the overall relationship will be significant (Winter, 1995). Partners should expect a change in the level of control as well, because their actions depend on the other partner. Conflict may result if a partner performing functions in the relationship behaves in an opportunistic manner. Therefore, safeguards in the management of the contract should be established to minimize the incentive for shirking. Winter (1995) argues that the most successful partnerships are those that permit each firm to jointly determine a strategy that: (1) fits the environment and needs of the consumer, (2) requires each firm's distinctive competence, and (3) generates actions that each firm would not be able to do on its own accord.

2.6 GOVERNANCE STRUCTURES AND SUPPLY CHAIN PERFORMANCE

2.6.1 The influence of governance structures on supply chain performance

As a transition towards a global market economy, companies are increasingly focussing on specific high value adding manufacturing niches. Hence, it is common for companies to purchase goods from suppliers. To remain competitive, companies are constantly faced with the challenges of reducing time to market, improving product quality and reducing production costs and lead-times. These challenges cannot be met effectively only by change within specific organisational units but rather through critical dependence on the relationship and interdependencies between different organisations both internal and external to a given firm.

It is often argued that coordination between suppliers and buyers enable potential benefits to both parties involved. Therefore, the welfare of each business entity on the supply chain directly depends in the performance of others and their willingness and ability to coordinate.

The availability of resources is a critical factor in an organisation's ability to produce a product. As a result of this, the relationship a company has with its suppliers is an important contributor to the organisation's performance (Hoyt, 1996). The relationship between a buyer (processor) and a supplier (grower) can take many forms. At one extreme are the arms length single transaction relationships and at the other extreme are the relationships based on vertical integration, where the supplier is an integral part of the processor's organisation. The way an organisation chooses to transact for its inputs is determined by uncertainty in the environment, the investments required in assets, competition in the suppliers' market and the willingness of both parties to assume some level of risks.

Mechanisms for dealing with the inherent risk of transacting across organisational boundaries are effectively explained by transaction costs (Williamson, 1979). Williamson's theory recognises that agreements between organisations will in most cases be subject to risks from opportunistic behaviour, unless the parties are restrained by some form of governance mechanism. The prevalence of uncertainty and asset specificity is viewed as the most important factor in determining the most optimal structure of inter-firm relationships (Walker and Weber, 1984). For example, in competitive markets with low asset specificity, the buyer can easily dissolve the relationship if the supplier fails to meet his obligations. However, if the relationship involves large initial investments and there are few suppliers in the market the agreements will be complex and less flexible. Such agreements involve long-term commitment between the parties and they may inhibit an organisation's ability to respond quickly to market changes in case the agreement cannot be modified easily (Tirole, 1993, as quoted by Hoyt, 1996).

Transaction costs economics suggest that formal contracts between the buyer and supplier should be negatively correlated with performance. This is because, once contracts are drafted, they are not easy to revise. In contrast, informal agreements based on trust and commitments are more easily modified (Hoyt, 1996), thus they are positively related to performance. The ability of companies to enact agreements based on trust involves concepts not easily carried out in a competitive market. Companies that successfully deal with suppliers under social

contracts are likely to sustain efficient exchanges that have good performance. Therefore, governance mechanisms based on trust, commitment and mutual cooperation between processing companies and their suppliers promote better performance under conditions of environmental uncertainty, high asset specificity, and low competition in the supplier's market (Hoyt, 1996), as is the case with the cane growers and millers in the sugar industry supply chain. Supporting this notion, Jick (1992) suggests that boundaries between cooperating organisations can be dysfunctional if they prevent the flow of information or the development of trust. John (1984) on the other hand argues that clan systems and social contracts are alternative ways to opportunism, whilst Heide and John (1990) in their study of alliances in industrial purchasing argue that closer relationships between organisations result in more bi-lateral governance mechanisms. They found that inter-firm cooperation improved when there was trust and expectation of a continued relationship, idiosyncratic investments by both buyers and sellers and increased verification of the supplier's performance.

Transaction cost theory has shown that governance structures are generally designed to mitigate the costs of transactions by allocating risk (Coase, 1937; Williamson, 1979; Klein *et al.*, 1978). The theory was then extended by Grossman and Hart (1986) who focused on the role of asset ownership in alleviating the hold-up problem in relationships with specific investments. This approach has been employed by Klein and Murphy (1997) and Baker *et al.* (2002) to study the relative advantages between vertical integration and relational contracts in facilitating self-enforcement. Both studies predict that vertical integration will be used when markets are highly uncertain. In essence the studies imply that relational contracts will fail to be self-enforcing if transactors' reputation is not aligned with their short-term incentives (Fan, 2000).

Governance mechanisms are expected to safeguard the performance and continuity of supply chain relationships (to have a positive impact on relationship outcomes). However, it is argued that the strength of a relationship changes as suspicions of opportunism increase between the focal firm and the counterpart. When opportunism is suspected, the relationship is in danger. Bilateral idiosyncratic investments are intended to avert opportunism, but when suspicions arise this mechanism loses some of its potency because the suspicious party may begin to fear for its investments and withhold further cooperation. Trust tends to lose its potency too as a safeguard, but for a different reason. In reaction, organisations will tend to exert influence as trouble arises, thus diluting the impact of relational processes developed

between trusting parties. However, goal congruence is expected to gain potency. This is because the pursuit of compatible ends is unspoken, taken for granted when things are going well. When suspicion arises, goal congruence becomes more relevant. Thus, the parties should be able to appeal to these goals in order to effectively resolve their differences and safeguard the outcomes of their transactions (Lorenzen,1998).

2.6.2 Contractual relationship outcomes

There are many benefits of exchange, including short and long-term economic, non-economic (strategic) benefits, achievement of competitive advantage, expectation of continued relationship, and joint profit for supply chain participants. Competitive advantages are benefits including strategic advantages gained over competitors. Examples of such benefits include: superior access to resources, decreased supplies and inventory costs, and the development of unique process technologies. These benefits are long-term in nature and enable the participating firms to compete more effectively in the marketplace (Sethuraman *et al.*, 1988). Eventually, these advantages may be reflected in joint profit. However, financial performance and strategic performance are not perfectly correlated. To capture strategic performance, it is necessary to go beyond accounting-based concepts and capture other facets of organisational performance (Pearce *et al.*, 1987).

Joint profit performance results from joint efforts in an exchange. It is not merely a summation of the two firm's individually realisable profits, but indexes of financial outcomes that result from the interdependence of effort and investments that reside within the relationship. The expectation of better joint profits, either through lower costs or high revenues, could be a major motive for long-term relationships (Oliver, 1990) between cane growers and millers.

The firm's expectation of relationship continuity reflects the focal firm's perspective of the long-term viability of the relationship. When a firm expects that the relationship will continue into the future, it is more willing to engage in processes and make investments that will enhance the relationship into the long run (Anderson and Weitz, 1989; Heide and Miner, 1992). Although confidence in the future of the relationship is not a performance outcome, it is important since without it the firms adopt a short time horizon, and refuse to engage in activities which do not pay off quickly and with certainty (Williamson, 1993).

2.7 THE IMPORTANCE OF GOVERNANCE IN SUPPLY CHAINS INVOLVING SMALLHOLDER FARMERS

Humphrey and Schmitz (2002) view governance to involve coordination and include the act of parameter setting and enforcement. Governance arises when non market co-ordination of activities along the supply chain is required, whereby agents at one point in the chain set the parameters followed by agents at one or more other points in the chain. They argue that the main parameters defining the activities of a supply chain include:

- *What is to be produced*? This involves the design of products, both in broad conception and detailed specifications.
- *How it is to be produced*? This involves the definition of production processes, which can include elements of technology to use, quality systems, labour and environmental standards.
- *Physical product flow*. How much is to be produced, when and how the flow of product along the chain is to be handled.

The product specifications arise when manufacturers make products with integral design and require high level of customised components or when the buyer has a better understanding of the demands of the market than the supplier. Hence, the buyer interprets the market and informs the supplier of what is required. The specification of process parameters is a result of risks. For instance, potential losses along the chain arising from failure of participants to meet commitments (for example, delivering the right product on time) or failure to meet certain product or process standards (ibid.).

The issue of governance in value chains cannot be overemphasised. The main reasons for supply chain governance according to Humphrey and Schmitz (2002) include:

- *Access to market*. Smallholder producers need to access lead firms in the supply chain. These lead firms undertake the functional integration and coordination of internationally dispersed activities (Gereffi, 1999). Decisions taken by these lead firms may result in some of the producers losing out. Humphrey and Schmitz (2002) point out that research in the horticulture industry in the United Kingdom and Africa suggest that smallholder growers are marginalized and the main reason appear not to

be because of the efficiency advantage of large producers, rather because of the lead firms' sourcing strategies, which are influenced by consumers' expectations, safety and environmental requirements by governments and non-governmental organisations, as well as labour standards.

- *Fast track to acquisition of production capabilities.* Smallholder producers who gain access to supply chains find themselves in a steep learning curve, because the lead firms tend to be too demanding in terms of cost reduction, raising quality standards, and increase in delivery speed. However, these firms do transmit best practises and provide advice (though accompanied with pressure). Therefore, highly governed chains are characterised by such kind of challenges.

- *Distribution of gains.* Understanding the governance of the supply chain helps in understanding the distribution of gains between the supply chain members. Although subject to systematic verification within the supply chain, these governance related issues play a critical role in the debate, whether there is a fair spread of gains among the supply chain members.

- *Leverage points for policy initiatives*. Because supply chains are not just strings of market relationships, they can undermine government policy but also offer leverage points for government initiatives aimed at smallholder farmers' development. However, governments and non-governmental organisations concerned with raising labour and environmental standards recognise these leverages.

- *Funnel for technical assistance.* Multilateral and bilateral donor agencies seek to find ways to provide effective technical assistance to developing country producers. As a result they try to foster trans-national corporations (TNC) and small, medium enterprises (SME) partnerships.

The main idea is to combine technical assistance with connectivity. Therefore, the lead firms become the entry point for reaching out to small and medium sized suppliers. Research has shown that some buyers may require mentoring in order to fulfil this funnel of transmission. In the UK for instance, supermarkets in the horticultural value chain play an important role in

targeting those buyers when considering promoting smallholder production of export horticultural crops (ibid.).

2.8 TRUST AS A GOVERNANCE MECHANISM IN EXCHANGE RELATIONSHIPS

2.8.1 Definition of trust

Trust is defined as the buyer/supplier's confident belief in the supplier/buyer's honesty towards the buyer/supplier (Morgan and Hunt, 1994). Trustworthiness and trusting behaviour are considered distinct, but related aspects of trust (Andaleeb, 1996). While trustworthiness refers to a belief (Anderson and Narus, 1990; Anderson and Weitz, 1989; Morgan and Hunt, 1994), trusting behaviour on the other hand is related to the engagement in risk-taking behaviour that reflects reliance on another partner (Moorman *et al.*, 1992). Both the belief and reliance aspects of trust indicate the importance of uncertainty and vulnerability to trust in buyer-seller relationships (Achrol, 1997; Doney and Cannon, 1997). Trust is considered to exist if one party believes that the other party is honest or benevolent (Doney and Cannon, 1997). It is the expectation that attenuates the suspicion that one party in the transaction will behave opportunistically (Gulati, 1995; Bradach and Eccles, 1989). Thus, if trust exists in a relational contract, the contracting parties will be convinced that they will not be victims of behaviour, such as adverse selection, moral risk, hold up or any type of contractual hazard.

2.8.2 Types of trust

Sako (1998) identified three types of trust. These include contractual trust, competence trust and goodwill trust. Contractual trust rests on a shared moral norm of honesty and promise keeping, while competence trust requires a shared understanding of professional conduct, technical and managerial standards. Goodwill trust can exist when there is consensus on the principle of fairness. She argues that there is a hierarchy of trust, whereby fulfilling a minimum set of obligations constitute contractual trust, while honouring a broader set constitutes goodwill trust. Therefore, a movement from contractual trust to goodwill trust involves a gradual expansion in the congruence of beliefs about what is acceptable behaviour. Hence, opportunism is not a mere opposite of trust. But the absence of opportunism forms the

bases for both contractual and goodwill types of trust. Sako (1998) further argues that a supplier withholding a vital piece of technical information may not be acting opportunistically according to the strict contractual sense, but fulfilling the spirit of the contract through commitment and fair behaviour, is close to goodwill trust.

Faulkner (1995) analysed trust into three types; calculative trust, predictive trust and friendship trust. Calculative trust develops when each party calculates that the other can help it, and hence trusts the other in the hope that matters will work out well. This type of trust is also referred to as calculus-based trust, which is based on the idea of rational choice between the trusting parties. It emerges when the trustor perceives that the trustee intends to perform an action that is beneficial to him. For example, when the farmer trusts the miller because he knows that the miller will be punished if he lets him down, but also because the farmer has information that the miller is competent in some sense, which is important for the farmer to trust the miller.

With predictive trust, each party believes that the other will behave as it says it will because it has kept its word in the past. Gulati (1995) referred to such trust as prediction based or knowledge based trust. It is the extent to which "the person who trusts " can predict that the "person trusted" will act in good faith. This type of trust is a result of knowledge acquired about the responsible behaviour of the partners through repeated contact.

Friendship trust on the other hand develops when each party likes each other as individuals and therefore the trust takes on a more personal aspect. If this is also present, it is likely to make the relationship more robust and flexible when problems arise. This type of trust is similar to the goodwill trust. Medina-Munoz and Medina-Munoz (2002) referred to such trust as affection-based. It is based on the emotional links and bonds formed as a result of frequent interactions between participants in relational exchange. In the presence of affectional trust participants express; (1) a sincere interest in the prosperity of the partners, (2) a feeling that the relationship has inherent advantages, and (3) the belief that those feelings are shared. They argue that affectional trust reduces opportunistic behaviour.

In both cases the first two factors are about whether the other party can be trusted to be capable of achieving the desired result and if so, whether it can then be trusted to keep to its

word. These factors usually provide the basis for trust in more formalised relationships, which are bounded by rules, whether written or unspoken.

2.8.3 Sources of trust

Humphery and Schmitz (1998) identified three sources of trust, the institution-based trust, meso-level characteristic-based trust, and processed-based trust. Institutional based trust involves the use of institutional factors that can act as support for trust. It is generated by confidence in the 'formal structures' of society and more importantly in their ability to impose sanctions when trust is breached (Lane and Bachmann, 1996; Humphery and Schmitz, 1998). Examples of institution-based trust include the legal system and trade associations. Meso-level characteristic-based trust, is trust based on the characteristics or reputation of the transacting parties. Here group membership serves as an indication of trustworthiness, as is reputation. Trust derived from experience of co-operative interaction is referred to as processed-based trust. This form of inter-firm trust is built incrementally as firms repeatedly interact (Nohria and Gulati, 1996).

These three sources of trust can be hierarchically conceived in that they represent varying levels of trust. Institution-based trust, also referred to as 'minimal trust', is a necessary but not sufficient condition for the formation of co-operative trust-based relationships. The basis of long-term co-operative supply chain relationships is 'extended trust'. Extended trust is not confined to honouring explicit contractual obligations, but includes a demonstrated long-term commitment to building the supply chain relationship, i.e. processed-based trust. Building and maintaining extended trust relationships is a complex process. Moreover, this process is aggravated by asymmetries in firm size, which may exist in the supply chain. This is particularly relevant where a smaller firm, for instance the smallholder farmers, supplies a much larger dominant firm like the millers. In this case, the smaller firm is the more vulnerable partner. Consequently, the responsibility rests with the dominant firm to initiate a collaborative trust based relationship (Humphery and Schmitz, 1998). Similarly, the broader business or institutional environment in which firms operate can contribute or detract from the formation of trust-based relationships (Lane and Bachmann, 1996).

2.8.4 Trust as an economic asset

Generally, an asset is a resource that creates benefits for a firm and the value of an asset can be measured and it depreciates overtime. Assets also have an opportunity cost and can complement or substitute for another (Wilson and Kennedy, 1999). Welsch *et al.* (1976), as quoted by Wilson and Kennedy (1999), argue that even unidentifiable intangible assets such as goodwill can be purchased, amortized, and sold. They point at reputation as one determinant of goodwill. Such reputation may be valued with other contributors to goodwill as present value of the expected future earnings of the firm. Dasgupta (1988) uses game theory to illustrate the economic value of trust. He argues that trustworthiness is similar to other assets such as knowledge and information.

According to Lorenzen (1998), trust is of economic value because it allows agents to initiate and maintain cooperation without safeguards. He argues that if trust is common amongst the whole group of agents, widespread flexible cooperation is a real option. He further argues that the importance of trust for economic action and cooperation applies to both principal-agent relationships within firms, relationships between firms and customers and between managers and independent business firms.

Trust is considered of economic value when it is based on non-contractual, rather than contractual mechanisms. Non-contractual trust such as goodwill eliminates the need for formal contracts, which are costly to write, monitor, and enforce (Barney and Hansen, 1994; Dyer, 1997), and thus it reduces transaction costs. For example, in conditions of high trust, transactors spend less time and resources on ex-ante contracting because they trust that pay-off will be divided fairly. Thus, there is no need for future contingencies (Dyer, 1997). Trusting parties spend less time and resources on monitoring to see if the other party is not shirking or is fulfilling the spirit of the agreement. This is because parties have confidence that each party will not take advantage of the other even when there is a chance to do so. When there is high trust, transactors spend less time and resources on ex-post bargaining and haggling over problems that may arise during the transaction process. Therefore, trusting parties assume each party is acting in good faith and will interpret behaviours positively (Dyer, 1997; Uzzi, 1997). In addition to reducing transaction costs, trust also enable participants in an exchange relationship to share important confidential information and

encourage them to make relationship-specific investments, which in turn enhance productivity in the exchange relationship without fear of opportunism (Parkhe, 1993; Dyer, 1997).

2.8.5 Trust as a governance mechanism

Several scholars have long recognised the importance of trust in an exchange relationship (Gambetta, 1988; Frank, 1988; Macaulay, 1963). The importance of trust results from the impossibility of establishing complete contracts that account for all contingencies (Macaulay, 1963). Recently, it has been recognised that the role of trust goes beyond just complementing incomplete contracts, but actually playing an effective role as a governance mechanism (Barney and Hansen, 1994; Sako, 1992, 1998).

One way of viewing the supply chain is to see it as made up of a number of dyadic relationships. In this rather atomistic conception actors only meet for a specific contract to buy and sell, there is no memory and no social context. The dyad is a one-time link. The theoretical analysis of long term dyadic relations in the past decade has largely been based on a comprehensive contracting model, in which society is portrayed as being comprised of isolated, self-interested individuals where contract law supplies the needed glue to hold individuals to their bargains. Yet this comprehensive contracting view of the world is an unrealistic description of both business relationships and the legal practise of contract law.

Macaulay (1963) introduced an alternative view to the neoclassical theory of contracts. He maintains that the importance of law in contractual relations has been vastly overstated and he argues that economic agents construct productive relationships mainly without reference to the legal system (Macneil, 1985; Klein and Leffler, 1981). They use a variety of purely private mechanisms such as personal trust, calculative trust, reputation and constructed mutual dependence. The main issue between the relationship governance through legal institutions and trust lies in the relative roles of trust and law in promoting cooperation (Deakin, Lane and Wilkinson, 1997).

Sociologists such as Grief (1996) and Granovetter (1985) argue that relationships are embedded in a broader social structure. Therefore, social or network relations affect the nature of interactions between traders and they provide powerful enforcement mechanism when a potential for dispute exists (Galanter, 1974). Businesses rarely resort to legal

remedies and even when they do, they find that contract law is not interpreted according to classical principles. The assumptions of neo-classical discourses of economics and law with regard to contract have been challenged by many scholars in the sociological and socio-legal literatures (Lewis and Weigert, 1985; Mayer, *et al.*, 1995; Luhmann, 1988; Zucker, 1986; Campbell and Harris, 1993). In commercial reality, trusting and cooperative relations are the norm rather than the exception because the majority of businesses do not engage in 'single-games' (Antle, 1984) or in 'discrete' contracting (Macaulay, 1963; Macneil, 1974).

It has been argued that trust is a positive factor in business relationships and that the transaction cost among individuals interacting with each other is lower in high trusting relationships. The main reason for this is that the need to negotiate agreements is not as frequent in high trust relationships as in low trust relationships. Trust between firms designates the nature of the working relationship between the firms. Where a firm can trust its partner, both initial negotiations as well as on-going relationship negotiations are eased. The risk of opportunistic behaviour by the other partner is reduced in the presence of trust (Bradach and Eccles, 1989; Chiles and McMakin, 1996; Hill, 1990). Trust allows a firm to rely on the partner confidently (Moorman *et al.*, 1993). Trust has also been shown to relate to the incidence of constructive conflict resolution and to act as a substitute for other governance mechanisms such as contractual safeguards (Weitz and Jap, 1995; Gulati, 1995; Gundlach and Murphy, 1993; Heide, 1994; Parkhe, 1993; Ring & Van de Ven, 1992). It allows for exchange that otherwise would be hazardous to a partnering firm, such as that involving provision of sensitive technical information to an exchange partner (Gundlach *et al.*, 1995). Trust affects the confidence in partner cooperation and the interaction between trust and control influences the development and maintenance of partner relationship confidence (Das and Teng, 1998). Trust and authority measures have been shown to interact, such that where there is a history of trust, there is less need for authority since the potential for authority advantage to disrupt a relationship may be mitigated by the existence of trust.

2.9 THE SOCIAL CONTEXT OF RELATIONAL EXCHANGE

2.9.1 Power and dependence

In any business relationship the balance of power and the degree of dependence or interdependence will help shape the atmosphere of the exchange process and the relationship. In this study power is defined as the ability of one party to influence the actions of the other (Gaski, 1984). The perceived balance of power is what becomes important, since it is not the use of the power within the relationship, which can change the actions of the parties, but the knowledge that power exists. It is considered that the relative dependence between the parties in the relationship determines their relative power (Hallen *et al.*, 1991). Hence, the need in an analysis of an atmosphere to investigate not only dependence, but also the degree of mutual dependence between the parties.

If party A perceives that he/she is dependent on party B and that party B is not dependent on A, then that would give party B a certain degree of power in the relationship. However, party B would only have that power if they hold the same perception of power differences. This is where perceptions become very important in shaping the actions of the parties and therefore the shape of the relationship. In this study the relationship between cane growers and millers is shaped by the perceptions of each other relative to the power position of self and the other party. Dependence in the sugar industry may result from several factors, including lack of alternatives by cane growers and the importance of sugarcane to the millers.

Pfeffer and Salancik (1978) suggest that organisations respond to the demands of other organisations that control critical resources. From this, power and dependency may be seen as opposite on the same continuum in that firms in a business relationship can be expected to adapt to each other to the degree that they are dependent on each other's resources (Hallen *et al.*, 1991). In other words, if one party holds the balance of power based on control of critical resources then the other party may be dependent on that party.

2.9.2 Cooperation, dependence and competition

Cooperation and dependence are the two extremes of the same continuum, going from a desired bilateral investment in the relationship to a constrained maintenance of the

relationship from one of the two parties regarding the difficulty to replace his partner (Emerson, 1962; Dabholkar *et al.*, 1994). Cooperation between a customer and a supplier is based on balance, harmony, equity and mutual support (Oliver, 1990). It combines a very positive state of mind and a very positive behaviour on behalf of each party. Cooperation is a bilateral management where the two parties involve common investments and coordinated actions (Anderson and Narus, 1990; Wilson, 1995), voluntarily (Morgan and Hunt, 1994) with the objective of making a profit (Smith *et al.*, 1995).

Cooperation and competition are seen in most of the interaction literature as being opposite along the same continuum as in the power and dependency situation. In simple terms, cooperation is the willingness by both parties to work towards common benefits or an attitude towards work in common, and this work in common is seen as "tit-for-tat", which inevitably gives benefit to both parties (Hallen and Sandstrom, 1991).

Competition on the other hand implies a lack of will to cooperate towards joint goals (Hallen and Sandstrom, 1991). Competition is not necessarily a negative influence on the relationship, but it may cause conflict in certain cases, which may be counterproductive in the development of the relationship. It is relevant therefore to look at both cooperation and lack of cooperation in assessing the atmosphere of relationships. More especially lack of cooperation, because it can cause a few problems, which may result in conflict. Reliance on perceptions in this regard is of importance since what one party may consider a problem the other party may not perceive as a problem or lack of cooperation. Hence, the perception of cooperation by millers and cane growers is vital in assessing their relationship.

Several studies have described the kind of actions and investments involved in cooperative relationships (Anderson and Narus, 1990; Dwyer *et al.*, 1987; Wilson, 1997; Mohr and Spekman, 1994; Morgan and Hunt, 1994). Even if there is reduced consistency between their results, it is clear that in all these studies the main effect of cooperative actions is to influence the behaviour of the parties, leading to a regular and stable relationship. Dependence may result to asymmetry of power between the two parties (Dwyer et al., 1987; Geyskens *et al.*, 1996; Wilson, 1995). This asymmetry of power may exist from the customer towards his supplier or from the supplier towards his customer (Dabholkar *et al.*, 1994).

2.9.3 Trust and opportunism

Trust is often equated as being inversely proportional to opportunism. Williamson (1992) believes that trust is only warranted when the expected gain from placing oneself at risk to another is positive. Hence, the assumed unidimensionality of trust and opportunism. This behaviour can manifest itself in the exchange of goods, services, and information. Since trust in a relationship is built up overtime, close continuing relationships are regarded as being vital in generating trust and characteristics such as predictability of behaviour in terms of repetitiveness, reliability, competence and credibility are also considered important in generating trust in relationships (Wilkinson and Young, 1989). Therefore, these characteristics are essential in measuring trust, but also helpful in assessing the degree of trust and the existence of legal agreements as well as the degree to which these are used within the relationship. The measurement of trust and its effects on the relationship characteristics and development, are mostly based on some supposed aggregate value, as opposed to potentially differing perceptions of trust the parties may have about their relationship.

2.9.4 Trust and commitment

Many studies on industrial buying patterns emphasise the crucial role of trust and commitment in facilitating relationship performance. These two variables are very often studied together and there is considerable agreement about their combined action on organisational buying behaviour (Morgan and Hunt 1994). Based on Moorman *et al.* (1992), trust is regarded as the willingness to rely on an exchange partner in whom one has confidence. Anderson and Narus (1990) define trust as the firm's belief that another company will perform actions that will result in positive outcomes for the firm and not take unexpected actions that result in negative outcomes.

Ganesan (1994) posed two distinct components of trust; (1) credibility, which is based on the extent to which one partner believes that the other has the required expertise to perform the job effectively and reliably, and (2) benevolence, which is based on the extent to which one partner believes that the other has good intentions and motives beneficial to the first when new conditions arise, conditions for which a commitment was not made.

Morgan and Hunt (1994) argue that the presence of commitment and trust is central to the success of relationship marketing, not power and its ability to "condition others." They argue that commitment and trust are "key" because they encourage suppliers to; (1) work at preserving relationship investments by cooperating with exchange partners, (2) resist attractive short-term alternatives in favour of the expected long-term benefits of staying with existing partners, and (3) view potentially high-risk actions as being prudent because of the belief that their partners will not act opportunistically. Therefore, when both commitment and trust (not just one) are present, they produce outcomes that promote efficiency, productivity, and effectiveness. Commitment and trust lead directly to cooperative behaviour that is conducive to the success of a relationship.

Regarding commitment, the concept has been widely investigated in the literature, mostly by Relationship Marketing and International Marketing Purchasing (IMP) researchers. The diverse perspectives of the researches have lead to a variety of definitions, hence creating confusion (Kim and Frazier, 1997). Derived from some of the most important researches carried out (Anderson and Weitz, 1992; Dwyer *et al.*, 1987; Moorman *et al.*, 1992; Morgan and Hunt, 1994), the concept can be defined as the willingness of a party to develop and maintain his relationship with another party. Commitment implies the importance of the relationship to the partners and desire to continue the relationship into the future. Thus, commitment assumes that the relationship will bring value or benefits to both parties. Because commitment may be motivated by different factors, hence there are different types of commitment (Meyer and Allen, 1991; Geyskens *et al.*, 1996). These include affective and calculative commitment. In affective commitment a partner would desire to continue a relationship because he likes the other partner and enjoys the relationship. In contrast, calculative commitment is the extent to which a partner perceives the need to maintain the relationship given the significant anticipated termination or switching costs of terminating a relationship. It is a result of calculation of costs and benefits, encompassing assessment of idiosyncratic investments and availability of alternatives (Geyskens *et al.*, 1996).

Geyskens *et al.* (1998) argue that the feelings of trust and commitment influence partners' behaviour, driving them to engage in long-term relationships. The main idea is that one partner's trust and commitment are closely linked to the regularity and the stability of his exchange. A confident partner would not have an incentive to switch to another partner, but will commit him/herself to maintain the relationship, thus, a stable relationship develops.

Commitment manifests itself not just in the investment adaptations the parties make to each other, but also in the perceptions each partner has about the other's degree of commitment to the future of the relationship. Ford (1980) argues that the development of a relationship is dependent on the perceptions of commitment held by each party. Commitment may be shown by investment of time or money in the relationship or it may just be a willingness by one partner to make changes and work towards mutual goals and benefits.

2.9.5 Trust, commitment, cooperation and satisfaction

The relationship between trust, commitment, cooperation and satisfaction has been described in different ways in the literature. Although the existence of a link between the four variables seems obvious in the vast majority of the studies, there is limited agreement about which variable is an antecedent or a consequence of the others. Several researchers have, however, established trust as an antecedent of commitment (Geyskens *et al.*, 1996; Morgan and Hunt, 1994; Dwyer, *et al.*, 1987). Most of them were based on the works of Dwyer *et al.* (1987) and Morgan and Hunt (1994). Theoretical and empirical researches have shown that if one party does not trust his partner, he will not commit himself to the relationship with the partner. In addition, the results of several other studies indicate that satisfaction is an antecedent of trust (Ganesan, 1994). Thus, a non-satisfied partner will not be able to feel confident in his partner, while others argue that trust is an antecedent of satisfaction.

Wilson (1995) presents thirteen variables that have theoretical and empirical support to buyer and seller relationships. These include; commitment, trust, cooperation, mutual goals, interdependence, performance, satisfaction, comparison level of the alternative, adaptation, non-retrievable investments, shared technology, summative construct, bonds (both structural and social bonds). This shows that commitment and trust are the most dependent variables used in buyer-seller relationships studies (Dwyer *et al.*, 1987; Moorman *et al.*, 1992)

It has been demonstrated that there is a link between cooperation and trust. Trust is an antecedent of cooperation in industrial relationships (Ring and Van de Ven, 1994). Morgan and Hunt (1994) give the details of the direct influence of trust and commitment on cooperation. They argue that to achieve cooperation, some degree of trust and commitment is essential. Kim and Mauborgne (1997) determined that fair process between exchange partners like the cane growers and the millers would help to bring about trust and commitment, which

in turn, maximise co-operation and business performance. In contrast, traditional tools of resource allocation, economic incentives and organisational structure tend to produce an attitude of outcome satisfaction, which will lead to compulsory co-operation, and a lower level of performance. The greater the levels of trust between exchange partners, the more likely the cooperation between exchange partners and cooperation itself breeds trust (Figure 2.1). Therefore, trust enables things to happen. As a bilateral investment in the relationship, cooperation seems to exist in most of the regular and stable relationships. After a period when satisfaction, trust and commitment have developed, the two parties begin to engage in activities such as co-development of products, co-investments, and technical advice. This cooperative behaviour reinforces the relationship, the stability and the regularity of purchases.

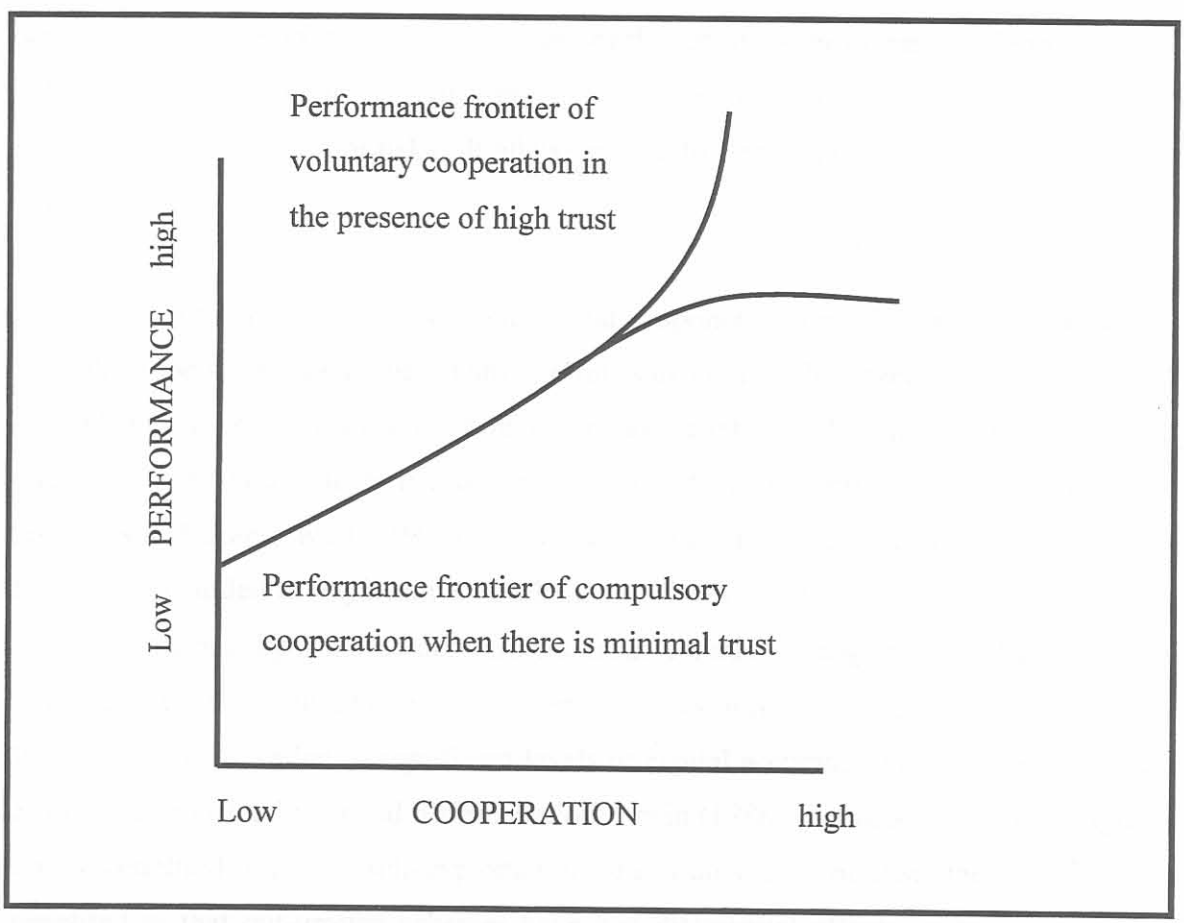

Figure 2.2: The effect of trust and cooperation on performance

Source: Kim and Mauborgne (1997)

2.10 EMPIRICAL STUDIES ON CONTRACTUAL RELATIONSHIPS IN AGRICULTURE

2.10.1 Economic benefits of contractual relationships

The economic assumption of contracting is that parties get more benefits from the contractual relationship compared to non-contracting parties. The best contractual outcome as put by Poirier and Reiter (1996) would be when both parties in the relationship experience a win-win situation. Contracts enable organisations to concentrate on their core competences and out-source all other production and service activities needed in the business. In a way contracts allow division of labour. A contract is a binding promise to deliver in the future to the other party a service or product against payment or other counter-performance. Hence, contract law is based on monetary terms. The contract therefore, is viewed as a tool that the contracting parties use to divide future risks. It allows parties to better anticipate future behaviour of the other party.

According to the neoclassical economists and proponents of agribusiness, a contract ensures mutualism between contracting parties (Binswanger and Rosenzeig, 1986). When freely entered into, a contract allows growers to make better use of their specific endowments in imperfect markets and to arrive at combinations of income, effort, and risk reflecting their resources and tastes (Watts, 1994). However, viewed from the dependency position, contract farming is regarded as exploitative (Dinham and Hines, 1983). This assertion overlooked the benefits obtained by smallholder farmers from contract arrangements. Buch-Hansen and Marcussen (1982) contradicting the dependency position, argue that out-grower schemes in Western Kenya have led to significant levels of capital accumulation, and benefiting sections of the peasantry lead to social differentiation. Levin (1988) concluded that, while agricultural capital benefited from the "self-exploitation" of peasants, in some cases the peasants have also benefited in that out-grower schemes have had differential effects on the peasantry. They provided the conditions for the reproduction of both a middle and rich peasantry.

Bucklin and Sengupta (1993) argue that there are many benefits from contractual relationships as there are the motives for entering into such relationships. However, understanding contractual relationship outcomes is critical because many contracts are said to have poor outcomes and are difficult to track quantitatively. Different scholars have

evaluated contractual relationship outcomes in different ways; for example, objective measures such as duration (Parkhe, 1998; Gulati, 1998), perceived effectiveness (Bucklin and Sengputa, 1993; Mohr and Speckman, 1994) and sales (Mohr and Speckman, 1994). Bucklin and Sengupta (1993) identified five factors affecting the effectiveness of contractual relationships. These include project management (power imbalance, managerial imbalance and conflict), project pay off, partner match (prior history, organization compatibility), age and rate of technological change.

Kliebenstein and Hillburn (1992) in a study of contracts in the poultry industry argue that the advantages and disadvantages of contracting are different for contractors and contractees just as their reasons for contracting. For the farmer the advantages include; reduced risk, reduced capital needs, improved technical support, more fully utilised labour and facilities, improved cash flow and the opportunity to produce a product. Contract farming provides an assured market for the grower, access to the company's services, and easy access to credit. Even if the company does not give loans, the contracts are generally accepted by banks as collateral (Levin, 1988). However, the disadvantages include; loss of managerial control, the need to work with contract management, and unguaranteed facility use. The advantages to the contracting firm include; reduced capital requirement, reduced coordination of production to match input supply, improved product uniformity, and a reduction or sharing of risks. The risk with respect to consistent supply and quality of inputs would be reduced. However, by offering a base payment in both good and bad years to the contractees, the contractor assumes the risk associated with a volatile pricing system of livestock in the open market (Zering and Beals, 1990).

A survey by Rhodes and Grimes (1992) indicated that contractees were asked for reasons that make contractors and contractees to enter into contracts. The two most popular answers, in 1990 were (1) lack of capital, and (2) contracting was less risky than independent production. In 1992 there were five top reasons and they were ranked a little different from those given in 1990, namely (1) contracting is less risky, (2) contracting provides more income or a better cash flow, (3) contracting is a way of getting started, (4) I like it, it is better for me, and (5) contracting simplifies management.

A closer look at the literature on contracts indicates that there is a consensus that contractual relationships improve the income stability of the farmers, facilitate risks sharing, ensure

technical support to the farmers, provide assurance of a market and provide access to credit (Rhodes and Grimes, 1992; Kliebenstein and Hillburn, 1992; Zering and Beals,1989; Laura, 1994; Hillburn, 1993; Hennessy and Lawrence, 1999).

2.10.2 Smallholder farmers within a contractual relationship

Contractual relationships are a result of organisations reacting to the competitive business environment. These relationships require organisations to focus on developing their core competences in order to be competitive in the market. In line with this reasoning, organisations evaluate what is the firm's knowledge base and which functions produce the most value for the customer? What functions and processes can be out-sourced and which processes and know-how areas are strengthened and by what means? (Anderson *et al.*, 1994). Should the firm hire more experts or start a co-operational relationship? Firms bring their entire relationship network into the cooperation effort, as the individual firms do not operate by themselves, but they usually belong to several different networks of companies. Hakansson and Snehot (1995) define the relationship approach as an inter-company relationship development followed over time, rather than on single exchange episodes and transactions. Relationships are valuable resources, which provide considerable returns on the investment of time and money devoted to their development, though they do not appear on the balance sheet. Thus, relationships can be a source of value creation for stakeholders.

Literature describing business relationships has shown a glut of diverse attempts to characterise and describe the relationship concept as the relationship is examined from different perspectives (Hakansson and Snehota, 1995). This is a result of the variety of business environments from which these relationships originate, develop and break up. Therefore, depending on the business context, relationships have their own distinct personalities and no two relationships are alike. Such heterogeneity is a problem, though it can be positive for the relationship.

Advocates of contractual farming promote it as a dynamic partnership between trans-national corporations and small farmers that benefits both, without sacrificing the rights of any of them. It is offered as a vehicle for the transfer of technology, the modernization of smallholders, and the creation of a stable and politically conservative class of family farmers. The increase in incomes and use of modern technology by peasant farmers is regarded as

evidence of the unambiguous benefits of contract farming to all concerned (Clapp, 1994). Contract farming, however, is criticised in that it would lead to disruption of subsistence production and inevitably impoverishment of the rural poor, and it is seen as the latest instrument for the subordination of the smallholders, creation of a class of virtual "development peons". Clapp (1994) notes that writers in the dependency tradition focus on the company's role as the sole purchaser of the farmer's produce and sole supplier of the essential inputs and credit. Hence, this raises the issue of domination and subordination, an issue that advocates of contract farming tend to ignore.

Glover (1987) in a study on contract farming argues that contract farming can present a variety of problems for the smallholder out-grower farmers. Many of these problems could be a result of difficulty in coordinating the production and deliveries in a manner that ensures optimal flow of raw material to the processing firm. Glover (1987) suggests three main sources of difficulty in coordination; (1) failure of growers to comply with company instructions, (2) the company's lack of physical or managerial capacity, and (3) exogenous variables like weather, and competition for a company-owned machinery during harvesting periods.

Woods (1999) points out that the main issues of concern in supply chain management include: sharing of long-term development goals and seasonal business planning; the relationships between operational staff within the businesses on issues such as timing, amount, ripeness and temperature of deliveries; the development of shared quality and safety standards and how they will be measured and monitored; the information systems to track product and standards. At the farmer level, Woods (ibid.) argues that technical and professional issues required to support a supply chain may include: (1) facilitating the development of relationships between farmers to allow their participation; (2) the development of relationships between members of the supply chain; (3) information flows between members of the supply chain; and (4) establishing common standards between members of the supply chain and optimising performance within each level of the supply chain, as well as in the linkage processes. She points out that, in most cases, farmers avoid to be members of a supply chain because they fear to lose independency, possible break-up of an existing relationships and the culture of being used to spot market transactions. The spot market transaction is based on the idea of increasing the existing pie, while the supply chain culture is based on sharing the benefits of the pie.

Woods (1999) in a study of the horticulture supply chain in Australia found that Australian horticultural producers who established relationships with either a domestic or an export supply chain can be provided with a plan of quantity, a timing of supply, and have agreed pricing arrangements. Woods argues that a relationship ensures immediate feedback on holding quality and presentation. Retailers in the horticulture industry depend on their suppliers in a similar way as the suppliers depend on the retailers. This suggests that there is mutual dependence and cooperation between the parties. This is evidenced through price negotiations. Such negotiations recognize the value of each partner and the need to invest in an ongoing loyalty to the relationship and ensure that all players in the chain have an incentive to continue to operate. Hence, "closer relationships also provide opportunities for farmers to extend their operations along the supply chain. For example, additional grading which improves product shelf life and reduces wastage represents extra value added by the farmer and can be recognized with high payment by retailers" (Woods, 1999: 4)

2.10.3 Trust and supply chain performance

Several empirical studies, which acknowledge the contribution of the New Institutional Economics (NIE) to supply chain relations, suggest that the main factors influencing efficiency in a supply chain include informal elements, which comprise of trust, norms or standards that support exchange relations irrespective of contractual obligations and authority relations, which are exerted throughout the supply chain by those who have superior power in relation to the market or information (Cullen and Hickman, 2001).

Milford (2002) in a study of the state of the value chain in the Australian Sugar Industry, found that millers perceive the level of trust between millers and growers to be better than the perceptions of growers and harvesters. Milford attributed the perception of lack of trust by growers and harvesters to the poor performance of the industry in the past, individualism on growers' part and perceived power and information imbalances.

A study by Medina-Munoz and Medina-Munoz (2002) on the role of trust in inter-organisational relationships' control and success found that all the different types of trust used in the analysis were positive and significantly associated with the success of the relationship

between tour operators and accommodation companies. This suggests that trust is associated with the success of the relationship.

Tregurtha and Vink (1999), in a study of trust and supply chain relationships using a case study of the South African Breweries (SAB) and the Taung barley project, found that the efficiency of barley production in Taung determines whether the trust relationship between the farmers and SAB will continue. They argue that trust cannot make an economically bad relationship good, but all it can do is make a good relationship better. The SAB emphasised that sound economic principles determine the long-term future of their involvement with the farmers. Similarly, the small-scale farmers who are involved in this supply chain indicated that they would only continue to produce barley as long as it represented the most profitable allocation of their resources, subject to their low risk preference. They pointed out that the trust alliance they have with SAB raises their net profit margin because it reduces their transaction costs. However, the scope for cost reduction is limited and cannot compensate for inefficient resource use. These findings imply that trust is a result of the benefits the individuals realise in the relationship. However, the study was qualitative in nature, hence it lacked the quantitative importance of trust in the relationship.

Morgan and Hunt (1994) argue that trust and commitment are very important factors if a company is going to succeed with its relationship marketing. They conclude that trust is positively affected by shared values and communication among supply chain partners, but negatively affected by the presence of opportunistic behaviour. They viewed shared values as the extent to which the trusting parties' goals, behaviour and way of work are congruent. In their view, communication is the extent to which information is shared between the parties, whereas opportunistic behaviour refers to the degree at which parties seek individual gain. Morgan and Hunt's results correspond to their model. They found that the presence of trust in a relationship has a positive effect on commitment, cooperation, and functional conflict, and a negative effect on uncertainty. Considering Morgan and Hunt's findings, it is clear that they were dealing with relational trust as opposed to the other types of trust.

A study by Moore (1998) aimed at understanding the importance of relations within logistic alliances also studied the concept of trust in relationships. Though the study was not exclusively about trust, it also focused on factors affecting the development of buyers' trust and relationship commitment in logistic alliances (Moore, 1998). The study assumed that

equity is important for the development of trust, where equity implies the sharing of benefits and burdens. This assumption that equity is an important factor for the creation of trust was supported by Moore's empirical findings.

Doney and Cannon (1997) examined how trust emerges and the impact of trust on buying behaviour in business-to-business relationships. Two kinds of trust were studied and they involved trust between the customer and the selling company as a whole and trust between the customer and front-line employees of the selling company. Doney and Cannon assumed that customers that trust companies as a whole are dependent on calculus factors, such as the selling company's image and size. The logic to trust front-line personnel is different for different customers. Therefore, trust in this context depends on emotional factors such as social contact, similarity between parties and mutual affections, but also on harder factors like power and expertise.

Scholars in chain relationships increasingly acknowledge the role of interpersonal factors such as trust on inter-firm outcomes. Larson (1992), studying the governance of exchange relationships, found that personal relationships and reputations, coupled with knowledge of the firm's skills and capabilities, shape the context of new exchanges between firms by reducing risks and uncertainties about the motives and intentions of the other firm. Several studies suggest that interpersonal trust operates in an independent, yet complementary manner to many organisational variables (Andaleeb, 1992; Anderson and Narus, 1990). For example, it facilitates relational processes, such as collaboration and relational norms, but has limited impact on performance (Jap, 1999; Moorman, Zaltman and Deshpande, 1992). However, empirical results suggest that interpersonal trust is capable of safeguarding joint competitive advantages against varying levels of ex-post opportunism. Thus, adverse effects of opportunism suspicions may be limited to less tangible relational outcomes, such as expectations of continuity and evaluations of an exchange counterpart.

2.11 FACTORS AFFECTING SUPPLY CHAIN PERFORMANCE

A firm's competitive advantage no longer depends on its own internal capabilities but on the links it forges with external organisations (Lewis, 1995). Inter-firm relationship performance is complex, multidimensional, and includes affective, behavioural, and economic aspects

(Johnson and Raven, 1996). Relationship performance describes the perceived contribution of the relationship to the members of the supply chain compared to what they could realise outside the relationship (Sollner, 1999). A relationship's positive performance is what makes the partner firm to stay in the relationship because it wants to as opposed to being pressured by external forces. Sollner argues that although Williamson (1985) emphasises efficiency or economising transactions as performance measures in exchange relationships, such an approach cannot satisfactorily explain the existence of different organisational arrangements. This is because firms enter into close business relationships for a variety of reasons. Moreover, measuring performance for privately owned firms in a supply chain is often problematic due to the unavailability of performance data to the public. As a result, subjective measures are often used in measuring relationship performance (ibid.).

There exist two schools of thought about the success of a relationship. The first school of thought advances that the concept of success is associated with the general satisfaction of participants within the inter-organisational relationship (Anderson and Narus, 1990). Satisfaction is defined as a positive emotional state resulting from the assessment of all the aspects of a well functioning relationship maintained by one organization with another. The concept of satisfaction is based on the premise that success is determined by a partner's positive experience of the other partner's ability to meet the norms and expectations of performance (ibid.).

The second school of thought advanced by Johnson and Lawrence (1988) refers to success in inter-organisational relationships as a quantitative measure of mutual benefit obtained by organisations participating in the relationship. Organisations use measurements of financial results, such as profits, or market share, inventory and reduction of costs (Beamon, 1999). However, Beamon argues that such measurements may not be adequate for the analysis of the entire supply chain. Anderson and Narus (1990) considered that many relationships might require a long time before the results can be measured. They argue that success refers to the overall assessment of an inter-organisational relationship by the associated organisations. Therefore, success is nothing else but the generation of satisfaction for the organisations participating in the relationship, resulting from the fulfilment of the expectations of performance. Thus, this study uses satisfaction as a measure of performance. Satisfaction is a close proxy for perceived effectiveness and has a potential to predict future actions of chain participants.

Varadarajan and Cunningham (1995) have called for a systematic analysis of the factors associated with inter-firm benefits. A holistic, perceptual approach to measuring relationship performance as the primary firm benefit in the negotiation context is desirable because it is flexible to capture the diverse and idiosyncratic evaluation criteria of the firms negotiating alliances (Yan and Gray, 1994). It is believed that in addition to standard objective performance measures such as financial returns, interests of the partners extend to matters such as reputation enhancement/protection, relationship maintenance and precedent-setting (Lax and Sebenius, 1986; Savage *et al.*, 1989). It should be noted, therefore, that perceptual performance measures have shown to correlate well with more objective criteria such as financial performance (Geringer and Hebert, 1989). The concern over appropriate evaluation criteria has been shown to be particularly important for relationships utilising diverse control mechanisms such as authority and trust.

Ittner and Larcker (1997) in their study on quality strategy, strategic control systems, and organisational performance, describe their exploratory analysis of the impact of a number of process-management techniques, including some supply chain practises, on overall firm profitability. The supply-chain management practices these authors examine are the extent of supplier or customer involvement in product design, the importance of non-price factors in partner selection, and the establishment of long term partnerships with suppliers and customers. They found that establishing long-term partnerships with suppliers and customers improves profitability. They argue that the most important factor in measuring performance is the understanding of the role of formal versus informal control mechanisms in implementing and monitoring strategic plans. Their study shows that several strategic control practises are negatively associated with performance, which they argue is consistent with claims that formal strategic control systems can actually hinder performance in some circumstances by focusing attention on formal and rigid action plans, targets, and information gathering when flexible and creative strategic responses may be more appropriate.

Forker (1996) studied factors affecting the supplier quality performance and found that when transaction-specific-investments are considered in the performance analysis, supplier's economic dependence on the customer was negatively correlated to the quality of the components produced and supplied. He argues that such findings support the theory of transaction costs, which predicts that asset specificity increases transaction costs regardless of governance type. Forker further argues that although the results did not support TCE's

assertion that bilateral dependence will result in market failure, because the customer's economic dependence on its suppliers was not significantly related to component quality performance. However, since market failure is embodied in suboptimal performance by either the buyer or the supplier on any of the dimensions in which they evaluate their exchange relationship, the negative correlation of the supplier's dependence to performance supports TCE theory.

Ramdas and Spekman (2000) used six variables that reflect different approaches to measuring supply chain performance. These included inventory, time, order fulfilment, quality, customer focus, and customer satisfaction. Their results indicate that authority balance is positively related to alliance performance. The more one partner controls the alliance through authority advantage, the greater the likelihood that the alliance would perform poorly. The interaction between trust and authority shows that the existence of trust affects the relationship between authority balance and performance. In the case of the relationship between authority balance and performance, it is shown that trust dampens the positive relationship. Trust and authority balance serve somewhat as proxies for each other in the prediction of relationship performance. Where a firm can trust its partner, the balancing of authority is not as critical for enhancing performance. Teegen and Doh (2002), concurring with Ramdas and Spekman (2000), conclude that trusting relationships are perceived to promote alliance performance and that the presence of authority advantage has a negative effect on alliance performance, which is further worsened by the absence of trust.

Paulin *et al.* (2002), studying relationship strength and the performance of business-to-business partnerships in emerging biotechnology clusters, conclude that the performance of partnerships in biotechnology clusters depended on how strong the parties see their relationship. They argue that: long lasting exchanges, with perceptions that partners are able to adapt to changing circumstances, might lead to formal or informal agreements to solve their problems, to the satisfaction of both parties (flexibility); the degree of mutual trust, commitment and benefits reflected through cooperative relationships in which each party would not act opportunistically, as a result of strong bargaining position (solidarity), play an important role in the performance of the relationship. Partnerships in biotechnology were more dependent on the perception of effective communication and fairness. Communication refers to the accuracy and timeliness of information provided by business partners and availability of the partner as well as the degree to which the partner offers open access to

additional contacts in the network. Fairness is the fair behaviour of the partner as well as the willingness of the partner to distribute benefits and costs between the parties in a fair manner and the adherence of the partner to business norms or principles of the industry.

Gassenheimer *et al.* (1996), in their study of cooperative arrangements among entrepreneurs, found that the age of the franchise relationship has a negative relationship to the performance of the franchise. They argue that as the relationship gets older the franchisee becomes complacent, and hence has a poor performance. Relatedly, studies have shown that the duration of a relational exchange is related to the level of trust between parties. Sohn (1994), in a study of social knowledge as a control mechanism in Japanese FDI behaviour, found that in-depth social and cultural knowledge facilitates coordination of transactions by making potential partners' behaviour both understandable and predictable. He argues that as social knowledge of transactors increase, information asymmetries decrease, thereby increasing trust as a result of low information asymmetries and uncertainty.

It is commonly recognised that suppliers who become dependent on their buyers often face performance problems resulting from opportunistic behaviour by the partners or from lack of information (Swaminathan *et al.*, 2002). Williamson (1993) argues that firms in a long-term relationship can face a hold-up problem in partner behaviour if they do not have alternative partners. Singh and Mitchell (1996) found that firms commonly face adaptation difficulties in times of environmental change if they become too reliant on partners, while Uzzi (1996) found that if a firm becomes over embedded in a network, the lack of arms-length relationships tend to isolate the firm from the market's imperatives and increase its likelihood of failure. Therefore, it is important that there is a mutual relationship, since a relationship that is one-sided would result in poor performance because of opportunism and hold-up syndrome between the parties.

2.12 SUMMARY

Contract law has been shifting from classical contracting through neoclassical contracting to relational contracting. Relational contracting is extensively operational in the business context of long-term relationships. Williamson (1985) explained the interdependence of contracting and governance with bilateral governance being appropriate to long-term

contractual issues. Ring and Van de Ven (1994) quoted Atiyah (1979) that a paradigm shift prevails in contract law from single and discrete transactions towards more accommodating future risks by relationship management processes, instead of adhering strictly to the written contract and its wordings. They further argue that overtime the development of the formal and informal processes of negotiation, commitment and execution complements the formal contractual relationship. The increase in the elements of personal relationships and the longer the cooperation, the more clearly the formal agreements mirror informal understandings and commitments. They emphasise that social-psychological processes take longer to develop than formal contracting itself. Hence, contract negotiating, drafting and writing processes may take longer, but the psychological aspects of the partners mentally adapting during the cooperation will take more time.

This chapter provided the review of literature related to the development and motivation of contractual relationships. The basis of contractual relationships as encompassing transaction cost economics, resource dependence, agency costs and relational theories were also discussed. Transaction cost economics is concerned with minimisation of costs of exchange. It focuses on the ex-ante and ex-post costs. Transaction cost theory argues that minimising transaction costs is the primary motivation for adopting alternative organisational designs like relational exchange, whilst resource dependence argues that firms cannot develop and compete effectively without relying on other firms for resources that may not be internally available. The agency theory on the other hand focuses on the difficulty of aligning the goals of the principal and the agent in a contract, which tend to result in moral hazard and adverse selection problems. The limitations of each theory in effectively addressing the existence of contractual relationships result in the emergence of the relational theory. The relational theory, in addition to recognising the transaction cost minimisation, also incorporate social capital, such as trust and commitment as important elements that explain long-term contractual relationships.

Relational exchanges are only one relatively new type of vertical coordination, and as such researchers who focus on contracting or vertical integration generally overlook them. Hence, most research loosely applies findings from integration and contracting problems to all forms of vertical coordination. Because relational exchanges are a blend between firms interacting within a traditional open market setting and a vertically integrated system, no single theory completely explains their existence. Instead, all four approaches to explaining vertical

coordination can be used in building a conceptual framework for understanding why relational exchanges are formed and the results of alternative design choices.

The literature has shown that vertical coordination through contractual arrangements has been practised in agriculture. However, most studies have been concentrating on the efficiency of the contracts and none of these studies have looked into the quality of the contractual relationship of the farmers and the processing firms, hence this study is designed to address this gap.

The issue of governance structures in agricultural supply chains has attracted many scholars. The reviewed literature presents agricultural supply chains as both demand and supply driven and as such argues that the governance structures in these supply chains become important in order to understand the use of power and authority within the chain. The literature has shown that the type of governance structure determines the flow of information and material within the members of the chain and it has a direct impact on the performance of the supply chain. It has also shown that social capital such as trust, commitment and cooperation enhance the performance of exchange relationships.

Evidence from previous studies discussed in this chapter suggests that there are gaps between the perceptions of suppliers and buyers regarding the nature of their exchange relationships. Specifically, it has been suggested that the perceptions of each partner in a relationship are a result of accumulated interaction between the two parties. However, a key factor in the ability of the parties to be able to adapt and actually benefit from the relationship is knowledge of the perceptions of the other partner regarding their relationship.

This research continues the search for information on contractual relationships in the agricultural supply chains, and most importantly it empirically analyses the quality and the role of social factors, such as trust, in the performance agricultural supply chains. The next chapter will provide the theoretical and conceptual framework followed in this study.

CHAPTER THREE

THEORETICAL AND CONCEPTUAL FRAMEWORK FOR CONTRACTUAL RELATIONSHIPS IN AGRICULTURAL SUPPLY CHAINS

3.1 INTRODUCTION

This chapter presents the theoretical and conceptual framework of the contractual relationship between smallholder cane growers and the millers in the sugar industry in Swaziland. This framework serves as a basis for the empirical analysis conducted in Chapter six of this study.

3.2 THE EVOLUTION OF SUPPLY CHAIN MANAGEMENT

The evolution of supply chain management (SCM) has appeared to be one of today's most powerful business strategic concepts. Its development can be traced back to the rise of modern logistics (Ross, 1998). Though supply chain management represents a radically new approach to leveraging the supply chain in search for order of magnitude breakthroughs in products and markets, it is closely connected with logistics and is in many ways a product of the changes that have taken place in logistics. Traditionally, planning, purchasing, manufacturing, distribution, and marketing were operated independently along the supply chain, with each activity having its own set of objectives and often conflicting. Supply chain management has evolved as a strategy to coordinate activities of these independent functions and create a single, integrated plan for the entire organisation (Yogesh, 2000).

Supply chain management is defined as "the management of upstream and downstream relationships with suppliers and customers to deliver superior customer value at less cost in the supply chain as a whole" (Christopher, 1998: 15). The concept of supply chain management has developed through four main management phases (Table 3.1). Phase one is referred to as logistics decentralisation; phase two, the total cost management; phase three is integrated functions and phase four is supply chain management.

It is worth noting that in the Swaziland sugar industry, though farmers and the millers still strive to optimise their own individual gains, the Swaziland Sugar Association (SSA) has the vision to optimise gains for the whole supply chain, and attempts to synchronise the operations of the cane growers and millers for the benefit of the whole supply chain.

The innovation of supply chain management is in a way an extension of the firm's boundaries. The original motive of supply chain management was the elimination of barriers between trading partners in order to facilitate synchronisation of information between the partners (Yogesh, 2000). Instead of focusing on a single firm and its performance, emphasis is made over several organisations within the chain, all making an effort to satisfy the end customer.

Table 3.1: Supply chain management stages

To 1960s Stage 1	1970s - 1980s Stage 2	1980s - 1990s Stage 3	1990s-2000 + Stage 4
Warehousing and Transportation	Total Cost Management	Integrated Logistics Management	Supply Chain Management
Management Focus Operations Performance	*Management Focus* Optimising Operations Cost & Customer Service	*Management Focus* Tactics/Strategies Logistics Planning	*Management Focus* Supply Chain Vision, Objectives & Goals
Organisational Design Decentralized Functions	*Organisation Design* Centralized Functions	*Organisation Design* Integration of logistic Functions	*Organisation Design* Partnering, "Virtual" Organization Market Co evolution

Sources: Ross (1998)

3.3 THE SUPPLY CHAIN CONCEPT

A supply chain is a system through which organisations deliver their products and services to their customers. It can be viewed as a network of interlinked organisations or constituencies that have a common purpose and the best possible means of effecting that delivery (Poirier and Reiter, 1996). In a supply chain the network begins with sources that can provide ingredients to start a chain of supply of raw materials, ingredients, commodities and subassemblies; these are called suppliers. The second linkage is the manufacturer, processor or converter who builds, assembles converts or finishes a product or service, identified as the consumable in the network and is called a manufacturer or processor. In this study the supplier refers to the cane growers who supply sugarcane to the mill, while the miller is the processor who purchases and processes sugarcane into sugar and other by-products such as molasses.

Although the term supply chain is relatively modern, the phenomenon has existed for quite a long time. Supply chain has been defined as an integrative philosophy to manage the total flow of a distribution channel from supplier to ultimate customer (Ellram and Cooper, 1993). Steven (1989) defined a supply chain as a connected series of activities that are concerned with planning, coordinating and controlling material, parts, and finished goods from supplier to customer. It is concerned with two distinct flows (material and information) through the organisation. A typical supply chain consists of a number of units beginning with suppliers, who provide raw material to factories or manufacturing plants, which manufacture products and transport them to distribution centres. These in turn transport them to wholesale dealers who then pass them on to retailers. Hence, the end unit in a supply chain is the consumer who buys products from the retailer (Yogesh, 2000). Different industries have different structures of supply chain. Some may have highly structured distribution networks comprising of a central warehouse, regional warehouses and local warehouses through which a product goes before it reaches the retailer and ultimately the consumer.

In this study, supply chain is conceptualised on the basis of Lee and Billington (1993) who defined it as a network (group) of entities (members) formed to solve a common logistics problem. It is about managing coordinated information, material, and financial flows, plant operations, and logistics. The main distinguishing feature of a supply chain from other vertically integrated firms is its organised synchronisation among multiple autonomous

entities represented in it, which indicates an improved coordination within and between various supply chain members and is achieved on the basis of a mutually agreed commitment by supply chain members (Chandra, 1997; Poirier, 1999). Similarly, cane growers, millers and the SSA are entities of the sugar industry supply chain, who have to synchronise the flow of sugarcane from the farmers and the mills' operations as well as the flow of money within the chain.

With the revolution in consumer behaviour, to be successful within an increasingly global agribusiness sector, organisations must be able to meet the desires of the discerning consumer better than their competitors (Hughes, 1994). However, consumer demands are not as simple as perceptions of which product attributes denote quality change according to the beholder's relationship to the final product (Garvin, 1984). Linking specific product attributes to the greater variety of benefits that consumers demand from a given good is a difficult task, especially for individual organisations with limited resources (Boehlje, 1996). Organisations have since realised that they need to "co-operate to compete" if they are to remain competitive (O'Keefe, 1997).

The essence of supply chain organisations is to focus on producing a final product that meets the demands as set by the intended market (Van Dalen, 1997) by combining their resources and close integration between organisations. In addition, as the attributes of a finished product often originate from a particular point in the chain, the effectiveness of the entire supply chain is essential to the acceptance of the final product.

According to Andersson (2001) the concept of supply chain encompasses the following:

- The supply chain identifies the complete operations of providing goods and services to the final user.
- It includes all parties and logistics operations from supplier to customer within a single system.
- The scope of the supply chain includes procurement, production and distribution operations.
- The supply chain extends across organisational boundaries.
- It is coordinated through an information system accessible to all members.

- The primary objective of the supply chain is service to the customer, which must be balanced against costs and assets.
- Objectives of individual supply chain members are achieved through the performance of the chain as a whole.

Leading edge companies have realised that real competition is no longer on company against company but supply chain against another supply chain. This is a result of system boundaries whereby a supply chain can be viewed as a system of companies that form a system of processes and functions. The supply chain can be aggregated to a system of supply chains as they are crossing each other with common links, but the rest is separated.

Due to the differences in consumer tastes and preferences, consumers detect how long the chain should be. Figure 3.1 shows the sugar industry supply chain in Swaziland. This study applies the dyadic type of relationship within the supply chain, where the focus is on the supplier (sugarcane growers) and the processor (millers). The Swaziland Cane Growers Association (SCGA) represents cane growers in the SSA, while the Swaziland Sugar Millers' Association (SSMA) represents millers. At the mill level, both millers and cane growers are represented through a Mill Group Committee (MGC). Cane growers, millers and SSA independently hire transporters, as they need them.

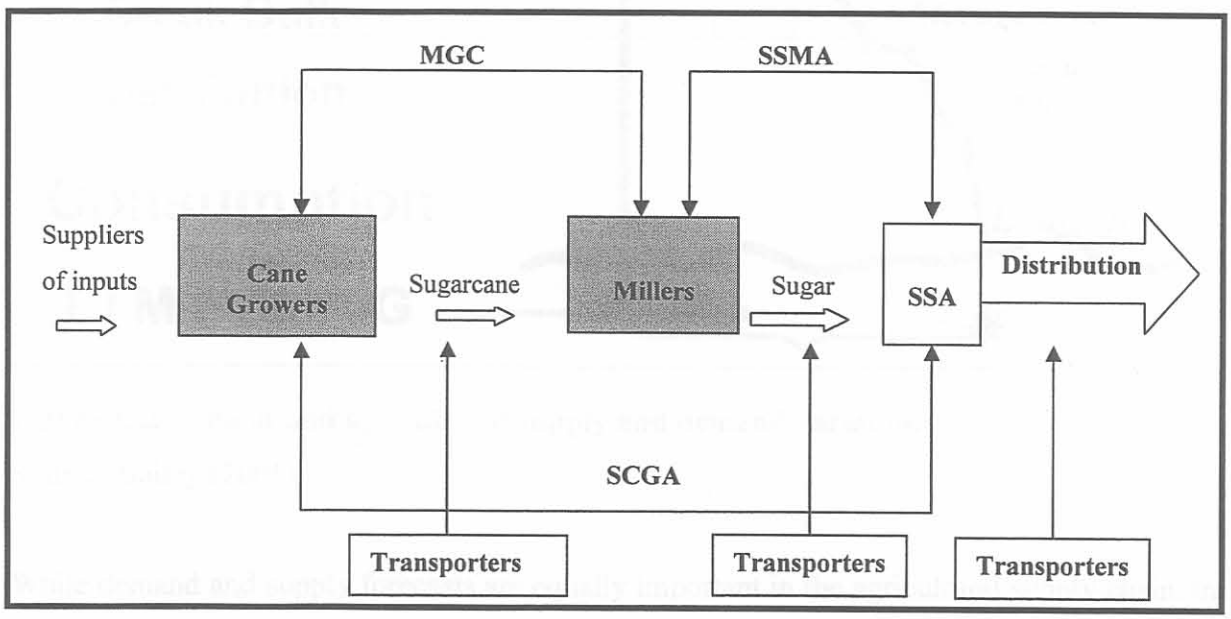

Figure 3.1: The sugar industry supply chain in Swaziland

3.4 AGRICULTURAL SUPPLY CHAINS

Supply chains are most frequently defined as 'customer driven systems and for such systems production plans are set based on demand forecasts. With such systems, the production process may be adjusted to meet changing customer needs over a specific time frame. The implicit assumption is that supply can be almost perfectly controlled with enough planning and co-ordination with supply chain members. The main difference between the supply chain for food, agricultural products and supply chains for other industries is that agricultural supply chains are both demand and supply driven (Bailey, 2001) (see Figure 3.2).

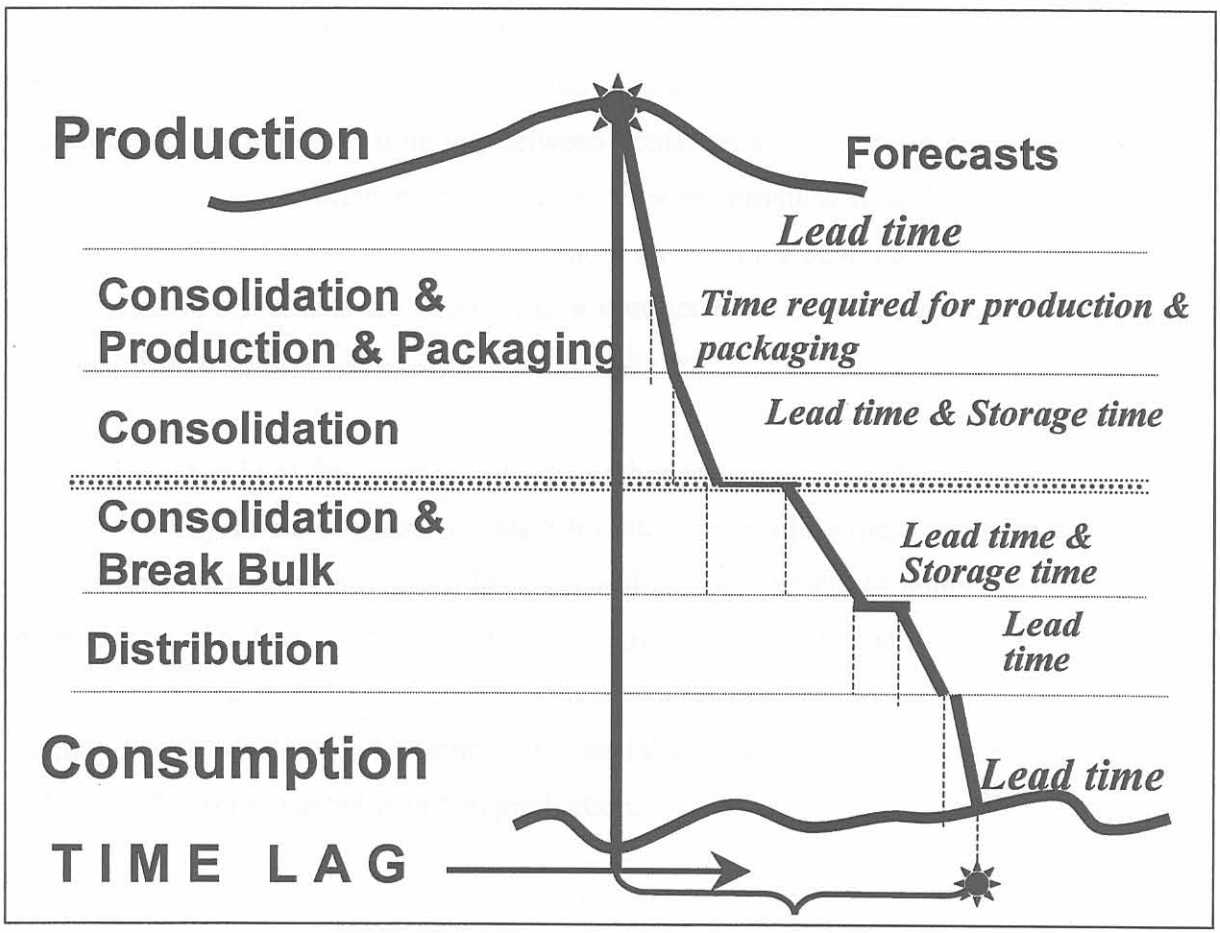

Figure 3.2: Food and agricultural supply and demand variation

Source: Bailey (2001)

While demand and supply forecasts are equally important in the agricultural supply chain, the ability of chain members to control supply is limited. As a result of factors specific to agricultural supply chains it is impossible for these supply chains to be purely customer driven. Seasonal patterns of production and other factors such as weather and diseases are

beyond the ability of either a company or chain members to control. Customers are usually at the far end of the chain and they have very specialised needs to which agricultural production does not and cannot react quickly. Bailey (2001) identifies agricultural supply chains as being production adjusted customer driven systems.

Figure 3.2 shows the variation in supply and demand for agricultural products. The left column represents the flow of material from the producer through to the customer. A horizontal line bisects the figure to indicate the movement of products across a country's borders. The right hand column depicts the interchange between production and demand, also the connection of actual versus forecast production and actual versus forecast customer demand. The variation between actual and forecast production when combined with demand uncertainty emphasise those characteristics unique to agricultural supply chains. These characteristics include: the time lag between actual production and product delivery to the final customer; the importance of storage for seasonal production; and the importance of the dual drivers of production and consumption on an integrated planning system. Hence, agricultural supply chains are faced with a conflict between production driven reality and customer driven reality.

The production side of the sugar industry like other agricultural supply chains is dominated by the perishability of its outputs. Perishability places specific requirements on the products. For example, sugarcane has to be delivered and crushed within 24 hours after harvesting in order to minimize loses in sucrose. Further, agricultural supply chains for different products have their own storage, handling, packaging, and delivery requirements. The characteristics unique to each of these chains emphasise the inherent variability in commodity production and in the chains associated with that production.

3.5 THE CONCEPTUAL MODEL FOR CANE GROWERS AND MILLERS' RELATIONSHIP

From the resource dependency and relational exchange theories, farmers and processors would get into a relational contract because of a need for resources required to achieve specified strategic, technical and operational purposes or benefits. The principle resource exchanged in this relationship is information, which is directed towards accomplishment of

strategic goals (those that relate to product, market and technology direction of the firm) (Nielson, 1994). The value of the information resides in its contribution to solving mutual strategic, operating, and technical problems directed towards achieving the firm's objectives. Therefore, what is central to this relationship is the processing firm's functional group interactions, since functional groups (R&D, production, processing, and marketing) are the main repository of the firm's strategic (ethical, product, and market) information. The functional interactions can be viewed as vertically interrelated variables: (1) intensity of the functional group interactions, (2) their cooperative orientation, and (3) trust. Cooperative in this context refers to inter-firm interaction behaviour characterised by open sharing of information, joint action, flexibility in the face of changing circumstances, an aversion to the use of power to influence the other party, and reluctance to cheat, even when presented with the opportunity to do so. The outcomes for these inter-firm relationships include pycho-social benefits and reduced transaction costs, and hence improved profits for both participants (Nielson, 1994).

The proposed overall framework (Figure 3.3) is based on the assumption that a relational contract (quasi-integration) is a particular form of inter-organisational relationship, which occurs when two or more organisations transact resources (money, physical, facilities, and technical staff services) with one another (Van de Ven, 1976). The relational contract among organisations is patterned after the social action system consisting of three major components: (1) the situational or contextual dimensions, (2) the process or structural dimensions, and (3) the outcome dimensions (Van de Ven, 1976).

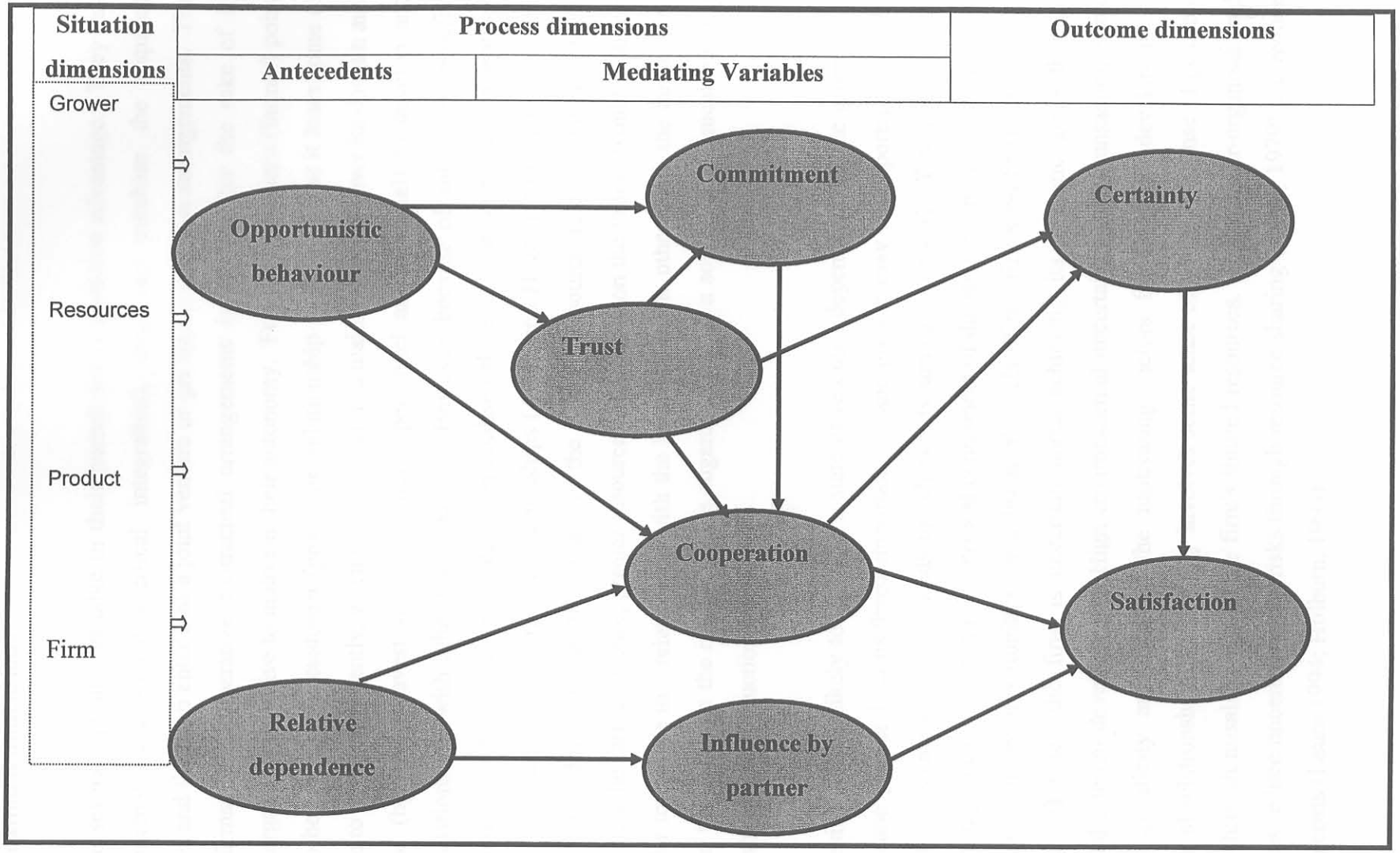

Figure 3.3: A conceptual model of cane growers and millers working under relational contract

Source: Adapted from (Van de Ven, 1976; Morgan and Hunt, 1994; Dwyer *et al*, 1987; Anderson and Narus, 1990)

3.5.1 Situational dimensions

Firms have several options available in their pursuit for competitive advantage. They can employ internal development (vertical integration), they can purchase the required technology, and they can enter into a joint venture or get into contractual arrangements. The entry of firms into cooperative contractual arrangements is not just for the sake of it, otherwise organisations strive to maintain their autonomy. From the supplier's (farmer) point of view, to be involved in customer (processor) relationship implies (a) that it loses some of its freedom to act independently, when it would prefer to maintain control over its domain and affairs, and (b) that it invest scarce resources (personnel and financial) to develop and maintain relationships with other organisations. However, because of anticipated benefits (not only money, but also resources such as specialised skills and satisfaction) organisations are pushed into inter-firm contractual relationships (Aiken and Hage, 1968). Therefore, the main situational dimension in the model is the miller's resource (e.g. labour and land) dependence on the farmer. Hence, greater resource dependence on the farmer would motivate to the miller to engage in a relationship with the farmer. On the other hand, the farmer also depends on the miller as the market for his sugarcane and as a source of technical services regarding sugarcane production.

The processing firm is likely to perceive a state of resource dependence on the grower: (1) when the cane grower is considered important; a cane grower may be important if he/she possesses the resources the firm needs to achieve its strategic goals. (2) When the product involved is important, i.e. when it is a critical component of the strategic portfolio of the firm, and or when it offers opportunities for substantial levels of the firm's profit (Frazier *et al.*, 1988), and (3) when the firm is uncertain about achieving its strategic goals through conventional internal development. High environmental uncertainty, high transaction costs, and asset specificity are some of the motivating factors for firms to develop inter-organisational relationships. Uncertainty involves some sense of doubt and sense of possible loss (risk) through misallocation of the firm's limited resources. Hence, inter-organisational relationships reduce uncertainty and risks through resource sharing (Arndt, 1979) and reduce transaction costs (Laura 1994; Hillburn, 1993).

3.5.2 The process dimensions

3.5.2.1 Antecedents of commitment, trust and cooperation

The behavioural component of the contractual arrangement is conceptualised as a process of iterative, dyadic group interactions between supplier and buyer occurring over an extended period of time. These groups are generally represented by the technical and marketing functions since the goals of the relationship involve attaining technical and competitive advantage. These inter-firm interactions are theorised to have both a quantitative and qualitative character (Van de Ven, 1976). The quantitative character is referred to as "intensity" of interactions, which is measured by the frequency of group meetings and number of groups and individuals involved in the relationship specificity and dependence (Frazier *et al.*, 1988). Qualitative character, referred to as "opportunistic orientation" of the relationship, reflects certain specific inter-firm behaviour.

Based on a review of the literature (Anderson and Narus, 1990; Morgan and Hunt, 1994; Neilson, 1994; Dwyer *et al.*, 1987) two antecedents of commitment, trust and cooperation in supplier-buyer relationships have been identified. It is argued that relative dependence and opportunistic behaviour are precursors to commitment, trust and cooperation in the relationship of cane growers and millers.

3.5.2.2 Relative dependence

Firms enter into relational contracting because they need each other's resources. Hence, they are interdependent. When one of the parties is terminated from a relationship, it is assumed that the terminated party will seek alternative relationships and in the process incur "switching costs" which, if too high, will lead to the partner's dependence on the other (Heide and John, 1988). Such costs are exacerbated by relationship specific investment (RSI), also called idiosyncratic investments, which make it difficult to switch to another relationship (Heide and John 1988; Dwyer *et al.*, 1987). Therefore, the partner's anticipation of high switching costs gives rise to his interest in maintaining a quality relationship. However, it may be possible that there would be no switch costs to be incurred after the relationship is dissolved. Therefore, terminal costs are all expected losses from termination and result from the perceived lack of comparable potential alternative partners, relationship dissolution expenses,

substantial switching costs (Morgan and Hunt, 1994) and relationship specific investment costs. These expected termination costs lead to an ongoing relationship being viewed as important, thus generating commitment and cooperation in the relationship. Since many business relationships are faced with uncertainty, the high expected terminal costs produce commitment that leads to cooperation.

A firm's perception of its dependence relative to its partner's dependence on the relationship is an important variable in buyer-seller relationship. It is this "relative dependence" that determines the extent to which a firm will have influence over, and be influenced by, its partner. Relative dependence can be defined as a firm's perceived difference between its own and the partner firm's dependence on the exchange relationship (Anderson and Narus, 1990). The principal result of relative dependence is influence or power. In inter-firm relationships, power can be reflected through the influence of one firm over the other or visa versa (Morgan and Hunt, 1994). Hence, it is argued that there is a positive relationship between relative dependence and influence by partner firm and cooperation. Therefore, a firm with greater relative dependence would be inclined to have an interest in sustaining the relationship and as a result it may be more receptive to changes by its partner. In contrast, a firm with less relative dependence can use its superior position to request changes to its partner that it believes will either mutually increase the outcomes of both or singly increase its own outcomes from the relationship (Morgan and Hunt, 1994).

3.5.2.3 Opportunistic behaviour

The transaction costs literature defines the concept of opportunistic behaviour as "self interest seeking with guile" (Williamson, 1979; Jap and Anderson, 2000). The essence of opportunistic behaviour is deceit-orientated violation of implicit or explicit promises about one's appropriate or required role behaviour. A central premise is that in any exchange either party may be capable of opportunism if the right circumstances arise. In practise, it involves several elements; (a) distortion of information, including overt behaviour such as lying, cheating and stealing, as well as more subtle behaviour such as misrepresenting information by not fully disclosing, and (b) reneging on explicit or implicit commitments such as shirking, or failing to fulfil promises and obligations. It is equivalent to bad faith and the implication is that the party that is opportunistic is not trustworthy. Opportunism figures prominently as a leading cause of relationship decline in the literature on organisational and social relationships

As Dwyer *et al.* (1987) put it, incorporating trust in models of distribution channel relationships provides a unique advantage point for treating opportunism as an explanatory variable. Hence, it is posited that when a farmer or a miller engages in opportunistic behaviour to relationship commitment, the result would be reduced commitment and reduced or absence of trust (Morgan and Hunt, 1994) and low cooperation.

3.5.3 Mediating variables

3.5.3.1 Relationship cooperation

Any relationship is characterised by disagreements or "conflicts", therefore, relational exchanges have no exception (Dwyer et al., 1987). The hostility and bitterness resulting from disagreements not being resolved amicably can lead to relationship dissolution. However, when disputes are resolved amicably, such disagreements are referred to as "functional conflicts," because they prevent stagnation, but stimulate interest and curiosity. The firms will interact with (a) limited use of power and harmonious resolution of conflict (Fraizer *et al.*, 1988), (b) flexibility and the use of "give and take" (Macneil, 1980), (c) the willingness to share valuable, proprietary information and not reveal confidences, and (d) jointly decision making, planning, problem solving, and goal identification (Speckman, 1988). The value of the exchange of information and the resulting strategic outcomes are a function of the extent to which cooperation is established in the relationship.

The cooperative functional interactions are conceptualised as an iterative and evolving process of increasing levels of interaction leading to higher levels of trust and cooperation, which in turn generates relatively high levels of exchange of valuable information. The recognition by a firm's functional participants that the relationship is creating valuable information exchange (leading to realisation of objectives) further increases the level of trust and cooperation. The degree of cooperation is also a function of resource dependence of each partner on the other. Each participant views the other as providing complementary strengths in the form of resources to the relationship (Arndt, 1979). Hence, cooperation is a "key" factor to successful relationships. As a result of cooperation, productivity may increase in an exchange relationship and it can be viewed as "just another way of doing business" (Anderson and Narus, 1990, p.45).

3.5.3.2 Trust

Trust is conceptualised as existing when one party has confidence in an exchange partner's reliability and integrity. Trust in a working relationship and its implications for a firm's actions have been defined as the belief that another partner will perform actions that will result in positive outcomes for the firm as well as not take unexpected actions that would result in negative outcomes for the other partner. The strength of this belief may result in the firm making trusting action, whereby it commits itself to a possible loss, depending upon the actions of the other partner. Trust will still be maintained, however, if the firm believes its partner has taken the expected actions, but forces beyond its control have negated the expected outcomes (Anderson and Narus, 1990). In buyer-seller relationships, it has been found that trust is central to the process of achieving cooperative problem solving and constructive dialogue. It has been established that trust is a key factor in the determination of the buyer's long-term orientation. Ganesan (1994) found that buyers who desired long-term orientation relationships, expected trust as a key factor in the relationship. Parkhe (1998) suggests that trust reduces opportunistic behaviour and can facilitate conflict resolution and cooperation.

In an organisational context it has been found that trust leads to high levels of commitment by the bargaining partners (Schurr and Ozanne, 1985). Hence, trust is theorised as an important factor in relational exchanges. Trust is a determinant of relationship commitment (Achrol, 1991; Anderson and Narus, 1990) and cooperation between cane growers and millers.

3.5.3.3 Relationship commitment

Morgan and Hunt (1994) conceptualised relationship commitment as a belief by one partner in an exchange that an ongoing relationship with another is so important that it warrants maximum effort at maintaining it. That is, the committed party believes that the relationship is worth working on to ensure that it endures indefinitely. Moorman *et al.* (1992) defined relationship commitment as an enduring desire to maintain a valued relationship. Hence, it is central to relational exchanges among firms, and is directly related to cooperation.

Commitment is a common feature of a long-term relationship, which manifests itself not just in the investments adaptations the parties make to each other, but also the perceptions each

has of the other's degree of commitment to the future of the relationship. It has been found to be a key factor of other variables in the buyer-seller relationships (Morgan and Hunt, 1994; Kale and Barnes, 1992). The perceptions of commitment held by each party play an important role in determining the development of the relationship (Ford, 1980). Commitment may be shown by investment of time or money in the relationship or it may also be just a willingness to make changes and work towards mutual goals and benefits. It is therefore expected that commitment would positively enhance cooperation between the cane growers and millers.

3.5.3.4 Influence by partner

Contractual agreement between two organisations reflects frequent power imbalance between parties as the dependence of one partner over the other leads to authoritative controlling behaviour. The behaviour of one partner controlling the other implies that the controlling partner's goals would dominate decisions, would determine which opportunities were to be targeted, and how risks and rewards will be allocated across the relationship (Jarratt and Morrison, 2001). The influence of one partner over the other in a relationship occurs when one partner hierarchically determines and applies rules that will govern interaction between partners. Jarratt and Morrison, (2001) argue that controlling behaviour implied through contractual agreements can be mitigated through the introduction of relational practises such as collaboration, constructive conflict resolution, and restraint from opportunism. Collaborative practises would involve data exchanges, information flows (Mohr *et al.*, 1996) and other measures of relational norms (flexibility and solidarity). Where controlling behaviour exists, there is likelihood that the controlled partner would perceive an inequitable distribution of relationship outcomes, which negatively influence the perception of the relationship. Hence, control by a partner may be negatively related to the influenced partner's satisfaction.

3.4.4 Outcome dimensions

The outcome dimensions of a relational exchange can be categorised as either "strategic" (product, market, or technological) or "psycho-social" (Nielson, 1994). The main strategic benefit to the farmer is the actualisation of the strategic aims or goals (market and money), which motivated the relationship. This may include improved quality and performance,

reduced production costs, or an improved logistic system resulting in the benefits associated with Just in Time (JIT) concept, while the psycho-social benefits may be reduced uncertainty, and expectation of continuity of the relationship (satisfaction). However, the principal functional cost is the development of "switching costs", investments in plant or other long-term capital, procedures, and personnel, which tend to be irreversible and transaction specific (Williamson, 1979).

3.5.4.1 Certainty

Certainty in decision making refers to the extent to which a partner (1) has enough information to make key decisions, (2) can predict the consequences of those decisions, and (3) has confidence in those decisions (Achrol and Stern, 1988). Walker and Weber (1987) define uncertainty as the inability to predict changes in relevant factors surrounding the exchange between a buyer and a seller. They argue that environmental uncertainty increases different expectations and goals about future supply requirements. Consequently, the buyer and the seller would likely desire a different contract term. For instance, if a farmer is unable to accurately forecast the price of his product inputs, he will be reluctant to enter into a contract that will lock him into a fixed price for an extended period of time. Instead, he would prefer negotiation of the agreements that address this price uncertainty and allow for periodic price adjustments. Similarly, the inability of the miller to predict the demand of his end products (sugar) makes him hesitant to commit to purchase a specified quantity of sugarcane. Therefore, the presence of uncertainty would make it difficult for the miller and the farmer to negotiate their contract. It is therefore expected that trust and cooperation reduce decision making uncertainty but promotes certainty, and certainty in turn increases their relationship satisfaction.

3.5.4.2 Satisfaction

Satisfaction has been defined as a positive affective state resulting from the appraisal of all aspects of a firm's working relationship with another firm (Anderson and Narus, 1990). Satisfaction is a focal consequence of working partnerships in this model. It is worth noting that satisfaction may not necessarily be an indicator of effectiveness, but it may be a predictor of future actions by partners as well as continued long-term relationships. Supply chain models have been utilised to measure the performance of a supply chain. Most supply chain

models have used costs and a combination of costs and customer responsiveness to measure performance. Cost measures include inventory costs and operating costs, while customer responsiveness measures include lead-time, stockout probability, and fill rate (Beamon, 1999). Beamon argues that other performance measures have been identified as appropriate for supply chain analysis, such as satisfaction, information flow, supplier performance and risk management. Hence, satisfaction is used in this model as a proxy for performance. The presence of uncertainty, power imbalance that may result in influence by a partner and cooperation in a supply chain is expected to impact the supply chain performance. It is posited that cane growers' relationship with millers is positively related to perceived cooperation and certainty but negatively related to the cane growers' influence by millers.

3.4 SUMMARY

Contractual relationships that link actors together like in the supply chain comprise of stream of transactions and these transactions may be differentiated according to their type and structure. They consist of exchange processes, which are limited to economic transactions. Broadly, they consist of all mutual advantages that form the basis of exchange. Therefore, contractual relationships involve the transfer of goods, services, diffusion of information and knowledge, development of trust and friendship and the flow of legitimacy (Thorelli, 1986).

This chapter introduce the conceptual framework for analysing contractual relationships between smallholder cane growers and millers in the sugar industry supply chain. A model of the cane growers' relationship with millers has been proposed, which is subsequently estimated to indicate the relationships in the industry. The subsequent chapter will involve specification of the method and analytical procedures followed in this study.

CHAPTER FOUR

METHODOLOGY APPLIED IN ANALYSING SMALLHOLDER FARMERS' RELATIONSHIP WITH MILLERS

4.1 INTRODUCTION

The purpose of this study is to determine the factors affecting the performance of the smallholder cane growers, and hence the sugar industry supply chain and to present and test a model that identifies the relationship between these smallholder cane growers and millers in the Swaziland sugar industry. The hypotheses developed in this study are that:

- Social factors, such as trust are important mechanisms that can complement formal governance mechanisms in exchange relationships between smallholder cane growers and the millers
- Smallholder cane growers' perceptions on their relationship with millers can be explained by the detailed relationship structure outlined in Chapter three (Figure 3.3). The summary of the relationship proposed by the model is presented in Table 4.1
- The performance of smallholder farmers, hence the sugar industry supply chain, is a function of the farmers' perceived opportunistic behaviour by millers, trust, perceived cooperation and the growers' proximity to the mill. In addition to the relationship shown in Table 4.1, Table 4.2 shows the expected relationship of the cane growers' performance and its determinants. This chapter provides details of the methodology used in this study to answer the research objectives and testing the hypotheses.

Table 4.1: Summary of cane growers and millers' relationship (proposed Figure 3.3)

Relationship constructs		
Exogenous	Endogenous	Hypothesised sign
Opportunistic behaviour (F6)	Trust (F3)	-
Opportunistic behaviour (F6)	Cooperation (F4)	-
Opportunistic behaviour (F6)	Commitment (F8)	-
Relative dependence (F1)	Cooperation (F4)	+
Relative dependence (F1)	Influence by partner (F2)	+
Trust (F3)	Commitment (F8)	+
Trust (F3)	Cooperation (F4)	+
Trust (F3)	Certainty (F7)	+
Commitment (F8)	Cooperation (F4)	+
Cooperation (F4)	Certainty (F7)	+
Cooperation (F4)	Satisfaction (F5)	+
Influence by partner (F2)	Satisfaction (F5)	-
Certainty (F7)	Satisfaction (F5)	+

Note: F1 to F8 indicates the representation of the constructs in the analysis, and F stands for factor.

Table 4.2: Expected relationship between performance measures and their determinants

Dependent variable for performance	Independent variables	Expected sign
• Revenue per hectare (R) • Do you make profit (0=No, 1=Yes) • How much profit (R) • Satisfaction (1= vmds, 4= vms)[6]	• Transport cost per tonne (R)	-
	• Distance to the mill (km)	-
	• Percentage change in quota (%)	+
	• Yield per ha (tonnes/ha)	+
	• Average sucrose content (%)	+
	• Number of years in sugarcane farming (years)	+

4.2 RESEARCH DESIGN

Research can be either longitudinal or cross-sectional. Longitudinal research takes place over time and focuses on at least two or more "waves" of measurement. Cross-sectional research on the other hand takes place at a single point in time. Thus, it takes a 'slice' or cross-section of whatever it is being measured. Longitudinal research often poses the problem of response biases, obtaining a representative sample because of the need for cooperation of panels,

[6] Measured by four items in a likert-scale, where 1= very much dissatisfied (vmds), 2 = dissatisfied, 3 = satisfied, and 4 = very much satisfied (vms).

respondents' refusal to cooperate and panel mortality (Churchill, 1995; Malhotra, 1996; Parasuraman, 1991). It also requires a long period of data collection. As a result of the limitations in time series data and its availability, this study makes use of cross-sectional data.

4.2.1 Data collection

There are different methods of conducting a survey. These may include the use of telephone, Internet, mail and personal interviews. This study involved the use of personal interviews. Personal interviews involve face to face encounters with the respondent (Babbie, 1995). They tend to outperform the other methods in many ways, except for the interviewer control and bias, cost, and social desirability bias. The interviews were conducted by the researcher and one assistant who was provided training by the researcher before setting out for the data collection. Thus, the interviewer control was minimised. Interviewer bias was reduced by the use of a structured questionnaire, which was prepared in advance.

Data were collected between May and December 2001. Two sets of questionnaires were used to collect the data. One set was used for cane growers and another for millers' representatives. The interviews were conducted on a one-on-one basis. Cane growers were interviewed at the farm site, whilst millers' representatives were interviewed at the mill site. The questionnaires were constructed following an extensive review of the literature. Previously established scales were modified and utilised to measure some of the study constructs where possible.

4.2.2 Subject selection

When a unit of analysis is extended from dyadic relationship to a supply chain, sampling becomes a problem. Since a supply chain consists of multiple inter-connected firms, it is almost impossible to deal with all the constituent firms in a single study. Hence, in this study the supply chain is explored from the supplier-processor perspective. The target population of the study includes cane growers and millers in the sugar industry. A list of cane growers was obtained from the three sugar mills, Simunye, Mhlume and Ubombo (Big Bend).

4.2.3 Sampling procedure

This study employed a purposive method of sampling, which is part of nonprobability sampling (Figure 4.1). Although the disadvantages of nonprobability sampling in terms of statistical precision and generalisation are generally recognised (Parasuraman, 1991, Churchil, 1995), it was the appropriate method in this study. A list of all the farmers supplying each mill was secured from the millers, however it was not possible to know in advance whether the farmer operates as an association or as an individual within an association and whether the farmers has already started supplying the mill. Therefore, sampling had to be conducted in the field. Hence, purposive sampling was the most appropriate method.

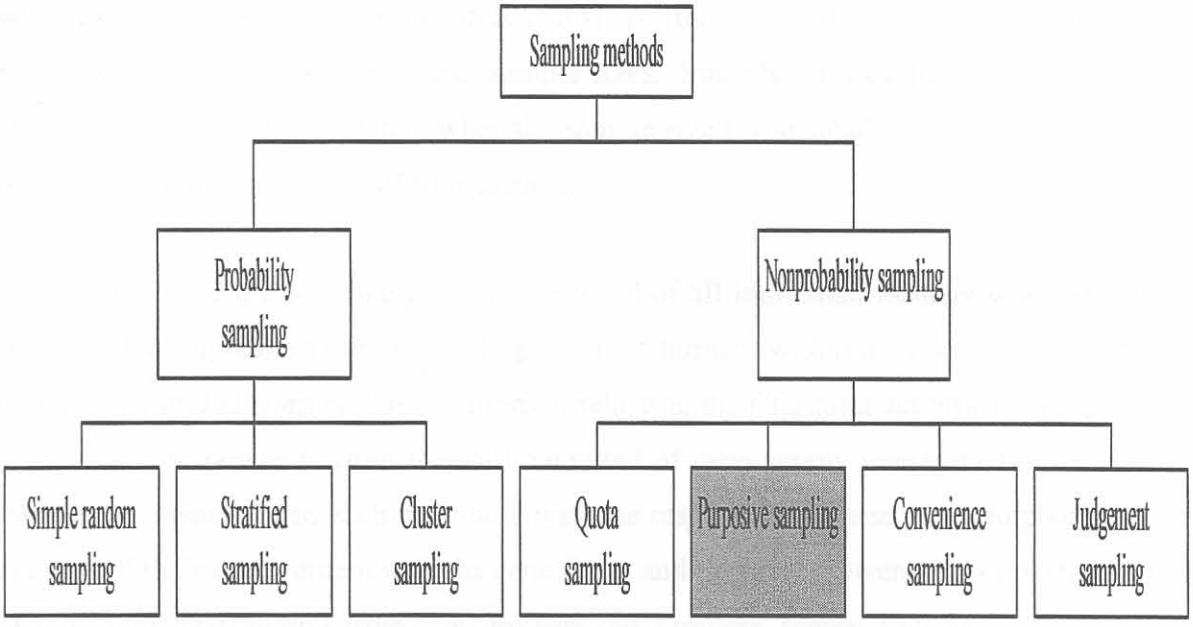

Figure 4.1: Types of sampling methods

Source: Adapted from Churchill (1995)

The most important criterion in selecting a sample is to increase the validity of the collected data (Carmines and Zeller, 1979, 1988). In this study, the data selection criterion was designed to increase validity, rather than to ensure that the sample was a representative of the given population. It is for that reason that the study used a purposive sampling, which is most desirable when certain important segments of the target population are intentionally represented in the sample. Purposive sampling is a deliberate non-random method of sampling, which aims to sample a group of people, or settings with a particular characteristic,

such as where they live in society, or specific cultural knowledge. The power of purposive sampling lies in selecting cases with rich information for the study, such cases provide a great deal of insight into the issues of central importance to the research study (Patton, 1990).

In this study, farmers' respondents were selected on the basis of having sold sugarcane to the mill before. Those who were still going to sell sugarcane for the first time were not included in the sample.

4.2.4 Sample size

There is little theoretical guidance related to adequate sample size (Baumgartner and Homburg, 1996). However, it is generally accepted that the minimal sample size required when using structural equation models (SEM) is 100 to 150 (Hair *et al.*, 1995, 1998). Too small samples are as bad as too large sample sizes. Since SEM uses the maximum likelihood estimation method, it is sensitive when the sample size is too small or too large. As a result it tends to yield poor goodness of fit measures.

The sample structure for cane growers consisted of all individual farmers who have already started delivering cane to the mills, 10 percent of farmers within an association[7] but farming individually and all farmers' associations conducting their farming activities collectively as a group. The respondents from the mill consisted of cane supply managers from each of the three mills. Hence, from each mill there was one respondent. These were purposely selected because of their involvement with the cane flows and the cane growers. This resulted in a total of 124 usable respondents from cane growers and 3 millers' representatives.

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[7] The farmers associations and schemes included in this study were: Nzama farmers Association; Vukani Association; Mankontshane association; Ntisheni farmers association; Makhabeni association; Lilanda farmers association; Lobovu farmers cooperative; Logoba Farmers association; Sukumani bomake farmers association; Maphobeni farmer association, Mavalela farmers association, Mbanana farmers association, Madlenya Irrigation scheme; Magwanyana farmers association; Mabhudlweni farmers association; Ntengenyane farmers association; Bambanani association; Hlomani association; Emadvodza association; Manyovu farmers association; Nsutumutwe farmers association; Mshumpula farmers association; Vulamehlo farmers association; Bambanani association; Mshumpula farmers association; Vulamehlo farmer association, Maphobeni farmer association; Mndobandoba farmers cooperation, Mdalantomb agric service; Yemshikashika farmers association; Phasentsaba farmers association; Vuvulane cooperative and vuvulane irrigation scheme.

4.3 STATISTICAL ANALYSIS

Data were analysed using descriptive statistics and multivariate analysis including logistic regression, multiple regression analysis and structural equation modelling.

4.3.1 Structural equation modelling

The most common way of estimating parameters in ordinary regression analysis is the ordinary least squares (OLS) method. In this method, the regression line is generated by trying to minimise the squared deviations of data points from a regression line that goes through the data. The straight line that generates the least squared deviations is said to have the best fit to the data. The coefficients that are generated to describe this regression line form the parameter estimates for this analysis. However, OLS is generally deemed to be inappropriate for generating parameter estimates in SEM studies. The most common method for estimating the best fitting parameters for SEM is the maximum likelihood (ML) method. This method generates a set of parameter estimates that are most likely to have been produced from non-chance relationships. The method is an iterative process in that a set of parameters is estimated and based on this first estimate a calculation of the "fit function", which is basically a coefficient describing the fit of the parameters to the data. Using this first estimate a second estimate is made in order to make the fit function smaller. This process is repeated until the fit function cannot be made any smaller. When this happens the model is said to have converged on a final set of parameter estimates.

Structural equation modelling evaluates how well a conceptual model that includes observed and latent (constructs) variables fit the obtained data (Bollen, 1989; Hoyle, 1995). The construct variable accounts for the inter-correlations of the observed variables that measure that construct (Bollen and Lennox, 1991). The basic formulation of structural equation modelling is in the form of:

$Y_1 = X_{11}+X_{12}+X_{13}+\ldots\ldots X_{1n}$

$Y_2 = X_{21}+X_{22}+X_{23}+\ldots\ldots X_{2n}$

$Y_m = X_{m1}+X_{m2}+X_{m3}+\ldots\ldots X_{mn}$

The CALIS (Covariance Analysis Linear Structural) equations generate an estimate covariance matrix, using a hypothesised factor structure specified by the investigator as a

guide. If only small differences are found to exist between the actual and estimated matrices, then the hypothesised factor structure is viewed as a plausible one. To test the proposed model of the relationship between cane growers and the millers, the study employed hierarchical regression and structural equation modelling using confirmatory factor analysis (CFA).

Structural equation modelling is a comprehensive statistical approach to testing hypotheses about relationships between observed and latent variables. It is an extension of multiple regression and factor analyses and allows separate relationships for each set of dependent variables. Hence, it is an appropriate and efficient estimation technique for a series of separate multiple regression equations estimated simultaneously (Hair *et. al.*, 1995). It consists of the structural model (path model) and the measurement model (factor analysis model) and hence is useful when one dependent variable becomes an independent variable in subsequent dependence relationships. It is characterised by estimation of multiple inter-related dependence relationships, and the ability to represent unobserved concepts in these relationships as well as accounting for measurement error in the estimation process (Hair *et. al.*, 1995). Therefore, one can assess the contribution of each scale item as well as how the scale measures the concept (reliability) into the estimation of the relationship between dependent and independent variables.

The measurement of the constructs is done indirectly through one or more observable indicator variables, such as responses to questionnaire items that are assumed to represent the construct adequately. Once the observable indicators define the theoretical constructs with theoretical guidance the inter-relationship between the constructs is then identified as dependent (endogenous) and independent (exogenous) constructs. Thus, the relationship between the indicator variables and the constructs constitute the measurement part of the model, whist the relationship between the constructs themselves constitutes the structural part (Joreskog, 1993).

The main advantages of structural equation modelling over other types of multivariate techniques are that; (1) it provides a straightforward method of dealing with multiple relationships simultaneously, whilst providing statistical efficiency, and (2) it has an ability to assess the relationships comprehensively and provides a transition from exploratory to confirmatory analysis (Bollen, 1989; Hair *et al.*, 1995, 1998).

A causal model as shown in Figure 3.3 was designed based on prior empirical research and theory. In order to test the causal assumptions the equations implied by the arrows were solved using the SAS PROCALIS procedure to give estimates of the magnitude of the linkages shown in Figure 6.2.

Factor analysis can be used to determine those variables, which measure relationship constructs (factors) for the perceptions of cane growers and the millers about their relationship. It is an interdependence technique in which all variables are simultaneously considered each related to all others (Hair *et. al.*, 1995). The factor loadings indicate the role each variable plays in defining each factor. They measure the degree of correspondence between the variable and the factor. Hence, a high factor loading means the variable is a representative of the factor. After conducting factor analysis, it is then that one can use the factors for regression analysis. However, due to the small number of items used to measure each construct, factor analysis was not used in the study, since during factor analysis some statements are lost as a result of low factor loadings to the constructs. Instead confirmatory factor analysis was used. Confirmatory factor analysis is a theory-testing model as opposed to a theory-generating method like exploratory factor analysis. In confirmatory factor analysis, the researcher begins with a hypothesis prior to the analysis. The hypothesis specifies which variables will be correlated with which factors and which factors are correlated. The hypothesis is based on a strong theoretical and/or empirical foundation (Stevens, 1996).

In addition, confirmatory factor analysis offers the researcher a more viable method for evaluating construct validity. The researcher is able to explicitly test hypotheses concerning the factor structure of the data as a result of having a predetermined model specifying the number and composition of the factors.

4.3.2 Data examination

4.3.2.1 Normality

The data were checked to verify that the assumptions of multivariate normality were met. In a strict definition of a normal distribution, the skewness and kurtosis of the data would be equal to zero. In a practical sense, normality is defined as a range of scores that span either side of

zero. According to Monte Carlo studies, skewness values ranging from 2.0 to 3.0 and kurtosis values ranging from 7.0 to 21.0 indicate that the data should be considered moderately non-normal (Curran *et al.*, 1996). If values are less than these (i.e., 2.0 for skewness and 7.0 for kurtosis), data should be considered to be approximating a normal distribution. Other authors provide more rigorous guidelines, indicating mild non-normality when two-thirds of the observed variables exceed skewness or kurtosis values of +/- 1.0 and moderate non-normality when two-thirds of the observed variables have skewness values of about +/- 1.5 and kurtosis values around +/- 3 to 4 (Fan and Wang, 1998). In this study, skewness and kurtosis values ranged from -.52 to 0.34 and -1.2 to 3.5 respectively. Considering the above criteria for skewness and kurtosis scores, the portion of the data used in the model was moderately normally distributed (Table 4.3). Therefore, data were not transformed for non-normality in this study, as this would also introduce problems by changing the actual meaning of the responses (Gassenheimer *et al.*, 1998).

Table 4.3: Normality distribution of data for item scales used for cane growers respondents

Item	Skewness	Kurtosis
Commitment	-0.5171	-0.6177
Opportunistic behaviour	-0.4080	3.5799
Cooperation	-0.0827	-0.0221
Certainty	0.3434	0.3629
Influence by partner	-0.3447	1.2485
Satisfaction	0.0109	-0.383
Relative dependence	0.0295	-0.2838
Trust	0.1640	-0.0480

4.3.2.2 Reliability and validity

Reliability is concerned with the extent to which a measurement of a phenomenon provides a stable and consistent result (Hair *et al.*, 1995). There are two dimensions of reliability, repeatability and internal consistency (Hair *et al.*, 1995, 1998). Internal consistency measures the ability of a scale to correlate with other scale items intended to measure the same variable. In this study internal consistency was measured by the Cronbach's (1951) coefficient alpha

and confirmatory factor analysis (CFA). Bollen (1989) argues that the most popular reliability coefficient used for internal consistency is the Cronbach alpha. Cronbach alpha estimates the degree to which the items in a scale are representative of the domain of the construct measured, whilst CFA on the other hand evaluates each item in the scale as well as any potential cross loading of items with others.

Validity refers to the relationship between a construct and its indicators. A construct is valid to the extent that it measures what it is supposed to measure (Hair *et al.*, 1995). Bollen (1989) identified three types of validity; face or content validity (verification of the content of the scale in measuring what it is supposed to measure), criterion validity (the degree of correspondence between a measure and a criterion variable, mostly measured by correlation) and construct validity (the ability of a measure to confirm a network of related hypotheses from theory based constructs). Content validity was determined through discussion with some farmers in the sugar industry and a review of the questionnaire and the scale items by professors in the Department of Agricultural Economics, Extension and Rural development at the University of Pretoria. The construct validity was assessed by analysing convergent validity and discriminant validity.

4.3.2.3 Variables aggregation

In SEM data abstraction for constructs may be conducted at three levels. These include total aggregation, partial aggregation and total disaggregation. Total aggregation involves the use of a single value for each construct as input in SEM by combining all indicator variables for that construct. Partial aggregation on the other hand involves the use of subsets of manifest items combined into various composites, which are then treated as multiple indicators of a particular construct. In total disaggregation, the true single manifest items are used as multiple measures of a construct. Due to the limited sample size for the cane growers and the requirement of at least 5 observations per estimate parameter, partial aggregation of indicator variables was used in this study. Bagozzi (1994) points out that partial aggregation also assists in reducing the variance of the items. Partial aggregation was done by aggregation of the items with the highest reliabilities with those with the lowest reliabilities (Table 4.4).

The issue of the number of indicators to use when measuring a construct is still not resolved in the literature (Baumgartner and Homburg, 1996). A general rule of thumb is that there

should be three indicators per construct since less than three indicators increases the chances of infeasible solutions (Baumgartner and Homburg, 1996; Bollen, 1989; Hair *at al.*, 1998). While it is advantageous to use many indicators per construct, however, too many indicators may result in a non-parsimonious measurement model (Baumgartner and Homburg, 1996). Bollen (1989) argues that at least two scale items or composite indices should represent a construct. However, three or more is preferred. In this study some constructs were represented by an aggregate of two indicator variables, while others were represented by an aggregate of three indicator variables.

Table 4.4: Aggregated statements measuring construct variables

Items	Variable ID	Resulting items	Construct	Highest item corr to total
Dep33r + Dep22r = Dag1 Dep2 + Dep8 + Dep7 = Dap2	V1 V2	2	Relative Dependence	Dep7
Conf2 + Opp2 = Oag1 RConf3 + Opp1 = Oag2 RConf1 + Opp3 = Oag3	V14 V15 V16	3	Opportunistic Behaviour	Conf2
Cert4 + Cert5 = Cag1 Cert1 + Cert2 + Cert3 = Cag2	V17 V18	2	Certainty	Cert 5 Cert 3
Inflby2r + inflov3r + inflov1r = Iag1 Inflby1 + inflby4 + inflov4r = Iag2 Inflby3 + infov2r = Iag3	V3 V4 V5	3	Influence by partner	Inflov3r
Satis1 + satis2 = sag1 Satis3 + satis4 = sag2	V12 V13	2	Satisfied	Satis2
Trust4 + preleave4 + trust5 + trust6 = Tag1 Preleave3 +preleave2 + trust2 + trust3 = Tag2 Trust1 + preleave1 = Tag3	V6 V7 V8	3	Trust	Trust5
Comit2 + comit5 = Mag1 Comit3 + comit4 = Mag2	V19 V20	2	Commitment	Comit5
Coop1 + benefit5 + benefit2 + coop2 = Pag1 Coop4 + benefit3 = Pag2 Coop3 + coop5 + benefit4 = Pag3	V9 V10 V11	3	Cooperation	Benefit2
Total		20		

4.3.3 Data analysis

Several statistical procedures were employed to analyse the data in this study. In determining the reliability of the scale items for each construct in the model the confirmatory factor analysis (CFA) was conducted. Bollen (1989) states that CFA is a better method of analysis than exploratory factor analysis in situations where hypotheses about plausible models exist, as is the case in this study. Moreover CFA procedure can assist one to identify potential problems with multicollinearity between items within each scale and it can identify scale items that cross-load on other constructs in the model (convergent and discriminant validity).

The presence of multicollinearity between items is one criterion for eliminating items for SEM analysis.

CFA provides factor loadings, which represent the direct effects of the scale items on the measurement of the construct (Bollen, 1989). Though others recommend factor loadings of above 0.7 (Nunnally, 1978; Hair *et al.* (1995, 1998) argue that "factor loadings greater than ± 0.30 are considered to meet the minimal level; loadings of ± 0.40 are considered more important; and if the loadings are ± 0.50 or greater, they are considered practically significant. Thus the larger the absolute size of the factor loading, the more important the loading in interpreting the factor matrix. Because factor loading is the correlation of the variables and the factor, the squared loading is the variable's total variance accounted for by the factor; thus a 0.30 loading translates to approximately 10% explanation and a 0.50 loading denotes 25% of the variance is accounted for by the factor. The loading must exceed 0.70 for the factor to account for 50% of the variance" (Hair *et al.*, 1998: 111). They further state that factor loadings of 0.80 and above are not typical and that it is the practical significance of the loadings that is an important criterion. Moreover, the emphasis of this approach is on practical rather than statistical significance.

The squared multiple correlations are the measure of each item in the scale when it is regressed on the remaining items in the same scale (discussed in detail in Chapter six). Thus, it is a measure of the degree of collinearity of the scale item with the other items in the same scale and is considered a measure of reliability for each scale item (Bollen, 1989). The main objective of the CFA is to refine the scale items measuring the constructs, so that they are reliable and valid measures in the model.

The model was evaluated on the basis of goodness of fit indices to determine if the model is a representation of the proposed relationship between cane growers and the millers. There are a number of goodness of fit indices that could be used. These include likelihood-ratio Chi-square significance (χ^2), the goodness of fit index (GFI), the comparative fit index (CFI) and root square mean error (RMSEA). The (χ^2) value is the most important measure of the overall fit. Technically the χ^2 should be insignificant ($p > 0.05$) because an insignificant χ^2 shows a good model fit (Gefen, *et al.,* 2000). However, since χ^2 is sensitive to larger sample size and the power of test, it is often rare to satisfy this criterion. Therefore, the ratio of χ^2 to degrees

of freedom is sometimes used. The recommended ratio of χ^2 to degrees of freedom is between 1 and 2 (Hair *et al.*, 1995, 1998). However, in some cases there has been some forgiving in that the recommendation would be a χ^2 as small as possible and the ratio of χ^2 to degrees of freedom smaller than 3:1.

The GFI measures the absolute fit (unadjusted for degrees of freedom) of the combined measurement and structural model to the data, while the adjusted goodness of fit index (AGFI) adjusts this value to the degrees of freedom in the model. The RMSEA on the other hand assesses the residual variance of the observed variables and how the residual variance of one variable correlates with the residual variance of the other items. Therefore, the closer the value of RMSEA is to zero, the better the model. The threshold for GFI, AGFI and RMSEA is 0.90, 0.80 and below 0.05 or at most 0.08 respectively (Gefen, *et al.*, 2000).

4.4 CONSTRUCT MEASURES

While the questionnaire structure also asked farmers to provide information about themselves and their farming practices, it was also divided into sections containing multiple item measures for each construct variable considered.

The measurement variables in a SEM represent the scale items for each construct to be measured. The conceptual model for the relationship between smallholder cane growers and millers in the sugar industry supply chain, presented in Chapter three, is represented by two exogenous variables (opportunistic behaviour and relative dependence) and six endogenous variables (commitment, trust, cooperation, influence by partner, certainty, and satisfaction). This section of the chapter details the scale items employed in the measurement of these constructs. The items measuring the constructs were validated by using confirmatory factor analysis (CFA), which is discussed in detail in Chapter six. The CFA statistical procedures were also used to reduce the number of scale items for measuring each construct used in the structural model testing. The number of items that remained in each construct were those that best represent the measurement of their respective constructs.

Most of the scales used were adopted from Morgan and Hunt (1994), Heide and John (1990) and Dwyer *et al.* (1987). However, they were modified to suit this specific study. Items used to measure constructs in the millers' questionnaire are presented in Appendix F.

4.4.1 Measurement of satisfaction

Satisfaction with an exchange relationship is regarded as an important outcome of buyer-seller relationships. Satisfaction was used as a proxy for relationship performance in this study. Four items were used to measure satisfaction (Table 4.5). Farmers were asked if they were satisfied with the statements used to measure satisfaction, using a 4-point likert type scale ranging from (1) = very much disatisfied to (4) = very much satisfied

Table 4.5: Items measuring satisfaction

1. Price received for sugarcane (satis1)
2. Procedures for testing sucrose content (satis2)
3. Time taken to receive payment after sugarcane has been delivered to the mill (satis3)
4. Technical assistance provided by the Sugar Association (satis4)

4.4.2 Measurement of commitment

Commitment has been considered an important element in business relationships. In this study commitment was measured using 5 items. The items were rated in a 4-point likert type scale ranging from (1) = strongly disagree to (4) strongly agree. Table 4.6 presents the items used to measure commitment.

Table 4.6: Items measuring commitment

1. Given a chance you would change to and supply another mill (comit1) (R)
2. You have invested a lot of capital in the sugarcane business (comit2)
3. You honour your quota as required by the mill (comit3)
4. You always try to satisfy your quota (comit4)
5. You do not care whether you meet your quota, as long as you make profit (comit5) (R)

R= reversed coding (The responses to these items were reversed before the analysis was conducted, i.e. responses such as 1 and 4 were switched over, and 2 and 3 were also switched over).

4.4.3 Measurement of influence by partner

Controlling behaviour among organisations in a contractual arrangement is a result of power imbalance and authority. The influence by partner implies that one partner's goals dominate the decisions made in the relationship. Hence, it affects the outcomes of the relationship. Eight items were used to measure the farmers' perception of influence by partner and are presented in Table 4.7.

Table 4.7: Items measuring influence by partner

1. The mill tries to control farmers (influby1)
2. Farmers can make farming decisions independently of the mill (influby2) (R)
3. Farmers take whatever the mill says because they do not have any bargaining power (influby3)
4. The mill has more bargaining power than farmers (influby4)
5. Farmers manage to have their concerns considered by the mill (Rinflov1) (R)
6. Farmers can influence the price of sugarcane offered in the industry (Rinflov2) (R)
7. Farmers and the mill have equal bargaining power (Rinflov3) (R)
8. Farmers have more bargaining power than the mill (Rinflov4) (R)

R= reversed coding (The responses to these items were reversed before the analysis was conducted, i.e. responses such as 1 and 4 were switched over, and 2 and 3 were also switched over).

4.4.4 Measurement of certainty

In today's fast-changing world it is inevitable that organisations involved in an exchange relationship are faced with uncertainty. It could be environmental uncertainty, how the environmental changes would affect each organization's business and how to react to such changes. Table 4.8 presents the items used to measure certainty in this study. The cane growers' perception of the degree of certainty in their relationship with millers was measured with 5 items rated in a 4 point likert-type scale.

Table 4.8: Items measuring certainty

1. Farmers are assured of a market (cert1)
2. Farmers know in advance the price at which the sugarcane will be bought (cert2)
3. Farmers have all the technical know-how on growing sugarcane (cert3)
4. Farmers can always get technical information from the SSA Extension department (cert4)
5. Now farmers know how to grow sugarcane (cert5)

4.4.5 Measurement of opportunistic behaviour

Opportunistic behaviour is a key concept in contract-centred approach to exchange relationships. Opportunism is defined as self-interest seeking with guile, which includes lying, stealing, and cheating. In general, it is the incomplete or distorted disclosure of information, especially to calculated efforts to mislead, distort, disguise, obfuscate, or otherwise confuse. Opportunistic behaviour was measured using 6 items, all rated in a 4 point likert-type scale (Table 4.9).

Table 4.9: Items measuring opportunistic behaviour

1. The mill takes advantage of the farmers' ignorance (opp1)
2. The mill is concerned with maximizing its own profits (opp2)
3. The mill cheats when testing farmers' sugarcane (opp3)
4. The difference in opinion between the mill and farmers is what strengthens the relationship between the two parties (Rconf1) (R).
5. The differences in opinions between the mill and farmers is an effort by the mill to cheat farmers (conf2)
6. Farmers regard conflict of opinion between the mill and farmers as a normal way of doing business (Rconf3) (R)

R= reversed coding (The responses to these items were reversed before the analysis was conducted, i.e. responses such as 1 and 4 were switched over, and 2 and 3 were also switched over).

4.4.6 Measurement of relative dependence

The perception of dependence of the parties in an exchange relationship is an important dimension. Dependence takes place when one partner does not control all of the conditions necessary for achievement of an action or when a desired outcome is performed by another partner (Handfield and Bechtel, 2002). A relative measure of dependence is imbalance in a relationship and the primary consequence of relative dependence is influence or power.

Relative dependence in this study was measured by 8 items rated in a 4 point likert type scale presented in Table 4.10.

Table 4.10: Items measuring relative dependence

1. If you want you can switch from growing sugarcane to another enterprise (dep1)
2. If this mill could close down, you would be forced to go out of business (dep2)
3. The mill makes an effort to assist farmers during emergencies (e.g. providing transport) (dep3)
4. Farmers can sell their sugarcane only to this mill (dep11)
5. The mill's output can be lowered without the farmers' involvement in sugarcane production (dep22R) (R)
6. Farmers can still do better by engaging in other businesses than sugarcane production (dep33R) (R)
7. Farmers are visited by the industry's extension agents on a frequent basis (dep7)
8. Farmers are invited to workshops by the SSA (dep8)

R= reversed coding (The responses to these items were reversed before the analysis was conducted, i.e. responses such as 1 and 4 were switched over, and 2 and 3 were also switched over).

4.4.7 Measurement of trust

Arrow (1973) asserts that there is an element of trust in every transaction. Parties to an exchange relationship in which past experiences and the shadow of the future emerge, will project their relationship into that future by focusing on the "relational quality" of the exchange (Arino and de la Torre, 1998). The critical determinant of relational quality is the experience of the parties with each other's behaviour as the exchange unfolds. Therefore, the direct experiences will influence the parties' views of each other's trustworthiness (Lewicki and Bunker, 1996; McKnight *et al.*, 1998). Trust in this study is measured by 9 items in a likert- type scale. Table 4.11 presents the items used to measure trust.

Table 4.11: Items measuring trust

1. The mill's decisions are meant to benefit both growers and the mill (trust1)
2. The mill treats cane growers with care (trust2)
3. There is a mutual understanding between the mill and the cane growers (trust3)
4. The mill can be relied upon for its technical ability (trust4)
5. The mill sometimes withholds some information that may be useful to cane growers (trust5R) (R)
6. The mill cheats on farmers (trust6R) (R)
7. One has to monitor and double check whatever information the mill gives to cane growers (trust7R) (R)
8. You sometimes think of quitting sugarcane farming (Rpleave1) (R)
9. The way farmers are treated by the mill one thinks of changing the mill (Rpleave2) (R)

R= reversed coding (The responses to these items were reversed before the analysis was conducted, i.e. responses such as 1 and 4 were switched over, and 2 and 3 were also switched over).

4.4.8 Measurement of cooperation

Cooperation is regarded as the starting point for supply chain management and as such it has become a necessary, but not a sufficient condition. The next important element is coordination, which ensures smooth flow of goods and resources among parties (Spekman *et al*, 1998). This study used 9 likert type scale items to measure the perception of cooperation between the cane growers and the millers. Table 4.12 presents the items measuring cooperation.

Table 4.12: Items measuring cooperation

1. Your activities with the mill are well coordinated (coop1)
2. Together with the mill you plan production and delivery schedules (coop2)
3. The mill seriously takes into consideration farmers' concerns (coop3)
4. The mill seeks farmers' opinions whenever it considers implementing changes that will affect farmers as well (coop4)
5. The mill is very much cooperative (coop5)
6. There are no hassles looking for a market (Benefit 2)
7. Subsidized transport by the mill (Benefit 3)
8. Loans provided by the mill to farmers (Benefit 4)
9. Use of mill equipment by farmers (Benefit 5)

4.5 SUMMARY

This chapter first introduced the hypotheses that guide the study. The second section addressed the methodology employed to gather the sample used in the study, and the third section presented the statistical procedures used to analyse the data. Finally, the measurement items used for the different construct variables used in the study were presented and discussed in this chapter.

CHAPTER FIVE

PERCEPTIONS OF CANE GROWERS AND MILLERS CONCERNING THEIR RELATIONSHIP

5.1 INTRODUCTION

Exchange relationships result from the wisdom that in the competitive and turbulent business environment organisations do not manage growth acting by themselves. Power dependence illustrates how dependent partners are on each other. This dependence can be both a source of strength or risk. The strength results from organisations working together and the risk can result from opportunistic behaviour by the power vested partner, which must be attenuated by legal contracts, norms, and social contacts. Therefore, aspiring organisations, in most cases, seek trust and cooperation as a long-term investment. This gives the relationship a long-term character. Trust and cooperation involve a learning process, where trust is achieved over time. The continuation of the relationship reflects the strength of using learning effects and built-in skills for mutual benefit. This kind of relationship development tends to generate strength and resistance to disruption of the relationship. As the cooperation process continues, partners are able to develop more trust and commitment for joint efforts and building a common trust base. Hence, they realise the benefits of being in the relationship.

This chapter provides a description of the perceptions of smallholder farmers and millers concerning their relationships. It begins with the description of the respondents, followed by the perceptions of the cane growers. Following this section are the perceptions of the millers. The description of performance and its indicators for cane growers in their exchange relationship with the millers is addressed in the final section of this chapter.

5.2 CHARACTERISTICS OF SMALLHOLDER CANE GROWERS IN THE SAMPLE

The characteristics of the cane growers in the sample are presented in Table 5.1a, while Table 5.1b presents the performance factors for these farmers. The results in Table 5.1a indicate that

the respondents from the cane growers consisted of 99 males (79.8%) and 25 females (20.2%). Forty five (36.3%) of the respondents sell their sugarcane to Ubombo (Bigbend) mill, while seventy five (60.5%) sell their cane to the Mhlume mill and four (3.2%) sell their cane to Simunye mill. It appears that the mills supplied by the majority of smallholder farmers are Mhlume and Ubombo. The Simunye mill has very few farmers supplying it. This is most likely as a result of the location of the mill in relation to the farmers and rivers as a source of water. Eighty six (69.4%) of the respondents are the owners of the farms they operate, while thirty eight (30.6%) are not individual owners of the farms, instead they are an association or act on behalf of the owner. Most of the farmers who own farms either work within a scheme, e.g. Vuvulane irrigated farms (VIF), or belong to an association which organises the inputs, and arranges for harvesting and transportation on behalf of the member farmers. Some farmers pool machinery like tractors, forming an association. This machinery is then hired to the members of that association. Farmers who operate a cooperative or an association pool their land and operate as one entity, which upon selling their cane and paying their obligations, share the proceeds according to an agreed formula.

The results indicate that more than three-quarters of the respondents (78.2%) are married and most of them (80.6%) are above the age of 40. Although some farmers have other businesses, apart from their sugarcane business, the majority of the farmers (54%) rely on sugarcane production as their sole source of income. Normally, it takes about 11 months before sugarcane is ready for harvesting. Moreover, while the crop is growing, money is required for the various operations necessary before the crop is ready to be harvested. Therefore, farmers require money to pay for labour and other activities. Most of the respondents (80%) are financed by commercial banks (for example the Swaziland Development and Savings Bank) and the Enterprise Fund in order to cater for these activities. The Enterprise Fund was established by His Majesty the King in order to support Swazi entrepreneurs at a reasonable interest rate. Half of the respondents have been in the sugarcane business for more than 10 years, while the other half has been involved in the business for less than 10 years.

Table 5.1b shows that the average distance for the between the farmers and the mill is 20.5km, while the average sucrose content in 1997 to 2001 seasons was 14.04%. While the average distance suggests that most of the farmers are closer to the mill, it is worth noting that some farmers are far away from the mill. The minimum distance to the mill is 5km, while the maximum distance is 106km. The results also show that on average the profit per ha for these

farmers is R7, 409.03 and the revenue per ha is R15, 611.74. There is a big variation in the distance between the farmers and the mill as well as the profit per ha and the revenue per ha as indicated by the respective standard deviations.

Table 5.1a: A profile of cane growers' interviewed, 2001 (n = 124)

Characteristics	Frequency	%
Gender		
Male	99	79.8
Female	25	20.2
Mill supplied		
Ubombo	45	36.2
Mhlume	75	60.5
Simunye	4	3.2
Ownership of sugarcane farms		
Owner of the farm	86	69.4
Not owner of the farm	38	3.2
Marital status		
Single	7	5.6
Married	97	78.2
Divorced/separated	1	0.8
Widowed	19	15.3
Age		
15-20	1	0.8
21-30	8	6.5
31-40	15	12.1
41-50	26	21
51-60	34	27.4
61-70	22	17.7
More than 70	18	14.5
Have other businesses		
Yes	56	45.2
No	68	54.8
Sources of finance for farming		
Commercial bank	28	22.6
Enterprise fund	15	12.1
Commercial bank and Enterprise fund	37	29.8
Commercial bank and IFAD	4	3.2
Association/cooperative	40	32.3
Number of years in farming		
Less than 10 years	62	50
More than 10 years	62	50

Table 5.1b: Sample farmers' performance indicators (n = 124)

Indicators	Mean	Std dev
Distance to the mill (km)	20.5	17.5
Av. Sucrose content (1997-2001) (%)	14.04	1.52
Profit per ha (R)	7409.03	5984.34
Total revenue per ha (R)	15611.74	4432.49

5.3 PERCEPTIONS OF CANE GROWERS

The perceptions of farmers were measured using a four point likert scale where one indicated that they strongly disagreed and four that they strongly agreed. Therefore, a response value above the midpoint of 2.5 means the respondent agrees with the statement, whilst a response value less than the midpoint means the respondent disagrees with the statement. Table 5.2 shows the level of certainty cane growers have in their relationship with the millers, their commitment in the relationship, the level of perceived cooperation, perceived practise of opportunism by the millers, perceived influence by the millers, the farmers' satisfaction with the relationship, the cane growers' level of trust in the millers and the level of farmers' dependence on the millers.

Table 5.2: Sample cane growers' perceptions of their relationship with millers, 2001 (n = 124)

Item	Mean	Std dev
Certainty of the relationship	3.382	0.391
Commitment	3.315	0.376
Cooperation	2.267	0.461
Influence by partner	2.914	0.476
Opportunistic behaviour	2.792	0.538
Satisfaction	2.853	0.585
Trust	2.531	0.350
Relative dependence	2.703	0.526

The results indicate that cane growers are certain about, and are committed to their relationship with the millers. However, they perceive poor cooperation between themselves and the millers. This is further evidenced by their perception of the practise of opportunistic behaviour by the millers. Despite this and their perceived dependence on the millers, cane growers are satisfied with their relationship and still trust the millers. It is worth noting, however, that farmers posses the minimal level of trust. This suggests that farmers have contractual trust rather than goodwill trust towards the millers. Contractual trust is trust limited to the contractual agreement, while goodwill trust goes beyond just fulfilling contractual obligations.

5.3.1 Certainty

Certainty in this context refers to the farmers being well informed on the operations of the sugar industry, being clear on how they are paid for their cane, having clear knowledge of the production processes and being assured of a stable market for their sugarcane. Table 5.3 presents the results of the perceptions of the farmers regarding certainty in their relationship with the millers. Although some farmers were uncertain about their exchange relationship with the millers, the majority (98.4%) of the respondents were certain. The fact that they have an agreement to deliver a certain amount of cane to the mill and that the mill is obliged to accept it as outlined in each farmer's quota, assures the farmers that their cane will be sold. Moreover, the SSA and the Swaziland Government provide extension service to these farmers to ensure that they are familiar with sugarcane farming. Although the industry faces a threat of having some of its sugar sold in the world market if it overproduces and if its access to preferential markets ceases, smallholder farmers do not recognise this threat. The SSA would have to explain this to the farmers.

Table 5.3: Certainty of sample cane growers in their exchange relationship with millers

Item	Frequency	Percent
Not certain	2	1.6
Not sure	0	0
Certain	122	98.4
Total	124	100

5.3.2 Relationship commitment

Relationship commitment is concerned with the engagement of the partners in their relationship. Commitment refers to the desire to continue a relationship. It could be either calculative or affective commitment. Calculative commitment refers to a partner's commitment because of anticipated benefits, while affective commitment is because the committed party likes the other partner in the relationship. Explicitly, commitment aids in strengthening an existing relationship through specific investments or considering the relationship in a wider scope, not just an exchange. The results in Table 5.4 show that most of the respondents (96%) are committed to their exchange relationship with the millers, a few were not sure (2.4%), while a minority are not committed (1.6%). The results suggest that most of the farmers would like to continue their relationship with the millers.

It is noted that sugarcane production requires a lot of investment in terms of land preparation, machinery, human capital and other specificities that cannot be used elsewhere when the farmers stop sugarcane farming. This implies that farmers have no choice but to continue their exchange relationship with millers. Another possible explanation could be that presently, sugarcane farming has a comparative advantage compared to other crops in Swaziland. Therefore, the type of commitment these farmers have is likely to be a calculative one rather than affective.

Table 5.4: Commitment on the sample farmers to their relationship with millers

Item	Frequency	Percent
No commitment	2	1.6
Not sure	3	2.4
Commitment	119	96
Total	124	100

5.3.3 Relationship cooperation

Inter-organisational cooperation reflects the abilities of two or more firms to collaborate and work together in an effort to achieve their respective goals. Cooperation is regarded as a product of positive exchange episodes between buyer and seller. Closer cooperation between

the members of a supply chain reduces transaction costs, enhances the ability of the commodity system to adjust to changing consumer demands, and improves supply chain integrity. Cooperation facilitates better matching of supply and demand. The results on the farmers' perception of the level of cooperation between farmers and the millers are presented in Table 5.5. These results indicate that the majority of farmers in the study (72%) perceive that there is no cooperation between farmers and the millers.

The lack of cooperation as perceived by farmers may be attributed to farmers feeling cheated by millers and that millers are concerned only about themselves, not with the welfare of the farmers. For example, during a discussion with some of the farmers it was indicated that there is a need for a stronger cane growers association to bargain with millers. Some of the farmers argued that "smallholder farmers are black, a black man is ignorant. How can a black man argue with a white man because the millers are white people?"

In contrast, some farmers attributed the lack of cooperation to certain farmers. They argued that: "Some farmers exchange their sugarcane when they have exceeded their quota, so that they will not be penalised by being paid a segregated price". Overall, the perception of lack of cooperation may be regarded as a result of lack of transparency between millers and farmers and the lack of benevolence trust on the part of both farmers and millers.

Table 5.5: Sample cane growers' perceptions of cooperation between farmers and millers

Item	Frequency	Percent
There is no cooperation	89	71.8
Not sure	0	0
There is cooperation	35	28.2
Total	124	100

5.3.4 Influence by partner

Influence by the partner firm is shown when the influenced firm makes decisions because of an assumed pressure to satisfy the power holder's wishes. Unlike authority, influence can be subtle rather than explicit. The imbalance of power between cane growers and the millers is

indicated by most of the respondents. Table 5.6 presents the farmers' perceptions of the millers influence on them. About three-quarters of the respondents (76.6%) indicated that millers exert influence on the cane growers.

Originally the sugar industry was vertically integrated with both production and milling in the hands of the milling companies. Gradually, the industry involved independent out-growers, mainly large-scale farmers. It is only recently that the industry has involved smallholder cane growers. These farmers are still new to the sugar industry and still have to familiarise themselves with the industry's regulations and operations. Therefore, they feel they are more dependent on the millers and more vulnerable to the power exerted by millers. This situation is compounded by the fact that smallholder farmers' production is insignificant when compared to the production by large companies and the millers themselves. Hence, the farmers regard themselves as being powerless and subject to the influence of the millers.

Table 5.6: Sample cane growers' perceptions of influence by partner

Item	Frequency	Percent
No influence by partner	22	17.7
Not sure	7	5.7
Influence by partner	95	76.6
Total	124	100

5.3.5 Farmers' trust in millers

Trust in this study is regarded as the farmers'/millers' confident belief in the millers'/farmers' honesty towards the farmers/millers. Trust economises on information search and transaction costs. It creates the conditions where exchanges between technologically and legally separate entities can take the form of problem solving rather than bargaining. Therefore, trust enhances supply chain performance by improving information availability, reducing transaction costs, reducing opportunistic behaviours, diminishing the likelihood of free-riding and other negative externalities. The main theme is that trust increases the propensity of people to cooperate and produce socially efficient outcomes and to avoid inefficient non-cooperative traps.

Every transaction has some element of trust. The fact that transactors agree to exchange shows that there is some level of trust, however, it is minimal trust. Trust in relationships is very important as it enhances cooperation between parties. The results in Table 5.7 shows that less than half of the respondents (46.8%) trust the millers. Trust in an exchange relationship is important because it reduces opportunistic behaviour and promotes cooperation and commitment in the relationship. The results indicate that farmers were divided on the issue of trust, since the percentage of those who do not trust the millers (42.7%) was very close to those who trusted. It can be noted in Table 5.2 that smallholder farmers have minimal trust. This implies that farmers trust that the millers will fulfil their obligation of accepting their cane as per contract. This trust results from the stable and consistent buying process of their cane by millers. However, the perception that millers cheat farmers tends to limit the farmer's trust to the minimum.

Table 5.7: Sample cane growers' trust on the millers

Item	Frequency	Percent
No trust	53	42.7
Not sure	13	10.5
Trust	58	46.8
Total	124	100

It is also worth noting that trust can be built in three ways in an exchange relationship. These include:

- Institutionally-based trust, which constitutes minimal trust based on formal controls such as rules, procedures and regulations in the industry. These specify the patterns of behaviour and penalties or sanctions to be applied in cases of non-conformance by both growers and millers.
- Characteristic-based trust, which is based on the reputation of the millers and farmers. This reputation collects, distributes and aggregates feedback about the millers and the farmers' past behaviour. Since farmers have the belief that millers are cheating them, they do not believe millers have a good reputation and
- Process-based trust, which results from the intensity of interaction between millers and farmers. Interaction between farmers and millers only occurs at the farmer/mill group committees and through representatives at the SSA.

The fact that an extension service is provided by the government and the SSA results in farmers believing that millers are not making an effort to assist or interact with them. The risk involved in the interaction process becomes important in enabling trust. However, in the case of smallholder farmers and millers there is no risk of each party defecting the contract because it would be uneconomic for farmers to change mills or change to other crops as presently sugarcane has high economic returns in comparison to other crops. The millers own estates from which they supply their own sugarcane to their mills. Hence, they may not be affected by defection of some farmers. Therefore, there are no risks faced jointly by both parties and this hinders the development of trust. Relatedly, some farmers argue that millers refuse to employ farmers' representatives in the laboratories, because they would ensure farmers are not cheated during the testing of sucrose content. This is a clear indication of limited trust by farmers in the millers.

5.3.6 Cane growers' satisfaction with millers' relationship

Satisfaction is defined as the seller/buyer's affective state resulting from his overall appraisal of his relationship with the buyer/seller. In an on-going exchange relationship, satisfaction with previous exchanges generates confidence between both parties because they tend to feel that they are not exploited and are concerned with each other's welfare in the exchange relationship. The results in Table 5.8 show that more than half (62.9%) of the respondents were satisfied with their relationship with millers. Satisfaction is regarded as a measure of the effectiveness or the performance of the relationship. Like any rational individual, farmers weigh the costs and benefits of being in the sugar industry against other options and their satisfaction is based on this comparison.

Table 5.8: Sample cane growers' satisfaction in their relationship with the millers

Item	Frequency	Percent
Not satisfied	25	20.2
Not sure	21	16.9
Satisfied	78	62.9
Total	124	100

Not surprisingly, satisfaction is related to economic performance. Most of the farmers realise economic benefits from growing sugarcane. Therefore, their satisfaction in the relationship stems from the economic benefits they receive from the sugar industry.

5.3.7 Farmers' perceptions of opportunistic behaviour by millers

Suspected opportunism is one factor that can destroy a relationship, irrespective of whether the suspicion is factual or not. It is important to note that in any exchange relationship either party may be capable of opportunism if the right circumstances arise. In practise, opportunism includes overt behaviour such as distortion of information, subtle behaviour such as misrepresentation of information by not fully disclosing it, cheating and reneging on commitments. Table 5.9 presents the farmers' perceptions of opportunistic behaviour by millers. The results suggest that about two-thirds (66%) of the respondents regard millers as being opportunistic, whilst only a few (7.3%) are not sure. These results seem to contradict that farmers are satisfied with the relationship. However, the possible explanation could be that, though they claim to be cheated by millers, they are better-off being in this relationship compared to other alternatives. This is because is better profit in cane production than in other crops.

The results suggest that the relationship between millers and smallholder cane growers is not a healthy relationship since farmers accuse millers of being unfair. They feel they are cheated by millers. In a discussion with farmers some stated that they want to be paid for all the products derived from sugarcane, including bagasse, molasses and compost. Others revealed that millers have a tendency to test the sucrose content of their cane whilst it is still in the field and if the sucrose content is low, they postpone harvesting until the sucrose content is higher. In contrast, the sucrose content for farmers' cane is tested at the mill and if it is low, the farmers lose-out financially since payment is based on sucrose content in the cane.

Table 5.9: Sample cane growers' perceptions of opportunistic behaviour by the millers

Item	Frequency	Percent
There is no opportunistic behaviour by millers	33	26.6
Not sure	9	7.3
There is opportunistic behaviour	82	66.1
Total	124	100

In another instance, farmers' associations submitted that the mill deducted R20,000 from their pay and when they enquired about this, they were told it was meant to cover the costs of producing white sugar. The concern for these farmers was that these deductions should not be effected on farmers. Hence, they regarded such an action as cheating and an act of opportunistic behaviour by the millers. However, they indicated that discussions were underway to get their money back.

5.3.8 Relative dependence

It is often argued that dependent firms will accept directions and changes requested by the dominant partner to sustain their relationship. On the other hand, the dominant partner will direct actions that will achieve its individual preferences over those that are jointly acceptable to both parties. In this study farmers were asked about their perception in regard to their dependence on the millers, and these results are presented in Table 5.10. The results indicate that more than half (56%) of the respondents perceive that cane growers are more dependent on the millers than millers are dependent on them.

As indicated in Chapter one, most of the sugarcane supplied for processing comes from mill cum-planters with the exception of the Ubombo mill. This suggests that even if cane growers were to withhold their cane, the mills could still operate with minimal disruptions. On the other hand, cane growers have no alternative market for their sugarcane. As a result of asset specificity that they incur in cane production in terms of machinery, equipment and other specificities, they find themselves locked in a dependence situation because the switching costs would be too high.

Table 5.10: Sample cane growers' perception of dependence on the millers

Item	Frequency	Percent
There is no dependence on the millers	39	31.5
Not sure	16	12.9
There is dependence on the millers	69	55.6
Total	124	100

The issue of dependence was stressed by some farmers who asked; "how can millers expect smallholder farmers to have equal powers with them". Relatedly, when the farmers were asked how they monitor whether the mill honours its agreements in terms of payment arrangements, price and procedures, they said; "that is a very difficult question since we mainly depend on the millers for processing our cane into sugar". This implies that farmers regard themselves as being helpless and dependant on the millers.

5.4 PERCEPTIONS OF MILLERS

The respondents for the millers' data consisted of three cane supply managers, one from each mill. These were chosen because they work closely with the smallholder farmers. The perception of the millers regarding their relationship with cane growers was assessed by finding the means of their responses on the item scales measuring each construct. The questionnaire used to collect data on the millers' perceptions was similar to that of the cane growers except in that it was specific to the millers (see Appendix F). In a 4-point likert type scale, where 1 represented strongly disagreeing with the statement and 4 represented strongly agreeing with the statement, an average response value above the midpoint of 2.5 implies the respondent agrees, while a score below 2.5 means the respondent disagrees with the statement. Table 5.11 presents the results of the perceptions of the millers in their relationship with cane growers. The results show that although millers are dependent on the cane growers (mean = 3.40), they have minimal trust in the growers (mean = 2.58). The results also indicate that millers are committed to and certain about their relationship with cane growers. They seem to be satisfied with this relationship (mean = 3.08). Unlike the cane growers' the results indicate that millers do not perceive any threat of opportunistic behaviour from cane growers (mean = 2.22). They also feel that cane growers have no influence on the millers (2.00). This could be due to the fact that, though smallholder farmers are numerous, their contribution in

terms of production and their proportionate representation in the sugar industry structure is low. However, they regard their cooperation with the cane growers to be high (mean = 3.33).

The results based on the perception of millers are not surprising. Smallholder farmers only contribute a small amount to the sugarcane produced in Swaziland. Moreover, millers are aware that smallholder farmers are dependent on them, since sugarcane has a comparative advantage over other crops. Therefore, they are certain that farmers will always grow sugarcane, hence maintaining the relationship with them.

Contrary to the farmers' perceptions where they indicated that there is lack of cooperation, millers perceive a high level of cooperation between themselves and the farmers. This is because farmers are dependent on the millers and as a result they are forced to cooperate. This suggests that cooperation is one sided, which implies compliance by farmers rather than cooperation since cooperation is viewed as reciprocal.

As expected, the millers indicated that smallholder cane growers do not influence their decisions. This is because of the small percentage of sugarcane produced by smallholder cane growers compared to the total production by the industry as a whole and they are not well represented in the structures of the sugar industry. As a result of their insignificant contribution, the millers do not perceive any threat of opportunistic behaviour by these farmers.

The millers had to expand their mill capacities in order to accommodate more sugarcane when smallholder farmers joined the industry. Therefore, it makes sense for the millers to view themselves as dependent on the farmers because, without the farmers' input the mills will be under-utilised.

Table 5.11: Millers' perceptions of their relationship with cane growers, 2001 (n = 3)

Item	Mean	Std dev
Certainty of the relationship	2.833	0.288
Commitment	2.890	0.697
Cooperation	3.333	0.461
Influence by cane growers	2.000	0.433
Opportunistic behaviour by cane growers	2.220	0.191
Satisfaction	3.083	0.382
Trust	2.583	0.144
Dependence to cane growers	3.417	0.520

5.5 DESCRIPTION OF CANE GROWERS' PERFORMANCE AND INDICATORS

The success of contractual relationships differ in spite of equal conditions in object and time based aspects. The objective of any contractual relationship is to increase the quality of the product and the benefits that accrue to each partner, while minimising the total costs associated with adding value incurred by both the buyer and the supplier. A contractual relationship must guarantee and communicate ex-ante that the contracting partners have higher benefits with the relationship than without. Also the benefits of remaining in the contractual relationship must be higher than the costs of coordinating the actions. Therefore, the economic performance of the cane growers may be affected by several transaction costs incurred during the exchange process. Table 5.12 shows the relationship between economic performance of the cane growers and the sources of transaction costs.

Table 5.12 suggest that respondents who indicate that they make a profit from the sale of sugarcane have less transportation costs (R523.78) per tonne compared to those who reported that they are not making a profit (R642.25), they also have more irrigation water (36.12 cusec) as opposed to those who claim they are not making profit (26.76 cusec) and they have high percentage changes in quota (71%). The results show that the distance between the farmers' production sites and the mill is important for cane growers to realize a profit. Even if farmers could use the same type of transport and obtain the same yields, the difference in their location (specificity) would result in differences in profit. The results show that farmers who

reported making a profit are closer to the mill to which they supply (20.41 km) compared to those who do not make a profit (20.91km).

The availability of assets in any business is regarded as important in production because farmers are able to use these assets at their convenient time and at a lower cost than when leasing such assets. Farmers who reported making a profit were found to have a high value of assets per ha (R1,229.36) than those who reported not making a profit (R1,094.07). Relatedly, such farmers also have less value of leased assets per ha (R4075), while those who reported not making a profit had high value of leased assets per ha (R4,369.61). The results further indicate that farmers who reported making a profit have more land under sugarcane production (24.16ha), high yield per ha (96.12 tonnes) and high sucrose content (13.92%) compared to 9.05ha, 78.31tonnes and 13.77% respectively for those respondents who reported not making profit.

Further analysis of the performance factors based on the smallholder farmers indicate that the performance of smallholder farmers is also dependent on transport cost, distance to the mill, percentage change in production quota, yield per ha, and duration of the relationship with millers (years in sugarcane farming). The results imply that these factors are important for the farmers to realise economic benefits from the sugar industry (Appendix A).

Table 5.12: Sample farmers' economic performance and sources of transaction costs in 2001

	Do you make profit					
Item	Mean for Yes	Std dev	N	Mean for No	Std dev	N
Transport cost per tonne (Rands)	523.78	642.25	95	614.51	1080	16
Irrigation water (cusecs)	36.12	20.98	82	26.76	14.55	14
Percent change in quota (%)	0.71	3.06	95	0.10	0.44	17
Distance to the mill (km)	20.41	16.92	95	20.91	24.49	16
Total value of assets per ha (Rands)	1229.36	1901.91	95	1094.07	1915.40	17
Total value of assets leased per ha (Rands)	4075	7585.93	95	4369.61	8893.50	17
Farm size (ha)	24.16	33.29	95	9.05	8.54	17
Yield per ha (tonnes)	96.12	22.79	92	78.31	25.44	16
Average sucrose content (%)	13.92	0.97	90	13.77	0.87	15

5.5.1 Farmers' satisfaction and perceptions of their relationship with millers

Conceptually, satisfaction and performance are closely related. Satisfaction is an affective response to evaluation of perceived performance and performance can be assessed at different levels. It can be assessed at product level, service level and at relationship level. At relationship level, performance has been shown to be related to relationship outcomes like satisfaction. Therefore, satisfaction is a proxy for performance in an exchange relationship. Table 5.13 shows the relationship between satisfaction and the perception of the farmers regarding their relationship with the millers.

All the respondents who are satisfied with their relationship with the millers as well as almost all (96.2%) of those who are not satisfied with their relationship, expressed their commitment to the relationship. As indicated before, respondents in this study perceived poor cooperation between themselves and the millers. About 85% of those cane growers who are not satisfied with their relationship perceived a lack of cooperation between farmers and millers, whereas (62.0%) of those who are satisfied also have a similar perception. The results show that about three-quarters (77.5%) of satisfied respondents and more than half (56%) of those not satisfied with their relationship feel they are relatively dependent on the millers. From the results it can be noted that more of the farmers who are satisfied are committed to the relationship and are dependent on the millers compared to those who are not satisfied. In contrast, more of those farmers who are not satisfied with their relationship with millers perceive that there is no cooperation between farmers and millers. This suggests that cooperation and satisfaction are positively correlated. It may be argued that farmers who are satisfied with their relationship with millers have trust in the millers and realise economic benefits from their exchange relationship. Hence, they are satisfied with the relationship since satisfaction is based on either economic or social benefits.

Table 5.13: Sample farmers' satisfaction and perceptions of their relationship with millers

Item	Respondents not satisfied (N=53)	Respondents satisfied (N=71)	Total respondents (N=124)
No commitment	2 (3.8)	0 (0)	2 (1.6)
There is commitment	51 (96.2)	71 (100)	122 (98.4)
No cooperation	45 (84.9)	44 (62.0)	89 (71.8)
There is cooperation	8 (15.1)	27 (38.0)	35 (28.2)
No relative dependence	23 (43.4)	16 (22.5)	39 (31.5)
There is relative dependence	30 (56.6)	55 (77.5)	85 (68.5)

5.5.2 Farmers' trust and perceptions of their relationship with millers

Trust is regarded as an important asset in an exchange relationship between supply chain members like the cane growers and millers. Its importance is rooted in the belief that it leads to desirable attitudes of commitment and that it reduces transaction costs associated with monitoring and providing safeguards in an exchange relationship.

Table 5.14 compares the perceptions of the farmers who trust the millers and those who do not trust them. The results indicate that almost all respondents who trust them (98.6%) and those who do not trust (98.1%) the millers are certain about their relationship with the millers. Almost all respondents (96.2%) who do not trust the millers and all those who trust them indicated their commitment to their relationship with the millers. The perception by farmers of lack of cooperation by the millers is evident in both farmers who trust as well as those who do not trust the millers. More than three-quarters (84.9%) of the farmers who do not trust millers and about two-thirds (62.0%) of those who trust millers expressed a perceived lack of cooperation in their relationship with the millers. Both farmers who trust and those who do not trust millers perceived dependence on the millers. More than half (56.6%) of the respondents without trust and more than three-quarters (77.5%) of those who trust perceive that farmers are dependent on the millers. The results also suggest that more than three-

quarters (88.7%) of farmers who do not trust the millers and 77.5% of those who trust millers feel that farmers are influenced by millers. About ninety percent (90.6%) of those farmers who do not trust millers and 59.2% of those who trust them, perceive that millers exercise opportunistic behaviour towards farmers. The majority of those who trust (91.5%) and those who do not trust millers (64.2%) are satisfied in their relationship with the millers.

Collectively, the results suggest that more of those farmers who trust millers than those who do not trust are certain of their relationship with millers, are committed to the relationship, are dependent on the millers and are satisfied with their relationship with the millers. On the other hand, more of those farmers who do not trust millers than those who trust them perceive that there is no cooperation between farmers and millers, farmers are influenced by millers, and opportunism by millers. The results show the importance of trust in an exchange relationship.

Table 5.14: Sample farmers' trust in millers and their perceptions of their relationship

Item	Respondents without trust (N=53)	Respondents with trust (N=71)	Total respondents (N=124)
Uncertain	1(1.9)	1 (1.4)	2 (1.6)
Certain	52 (98.1)	70 (98.6)	122 (98.4)
No commitment	2 (3.8)	0 (0)	2 (1.6)
There is commitment	51 (96.2)	71 (100)	122 (98.4)
No cooperation	45 (84.9)	44 (62.0)	89 (71.8)
There is cooperation	8 (15.1)	27 (38.0)	35 (28.2)
No relative dependence	23 (43.4)	16 (22.5)	39 (31.5)
There is relative dependence	30 (56.6))	55 (77.5)	85 (68.5)
No Influence by miller	6 (11.3)	16 (22.5)	22 (17.7)
There is influence by miller	47 (88.7)	55 (77.5)	102 (82.3)
No opportunistic behaviour	5 (9.4)	28 (39.4)	33 (26.6)
There is opportunistic behaviour	48 (90.6)	42 (59.2)	90 (72.6)
No Satisfaction	19 (35.8)	6 (8.5)	25 (20.2)
Satisfaction	34 (64.2)	65 (91.5)	99 (79.8)

It is a common phenomenon that the element of trust in relationships is linked to economic benefits. In most cases people who realise economic benefits in their relationship are likely to have developed trust in that relationship. Table 5.15 presents the results of the respondents who trust millers and those who do not trust the millers with their perceptions on profit. The results show that nearly all the farmers (94.2%) who trust the millers indicated that they make a profit from the sale of sugarcane. Nearly three-quarters (72.3%) of those who do not trust the millers also indicated that they make a profit. The results suggest that both farmers who

trust and those who do not trust the millers realise economic benefits from their relationship with the millers. However, most of those who trust the millers compared to those who do not trust them indicated that they make a profit in sugarcane production. This indicates the importance of trust in enhancing economic benefits.

Table 5.15: Trust and profit making

Item	Respondents without trust (N=47)	Respondents with trust (N=69)	Total respondents (N=116)
Not making profit	13 (27.7)	4 (5.8)	17 (14.7)
Making profit	34 (72.3)	65 (94.2)	99 (85.3)

5.5.4 Farmers' trust and duration of relationship with millers

The relationship between exchange partners is expected to improve with time. The longer the duration of engagement between parties involved in the relationship, the stronger the relationship. Thus, the level of trust in a relationship is expected to be higher as the period of relationship engagement increases. However, the results in Table 5.16 show a negative relationship between the number of years in the farmers' exchange relationship and their trust in the millers. More than half (57.7%) of the farmers who trust the millers have less than 10 years in sugarcane farming, while 61.2% of those who do not trust millers have more than 10 years in sugarcane farming. However, there was no difference in the duration of exchange relationships in terms of the farmers' perceptions of opportunism by the millers. The results indicate that more than half (60%) of the respondents who had been farming sugarcane for less than 10 years and more than three-quarters (85%) of those who had been farming for more than 10 years regard millers as being opportunistic (Table 5.17). A closer look at the results indicate that more of the farmers who perceived opportunistic behaviour by millers are those who have been farming sugarcane for more than 10 years. This implies that since these farmers have been working with the millers for a long time, they are familiar with the operations of the industry and expected more than what they presently receive from the millers. Thus, they feel millers are cheating them.

Table 5.16: Duration of relationship and sample farmers' trust in millers

Item	Respondents without trust (N=49)	Respondents with trust (N=71)	Total respondents (N=120)
Less than 10 years	19 (38.8)	41 (57.7)	60 (50.0)
More than 10 years	30 (61.2)	30 (42.3)	60 (50.0)

Table 5.17: Duration of relationship and sample farmers' perceptions of opportunism

Item	Less than 10 years experience (N=60)	More than 10 years experience (N=60)	Total respondents (N=120)
No opportunistic behaviour	24 (40.0)	9 (15.0)	33 (27.5)
There is opportunistic behaviour	36 (60.0)	51 (85.0)	87 (72.5)

5.6 SUMMARY

This chapter presented the descriptive part of the study. It also examined the characteristics of the cane growers sample used in the study.

A closer look at the perceptions of the cane growers reveals that smallholder farmers are certain of their relationship with the millers and are committed to the relationship. Though the farmers perceive poor cooperation between the millers and themselves, they however possess some contractual trust towards the millers. The farmers perceive millers to influence farmers' decisions and to display some opportunistic behaviour towards them. Farmers also perceive that they are more dependent on the millers than the millers are on the farmers.

The results of the millers' perceptions indicate that millers are certain and committed to their relationship with farmers, millers believe there is cooperation between themselves and the farmers and they do not perceive any opportunistic behaviour by the farmers. Like the cane growers, the millers also possess contractual trust towards the farmers. They regard themselves as being dependent on the cane growers and they are satisfied with their relationship with the farmers.

Based on the results of the cane growers' performance, it is evident that the performance of the smallholder farmers, and hence the performance of the sugar industry supply chain, is influenced by two categories of factors. Firstly, those factors that are mainly dependent on the farmers themselves. Such factors include; transportation costs, percentage changes in the farmers' production quota, the distance between the farmers' production site and the mill, the value of the farmers' assets, farm size, yield per ha, and sucrose content of the sugarcane. Secondly, those factors that depend on the relationship between the farmers and the millers, such as perception of opportunistic behaviour, dependence on the millers, perceived poor cooperation between farmers and millers, and lack of goodwill trust by both farmers and millers. The results suggest that most farmers who trust the millers are committed to the relationship and a few of them perceive a lack of cooperation compared to those who do not trust the millers. The farmers' perception of opportunistic behaviour by the millers is associated with a few of those who trust, but more of those who do not trust the millers, while the majority of farmers who are satisfied in their relationship with the millers are associated with trust.

This chapter provided an informative description of the cane growers, their perceptions as well as the perceptions of the millers about their relationship. The next chapter will provide analytical tests of the social factors affecting the performance of the cane growers, and hence the supply chain. It further provides tests of the model for smallholder cane growers and the millers' relationship.

CHAPTER SIX

MODELLING SMALLHOLDER CANE GROWERS' EXCHANGE RELATIONSHIP WITH MILLERS

6.1 INTRODUCTION

The purpose of this study is to investigate the contractual relationship between smallholder cane growers and millers in the sugar industry in Swaziland. The study employed latent behavioural constructs such as trust, commitment, cooperation, influence by the partner, opportunistic behaviour, certainty, relative dependence, and satisfaction to model the relationship between smallholder cane growers with millers. Although these constructs have been used in other studies (Morgan and Hunt, 1994; Dwyer *et al.*, 1987; Ganesan, 1994; Heide and John, 1990), this is the first study to investigate these constructs together in an agricultural supply chain in Southern Africa. Batt and Rexha (1999) used some of these constructs in a study of the seed potato industry. However, their model structure was different and they were focusing on the farmer as a buyer of seed from the seed supplier, whereas this study focuses on the farmers as the supplier of sugarcane to the millers.

The objective of this chapter is to present the empirical results of the model formulated in the theoretical and conceptual framework (Chapter three). This chapter provides a model of the smallholder farmers' relationship with millers as well as identifying the important factors influencing the performance of the smallholder farmers, and hence the performance of the sugar industry supply chain. Three questions will be answered in this chapter.

1. What is the role of social factors in the performance of the smallholder farmers and their relationship with millers?
2. What kind of model would enable the understanding of contractual relationship between smallholder cane growers and millers in the sugar industry supply chain?
3. Which factors are important in enhancing the performance of the smallholder farmers, and hence the sugar industry supply chain?

6.2 RELATIONSHIP BETWEEN CANE GROWERS AND THE MILLERS

The cane growers' and millers' relationship model presented in Chapter three was estimated using two procedures. First, recursive models and multiple regression analysis were used to model the relationship of the two parties. Secondly, structural equation modelling (SEM) was used to determine the structure of the relationship and the fitness of the model to the data.

6.2.1 Measurement model evaluation

SEM contains two inter-related models, the measurement model and the structural model of which both models are defined by the researcher (Gefen *et al.*, 2000). The measurement model defines the constructs that the model will use and assigns manifest variables to each construct, whilst the structural model defines the causal relationship between the constructs (Gefen *et al.*, 2000; Hair *et al.*, 1995, 1998). The measurement model normally uses factor analysis to assess the degree that the observed variables load on their respective constructs. However, in this study factor analysis was not used as the sample was not large enough and the items measuring each construct were limited. Conducting a factor analysis would have risked some of the items being dropped pre-maturely. Some of the items used in this study were adopted from previous studies, but modified for this study's specific situation. Therefore, not using factor analysis in the study was not an issue since items had been used in previous studies before (Morgan and Hunt, 1994; Dwyer *et al.*, 1987).

The item loadings provided by SEM are analogous to a factor analysis, where each factor is a latent variable. SEM techniques assume that each manifest variable has a unique measurement error (a measure of inaccuracy in participant responses and their measurement and theoretical representation of the concept used in manifest variables). However, the use of the covariance matrix as an input in the model is well suited for the analysis of a model containing variables with measurement error (Hair *et al.*, 1995, 1998), thus facilitating a transition from exploratory to confirmatory analysis. This study used a covariance matrix as an input to the model.

The measurement model describes the relationships between the latent (unobserved) factors and their indicator variables. Confirmatory Factor Analysis (CFA) was used in this study to test the adequacy of the measurement model as a prerequisite to structural models. CFA

enables the researcher to test if conjectured relationship structures are supported by the observed data. Anderson and Gerbing (1988) argue that CFA should be conducted and if necessary the model has to be respecified before one could simultaneously examine the measurement and the structural models. CFA is more appropriate when the measures have been fully developed and validated. It seeks to determine the extent to which items designed to measure a particular factor actually do so. All sub-scales that are designed to measure a particular construct are expected to load onto their related factor (Barney, 1991). A confirmatory factor analysis of the indicator variables measuring the eight constructs in this study was conducted. Table 6.1 reports the measurement model of the unaggregated items in terms of the composite reliabilities of all constructs, the loadings of all construct items, and the error variance of all constructs, while Table 6.2 presents the measurement model for aggregated indicator variables (detailed CFA are presented in Appendix B and C).

The results in Table 6.1 indicate that all the indicator variables loaded satisfactory on the respective construct and they showed a moderately strong reliability in measuring the construct. Table 6.2 on the other shows the results of aggregated indicator variables. The results show that after aggregation, the variables had higher loading onto their respective constructs. The error variance was also reduced, which means the constructs are better explained by the aggregated indicator variables.

Table 6.1: Confirmatory Factor Analysis (CFA) results of the unaggregated indicator variables of the endogenous variables (λ,Y)

Exogenous variable	Indicator	Standard loading (λ)	Reliability[a]	Error variance[b]
Relative dependence			**0.522**[c]	
	Dep2	0.2060	0.0424	0.9576
	Dep22R	0.4500	0.2088	0.7912
	Dep33R	0.5893	0.2185	0.7815
	Dep7	0.4569	0.3473	0.6527
	Dep8	0.4674	0.2025	0.7975
Influence by partner			**0.645**	
	Inflby1	0.2054	0.0422	0.9578
	Inflby3	0.6407	0.4106	0.5894
	Inflby4	0.8394	0.7047	0.2953
	Rinflov1	0.2290	0.0524	0.9476
	Rinflov2	0.0898	0.0081	0.9919
	Rinflov3	0.8745	0.7648	0.2352
	Rinflov4	0.5999	0.3599	0.6401
Trust			**0.715**	
	Trust1	0.4639	0.2152	0.7848
	Trust2	0.4421	0.1954	0.8046
	Trust3	0.5301	0.2810	0.7190
	Trust5R	0.6010	0.3612	0.6388
	Trust6R	0.7551	0.5701	0.4299
	Rpleave1	0.1963	0.0385	0.9615
	Rpleave2	0.4614	0.2129	0.7871
Cooperation			**0.707**	
	Coop1	0.2953	0.0872	0.9128
	Coop2	0.6519	0.4250	0.5750
	Coop3	0.3879	0.1505	0.8495
	Coop4	0.5043	0.2543	0.7457
	Coop5	0.3168	0.1004	0.8996
	Benefit2	0.7447	0.5546	0.4454
	Benefit3	0.3216	0.1034	0.8966
	Benefit4	0.3394	0.1240	0.8760
	Benefit5	0.3394	0.1061	0.8939
Satisfaction			**0.554**	
	Satis1	0.4650	0.2163	0.7837
	Satis2	0.4440	0.1971	0.8029
	Satis3	0.3907	0.1526	0.8474
	Satis4	0.5619	0.3157	0.6843
Certainty			**0.500**	
	Cert2	0.2693	0.0725	0.9275
	Cert3	0.5611	0.3148	0.6852
	Cert4	0.1248	0.0156	0.9844
	Cert5	0.8239	0.6788	0.3212
Commitment			**0.580**	
	Comit2	0.2466	0.0608	0.9392
	Comit3	0.7526	0.5665	0.4335
	Comit4	0.7000	0.4900	0.5100
	Comit5R	0.3274	0.1072	0.8928
Opportunistic behaviour			**0.546**	
	Rconf1	0.3501	0.1225	0.8775
	Conf2	0.5665	0.3210	0.6790
	Rconf3	0.3449	0.1190	0.8810
	Opp1	0.5746	0.3302	0.6698
	Opp2	0.5606	0.3142	0.6858
	Opp3	0.8961	0.4179	0.5821

R indicates reversed statements
a = Squared multiple correlation
b = 1-indicator reliability
c = Composite reliability

Table 6.2: Confirmatory Factor Analysis (CFA) results of aggregated indicator variables of the endogenous variables (λ,Y)

Exogenous variable	Indicator	Standard loading (λ)	Reliability[a]	Error variance[b]
Relative Dependence			**0.523**[c]	
	Dag1	0.6225	0.3875	0.6125
	Dag2	0.5543	0.3072	0.6928
Influence by partner			**0.671**	
	Iag1	0.8324	0.6929	0.3071
	Iag2	0.7289	0.5313	0.4687
	Iag3	0.5832	0.3401	0.6599
Trust			**0.714**	
	Tag1	0.7383	0.5451	0.4549
	Tag2	0.4716	0.2224	0.7776
	Tag3	0.8084	0.6535	0.3465
Cooperation			**0.691**	
	Pag1	0.7356	0.541	0.459
	Pag2	0.5699	0.3248	0.6752
	Pag3	0.5832	0.3401	0.6599
Satisfaction			**0.526**	
	Sag1	0.5993	0.3591	0.6409
	Sag2	0.5869	0.3444	0.6556
Certainty			**0.504**	
	Cag1	0.3063	0.0938	0.9062
	Cag2	1.4725	2.1682	-1.1682
Commitment			**0.580**	
	Mag1	0.3769	2.2964	-1.2964
	Mag2	0.2872	0.0876	0.9124
Opportunistic behaviour			**0.694**	
	Oag1	0.7058	0.4981	0.5019
	Oag2	0.6739	0.4541	0.5459
	Oag3	0.7237	0.5238	0.4762

a = Squared multiple correlation
b = 1-indicator reliability
c = Composite reliability

The overall model consists of eight factors: opportunistic behaviour, relative dependence, commitment, trust, cooperation, influence by partner, certainty and satisfaction. Each of these constructs was measured by indicator variables, which were later aggregated into two or three manifest indicator variables. Table 6.3 shows the measurement properties of the eight constructs with the aggregated indicator variables. The table shows the standardised pattern of coefficients, the t-statistics and the constructs reliabilities useful in assessing the quality of the measurement model. All the indicator variables loaded significantly at the 5% level of

significance to their respective constructs with the exception of those indicator variables measuring certainty and commitment, which were significant at the 10% level.

Table 6.3: Measurement properties for constructs

Aggregate Indicator variable	Measurement item	Factor loading (λ)	t-statistic	Composite reliability
Tag1 (V6)	Trust	0.7383	8.7313	0.71407
Tag2 (V7)		0.4716	5.0810	
Tag3 (V8)		0.8084	9.7587	
Oag1 (V14)	Opportunistic	0.7058	8.3590	0.69361
Oag2 (V15)	behaviour	0.6739	7.8806	
Oag3 (V16)		0.7237	8.6324	
Cag1 (V17)	Certainty	0.3063	1.6515	0.50468
Cag2 (V18)		1.4725	1.8774	
Iag1 (V3)	Influence by	0.8324	9.8963	0.67083
Iag2 (V4)	partner	0.7289	8.4349	
Iag3 (V5)		0.5832	6.4462	
Mag1 (V19)	Commitment	0.3769	1.6579	0.58028
Mag2 (V20)		0.2872	1.6760	
Pag1 (V9)	Cooperation	0.7356	8.6791	0.69081
Pag2 (V10)		0.5699	6.4387	
Pag3 (V11)		0.5832	6.6133	
Dag1 (V1)	Relative	0.6225	6.1815	0.52253
Dag2 (V2)	dependence	0.5543	5.6205	
Sag1 (V12)	Satisfaction	0.5993	5.9184	0.52617
Sag2 (V13)		0.5869	5.8209	

A model is said to fit the observed data to the extent that the covariance matrix is equivalent to the observed covariance matrix (elements of the residual matrix are near zero) (Hoyle, 1995). The results show that the overall fit indices support the measurement model. Table 6.4 presents the fit indices for the confirmatory factor analysis of the aggregated manifest variables. The χ^2 fit statistic was 324.49 with degrees of freedom of 142 ($p<0.001$); while the

root mean squared error of approximation (RMSEA) was 0.10. The root mean squared residual (RMSR) represents the average discrepancy between the observed sample and the proposed variance-covariance matrices and indicates a well fitting model. The results show a RMSR of 0.09, which is slightly greater than the recommended upper cutting point of 0.08 for a good model. The goodness of fit index (GFI) was 0.806 and the ratio of χ^2/df was 2.29. Generally GFI and AGFI scores ranging from 0.80 to 0.89 are interpreted as representing reasonable fit, while scores of 0.90 and above represent a good fit model (Doll *et al.*, 1995). The ratio of the χ^2/df should not be more than 3. Based on these indices the measurement model is moderately acceptable.

Table 6.4: Fit indices for CFA of aggregated manifest variables

Model	χ^2	df	χ^2/df	GFI	AGFI	CFI	NFI	NNFI	RMSR	RMSEA
Null model	324.49	142	2.29							
Eight factor model				0.80	0.71	0.78	0.79	0.71	0.09	0.10

Note: N = 124; GFI = Goodness of fit index; RMSR= Root Mean Square Residual; RMSEA = Root Mean Square of Approximation; AGFI = Adjusted Goodness of Fit Index CFI = Comparative Fit index
NFI = Normed Fit Index; NNFI = Nonnormed Fit Index

6.3.2 Scale development: reliability and validity

6.3.2.1 Internal consistence

Internal consistence is the extent to which the individual items that constitute a test correlate with one another or with the test total (Hatcher, 1998). The most widely used indices of internal consistence in social sciences is the coefficient alpha (Cronbach, 1951) and the widely used rule of thumb is alpha of 0.70 as suggested by Nunnally (1978). However, Hatcher (1998) argues that this is only a rule of thumb, and in social science literature coefficient alpha reliabilities of under 0.7, and even under 0.60 have been reported. The reliability of indicator variables is defined as the correlation between a latent factor and their indicator variables (Hatcher, 1998; Hair *et al.*, 1998). Reliability indicates the percentage of variation of the indicator variable that is explained by the factor that it is supposed to measure. Items within each scale were summed to obtain each respondent's score. The Cronbach's alpha was then calculated to determine the internal consistency of each scale. Appendix D

shows the reliability of the items used in the study. Based on Hair *et al.* (1995), Appendix D shows all constructs to be satisfactorily reliable. According to Hair *et al.* (1995) an alpha level of 0.5 is acceptable since below that it would mean more than 50% of the construct variance would be an error variance.

The composite reliability on the other hand estimates the internal consistency of a construct. Composite reliabilities for aggregated manifest variables are presented in Table 6.3. The results show composite reliabilities ranging from 0.50 to 0.71.

6.3.2.2 Convergent validity

Convergent validity is the extent to which different measures intended to measure the same construct concur with each other. If different indicator variables are used to measure a construct (latent variable), those observed indicator variables should be highly correlated. In this study, convergent validity was assessed by examining the standardised parameter estimates of the CFA for both unaggregated and aggregated indicator variables for the measurement model and their t-statistics. Table 6.3 reveals that indicator variables for two constructs; certainty and commitment were significant at the 10% level, while indicators for the other constructs were significant at the 5% level. Thus, an acceptable convergent validity was achieved.

6.3.2.3 Discriminant validity

Discriminant validity addresses the concept that indicator variables measuring different constructs should not be related. It is the extent to which different indicator variables measuring different constructs diverge in their constructs. The correlation between these indicator variables should be minimal. In most cases correlation coefficients between ±0.8 and ±1 are considered to be highly correlated, between ±0.6 and ±0.8 to be moderately correlated, between ±0.4 and ±0.6 to have a weak correlation, between ±0.2 and ±0.4 to posses very weak or low correlation, and between +0.2 and –0.2 to have little or no correlation at all (Burns and Bush, 1998). Table 6.5 shows the correlation between the constructs. The highest correlation is 0.57, which is a weak correlation. Therefore, these results support the discriminant validity of the constructs. If the correlations were high, a chi-

square difference test in the constrained model would have to be compared to the chi-square for the unconstrained model, and if there is no significant difference in the two chi-squares then the discriminant validity is achieved (Anderson and Gerbing, 1988).

6.3.2.4 Relationship among latent variables

Table 6.5 presents the correlations between exogenous and endogenous latent variables. The bold values are correlations of the variables depicted in the proposed model of the relationship of farmers and the millers.

Table 6.5: Correlation between latent factors

	Opp	Cert	Trust	Comit	Coop	Dep	Influby
Opp	1						
Cert	.083	1					
Sig	.362	.					
Trust	**-.576****	**-.069**	1				
Sig	.000	.444	.				
Comit	**-.048**	-.067	**.111**	1			
Sig	.595	.459	.220	.			
Coop	**-.552****	**-.059**	**.452****	**.288****	1		
Sig	.000	.517	.000	.001	.		
Dep	-.383**	-.165	.192	.215*	**.543****	1	
Sig	.000	.067	.033	.017	.000	.	
Influby	.496**	-.020	-.177*	-.305**	-.429**	**-.267****	1
Sig	.000	.829	.050	.001	.000	.003	.
Satis	-.380**	**-.029**	.393**	.175	**.556****	.440**	**-.252****
Sig	.000	.747	.000	.052	.000	.000	.005

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Note: Opp = Opportunistic behaviour; Cert = Certainty; Trust = Trust; Comit = Commitment; Coop = Cooperation; Dep = Relative dependence; Influby = influence by partner; Satis = Satisfaction

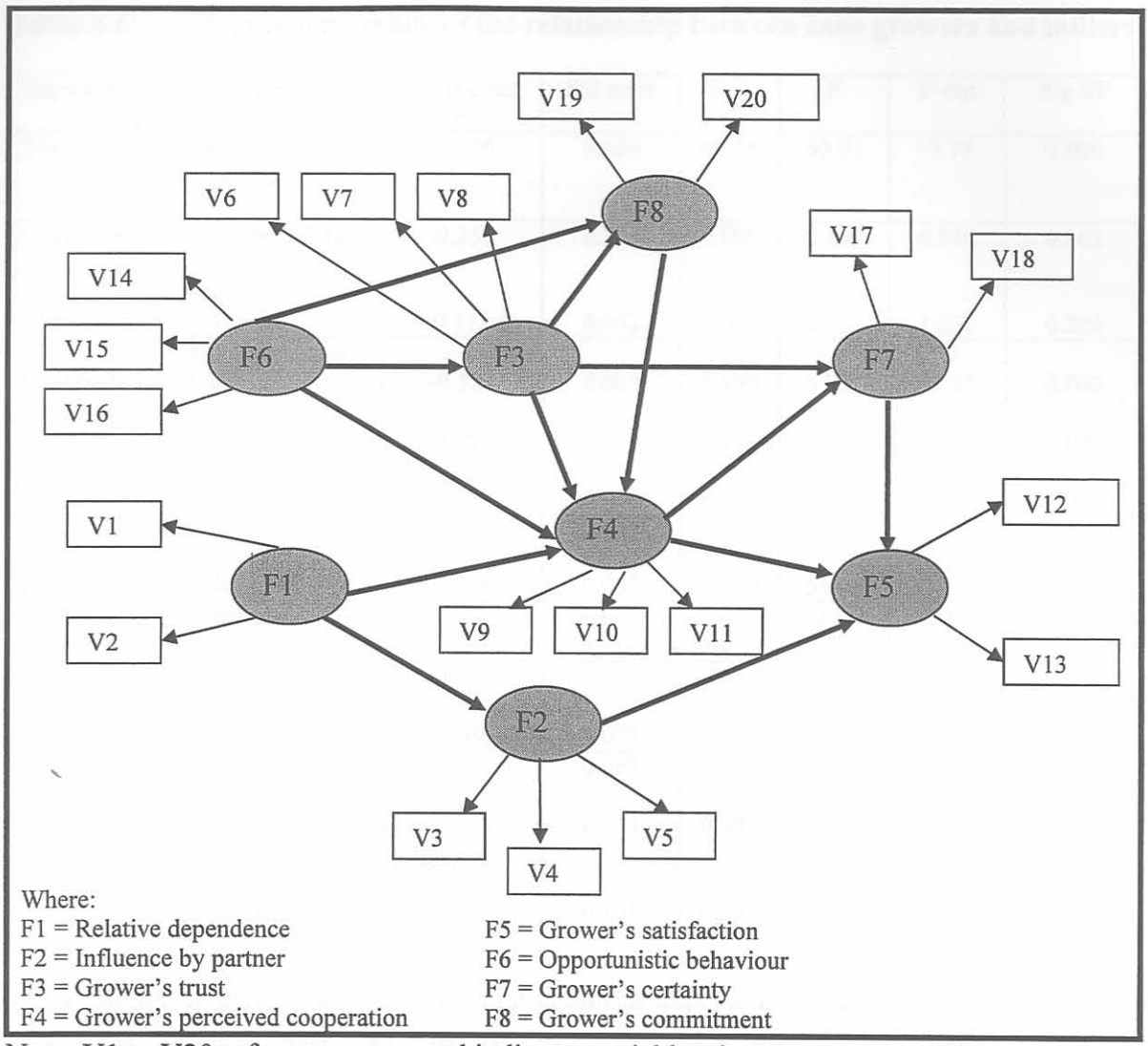
The results show a negative relationship between the cane growers' relative dependence on the millers and the cane growers' perceived influence by the millers, while relative

dependence and cooperation are positively related. Unexpectedly, certainty is negatively related to trust and cooperation. However, the relationship between these variables was not significant ($p>0.05$). Cane growers' perceived influence by the millers is significant and negatively related to the farmers' satisfaction in their relationship with the millers. The results also indicate that the cane growers' perception of opportunistic behaviour by the millers has a significant ($p<0.01$) negative relationship with cane growers' trust and cooperation with the millers. The presence of trust in a relationship is expected to result in cooperation among the parties, commitment of each partner to the relationship and satisfaction for both parties in the relationship. Although the results show that trust has a positive relationship with commitment, it is insignificant ($p>0.05$). The results indicate that trust has a positive and significant relationship with cooperation as well as satisfaction ($p<0.01$). Cane growers' perception of cooperation is positively related to their satisfaction with their relationship with the millers.

6.4 STRUCTURAL MODEL EVALUATION

6.4.1 Hierarchical regression analysis

Because linear regression cannot test all relationships between the construct variables in a single statistical test, it is necessary to use separate regressions (hierarchical regression) to test the model fully. Figure 6.1 shows the overall model as illustrated in the conceptual framework (Chapter three). The figure shows that "relative dependence" construct (F1) is measured by manifest variables V1 and V2, while the construct "influence by partner" (F2) is measured by V3 through V5, and so forth. The variables V1 up to V20 refer to the items measuring each construct after aggregation. For example V1 is Dag1 and V2 is Dag2 (see Table 6.3). The results of the regression analysis for the model illustrated in Figure 6.1 are presented in Table 6.6.



Note: V1 to V20 refers to aggregated indicator variables that measure the different constructs in the model as explained in Table 4.3.

Figure 6.1 Relationship between smallholder farmers and the millers

The results of the regression analysis indicate a significant negative relationship between opportunistic behaviour and trust. The perception of cane growers that millers are opportunistic explains about 33% of the cane growers' trust. Although there could be other factors explaining farmers' trust in millers, perceived opportunistic behaviour has a significant impact on the farmers' trust in the millers. The results also indicate that opportunistic behaviour, though negatively related to commitment, is however insignificant in explaining commitment.

Table 6.6: Regression results of the relationship between cane growers and millers

Dependent	Independent	Coefficient (B)	Std error	R^2_{adj}	F	F-stat	Sig-t/F
Trust	Opportunistic behaviour	-0.576	0.066	0.326	60.61	-7.79	0.000
Commitment	Opportunistic behaviour	-0.253	0.286	0.008	0.892	0.944	0.362
	Trust	0.111	0.092	0.004	1.152	1.232	0.220
Cooperation	Opportunistic behaviour	-0.552	0.063	0.299	53.57	-7.32	0.000
	Trust	0.452	0.076	0.198	31.39	5.60	0.000
	Commitment	0.152	0.080	0.075	11.00	3.31	0.001
	Relative dependence	0.543	0.060	0.289	51.04	7.14	0.000
Influence by partner	Relative dependence	-0.267	0.077	0.064	9.35	-3.06	0.003
Certainty	Trust	-0.069	0.074	0.003	0.59	-0.77	0.444
	Cooperation	-0.059	0.078	0.005	0.42	-0.650	0.517
Satisfaction	Cooperation	0.556	0.097	0.303	54.53	7.38	0.000
	Certainty	-0.029	0.135	0.007	0.10	-0.32	0.747
	Influence by partner	-0.252	0.101	0.056	8.28	-.877	0.005

The presence of trust in an exchange relationship is expected to encourage partners to commit themselves to their relationship. The literature identifies different types of trust as well as different types of commitment. The results indicate that trust was not significant in explaining cane growers' commitment in their relationship with millers. The insignificant impact of trust on commitment suggests that the kind of commitment the farmers have in their relationship with the millers is the calculative type of commitment rather than affective commitment. Calculative commitment is a case where one partner makes a commitment to a relationship because he expects benefits, whereas affective commitment is based on the fact that the committed partner likes the other partner.

While the millers' opportunistic behaviour, as perceived by farmers, was able to explain 30% of the perceived cooperation by farmers in their relationship with the millers, it was apparent that factors like farmers' trust in the millers, commitment of the farmers to their relationship with the millers and the farmers' relative dependence on the millers also had an impact on the cooperation of the millers and the farmers. Trust accounted for about 20% of the variation in

the farmers' perception of cooperation, while commitment explained only 7%, and of significance was the perception of relative dependence by the farmers on the millers, which explained 29% of the farmers' perceived cooperation. As expected opportunistic behaviour had a significant negative influence on the farmers' perceived cooperation, while commitment had a positive influence. The positive influence of relative dependence on cooperation implies the existence of forced cooperation among the parties. Although farmers realise that they are more dependent on the millers compared to the millers' dependence on them, they find themselves having to cooperate because they have no other alternative since they can only sell sugarcane to the assigned mill. Also sugarcane is currently the only crop with a comparative advantage in Swaziland.

Unexpectedly, a significant negative relationship was observed between the farmers' perceived relative dependence on the millers and the influence by the partner (millers). The results suggest that an increase in the farmers' perception of their relative dependence on the millers is accompanied by a low perception of influence by the millers. This could be attributed to the fact that smallholder farmers are just a minority in the sugar industry. Even if they are aware of their dependence on the millers, they do not perceive that as a reason for the millers to influence them because they are forced to cooperate. Therefore, the increase in dependence on the millers makes farmers to comply with millers and as a result there is less need for millers to use their power on the farmers. This possibly explains the negative relationship between relative dependence and influence by partner.

Farmers' trust and their perceptions of cooperation with the millers were expected to be positively related to certainty of the farmers in their relationship but negatively related to certainty. The results show that though trust and cooperation were negatively related to certainty, they were not significant in explaining the certainty of the relationship between the farmers and millers.

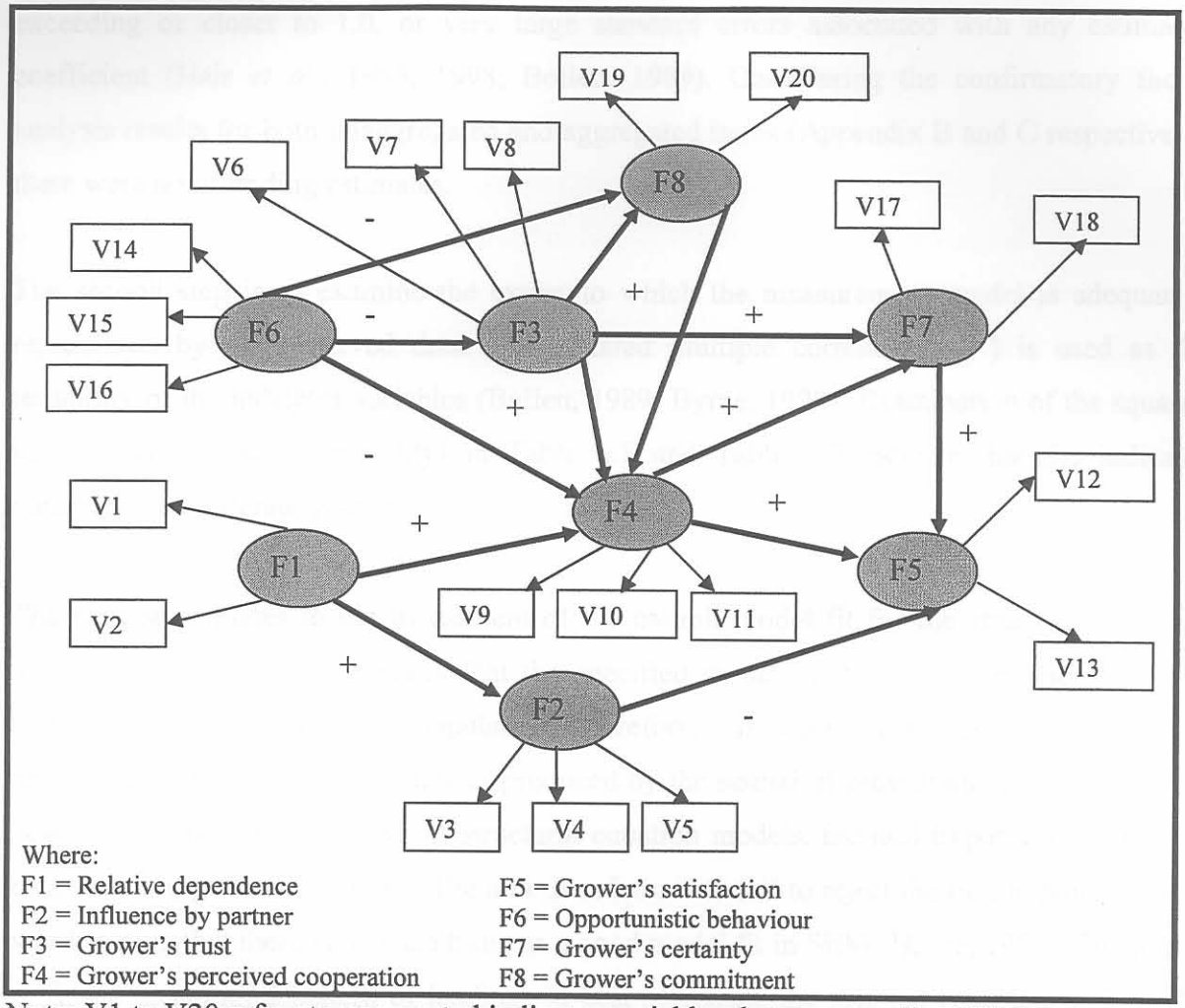
A significant positive relationship was observed between perceived cooperation and satisfaction with the relationship. The farmers' perceived cooperation explained 30% of their satisfaction with the relationship. The results suggest that cooperation plays a very important role in enhancing farmers' satisfaction in their relationship with the millers. Farmers' satisfaction is also explained by perceived influence on the part of the millers. The more farmers perceive they are influenced by the millers, the less satisfied they become with the

relationship. Influence by partner explained 5.6% of the variation in the farmers' satisfaction in their relationship with the millers.

Collectively, including opportunistic behaviour, trust, commitment and relative dependence, the model was able to explain 86% of the farmers' perceived cooperation between the millers and the farmers, while cooperation and influence by partner explained 35.9% of the farmers' satisfaction in their relationship with millers.

6.4.2 Structural equation modelling

In line with James, Mulaick and Brett (1982), this study used a two-step approach to test the role of behavioural factors in the cane growers and millers' relationship. The first step is to use confirmatory factor analysis (CFA) to test the measurement model. CFA provides evidence for determining whether the manifest indicator variables appropriately measure the latent constructs. Once an appropriate measurement model has been identified, items can then be combined to form scales of the constructs. The second step is to then test the hypothesised structural model. The structural model is in fact the regression part of the latent variables. It depicts the links between the latent variables. Figure 6.2 presents the proposed theoretical structural model and the measurement model of the cane growers' and millers' relationship.



Note: V1 to V20 refers to aggregated indicator variables that measure the different constructs in the model as explained in Table 4.3.

Figure 6.2: Proposed model of cane growers and millers' relationship

There is still some debate regarding determination of model fit and interpretation of the model in structural equation models (Bollen and Long, 1993). A structural equation model with a good fit provides an indication of the general pattern of the relationships among the constructs in the study (Fan and Wang, 1998). Some researchers tend to interpret only the model fit indices, while others argue that the model components fit (direction, strength and significance of the parameters) are equally important. Therefore, in this study both the model fit indices and the components fit of the model are discussed.

The first step in evaluating the overall model was the inspection of "offending estimates", which could be in the form of estimates that exceed acceptable limits in the measurement and structural models. These may include negative error variances, standardized coefficients

exceeding or closer to 1.0, or very large standard errors associated with any estimated coefficient (Hair *et al.*, 1995, 1998; Bollen, 1989). Considering the confirmatory factor analysis results for both unaggregated and aggregated items (Appendix B and C respectively) there were no offending estimates.

The second step is to examine the extent to which the measurement model is adequately represented by the observed data. The squared multiple correlations (r^2) is used as the reliability of the indicator variables (Bollen, 1989; Byrne, 1998). Examination of the squared multiple correlations (reliability) in Table 6.1 and Table 6.2 indicate that the indicator variables are moderately strong.

The next step relates to the assessment of the overall model fit for the structural equation model. Joreskog (1993) indicates that the specified model of the researcher should not be assumed to hold exactly in the population. Therefore, it is necessary to assess the model's fit and examine the modification indices produced by the statistical programme to determine the best fitting model to be tested. In structural equation models, the null hypothesis is that the data fit the hypothesised model. The aim therefore, is to fail to reject the null hypothesis. It is worth noting that there is no such thing as a good model fit in SEM (Hattie, 1985). The aim is to find a meaningful pattern of loadings to best reproduce the original covariance. A model with a fit index of 0.80 may be the best that can be achieved given the status of the theory, the adequacy of the measures, and the representativeness of the sample. In contrast, one may get a fit index of 0.95 through over-factoring the data. Therefore, there is no clear-cut measure of goodness of fit, as it is like with other multivariate dependence techniques. Hair *et al.* (1998) argue that although there are many guidelines suggested, there is no absolute test available. Bollen (1989) argue that selecting a rigid cut-off for incremental fit indices is like selecting a minimum R^2 for a regression equation hence any value will be controversial. The main aim of the fit indices, therefore, is to assist in the development of meaningful theory. If the fit is excellent but the model is not meaningful it is useless, whereas if the theory is excellent, the fit indices are, therefore, an indication of the direction to take (Hattie, 1985). Table 6.7 presents the structural results of the proposed model.

There are three main categories of metrics used to test the structural model. They include the chi-square statistic, the fit indices, and the parameter estimates. The chi-square test is an inferential test that determines whether the null hypothesis should be rejected. However, as

stated before, the chi-square is sensitive to sample size. Thus, it is commonly used as a guideline. The ratio of the chi-square to the degrees of freedom is a useful index of fit as it gives an indication whether more information could be extracted from the data. The recommended ratio is 3:1. The other category is the fit indices. The fit indices are a descriptive indication of the overall fit of the observed data to the hypothesised model. The fit indices are divided into absolute fit indices and incremental fit indices. Absolute fit indices assess how well an *a priori* model (both measurement and structural models) reproduces or predicts covariance of the sample data (Hair *et al.*, 1995, 1998). It compares the hypothesised model with no model at all (null model). Therefore, this type of indices is analogous to R^2 by comparing the goodness of fit to a component that is similar to a sum of squares, while the incremental fit indices compare the target model with a baseline model, also referred to as the null model, in order to measure the proportionate improvement in fit (Hair *et al.*, 1995).

Table 6.7: Structural parameters of proposed model (for the full model)

Parameter	Estimate	Std Error	t-stat
F6-F4	-0.0468	0.2811	-0.166
F6-F8	-0.4251	0.0674	-2.032
F3-F4	0.0974	0.2509	0.388
F8-F4	0.1060	0.1413	0.750
F1-F4	0.6898	0.2267	3.043
F1-F2	-0.5212	0.0905	-5.759
F6-F3	-0.5706	0.0862	-6.617
F3-F8	0.3934	0.1426	2.758
F3-F7	0.0764	0.3485	0.468
F4-F7	-0.0106	0.0042	-2.493
F4-F5	0.7288	0.1541	4.729
F2-F5	0.2129	0.1031	2.065
F7-F5	0.1846	0.1323	1.395

Where: F1 = Relative dependence
F2 = Influence by partner
F3 = Grower's trust
F4 = Perceived cooperation
F5 = Grower's satisfaction
F6 = Opportunistic behaviour
F7 = Grower's certainty
F8 = Grower's commitment

For indices such as GFI, AGFI, CFI, NFI and NNFI, their values range from 0 to 1.0. Therefore, as a general rule, values closer to 0.9 indicate good fit, whilst for the RMSEA, values less than 0.05 indicate good fit, values between 0.05 and 0.08 indicate reasonable fit, values between 0.08 and 0.10 indicate mediocre fit and values greater than 0.10 indicate poor fit to the data.

The issue of sample size in SEM remains an active debate (Hair *et al.*, 1995,1998; Anderson and Gerbing, 1988). With smaller samples (N < 150) there is a danger of not obtaining convergent solutions even for highly specified models (Anderson and Gerbing, 1988). . Small sample sizes may result in unreliable, inflated and spurious results. Therefore, the recommended sample size is at least 100 for simple models or at least 5 observations per parameter (Hair *et al.*, 1995, 1998). Similarly, large sample size, (N > 400) would result in discrepancies in the model fit indices and lead to their rejection when the model is satisfactory because the fit indices are sensitive to large sample sizes. Due to the sensitivity of SEM in terms of sample size and the number of observations per parameter to be estimated, the proposed model was then reduced by splitting it into three sub-models for purposes of analysis in order to make use of the 124 respondents from the cane growers (see detailed results for sub-models 1, 2 and 3 in Appendix E). Figure 6.3 shows the split of the three sub-models.

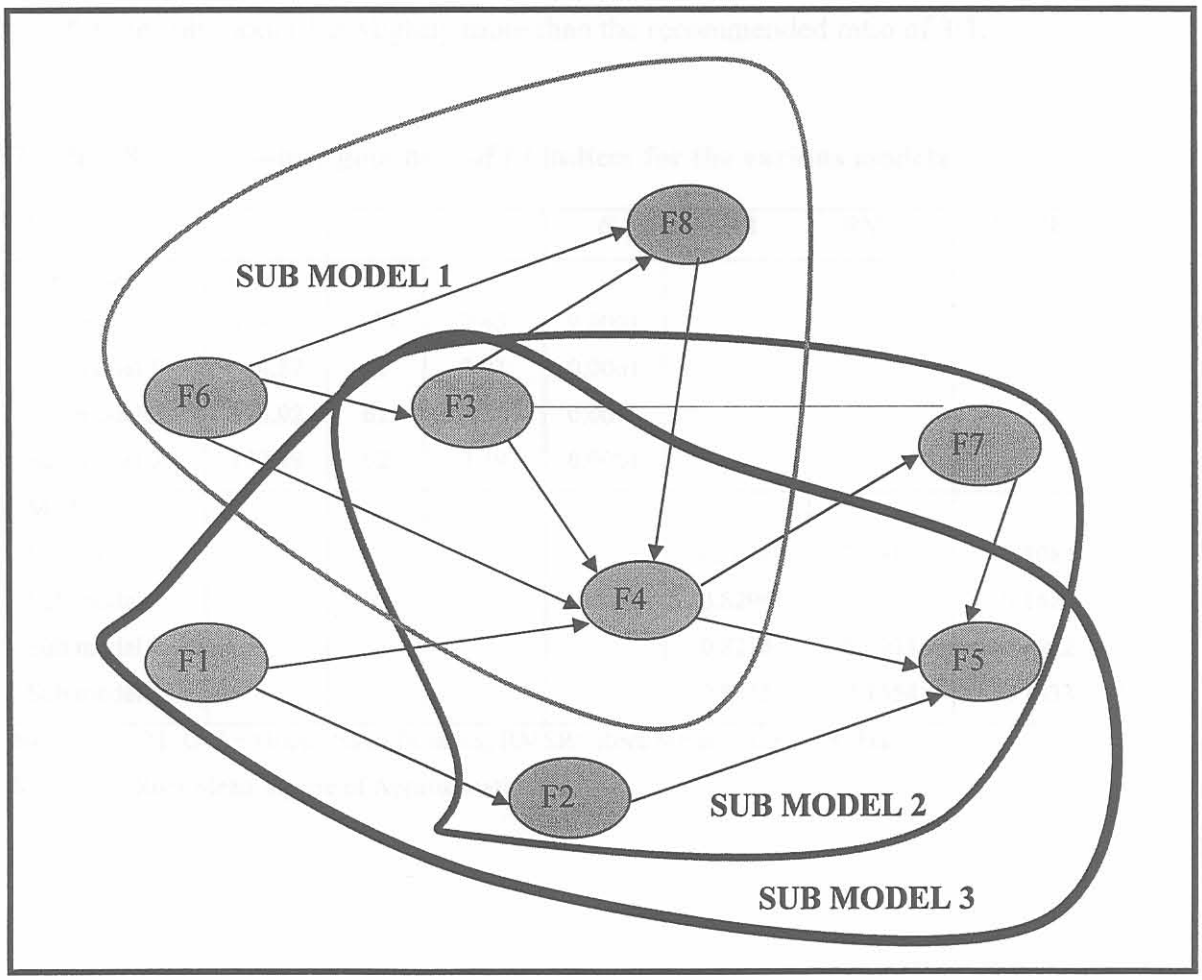


Figure 6.3: Sub-models 1, 2, and 3 of proposed model of cane growers and millers' relationship

Even if the hypothesised model may provide a good fit to the data, it would be premature to accept the model without considering alternative models provided by theory. This is mainly because there may exist some models that may fit the data equally well or even better than the hypothesised model. Therefore, the final approach in model assessment is to compare the proposed model with a series of competing models, which act as alternative explanations to the proposed model (Hair *et al.*, 1995). In this way one can determine whether the proposed model is acceptable, since there is no other similar formulated model that can achieve a higher level of fit. In this study, different models were considered, which could be theoretically supported. While the proposed model does not achieve the recommended levels of a good fit, it represents the best available model in this study. The results of the sub-models are shown in Table 6.8. The results show that all three sub-models had an average fit. The RMSEA is about 0.1, which meets the acceptable level for an average model fit to the data. The overall model fit, though less than 0.90, also shows an average fit for all three sub-models. The GFI is above 0.80. The ratio of chi-square to degrees of freedom is also relatively acceptable, though the one for the sub-model 1 is slightly more than the recommended ratio of 3:1.

Table 6.8a: Absolute goodness of fit indices for the various models

Model	χ^2	*Df*	χ^2 / Df	*P*	GFI	RMSR	RMSEA
Null Model:							
Full model.	388.98	159	2.45	0.0001			
Sub model 1.	144.87	39	3.71	0.0001			
Sub model 2.	175.92	62	2.84	0.0001			
Sub model 3.	197.49	62	3.19	0.0001			
Model:							
Full model.					0.7668	0.1386	0.1084
Sub model 1.					0.8296	0.1647	0.1486
Sub model 2.					0.8255	0.1913	0.1222
Sub model 3.					0.8345	0.1554	0.1333

Note: N = 124; GFI = Goodness of fit index; RMSR= Root Mean Square Residual;
RMSEA = Root Mean Square of Approximation

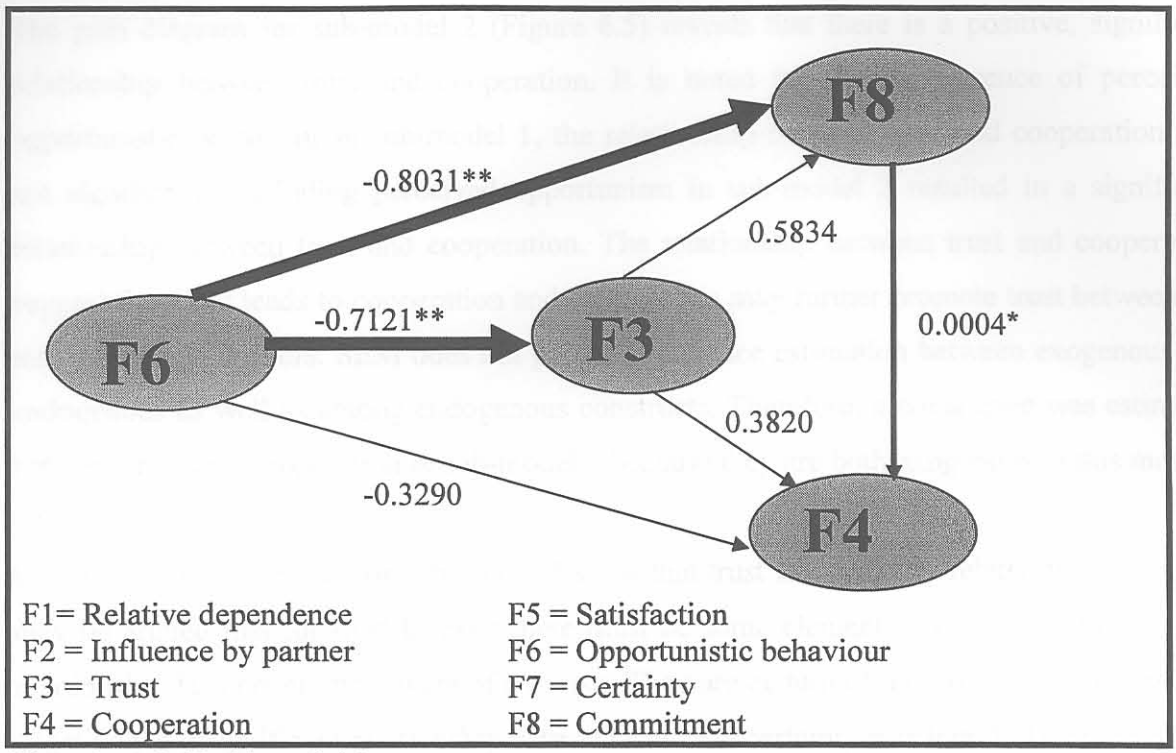
Table 6.8b: Incremental goodness of fit indices for the various models

Model	AGFI	CFI	NFI	NNFI
Null Model:				
Model:				
Full model.	0.692	0.728	0.624	0.675
Sub model 1.	0.712	0.767	0.716	0.672
Sub model 2.	0.744	0.759	0.681	0.697
Sub model 3.	0.757	0.744	0.675	0.678

Note: N = 124; AGFI = Adjusted Goodness of Fit Index CFI = Comparative Fit index NFI = Normed Fit Index; NNFI = Nonnormed Fit Index.

The results of the paths for the three sub-models are presented in Figures 6.4, 6.5, and 6.6. The results of the path diagram for sub-model 1 (Figure 6.4) show that opportunistic behaviour is negatively related to trust and commitment. A lack of significance was observed in the relationship between opportunistic behaviour and perceived cooperation. Surprisingly, trust was not significant in influencing commitment and farmers' perceived cooperation with the millers. This insignificance could be a result of the trade-off between the level of perceived opportunistic behaviour and the level of farmers' trust to the millers. As discussed in Chapter five, farmers have minimal trust in the millers. Hence, the presence of a greater perception of opportunistic behaviour results in less trust, which becomes insufficient to influence the farmers' perception of cooperation. Minimal trust implies contractual trust only; this is based on the contractual obligation of the parties and hence does not influence commitment. A significant relationship was found between commitment and cooperation.

Table 6.9 presents the structural parameters and the squared multiple correlations of the factors in sub-model 1. The results in Table 6.9b show that 78% of the variance in trust is explained by the perception of opportunistic behaviour, 62% of the variance in cooperation is explained by commitment and 0.08% of the variation in commitment is explained by the farmers' perception of opportunistic behaviour by millers.



Note: $*p < 0.10$, $**p < 0.05$

Figure 6.4: Path Diagram for sub-model 1

Table 6.9a: Structural Parameters for sub-model 1

Parameter	Estimate	Std Error	t-stat
F3-F8	0.5834	0.4281	1.3628
F6-F8	-0.8031	0.3443	-2.3326
F6-F3	-0.7121	0.0845	-8.4278
F3-F4	0.3820	0.2842	1.3441
F6-F4	-0.3290	0.2280	-1.4430
F8-F4	0.0004	0.0003	1.6838

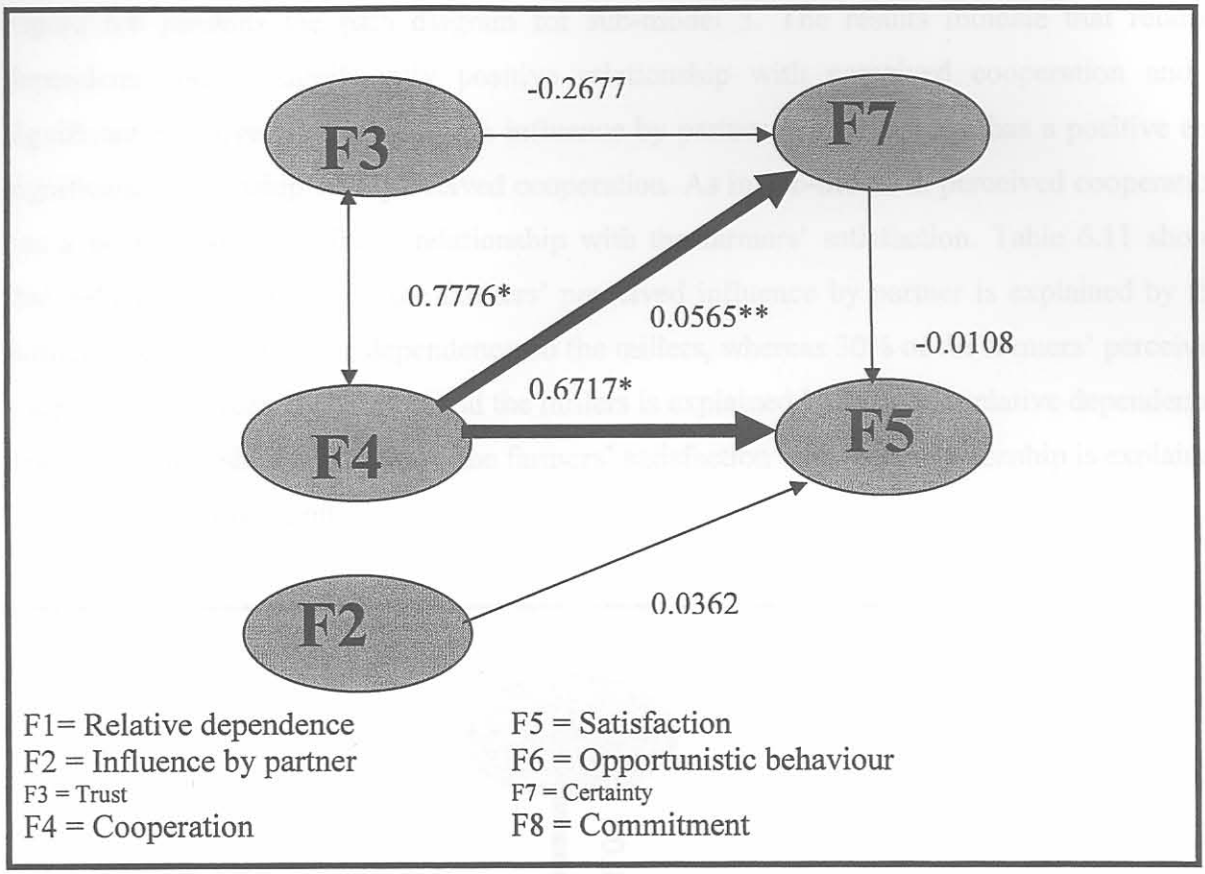
Table 6.9b: Squared Multiple Correlations

Variables	Error Variance	Total Variance	R-squared
F3	0.1449	0.6519	0.7777
F4	0.2353	0.6178	0.6191
F8	236.0768	236.2765	0.0008

The path diagram for sub-model 2 (Figure 6.5) reveals that there is a positive, significant relationship between trust and cooperation. It is noted that in the presence of perceived opportunistic behaviour in sub-model 1, the relationship between trust and cooperation was not significant. Excluding perceived opportunism in sub-model 2 resulted in a significant relationship between trust and cooperation. The relationship between trust and cooperation suggest that trust leads to cooperation and cooperation may further promote trust between the millers and the farmers. SEM does not permit covariance estimation between exogenous and endogenous as well as among endogenous constructs. Therefore, a covariance was estimated between trust and cooperation in sub-model 2 because they are both exogenous in this model.

Unexpectedly, the results for sub-model 2 show that trust is negatively related to certainty. It may be argued that for trust to exist there must be some element of risk. Therefore, in this relationship farmers are not aware of any risk. They are certain of their relationship. Hence, a negative yet insignificant relationship between trust and certainty was found. As expected, the farmers' perceived cooperation was positive and significantly related to the farmers' certainty in their relationship with the millers as well as the farmers' satisfaction with the relationship. However, certainty was negatively related to satisfaction but this was also insignificant. A possible explanation for the negative relationship between certainty and satisfaction could be that as farmers become certain of their relationship with millers, they tend to expect more benefits from this relationship and if they do not get the expected benefits, their satisfaction with the relationship decreases. As noted also in Chapter five, farmers with more experience are less satisfied because of complacency when they are expected to be more certain and more satisfied with their relationship with the millers because they have been in the sugar industry for a long time.

The results in Table 6.10 reveal that 81% of the variation in the farmers' satisfaction with their relationship with the millers is explained by their perception of cooperation between farmers and the millers. The results further show that the perceived cooperation explains about 0.8% of the variation in certainty.



Note: $**p < 0.01$, $*p < 0.05$

Figure 6.5: Path Diagram for sub-model 2

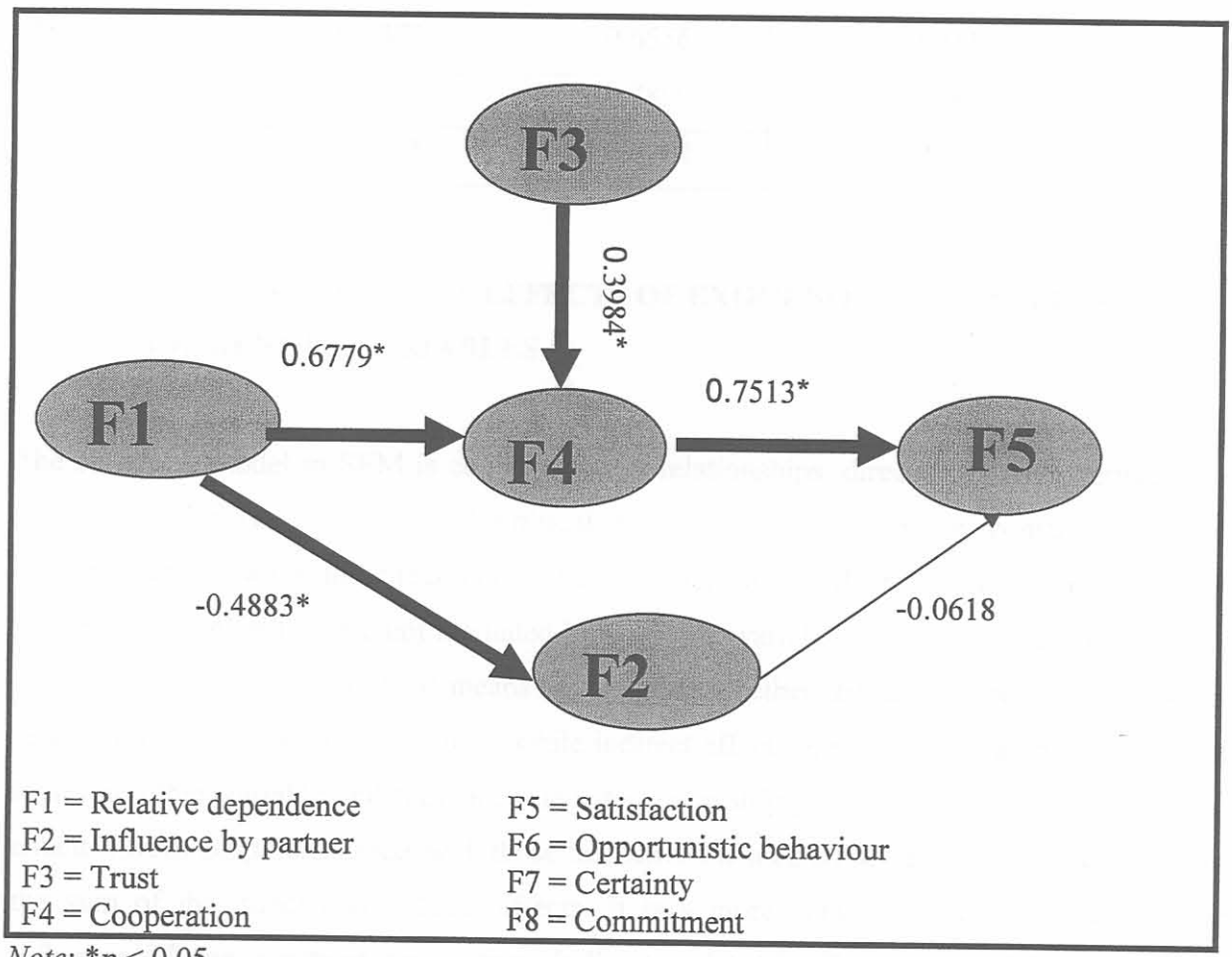
Table 6.10a: Structural Parameters for sub-model 2

Parameter	Estimate	Std Error	t-stat
F3-F7	-0.2677	0.1840	-1.1830
F4-F7	0.0565	0.1906	2.0565
F2-F5	0.0362	0.0682	0.5313
F4-F5	0.6717	0.0878	7.6473
F7-F5	-0.0108	0.0830	-0.1303
Cov: F3F4	0.7776	0.0545	14.27

Table 6.10b: Squared Multiple Correlations for sub-model 2

Variables	Error Variance	Total Variance	R-squared
F5	0.1078	0.5586	0.8069
F7	8.0175	8.0797	0.0077

Figure 6.6 presents the path diagram for sub-model 3. The results indicate that relative dependence has a significantly positive relationship with perceived cooperation and a significant negative relationship with influence by partner (millers). Trust has a positive and significant relationship with perceived cooperation. As in sub-model 2, perceived cooperation has a positive and significant relationship with the farmers' satisfaction. Table 6.11 shows that 94% of the variation in the farmers' perceived influence by partner is explained by the farmers' perceived relative dependence on the millers, whereas 30% of the farmers' perceived cooperation between themselves and the millers is explained by trust and relative dependence. The results also show that 82% of the farmers' satisfaction with their relationship is explained by perceived cooperation.



Note: $*p < 0.05$

Figure 6.6: Path Diagram for sub-model 3

Table 6.11a: Structural parameters for sub-model 3

Parameter	Estimate	Std Error	t-stat
F3-F4	0.3984	0.0675	5.9004
F1-F4	0.6779	0.0817	8.2956
F1-F2	-0.4883	0.0931	-5.2441
F2-F5	0.0618	0.0933	0.6619
F4-F5	0.7513	0.1322	5.6827

Table 6.11b: Squared Multiple Correlations for sub-model 3

Variables	Error Variance	Total Variance	R-squared
F2	0.0373	0.6556	0.9431
F4	0.5515	0.7899	0.3018
F5	0.0728	0.4152	0.8246

6.5 TOTAL AND INDIRECT EFFECTS OF EXOGENOUS VARIABLES ON ENDOGENOUS VARIABLES

The structural model in SEM is concerned with relationships, direct or indirect between the latent variables (Bollen, 1989). Empirical analysis of links between constructs can be examined in two ways, the direct and total effects. The direct effects are the influences of one variable on another that are not mediated by any other variable. The test of the direct effects provides a more straightforward means of assessing whether the data supports the proposed relationships between two constructs, while indirect effects are those that are mediated by at least one other variable and they are calculated by multiplying all the significant links that emanate from single constructs with those that leave the mediating variables. Total effects are the sum of the direct and indirect effects. It is a more comprehensive indication of the influence of one construct on another. Indirect and total effects are useful in answering questions that may not be addressed by direct effects (Bollen, 1989). Tables 6.12 and 6.13 present the direct, indirect and total effects of each construct.

Table 6.12: Indirect, direct, and total effects for hierarchical regression

	F2	F3	F4	F5
F1: IDE				0.0673
IDE				0.3019
DE	-0.2670		0.5430	
TE	**-0.2670**		**0.5430**	**0.3692**
F2: IDE				
DE				-0.2520
TE				**-0.2520**
F3: IDE				0.2513
DE			0.4520	
TE			**0.4520**	**0.2513**
F4: IDE				
DE				0.5560
TE				**0.5560**
F6: IDE				-0.1448
IDE			-0.2604	-0.3069
DE		-0.5760	-0.5520	
TE		**-0.5760**	**-0.8124**	**-0.4549**
F8: IDE				0.0845
DE			0.1520	
TE			**0.1520**	**0.0845**

Table 6.13: Indirect, direct and total effects for SEM in sub model 1, 2 and 3

	F2	F3	F4	F5	F7	F8
F1: IDE				0.5093		
DE	-0.4883		0.6779			
TE	**-0.4883**		**0.6779**	**0.5093**		
F3: IDE				0.2993		
DE			0.7776*			
DE			0.3984**			
TE			**0.5880*** **	**0.2993**		
F4: IDE						
DE				0.6717*		
DE		0.7776		0.7513**	0.0565	
TE		**0.7776**		**0.7115*** **	**0.0565**	
F6: IDE			-0.0003			
DE		-0.7121				-0.8031
TE			**-0.0003**			**-0.8031**
F8: IDE				0.0003		
DE			0.0004			
TE			**0.0004**	**0.0003**		

* = direct effect from sub-model 2
** = direct effect from sub-model 3
*** = total effect (average of sub-model 2 and 3 direct effects)

Note: F1= Dependence; F2 = Influence by partner; F3 = Trust; F4 = Cooperation ; F5 = Satisfaction; F6 = Opportunistic behaviour; F7 = Certainty; F8 = Commitment

Note: DE = Direct effect; IDE = Indirect effect; TE = Total effect

The results in both Tables 6.12 and 6.13 indicate that, though relative dependence (F1) does not have a direct effect on satisfaction (F5), it does however have a significant positive influence on perceived cooperation (F4) and a negative impact on influence by partner (F2). Relative dependence (F1) has a positive significant relationship with farmers' satisfaction via cooperation. Trust (F3) is regarded as an important element influencing cooperation in relationships and as an indispensable asset in successful relationships. The results in both tables show that trust is important in the smallholder cane growers' satisfaction with their relationship with millers. Through cooperation, trust has a positive significant influence on satisfaction.

The presence of opportunistic behaviour in any exchange relationship affects the performance of the parties in the relationship. The results show that cane growers' perceptions of opportunistic behaviour (F6) by millers has a significant negative impact on the cane growers' satisfaction via trust and perceived cooperation.

The results also indicate that commitment (F8) is important in an exchange relationship. It has a significant positive impact on cooperation and through cooperation also positively influences the cane growers' satisfaction in their relationship with the millers.

6.6 ANALYSIS OF HYPOTHESES

The study aims to determine factors affecting the performance of cane growers in their exchange relationship with millers and hence the sugar industry supply chain. It further seeks to identify the importance of social factors such as trust, commitment, opportunism, dependence and cooperation in the contractual relationship between these farmers and the millers. Finally, this study presents, and empirically tests a model that describes the contractual relationship of cane growers and millers as important units of the sugar industry supply chain.

Following a discussion of the issues and challenges in the Swaziland sugar industry, hypotheses were developed to guide the study process. The analysis of these hypotheses is addressed in this section.

Hypothesis 1: social factors such as trust are important mechanisms that can complement formal governance mechanisms in exchange relationships between smallholder cane growers and millers. An analysis of the perceptions of the farmers in Chapter five showed that trust is inevitably an important element in relationships. Exchange relationships can rely on trust as one of the governance mechanisms. The results in the study have shown that both millers and farmers have minimal trust in each other within their relationship, which is mainly the contractual trust based on fulfilling what they are obligated to by contract. The results further indicated that more farmers who trust than those who do not are committed to their relationship and more farmers who do not trust millers than those who trust them perceive millers to be opportunistic. Similarly, more of the farmers who do not trust the millers than those who do perceive poor cooperation between farmers and millers.

The results indicate the important role played by trust as a governance mechanism. The presence of trust in a relationship tends to influence the perceptions of the parties within the relationship.

Hypothesis 2: The relationship of cane growers and millers is explained by the structural model developed in Chapter three (Figure 3.3). Table 6.14 provides a summary of the analysis of the hypothesis. The analysis of this hypothesis shows that some of the proposed relationships between the constructs were supported, and some were not supported, while others were partially supported. Partially supported relationships, refers to those that were either supported by the regression analysis or by the SEM but not both. Although both methods result in the same conclusion in terms of the direction of the relationship, the SEM also provides an indication whether the proposed structure of the relationship really fits the data. This is achieved through the goodness of fit indices.

Table 6.14: Summary of hypothesised farmers' relationship with millers.

Factor	Hypothesised relationship	Results
F6-F3	-	Supported
F6-F4	-	Partially supported
F6-F8	-	Partially supported
F1-F2	+	Not supported
F1-F4	+	Supported
F3-F4	+	Supported
F3-F7	+	Not supported
F3-F8	+	Not supported
F8-F4	+	Supported
F4-F5	+	Supported
F4-F7	+	Partially supported
F2-F5	+	Partially supported
F7-F5	+	Not supported

F1 = Dependence
F2 = Influence by partner
F3 = Trust
F4 = Cooperation
F5 = Satisfaction
F6 = Opportunistic behaviour
F7 = Certainty
F8 = Commitment

Hypothesis three: The performance of smallholder farmers in the sugar industry is a function of their perceived opportunistic behaviour, trust, perceived cooperation and the growers' proximity to the mill to which they deliver sugarcane. The summary analysis of this hypothesis is presented in Table 6.15.

Table 6.15: Summary of hypothesised determinants of farmers' performance

Variable	Variable description	Performance measure	Hypothesised relationship	Results
Distance to the mill	Milldist	Profit/ha	-	Supported
		Revenue/ha	-	Not supported
		Perception of profit	-	Not supported
Perceived Opportunistic behaviour	F6	Satisfaction (F5)	-	Supported
Trust	F3	Satisfaction (F5)	+	Supported
Cooperation	F4	Satisfaction (F5)	+	Supported

6.7 SUMMARY

This chapter first examined the results of the statistical analyses performed on the smallholder cane growers' relationship with the millers. The role of social factors in the performance of smallholder farmers and hence the sugar industry supply chain, and a test of the model representing the relationship between the farmers and the millers' were simultaneously examined using both multiple regression and structural equation modelling analyses.

Table 6.16 provides a summary of the factors explaining the relationship between the farmers and the millers. The results indicate that absence of opportunistic behaviour, perceived cooperation, trust, commitment, and dependence are important factors in the relationship between smallholder cane growers and the millers.

Table 6.16: Summary of factors affecting the relationship of farmers and the millers

Dependent variable	Independent variable	Regression	SEM
Trust	Opportunistic behaviour	-***	-
Commitment	Opportunistic behaviour	-	-**
	Trust	+	+
Cooperation	Opportunistic behaviour	-***	-
	Trust	+***	+/+**
	Commitment	+***	+*
	Relative dependence	+***	+**
Influence by partner	Relative dependence	-***	-**
Certainty	Trust	-	-
	Cooperation	-	+**
Satisfaction	Cooperation	+***	+**
	Certainty	-	-
	Influence by partner	-***	-

* = Significant at 10% level, ** = Significant at 5% level, *** = Significant at 1% level

The final model of the relationship between the cane growers and millers, based on both the multiple regression and SEM analysis, is presented in Figure 6.7. This figure combines the results from the hierarchical regression and the three SEM sub-models. The model suggests that farmers' perceived opportunistic behaviour by millers is negatively related to farmers' trust, perceived cooperation and commitment, while farmers' perception of cooperation is positively influenced by trust, commitment, and relative dependence. Perceived influence by the partner is negatively influenced by relative dependence. The overall model indicates that perceived cooperation positively influences the farmers' satisfaction and the certainty of the farmers in their relationship.

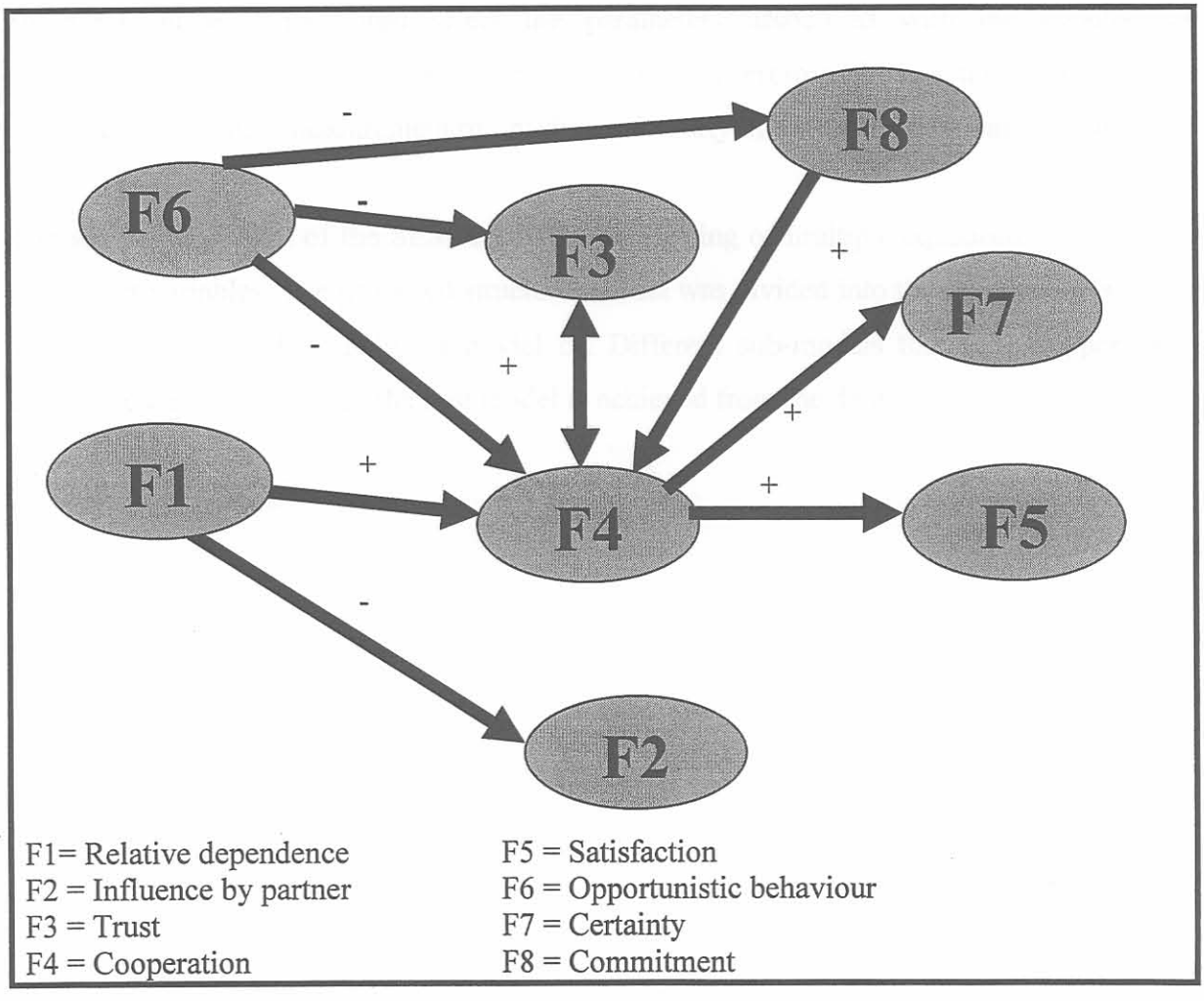


Figure 6.7: A model of smallholder cane growers' relationship with millers

A structural equation model (SEM) was utilised to empirically test the relationships between the constructs in this study. SEM allows simultaneous estimation of (1) a measurement model that relates the items in each scale to the construct they represent, giving factor loadings for

each item, and (2) a structural model that relates constructs to one another, providing parameter value (i.e., path coefficients). This method was chosen so that both an a priori model accounting for measurement error in the construct and their respective scale measurements and simultaneous estimation of those relationships for the complex model can be achieved. The properties of the items of the constructs in the proposed model and the hypotheses were tested using the SAS Procalis version 8 with maximum likelihood (ML) method of estimation.

The use of confirmatory factor analysis (CFA) ensures the uni-dimensionality of the scales measuring each construct in the model and avoids the interaction of the measurement and structural models that could affect the parameters associated with the hypothesised relationship between the constructs in the model. Therefore, before testing the overall measurement model, measurement of uni-dimensionality of each construct was assessed.

The structural portion of the SEM allows for the testing of multiple equations with multiple dependent variables. The proposed structural model was divided into three sub-models, which were then tested individually for model fit. Different sub-models that were supported by theory were tested to ensure the best model is achieved from the data.

CHAPTER SEVEN

SUMMARY AND CONCLUSIONS

7.1 INTRODUCTION

The purpose of this study was to investigate the role of contractual relationships in the performance of the Swaziland sugar industry's supply chain. This study explored the factors affecting the quality of contractual relationship between smallholder cane growers and millers and its impact on the performance of the smallholder cane growers, and hence the performance of the sugar industry supply chain in Swaziland.

Considerable research and development capacity of both the state and large-scale sectors had in the past been orientated towards large-scale farmers focusing on industrialisation. As a result emphasis was on maximising production through increased inputs. Policy is now being orientated in favour of the commercialisation of smallholder farmers; however, researchers and institutions often lack the skills, experience or inclination for this new orientation. Most are still embedded in a high input/output paradigm and understand the task as one of adapting and transferring large-scale farming technologies to smallholders. Understanding of smallholder farmers' reality, with their particular complex, diverse, risk prone and dynamic nature is still poor. Hence, this study focused on the smallholder farmers and millers in the Swaziland sugar industry.

The trend towards globalisation, technological advancement and the increased instability and uncertainty of the competitive arena and the environment in which organisations operate has led to the complexity of organisations (Kanter, 1989). In response to these complexities organisations have explored the use of social structures in which they operate by forging inter-organisational relationships. In the past, there has been limited focus on the social context of organisations. Hence, there has been very little attention paid to the role of relationships between organisations and the effect it has on the outcomes of these relationships. This study is concerned with the relationship of the smallholder cane growers and millers in the Swaziland sugar industry supply chain. It attempts to bring to light the role of relational factors in the performance of agricultural supply chains. This chapter presents

the summary, conclusions and implications of this study as well as the limitations and directions for future research. The following section presents the summary of the findings. The conclusions are presented in section 7.3. Section 7.4 presents the theoretical and managerial implications of the findings of the study. Finally, the limitations and suggestions for future research are presented in Section 7.5

7.2 SUMMARY OF FINDINGS

This study combines the New Institutional Economics (NIE) and the New Economic Sociology (NES), which try to explain institutional structures and organisational behaviour in terms of social actions. However, NIE stresses rationality and argues that economic action is essentially maximising rational behaviour, while the NES puts more emphasis on social actions and argues that economic action is part of social action. This study applies the relational contracting paradigm, which describes relations in terms of principles and norms, such as solidarity, mutuality, integrity of functions, and flexibility. Relational contracting involves management of contractual relationship based on the recognition of mutual benefits and win-win scenarios through cooperative relationships. Hence, it is a social as well as an economic system. Therefore, it is critical to consider the quality of relationships within a supply chain as a social system.

The purpose of a contract is to integrate partners from separate organisations to become one unit with a common understanding of the goals of the relationship, risks involved and how to cooperate in order to improve their performance. The organisational literature has always posited that relational factors, such as trust, cooperation, commitment and absence of opportunistic behaviour play a key role in economic exchange, particularly when one or another party is subject to the risk of opportunistic behaviour and incomplete monitoring or when moral hazard problems arise. These conditions are common in contractual relationships between independent parties like the cane growers and millers.

This study explored the concept of relational contracting in the Swaziland sugar industry and assumes that past experience and the "shadow" of the future play an important role in shaping the relationship of the cane growers and millers. This is because economic action takes place

within the networks of social relations that make up the social structure. Their social actions may be oriented to past, present or future behaviour of others.

There are three elements, which affect relational exchange quality. These include the initial conditions surrounding the exchange, the cumulative experiences of the parties with each other's behaviours as the exchange unfolds, and the impact that external events or behaviours outside the contractual context have on the perceptions and attitudes of the parties towards each other. Relying on theory and conceptual frameworks incorporating trust, cooperation, commitment and opportunistic behaviour, a model of cane growers' and millers' relationships was developed.

This study utilised a sample of 124 smallholder cane growers and three millers' representatives from three sugar mills (Mhlume, Simunye and Ubombo mill). The sample of the smallholder cane growers was drawn through the use of non-probability sampling, and specifically purposive sampling. The survey was conducted between the period of May and December 2001 and it involved the use of personal, face-to-face interviews.

7.2.1 Description of respondents and their perceptions

The results indicated that most of the respondents were male and most sell their cane to the Mhlume and Ubombo mills. The average distance between farmers and the mill to which they deliver their cane is 20.5km. On average the profit per ha and revenue per ha for these respondents is R7, 409.03 and R15, 611.74 respectively.

Results regarding perceptions of cane growers indicate that there is no threat of uncertainty in their relationship with millers. Both cane growers and millers are certain and committed to their relationship. However, they differ in their perception of cooperation and opportunism. Cane growers perceive poor cooperation and opportunism by millers, while millers perceive good cooperation between cane growers and themselves as well as absence of opportunism by cane growers. The study further found that both cane growers and millers are dependent on each other and possess minimal trust towards each other.

Analysis of the farmers' perceptions on their performance indicate that farmers with better economic performance are associated with less transportation costs, more irrigation water,

shorter distance to the mill to which they deliver their cane, more land under cane production, a high yield per ha and a high sucrose content of the cane.

The results indicate that most farmers who are satisfied with their relationship with millers have been in the sugarcane business for less than 10 years. The results further suggest that the duration of the relationship is inversely related to satisfaction of farmers with their relationship with millers. A comparison of perceptions by farmers who trust and those who do not trust millers showed that more farmers who trust millers than those who do not reported making a profit from sugarcane farming, they are also certain of their relationship with millers, are committed to their relationship, are dependent on the millers and are satisfied with their relationship. In contrast, more farmers who do not trust millers than those who do, reported opportunistic behaviour by millers. As with satisfaction, the duration of farmers' relationship with millers was inversely related to trust. Farmers with more than 10 years in the sugarcane business had no trust in the millers.

7.2.2 Social factors and performance of cane growers' relationship with millers

According to transaction cost economics, relationships between exchange partners are based on calculated costs and benefits, in which the economic components of an exchange become the key drivers in the exchange decision process and the social environment is regarded as less important. Contrary to this perspective, the relational contracting theory points at the limitations of building business-to-business relationships on a pure market basis and suggests that most inter-firm exchanges are embedded in specific social contexts that play an important role in supporting business-to-business transactions. Most importantly, inter-organisational trust, commitment and cooperation appear to be of fundamental importance to transactions as key enablers that arise from the social context.

The central question is "What is the role of social capital in the performance of supply chains?". It was hypothesised that relational factors such as trust, commitment and cooperation (elements of social capital) influence the performance of supply chains. The study used descriptive statistics and regression analyses to determine the factors affecting the performance of cane growers. As suggested by the literature, that increasing the relational content in an exchange can encourage cooperation and trust between transactors, thereby discourage opportunistic behaviour, and enhance relationship performance of each party in

the relationship. The results of this study indicate that, among other factors, the performance of the sugar industry supply chain is influenced by two types of factors. Firstly, those that relate only to the smallholder farmers. These include transportation costs of sugarcane, amount of irrigation water available, percentage change of the farmers' production quota, distance between production sites and the mill, which tends to have implications for transport costs, the value of assets per ha, yield per ha and the sucrose content of the sugarcane. Secondly, those that relate to the cane growers' relationship with the millers, such as farmers' dependence on the mill, perceived cooperation between millers and farmers, lack of goodwill trust by both millers and farmers and the perception of opportunistic behaviour practised by millers.

The results of this study revealed that there is a negative relationship between opportunism by millers and cane growers' commitment, trust, and perceived cooperation. The results suggest that an increase in the level of opportunism by millers is indirectly associated with a decrease in cane growers' trust, commitment and perceived cooperation, which in turn, have a positive influence on the cane growers' satisfaction. As expected, farmers' dependence on millers was positively related to their perceived cooperation. However, it was unexpectedly negatively related to cane growers' influence by millers, which in turn was negatively related to cane growers' satisfaction with their relationship with millers. The findings imply that the improvement of the sugar industry supply chain depends on the relationship of the participants within the chain. The absence of opportunistic behaviour and establishment of trust and commitment play a major role in facilitating cooperation between the farmers and millers.

7.2.3 Relationships between cane growers and millers

A model explaining the relationship between cane growers and millers was proposed and empirically tested. The proposed model presented in Chapter three shows the interrelationship between relational constructs, and it was hypothesised in Chapter one that this model explains the relationship between smallholder cane growers and millers. The study employed both hierarchical regression and structural equation modelling (SEM). SEM was used because it allows simultaneous estimation of a measurement model and a structural model. The decision to use SEM was based on its advantage in accounting for measurement

error in constructs and their indicator variables as well as the simultaneous estimation of complex models. The SAS procalis procedure was used to estimate the model.

The proposed conceptual model also included constructs that represent the structure of the relationship between smallholder cane growers and millers in the Swaziland sugar industry. However, due to the complex nature of the proposed model and limited sample size, it seemed that dividing the model into three sub-models would provide a better understanding of the relationship between cane growers and millers as opposed to examining the model as a whole. Therefore, the model presented in Figure 3.3 was divided into three sub models as illustrated in Figure 6.3 and these sub-models were empirically tested using SEM. For the regression analysis, the model was not divided since regression analysis is not as sensitive to sample size as with SEM.

Several authors doubt whether relationship trust, cooperation, commitment and satisfaction can be regarded as distinct constructs (Bejou *et al.*, 1996; Crosby *et al.*, 1990; Dwyer *et. al.* 1987; Kumar *et al.*, 1995; Lagace *et al.*, 1991; Leuthesser, 1997; Scheer and Stern, 1992; Wray *et al.*, 1994). Contrary to their belief, strong empirical support for their distinctiveness has been found as evidenced by the results of the measurement models reported in Chapter six. This supports Geyskens' (1998) empirical evidence on the basis of an extensive meta-analysis incorporating these constructs.

The study hypothesised that relationship trust, commitment and dependence positively influence cooperation, which in turn positively affects the cane growers' satisfaction in their relationship with millers. The findings suggest that smallholder cane growers' satisfaction is positively influenced by perceived cooperation between growers and millers. It is also indirectly influenced via perceived cooperation by growers' trust in the millers, commitment to, as well as dependence, on their exchange relationship with millers. Cane growers' perceived opportunistic behaviour by millers, through trust in millers and perceived cooperation, negatively influenced the cane growers' satisfaction

With respect to the trust-commitment relationship, it was expected that the influence of trust on relationship commitment would be positive and very strong. However, though there was a positive relationship, it was not very strong. The findings agree with the explanation given by Moorman *et al.* (1993) that the trust-commitment relationship would be less strong in an

environment with less uncertainty and vulnerability. Similarly, the results in this study indicated that both millers and cane growers are certain about their exchange relationship. Hence, they had no threat of uncertainty. However, this has a strong influence on cooperation, which in turn influences the cane growers' satisfaction. The results confirm previous findings by Morgan and Hunt (1994) and Moorman *et al.* (1992). Therefore, the derived structural model confirms that perceived cooperation has a direct influence on satisfaction, while trust, commitment and dependence have an indirect influence on satisfaction through cooperation. The findings also point out the importance of goodwill trust in a contractual relationship rather than contractual trust. These findings suggest that the presence of contractual trust is a necessary, but not a sufficient condition for farmers to be committed to their relationship, thus it is clear that there is a need for goodwill trust in supply chain relationships. Therefore, the findings of this study strongly support the proposed model.

7.3 CONCLUSIONS

It is well recognised that the quality of a contractual relationship plays a major role in the performance of the parties involved in the relationship. However, remarkably very little research has been done on the quality and role of contractual relationships in the agribusiness supply chain. Therefore, this study aimed at investigating the factors affecting the performance of the smallholder cane growers, which in turn impacts on the performance of the whole sugar industry supply chain. It also aimed to develop and test a model that explains the relationship of the smallholder cane growers and millers in the Swaziland sugar industry. The results of this study provide considerable insights regarding the perceptions of the smallholder cane growers and millers in their exchange relationship and the importance of relational factors in the performance of the sugar industry supply chain.

The results increase the understanding of relationships between smallholder cane growers and millers in the Swaziland sugar industry. Collectively, the results seem to suggest that trust, commitment, cooperation and absence of opportunistic behaviour between smallholder cane growers and millers are important in enhancing the performance of their relationship. This thesis, therefore, demonstrates the need to incorporate social factors in contractual relationships between supply chain members in order to improve their performance.

The results confirm the explanatory and predictive power of relational theory and the findings of the study are consistent with other studies, in that successful relationships often exhibit a high degree of trust and commitment, and fewer incidences of opportunistic behaviour. Therefore, contracts based on trust, and cooperation tend to minimise opportunism and uncertainties. They also guarantee consistent flow of materials (sugar cane and money) and information between members of the supply chain, thus, providing gains in efficiency for the whole supply chain system.

7.4 IMPLICATIONS

7.4.1 Theoretical implications

Since the theory of relational contracting is still at an early stage, this study has hoped to increase the understanding of the concept of relational contracting and its role in the performance of supply chains. This study is possibly the first to address the concept of relational contracting in an agricultural supply chain. The use of different scale indicators to measure relational constructs and the interrelationship of the constructs was an attempt to conceptualise relational contracting in an agricultural context.

The findings of this study provide support for the theory underlying the proposed model. According to relational contracting theory, relational-orientated exchanges can be analysed as a form of governance that is likely under the presence of economic factors (for example, dependence because of the absence of alternatives and the investment on specific assets). This study has also demonstrated that social factors play an important role in the constitution and maintenance of close exchange relationships.

The results support behavioural and social arguments proposed by relational contracting. Moreover, the study affirms that the evolution from adversarial to cooperation relationships is based mainly on the level of trust, commitment, dependence and the absence of opportunism. An attempt has thus been made to analyse the interrelationship between social and performance factors in exchange relationships. However, there is still a need for further research in this area, especially in terms of the conceptualisation of different constructs in the

context of relationships in agriculture and the establishment of items that accurately measure such constructs.

7.4.2 Managerial implications

The prime purpose of this study was to present and empirically test a model of the relationship between smallholder cane growers and millers in the Swaziland sugar industry. In addition to contributing to the understanding of business relationships, the study's findings provide empirical evidence on the theoretical links between relational behaviours in business relationships as well as practical implications for the members of the sugar industry supply chain, especially the cane growers and millers.

In practice, business transactions urge buyers and supplier firms to seek close, collaborative relationships with each other. This change in focus from value exchanges to value-creation relationships have led firms to develop a more integrative approach in marketing their products, which suggests that other firms are not always competitors and rivals, but are considered partners in providing value to the consumer. This has resulted in the growth of many partnering relationships such as relational exchanges. Therefore, close, cooperative and interdependent relationships are seen to be of greater value than purely transaction based relationships.

Drafting detailed written contracts and using them to resolve business relationship problems creates mistrust between partners in an exchange relationship. Correspondingly, the absence of a formal contract displays the level of trust that prevails in that relationship. It may be argued that organisations establish more straightforward, lasting and confidential relationships if they have constructed formal institutionalised procedures to further their cooperation. However, it is important to note that a contract works on compliance, while relational exchange requires trust and commitment. A relationship founded on trust and mutual respect is more likely to succeed than a relationship of convenience supported by legal contingencies. Therefore, relationships characterised by trust and physical and psychological commitment as well as cooperation between smallholder cane growers and millers is more important for mutual benefit and good quality relationships. Since smallholder farmers have limited access to legal recourse it would be to their benefit to rely on trust as their principal governance mechanism for their exchange relationship with millers.

The study has shown that the absence of opportunistic behaviour, and high levels of trust, which translate to benevolent or goodwill trust and commitment are important in promoting cooperation and satisfaction for smallholder cane growers and millers. Hence, it also improves the performance of the sugar industry supply chain. The results suggest that both cane growers and millers need to develop goodwill trust in each other and resist opportunistic behaviour. Both smallholder cane growers and millers need to understand that trust can be created easily, it is not a simple factor that can be regarded as separate from other preconditions. Therefore, there is a need for (1) directness (openness, honest and effective communication and providing explanations and justifications for actions), (2) continuity (frequency of communication, taking time to explain and investing time in the relationship), (3) multiplexity (understanding each party, their roles and responsibilities), (4) parity (fairness, impartiality, not acting opportunistically, integrity, good intentions and honouring promises), and (5) common interests and diversity (shared values, purpose and vision, setting expectations, successful handling of problems, reconciliation). Overall, the smallholder cane growers and millers need to practise fairness, have integrity, ensure effective communication, have commitment and shared purpose or values which are realistic to their situations.

7.4.3 Policy implications

The sugar industry is the major foreign exchange earner and economic contributor to the economy of Swaziland. The move by the Swaziland government to encourage participation of smallholder farmers, who are mostly on the Swazi Nation Land, to participate in sugarcane production is acknowledged as a good move for the country's economy. Although the Swaziland Government has no major role in the operations of the sugar industry, some of the Government's National Strategies include enhancing private sector involvement in the upliftment of farmers on the Swazi Nation Land from subsistence to commercial farming whilst maintaining economic efficiency in production and promoting the production of sugarcane by smallholder cane growers. Therefore, understanding the factors affecting the performance of smallholder farmers, and hence the sugar industry supply chain as a whole, as well as their relationship with millers would assist the Swaziland Government in evaluating its national strategies for promoting the links between smallholder farmers and the private sector.

The study indicated that one of the problems facing the relationship of smallholder cane growers and millers is lack of commercialisation skills by smallholder farmers. This results in the misunderstanding of regulations and operations within the industry by such farmers. This suggests that smallholder farmers need to be trained and motivated in order to be commercially oriented. The Swaziland Government should be able to play a role in providing smallholder cane growers with some training in business management skills and in addressing issues of concern to farmers as they develop. This should be done through the government extension agents, provided specifically to assist smallholder sugarcane farmers, and the various government departments involved in providing training in business and management skills.

The results demonstrate that there is a lack of benevolent trust between smallholder farmers and millers as well as perceptions of opportunistic behaviour. This suggests that there is need for a policy that would facilitate the establishment and maintenance of trust between the members of the sugar industry supply chain. Therefore, the Swaziland Government in conjunction with the millers need to facilitate smallholder farmers' effective participation in the sugar industry supply chain through raising awareness of the potential benefits of a good relationship between members of the supply chain, providing access to information as well as the right mix of financial and technical support where needed. Measures should also include access to independent advice at the various levels of the farmers' representation within the sugar industry.

The Swaziland Government has to provide an enabling environment for both the smallholder cane growers and millers to improve their exchange relationships by creating and maintaining an overall macroeconomic environment that is conducive to the cooperation of smallholder farmers and the private sector such as the millers. This could include:

(1) Providing close support for enterprises and encouraging the creation of efficient, flexible and independent organisations such as farmers' associations and cooperatives. The success of the sugar industry is based on strong local farmer organization structures that uphold democratic values and champion common economic, commercial and financial objectives of the sugarcane farmers. Institutions that are formed on the basis of non-economic objectives in a business setting like that of the cane growers and the millers are bound to collapse.

(2) Government, and in particular its line-function departments, need to make an effort to understand specific industries like the sugar industry, with a view to providing necessary regulatory, legislative and trade support. There is a need to ensure that the legal framework is favourable for business relationships by clearly defining the legal and regulatory measures that govern business relations and inter-firm transactions; for example, the system of property rights, contract law, commercial law, tax measures and settlement of disputes. Most importantly, they need to ensure that such legal and regulatory measures are effectively implemented. Policies promoting the relationship between farmers and the industry will go a long way to improving the quality of the sugar industry supply chain.

7.5 RESEARCH LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

7.5.1 Limitations

As with any study, the present study has its limitations, including those of time, financial considerations, and the nature of the research design. Therefore, several limitations of this study should be noted as they could provide opportunities for future research.

This study looks at the contractual relationship in a particular setting, specifically the sugar industry in Swaziland. Therefore, the external validity of the results is limited. The results of this study cannot be generalized to include supply chain relationships other than those in the sugar industry or to countries other than Swaziland. However, the study is viewed as the first to investigate the role of relational concepts in a contractual setting related to the actual behaviour of smallholder farmers and their processing firms.

This study, like most studies in agribusiness, suffers from the weakness of using cross-sectional data. Hence would shy away from making strong inferences of the relational concepts in relation to economic performance of a supply chain. Therefore, the use of a longitudinal approach could provide strong support for these relational constructs on performance. It can also enable the establishment of measurement scales that would have been tested over time with the same population.

The study utilised data collected mostly from one side of the inter-firm dyad. However, this is often the case in empirical studies on inter-organisational exchange. Using data from cane growers only often precludes the examination of how the model of the relationship would differ based on the perceptions of millers. The inclusion of the perception of the millers in modelling relationships could provide greater insights when comparing the models based on the two parties.

Conclusions about causality cannot be drawn from the model of the cane growers and the millers' relationship because structural equation modelling techniques do not allow one to determine the direction of causality as well as ascertaining whether that causality exists.

The issue of sample size is a critical one in structural equation models. Since this study utilised 124 observations, which is below the recommended sample size for SEM, this could result in the failure of convergence within the model. This problem was counteracted by splitting the model into three sub-models, which might have changed the estimation of the proposed model. Also some biases might have occurred during the data collection and analysis process, possibly through omitting important indicator variables.

7.5.2 Future research

This study can be considered as a starting point for research concerning exchange relationships in agricultural supply chains. Future research is needed in order to fully develop the theory of relational exchange. As theory in this area is still developing, there are numerous possibilities for future research.

Although the construct measures used in this study have performed moderately well, it is possible that better measures could be found for the different constructs used in the study. For example, the link between trust and commitment was not supported. Though the relationship was positive, as expected, it was insignificant. This could be due to the fact that there are different types of commitment, which include affective and calculated commitment. In future research, it would be necessary to separate the measures of these different types of commitment. Certainty was expected to have a positive relationship with trust, cooperation and satisfaction. Cane growers who trust millers should feel more certain of and satisfied with their relationship with millers. However, the results in this study failed to support this

expectation. Therefore, future research should use uncertainty as a construct rather than certainty and also incorporate more indicator variables.

The study has shown that most of the conflict between cane growers, especially smallholder cane growers and the millers is based on economic issues as well as socio-economic issues. Farmers complain of unfair distribution of the sugar supply chain revenues, which involves price sharing between sugarcane production and processing as well as sharing of income from the sugarcane by-products and sharing of transportation costs for cane to the mill. The educational programmes aimed at availing information to farmers, seem not to be effective, since some farmers still lack the understanding of the operations of the industry and the rules and regulations. Therefore, an in-depth action research aimed at identifying the strategies used in the sugar industry with a purpose of providing new strategies as possible solutions to the existing conflicts and perceptions of poor relationships would be important. This could possibly enlighten both millers and growers that they all belong to one supply chain, and the need to improve the competitiveness of the chain through fair dealings between them.

The findings of this study are specifically relevant to the relationship between smallholder cane growers and millers in the Swaziland sugar industry. The situation may be different for this same industry in other countries and also when applied to different commodities within the country. Thus, similar studies in other commodities in the region as well as other countries could assist in generalizing findings of relationships between smallholder farmers and processing firms.

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APPENDICES

APPENDIX A
FACTORS AFFECTING THE PERFORMANCE OF CANE GROWERS

As is well known that choosing the relevant variables for measuring performance is not trivial. Several dimensions can be taken into account and several indicators can be chosen, such as objective (financial, economic, or even physical) and subjective. Researchers studying organizational performance often have difficulty finding objective data. As a result multi-firm relationship is difficult because of (1) firm-specific factors, and (2) the different influences of profitability. Performance data must be accurately allocated across different business units. Performance measurement for privately held firms is difficult because owners are reluctant to release performance data, and if they do it is often censored and data may not be comparable across firms because of different accounting procedures. In this study, it is shown that, when adequate objective performance data are not available for firms, researchers may use subjective performance data to supplement performance measurement.

A 1 Variables in the model

In order to analyse the factors affecting the performance of cane growers in the sugar industry supply chain, the following dependent variables were identified as a measure for performance of the cane growers: revenue per hectare, the amount of profit as reported by the respondents, farmers' perception whether they make profit or not and finally by the level of satisfaction the farmer attach to the exchange relationship with the millers. Table A.1 presents a summary of the variables used in the regression equations for factors affecting performance.

The independent variables include yield per ha, percentage change in the cane grower's quota (Quotachg), distance from the cane grower's farm and the processing mill (milldist), average sucrose content from 1997 to 2001 (average sucrose %) and duration of relationship (measured in years of sugarcane farming).

Table A.1: Dependent and independent variables used in the performance of smallholder farmers

• Dependent variable for performance	• Independent variables
• Revenue per hectare (R) • Do you make profit (0=No, 1=Yes) • How much profit (R) • Satisfaction (1= vmds, 4= vms)[8]	• Distance to the mill (km) • Transport cost per tonne (R) • Percentage change in quota (%) • Yield per ha (tonnes/ha) • Average sucrose content (%) • Number of years in sugarcane farming (years)

A.1.1 Distance to the mill (Milldist) and transport costs

The cost of transporting sugarcane from the farmers' loading zone to the mill is charged on per tonne per kilometre basis. Therefore, the difference in transport costs among farmers could be a result of farmers using transport that does not charge the same rate or in terms of distance between the farmer's loading zone and the processing mill. As a result of differences in distance farmers who are further away from the mill are likely to experience high transportation costs even if the rates are the same.

A1.2 Percentage change in quota (quotachg)

A production quota is the tonnes of sucrose a particular farmer is contracted to supply to the specific mill as per agreement. A higher quota means the farmer can deliver more sucrose at the prevailing quota price compared to a farmer with fewer quotas. However, farmers are allowed to deliver up to their quota, beyond that they are penalized by being paid a segregated price. Therefore, farmers with big quotas, if they deliver their entire quota, are likely to have higher income than those with fewer quotas.

[8] Measured by four items in a likert-scale, where 1= very much dissatisfied, 2 = dissatisfied, 3 = satisfied, and 4 = very much satisfied.

A1.3 Yield per hectare and sucrose content

Sugarcane yields may vary widely according to the physical environment, farm infrastructure (such as irrigation system and amount of water), crop management and varieties used. The average yield in Swaziland is 96t/ha. However, there may be a variation from farmer to farmer. High yield per ha contribute to high income on condition the sucrose content is also high.

The amount paid to cane growers is a function of the sucrose content in the sugar cane. High sucrose content per tonne of sugarcane is related to high income per tonne of sugarcane delivered. Therefore, farmers with high yields and high sucrose content in their sugarcane are expected to get better payment and thus will be satisfied with their business exchange relationship.

A1.4 Duration of exchange relationship

Number of years a farmer is involved in sugarcane farming is a proxy of the duration of the relationship between the farmers and the miller to which the farmer is attached and is expected to have an influence in the farmer's management skills as well as improved interaction with the mill where he deliver his sugarcane. Through the interaction, the farmer may develop some confidence in sugarcane farming and to the mill. Such behaviour is expected to breed trust and cooperation, which further improves the farmers' performance. Thus, farmers who had been involved in the sugarcane farming for several years are expected to perform better than relatively new farmers or rather the same. Therefore, factors that affect the performance of smallholder cane growers can be modelled as follows:

Performance = f (yield per ha, quotachg, milldist, years in sugarcane farming, average sucrose %, and transport cost)

A 2 Estimation procedure

Regression analysis was used to estimate the relationship between the independent factors (*Xi*) and the performance factors (PF). In each performance factor, the least-squares technique was used to estimate the regression coefficients (*bi*) in an equation form:

$PF = b_o + b_1X_1 + b_2X_2 \ldots\ldots + b_nX_n + u$

Where u is a random disturbance term. While the regression coefficient (bi) represents the expected change in the performance indicator associated with a unit change in the independent variable. The backward stepwise regression method was used to determine the independent variables that affect each of the performance measures. Backward stepwise regression method starts by putting all the independent variables in the equation and then deletes one at a time in order to remain with those that reduce the sum of the squared errors.

A 3 Factors affecting farmers' perception about making profit

The logit technique was employed to determine the factors that influence the cane growers' perceptions on making profit from sugarcane production. Farmers in this study were asked if they were making profit from sugarcane production and their response was either yes or no. This response was then used as a dependent variable measuring the performance of the cane growers. When a dependent variable is a dummy (0 or 1) the logit or probit becomes the appropriate technique to use. The logit was preferred in this study compared to the probit because the logistic does not depend on the assumption that the independent variables are normally distributed. As a result many other independent variables may be included. The logistic model may be expressed as:

$$p_i = E(Y_i = 1/X_{ni}) = \frac{1}{1 + e^{-(\sum_{i=1}^{k} \beta_n X_{ni})}}$$

Where pi is the probability of cane growers' perception of making profit and e is the base number of the natural logarithm. Taking the natural log of the odds ratio in favour of being classified as making profit is expressed as:

$$L_i = \ln\left(\frac{p_i}{1-p_i}\right) = \sum_{i=1}^{k} \beta_n X_{ni}$$

The results of the logistic regression are presented in Table A. 2. The results indicate that cane growers' perceptions on whether they make profit on sugarcane is influenced by the yield of sugarcane they obtain per hectare. Observing the percentage change in odd ratio, the results show that an increase in the grower's yield per ha by 1% would result to a 96.9% change in the odd ratio in favour of making profit. Farmers consider improvement in the yield of cane as an important determinant of performance. This view is attributed to the fact that the profit they obtain from growing cane is a function of the sucrose content in the cane and the amount of cane delivered. Assuming that farmers would have the same sucrose content in their cane, therefore, the difference in their profit would be among other things a result of differences in their cane yield per ha. The results indicate that 86.5% of the variation in the odd ratio in favour of making profit is predicted correctly.

Table A 2: Factors affecting cane growers' perception on profit making

Item	Coefficient	Std error	wald	sig
Intercept	-0.8387	1.1472	0.5344	0.4648
Yield per ha	0.0314	0.0135	5.3938	0.0202

Percent predicted correctly = 86.5

-2log likelihood = 72.665

Cox & Snell R-sq = 0.156

Nagelkerke R-sq= 0.279

% change in odd ratio = 96.86

A 4 Factors affecting cane growers' profit

A regression analysis was conducted to identify the factors that determine the profit received by cane growers from sugarcane production. Using a backward stepwise method, out of the six variables entered in the equation, only two of the variables were significant in explaining the profit of cane growers. Results in Table A.3 indicate that percentage change in the farmer's production quota has a positive and significant relationship ($p<0.01$) with the farmer's profit, while the distance between the millers and the production site has a significant ($p<0.01$) and negative relationship with the profit to cane growers. About 47% of the variation in the farmers' profit is explained by the percentage change in their quota and their proximity to the mill.

The results suggest that an increase in the farmer's quota has a considerable impact on the farmers' output and subsequently their profit. The distance between farmers' production areas and the processing mill negatively affects the farmers' profit. The profit for farmers further away from the receiving mills is highly compromised due to the costs they incur in transporting their cane to the mills over long distances. This suggest that for farmers to realise profit from the sugarcane business, they need to be closer to the mill, to which they deliver.

Table A.3: Factors affecting cane growers' profit per ha

Independent	Coefficient	Std error	F	sig
Intercept	10213	982.479	108.06	0.0001
Quotachg	1081.225	166.846	42.00	0.0001
Milldist	-219.569	46.191	22.60	0.0001

R square = 0.4740 F = 31.09

A 5 Factors affecting cane growers' revenue

The results of the factors affecting the revenue received by cane growers are presented in Table A.4. The results indicate that the revenue to cane growers is significantly ($p<0.01$) and positively affected by yield per hectare as well as the sucrose content in the sugarcane. One would expect farming experience to be positively related to the amount of revenue farmers obtain from cane production. However, the results in this study indicate a negative impact of farming experience to revenue. This could be attributed to that, farmers who had been in farming for many years tend to be complacence as they realise that they have the knowledge of farming sugarcane. As a result they ignore some of the important crop husbandry. Thus obtaining low yields and ultimately low revenues.

Table A 4: Factors affecting cane growers' revenue per ha

Item	Coefficient	Std error	F	Sig
Intercept	-13415	2117.302	40.14	0.000
Yield per ha	166.738	4.418	1424.24	0.000
Years in farming	-726.422	280.467	6.710	0.011
Average sucrose %	0.993.968	147.807	45.220	0.001

R square= 0.956 F = 31.09

A 6 Factors affecting farmers' satisfaction

The final measure of performance used in the study was the satisfaction of the cane growers in their contractual relationship with the millers. The results in Table A.5 show that cane growers' satisfaction is positively affected by percentage change in their production quota ($p<0.10$), and the duration of the relationship measured by the number of years a farmer is involved in sugarcane farming. Yield per ha, though has a positive relationship with farmers' satisfaction, it has no significant impact ($p>0.10$) on the farmers' satisfaction. The results indicate that about 25% of the variation in the farmers' satisfaction with the millers' relationship is explained by change in their production quota and the number of years being engaged with the millers. The lack of significance by yield per ha in explaining farmers' satisfaction, could be attributed to the way farmers evaluated their satisfaction. Satisfaction refers to the overall evaluation of the relationship, which includes economic and non-economic evaluation of benefits. Although, farmers gain economic benefits, they are not happy with the non-economic aspect of their relationship. For, example, they have limited trust in the millers, and they perceive poor cooperation between themselves and the millers.

Table A 5: Factors affecting cane growers' satisfaction

Independent	Coefficient	Std error	F	sig
Intercept	8.3043	0.9803	71.76	0.0000
Quotachg	0.1248	0.0700	3.17	0.0786
Yield per ha	0.0135	0.0087	2.41	0.1244
Years in farming	1.0880	0.4590	5.62	0.0202
R square = 0.2487		F = 6.70		

APPENDIX B

CFA FOR UNAGGREGATED MANIFEST VAIABLES

Fit criterion			13.8910
Goodness of Fit index (GFI)			0.6204
GFI Adjusted for Degrees of Freedom (AGFI)			0.5735
Root Mean Square Residual (RMSR)			0.1118
Parsimonious GFI (Mulaik, 1989)			0.5767
Chi-square = 1708.5911	df = 962	prob>chi**2 =	0.0001
Null Model Chi-square:	df = 1035		2738.9
RMSEA Estimate	0.0794		90% C.I [., 0.0855]
ECVI Estimate	17.0226		90% C.I [., 18.1155]
Probability of Close Fit			0.0000
Bentler's Comparative Fit Index			0.5618
Normal Theory Reweighted LS Chi-square			1730.8943
Akaike's Information Criterion			-215.4089
Bozdogn's (1987) CAIC			-3890.5198
Schwarz's Bayesian Criterion			-2928.5198
McDonald's (1989) Centrality			0.0493
Bentler & Bonett's (1980) Non-normed Index			0.5286
Bentler & Bonett's (1980) NFI			0.3762
James, Mulaik, & Brett (1982) Parsimonious NFI			0.3496
Z-Test of Wilson & Hilferty (1931)			13.8998
Bollen (1986) Normed Index Rho1			0.3288
Bollen (1988) Non-normed Index Delta2			0.5798
Hoelter's (1983) Critical N			76

Covariance Structure Analysis: Maximum Likelihood Estimation

Covariances among exogenous variables

Var1	parameter	Estimate	Std Error	t Value
e1	u1	0.95756	0.12288	7.79
e2	u2	0.79124	0.10624	7.45
e3	u3	0.78153	0.10537	7.42
e4	u4	0.65275	0.09576	6.82
e5	u5	0.79749	0.10680	7.47
e6	u6	0.95780	0.12285	7.80
e7	u7	0.58945	0.08306	7.10
e8	u8	0.29531	0.05873	5.03
e9	u9	0.94756	0.12172	7.78
e10	u10	0.99193	0.12662	7.83
e11	u11	0.23517	0.05640	4.17
e12	u12	0.64009	0.08836	7.24
e13	u13	0.78476	0.10493	7.48
e14	u14	0.80458	0.10698	7.52
e15	u15	0.71895	0.09823	7.32
e16	u16	0.63884	0.09030	7.07
e17	u17	0.42985	0.07284	5.90
e18	u18	0.96148	0.12342	7.79
e19	u19	0.78715	0.10518	7.48
e20	u20	0.91280	0.11784	7.75
e21	u21	0.57498	0.08196	7.02
e22	u22	0.84954	0.11087	7.66
e23	u23	0.74569	0.09961	7.49
e24	u24	0.89963	0.11638	7.73
e25	u25	0.44542	0.07048	6.32
e26	u26	0.89660	0.11605	7.73
e27	u27	0.81357	0.10557	7.71
e28	u28	0.96978	0.12546	7.73
e29	u29	0.78372	0.10976	7.14
e30	u30	0.80287	0.11104	7.23
e31	u31	0.84738	0.11430	7.41
e32	u32	0.68429	0.10498	6.52
e33	u33	0.67902	0.09013	7.53
e34	u34	0.88104	0.11320	7.78
e35	u35	0.87745	0.11277	7.78
e36	u36	0.66983	0.08914	7.51
e37	u37	0.68576	0.09086	7.55
e38	u38	0.58204	0.08008	7.27
e39	u39	0.92749	0.12254	7.57
e40	u40	0.68521	0.13661	5.02
e41	u41	0.98442	0.12628	7.80
e42	u42	0.32125	0.22733	1.41
e43	u43	0.93919	0.12265	7.66
e44	u44	0.43352	0. 11901	3.64
e45	u45	0.51002	0. 11274	4.52
e46	u46	0.89278	0.11909	7.50

Covariance Structure Analysis: Maximum Likelihood Estimation

Squared multiple correlations

	Variable	Error variance	Total variance	R-Square
1	Dep2	0.95756	1.00000	0.0424
2	Dep22R	0.79124	0.99999	0.2088
3	Dep33R	0.78153	0.99999	0.2185
4	Dep7	0.65275	1.00000	0.3473
5	Dep8	0.79749	0.99999	0.2025
6	Inflby1	0.95780	1.00000	0.0422
7	Inflby3	0.58945	1.00000	0.4106
8	Inflby4	0.29531	0.99999	0.7047
9	Rinflov1	0.94756	1.00000	0.0524
10	Rinflov2	0.99193	1.00000	0.00807
11	Rinflov3	0.23517	0.99999	0.7648
12	Rinflov4	0.64009	1.00001	0.3599
13	Trust1	0.78476	1.00000	0.2152
14	Trust2	0.80458	1.00000	0.1954
15	Trust3	0.71895	0.99999	0.2810
16	Trust5R	0.63884	1.00000	0.3612
17	Trust6R	0.42985	1.00000	0.5701
18	Rpleave1	0.96148	1.00000	0.0385
19	Rpleave2	0.78715	1.00000	0.2129
20	Coop1	0.91280	1.00000	0.0872
21	Coop2	0.57498	0.99999	0.4250
22	Coop3	0.84954	0.99999	0.1505
23	Coop4	0.74569	1.00000	0.2543
24	Coop5	0.89963	1.00000	0.1004
25	Benefit2	0.44542	0.99999	0.5546
26	Benefit3	0.89660	0.99999	0.1034
27	Benefit4	0.81357	0.92873	0.1240
28	Benefit5	0.96978	1.08494	0.1061
29	Satis1	0.78372	0.99999	0.2163
30	Satis2	0.80287	0.99999	0.1971
31	Satis3	0.84738	0.99999	0.1526
32	Satis4	0.68429	1.00001	0.3157
33	Cert2	0.92749	0.99999	0.0725
34	Cert3	0.68521	0.99999	0.3148
35	Cert4	0.98442	1.00000	0.0156
36	Cert5	0.32125	1.00002	0.6788
37	Comit2	0.93919	1.00001	0.0608
38	Comit3	0.43352	0.99999	0.5665
39	Comit4	0.51002	0.99999	0.4900
40	Comit5R	0.89278	1.00001	0.1072
41	Rconf1	0.87745	0.99999	0.1225
42	Conf2	0.67902	0.99998	0.3210
43	Rconf3	0.88104	1.00000	0.1190
44	Opp1	0.66983	0.99999	0.3302
45	Opp2	0.68576	0.99998	0.3142
46	Opp3	0.58204	0.99997	0.4179

Covariance Structure Analysis: Maximum Likelihood Estimation

Covariances among exogenous variables

Var1	Var2	Estimate	Std Error	t Value
f1	f2	-0.39140	0.11464	-3.41
f1	f3	0.42965	0.12214	3.52
f2	f3	-0.30733	0.10260	-3.00
f1	f4	1.02036	0.07244	14.08
f2	f4	-0.55209	0.08465	-6.52
f3	f4	0.62026	0.08721	7.11
f1	f5	0.85627	0.11988	7.14
f2	f5	-0.40275	0.11934	-3.37
f3	f5	0.71084	0.10688	6.65
f4	f5	0.88456	0.09224	9.59
f1	f6	-0.68025	-0.10749	-6.33
f2	f6	0.59889	0.08423	7.11
f3	f6	-0.93983	0.05648	-16.64
f4	f6	-0.78927	0.07362	-10.72
f5	f6	-0.70016	0.11310	-6.19
f1	f7	-0.33317	0.13469	-2.47
f2	f7	0.03013	0.11299	0.27
f3	f7	-0.07742	0.12129	-0.64
f4	f7	-0.22785	0.11948	-1.91
f5	f7	-0.10711	0.14375	-0.75
f6	f7	0.21314	0.12378	1.72
f1	f8	0.10242	0.13985	0.73
f2	f8	-0.07739	0.11386	-0.68
f3	f8	0.10211	0.12213	0.84
f4	f8	0.13748	0.12156	1.13
f5	f8	0.05833	0.14566	0.40
f6	f8	0.23968	0.12256	1.96
f7	f8	0.12878	0.12477	1.03

Covariance Structure Analysis: Maximum Likelihood Estimation

Manifest variable equations with standardized estimates

Dep2	=	0.2060*F1 F1 Dep2	+	0.9785 e1
Dep22R	=	0.4569*F1 F1Dep22R	+	0.8895 e2
Dep33R	=	0.4674*F1 F1 Dep33R	+	0.8840 e3
Dep7	=	0.5893*F1 F1Dep7	+	0.8079 e4
Dep8	=	0.4500*F1 F1 Dep8	+	0.8930 e5
Inflby1	=	0.2054*F2 F2Inflby1	+	0.9787 e6
Inflby3	=	0.6407*F2 F2 Inflby3	+	0.7678 e7
Inflby4	=	0.8395*F2 F2 Inflby4	+	0.5434 e8
Rinflov1	=	0.2290*F2 F2 Rinflov1	+	0.9734 e9
Rinflov2	=	0.0898*F2 F2 Rinflov2	+	0.9960 e10
Rinflove3	=	0.8745*F2 F2 Rinflove3	+	0.4850 e11
Rinflov4	=	0.5999*F2 F2 Rinflov4	+	0.8001 e12
Trust1	=	0.4639*F3 F3 Trust1	+	0.8859 e13
Trust2	=	0.4421*F3 F3 Trust2	+	0.8970 e14
Trust3	=	0.5301*F1 F3 Trust3	+	0.8479 e15
Trust5R	=	0.6010*F3 F3 Trust5R	+	0.7993 e16
Trust6R	=	0.7551*F3 F3 Trust6R	+	0.6556 e17
Rpleave1	=	0.1963*F3 F3 Rpleave1	+	0.9806 e18
Rpleave2	=	0.24614*F3 F3 Rpleave2	+	0.8872 e19
Coop1	=	0.2953*F4 F4 Coop1	+	0.9554 e20
Coop2	=	0.6519*F4 F4 Coop2	+	0.7583 e21
Coop3	=	0.3879*F4 F4 Coop3	+	0. 9217e22
Coop4	=	0.5043*F4 F4 Coop4	+	0.8635 e23
Coop5	=	0.3168*F4 Coop5	+	0.9485 e24
Benefit2	=	0.7447*F4 F4 Benefit2	+	0.6674 e25
Benefit3	=	0.3216*F4 Benefit3	+	0.9469e26
Benefit4	=	0.3521*F4 F4 Benefit4	+	0.9359 e27
Benefit5	=	0.3258*F4 F4 Benefit5	+	0.9454 e28

Covariance Structure Analysis: Maximum Likelihood Estimation

Manifest variable equations with standardized estimates cont:

Satis1	=	0.4650*F5 F5 Satis1	+	0.8853 e29
Satis2	=	0.4440*F5 F5Satis2	+	0.8960 e30
Satis3	=	0.3907*F5 F5 Satis3	+	0.9205 e31
Satis4	=	0.5619*F5 F5 Satis4	+	0.8272 e32
Conf2	=	0.5665*F6 F6Conf2	+	0.8240e33
Rconf3	=	0.3449*F6 F6Rconf3	+	0.9386 e34
Rconf1	=	0.3501*F6 F6Rconf1	+	0.9367 e35
Opp1	=	0.5746*F6 F6Opp1	+	0.8284 e36
Opp2	=	0.5606*F6 F6O pp2	+	0.8281 e37
Opp3	=	0.6465*F6 F6O pp3	+	0.7629 e38
Cert2	=	0.2693*F7 F7 Cert2	+	0.9631 e39
Cert3	=	0.5611*F7 F7 Cert3	+	0.8278 e40
Cert4	=	0.1248*F7 F7 Cert4	+	0.9922 e41
Cert5	=	0.8239*F7 F7 Cert5	+	0.5668 e42
Comit2	=	0.2466*F8 F8 Comit2	+	0.9691e43
Comit3	=	0.7526*F8 F8 Comit3	+	0.6584 e44
Comit4	=	0.7000*F8 F8 Comit4	+	0.7142 e45
Comit5R	=	0.3274*F8 F8 Comit5R	+	0.9449 e46

Covariance Structure Analysis: Maximum Likelihood Estimation

Equations with standardized estimates

Confirmatory Factor Analysis (CFA) results of indicator variables

Indicator variable	Measurement item	Factor loading (λ)	Std Error	t - statistics
Dep2	Relative dependence	0.2060	0.0953	2.1624
Dep8		0.4500	0.0929	4.8462
Dep7		0.5893	0.0913	6.4554
Dep22r		0.4569	0.0928	4.9249
Dep33r		0.4674	0.0926	5.0452
Opp1	Opportunistic behaviour	0.5746	0.0853	6.7340
Opp2		0.5606	0.0857	6.5439
Opp3		0.8961	0.6465	0.0835
Rconf1		0.3501	0.0897	3.9047
Conf2		0.5665	0.0855	6.6247
Rconf3		0.3449	0.0897	3.8440
Cert2	Certainty	0.2693	0.1067	2.5239
Cert3		0.5611	0.1249	4.4910
Cert4		0.1248	0.1054	1.1838
Cert5		0.8239	0.1542	5.3418
Inflby1	Influence by partner	0.2054	0.0949	2.1654
Inflby3		0.6407	0.0850	7.5400
Inflby4		0.8394	0.0774	10.8498
Inflov1R		0.2290	0.0946	2.4207
Inflov2R		0.898	0.0957	0.9383
Inflov3R		0.8745	0.0759	11.5161
Inflov4R		0.5999	0.0864	6.9449
Satis1	Satisfaction	0.4650	0.0981	4.7383
Satis2		0.4440	0.0984	4.5141
Satis3		0.3907	0.0989	3.9491
Satis4		0.5619	0.0977	5.7515
Trust1	Trust	0.4639	0.0917	5.0579
Trust2		0.4421	0.0923	4.7919
Trust3		0.5301	0.0900	5.8925
Trust5R		0.6010	0.0878	6.8430
Trust6R		0.7551	0.0826	9.1424
Pleave1R		0.1963	0.0964	2.0368
Pleave2R		0.4614	0.0918	5.0263
Comit2	Commitment	0.2466	0.1037	2.3774
Comit3		0.7526	0.1036	7.2661
Comit4		0.7000	0.1023	6.8423
Comit5R		0.3274	0.1027	3.1889
Coop1	Cooperation	0.2953	0.0935	3.1583
Coop2		0.6519	0.0848	7.6875
Coop3		0.3879	0.0919	4.2208
Coop4		0.5043	0.0892	5.6515
Coop5		0.3168	0.0932	3.4003
Benefit2		0.7447	0.0816	9.1246
Benefit3		0.3216	0.0931	3.4541
Benefit4		0.3394	0.0674	5.0333
Benefit5		0.3394	0.0674	5.0333

APPENDIX C

CFA FOR AGGREGATED MANIFEST VAIABLES

Fit criterion					2.6381
Goodness of Fit index (GFI)					0.8060
GFI Adjusted for Degrees of Freedom (AGFI)					0.7131
Root Mean Square Residual (RMSR)					0.0913
Parsimonious GFI (Mulaik, 1989)					0.6024
Chi-square	= 324.4922	df = 142	prob>chi**2	=	0.0001
Null Model Chi-square:		df = 190			1017.0
RMSEA Estimate		0.1022			90% C.I [., 0.1169]
ECVI Estimate		3.9715			90% C.I [., 4.4642]
Probability of Close Fit					0.0000
Bentler's Comparative Fit Index					0.7793
Normal Theory Reweighted LS Chi-square					295.9287
Akaike's Information Criterion					40.4922
Bozdogan's (1987) CAIC					-501.9878
Schwarz's Bayesian Criterion					-359.9878
McDonald's (1989) Centrality					0.4791
Bentler & Bonett's (1980) Non-normed Index					0.7047
Bentler & Bonett's (1980) NFI					0.6809
James, Mulaik, & Brett (1982) Parsimonious NFI					0.5089
Z-Test of Wilson & Hilferty (1931)					0.0569
Bollen (1986) Normed Index Rho1					0.5731
Bollen (1988) Non-normed Index Delta2					0.7914
Hoelter's (1983) Critical N					66

Covariance Structure Analysis: Maximum Likelihood Estimation

Covariances among exogenous variables

Var1	parameter	Estimate	Std Error	t Value
e1	u1	0.45487	0.07785	5.84
e2	u2	0.77757	0.10520	7.39
e3	u3	0.34650	0.07471	4.64
e4	u4	0.45895	0.07832	5.86
e5	u5	0.67517	0.09352	7.22
e6	u6	0.65985	0.09209	7.17
e7	u7	0.13942	0.23561	1.13
e8	u8	0.99240	0.13712	7.24
e9	u9	0.50190	0.07833	6.41
e10	u10	0.54591	0.08193	6.66
e11	u11	0.47620	0.07643	6.24
e12	u12	0.61247	0.10798	5.67
e13	u13	0.69280	0.10629	6.52
e14	u14	0.90620	0.15280	5.93
e15	u15	0.16817	0.91578	1.50
e16	u16	0.30708	0.08010	3.83
e17	u17	0.46871	0.08218	5.70
e18	u18	0.65986	0.09506	6.94
e19	u19	0.64090	0.10874	5.89
e20	u20	0.65558	0.10826	6.06

Covariance Structure Analysis: Maximum Likelihood Estimation

Squared multiple correlations

	Variable	Error variance	Total variance	R-Square
1	Tag1	0.45487	1.00000	0.5451
2	Tag2	0.7776	0.99999	0.2224
3	Tag3	0.3465	0.99999	0.6535
4	Pag1	0.4589	1.00000	0.5410
5	Pag2	0.6752	0.99999	0.3248
6	Pag3	0.6598	1.00000	0.3401
7	Mag1	-1.3941	1.00000	2.2964
8	Mag2	0.9924	1.00000	0.0876
9	Oag1	0.5019	1.00000	0.4981
10	Oag2	0.5459	1.00000	0.4541
11	Oag3	0.4762	1.00000	0.5238
12	Dag1	0.6125	1.00000	0.3875
13	Dag2	0.6928	1.00000	0.3072
14	Cag1	0.9062	1.00000	0.0938
15	Cag2	-1.1682	0.99999	2.1682
16	Sag1	0.6409	1.00000	0.3591
17	Sag2	0.6555	1.00000	0.3444
18	Iag1	0.3071	1.00000	0.6929
19	Iag2	0.4687	1.00000	0.5313
20	Iag3	0.6599	1.00000	0.3401

Covariance Structure Analysis: Maximum Likelihood Estimation

Covariances among exogenous variables

Var1	Var2	Estimate	Std Error	t Value
f3	f4	0.68975	0.08721	7.91
f3	f8	0.04961	0.17718	0.28
f4	f8	0.12298	0.43426	0.28
f3	f6	-0.84356	0.06339	-13.31
f4	f6	-0.77471	0.08061	-9.61
f8	f6	-0.09358	0.33095	-0.28
f3	f1	0.44836	0.13041	3.44
f4	f1	0.96937	0.11150	8.69
f8	f1	0.12808	0.45256	0.28
f6	f1	-0.68752	0.11869	-5.79
f3	f7	-0.08335	0.08318	-1.00
f4	f7	-0.11848	0.09962	-1.19
f8	f7	-0.05027	0.18044	-0.28
f6	f7	0.08986	0.08639	1.04
f1	f7	-0.21573	0.15116	-1.43
f3	f2	-0.28668	0.10810	-2.65
f4	f2	-0.60163	0.09344	-6.44
f8	f2	-0.11599	0.40954	-0.28
f6	f2	0.60890	0.08650	7.04
f1	f2	-0.36668	0.13202	-2.78
f7	f2	-0.02804	0.06823	-0.41
f3	f5	0.65067	0.11773	5.53
f4	f5	0.94018	0.11073	8.49
f8	f5	0.09733	0.34466	0.28
f6	f5	-0.61342	0.12247	-5.01
f1	f5	0.85869	0.14816	5.80
f7	f5	-0.05180	0.08737	-0.59
f2	f5	-0.34306	0.13257	-2.59

Covariance Structure Analysis: Maximum Likelihood Estimation

Manifest variable equations with standardized estimates

Tag1	=	0.7383*F3 F3 tag1	+	0.6744 e1
Tag2	=	0.4716*F3 F3 tag2	+	0.8818 e2
Tag3	=	0.8084*F3 F3 tag3	+	0.5886 e3
Pag1	=	0.7356*F4 F4Pag1	+	0.6775 e4
Pag2	=	0.5699*F4 F4Pag2	+	0.8217 e5
Pag3	=	0.5832*F4 F4Pag3	+	0.8123 e6
Mag1	=	3.3610*F8 F8Mag1	+	1.0000 e7
Mag2	=	0.0872*F8 F8Mag2	+	0.9962 e8
Oag1	=	0.7058*F6 F6Oag1	+	0.7084 e9
Oag2	=	0.6739*F6 F6Oag1	+	0.7389 e10
Oag3	=	0.7237*F6 F6Oag1	+	0.6901 e11
Dag1	=	0.6225*F1 F1 Dag1	+	0.7826 e12
Dag2	=	0.5543*F1 F1 Dag2	+	0.8323 e13
Cag1	=	0.3063*F7 F7Cag1	+	0.9519 e14
Cag2	=	1.4725*F7 F7Cag2	+	1.0000 e15
Sag1	=	0.5993*F5 F5 Sag1	+	0.8006 e19
Sag2	=	0.5869*F5 F5Sag2	+	0.8097 e20
Iag1	=	0.8324*F2 F2Iag1	+	0.5541 e16
Iag2	=	0.7289*F2 F2Iag2	+	0.6846 e17
Iag3	=	0.5832*F2 F2Iag3	+	0.8123 e18

Covariance Structure Analysis: Maximum Likelihood Estimation

Equations with standardized estimates

Confirmatory Factor Analysis (CFA) results of aggregate indicator variables

Aggregate Indicator variable	Measurement item	Factor loading (λ)	Std Error	t statistics
Tag1	Trust	0.7383	0.0846	8.7313
Tag2		0.4716	0.0928	5.0810
Tag3		0.8084	0.0828	9.7587
Oag1	Opportunistic behaviour	0.7058	0.0844	8.3590
Oag2		0.6739	0.0855	7.8806
Oag3		0.7237	0.0838	8.6324
Cag1	Certainty	0.3063	0.1854	1.6515
Cag2		1.4725	0.7843	1.8774
Iag1	Influence by partner	0.8324	0.0841	9.8963
Iag2		0.7289	0.0864	8.4349
Iag3		0.5832	0.0905	6.4462
Mag1	Commitment	0.3769	1.7287	1.5879
Mag2		0.2872	0.3159	1.6760
Pag1	Cooperation	0.7356	0.0848	8.6791
Pag2		0.5699	0.0885	6.4387
Pag3		0.5832	0.0882	6.6133
Dag1	Relative dependence	0.6225	0.1007	6.1815
Dag2		0.5543	0.0986	5.6205
Sag1	Satisfaction	0.5993	0.1013	5.9184
Sag2		0.5869	0.1008	5.8209

APPENDIX D

RELIABILITY OF SCALE ITEMS FOR CANE GROWERS

Trust

Item	N	Mean	Std	Item-total corr	Alpha if deleted
Trust1	124	2.74194	0.73109	0.42467	0.68126
Trust2	124	3.00000	0.70998	0.47747	0.66790
Trust3	124	3.25009	0.67021	0.50639	0.66044
Trust5R	124	2.41123	1.02022	0.45783	0.67291
Trust6R	124	2.51610	0.88789	0.52211	0.65635
Rpleave1	124	3.63710	0.73623	0.25710	0.72157
Rpleave2	124	3.07268	0.71196	0.33237	0.70385
Overall		2.94702			

Alpha : Raw = 0.71167

Standardized = 0.71407

Dependence

Item	N	Mean	Std	Item-total corr	Alpha if deleted
Dep2	124	2.82258	1.03632	0.16255	0.54285
Dep22R	124	2.20968	1.03023	0.33468	0.43812
Dep33R	124	2.00806	0.95845	0.19051	0.52668
Dep7	124	2.69355	1.06058	0.46276	0.35185
Dep8	124	3.31452	0.77948	0.31929	0.44799
Overall		2.60968			

Alpha : Raw = 0.51972

Standardized = 0.52253

Influence by partner

Item	N	Mean	Std	Item-total corr	Alpha if deleted
Inflby1	124	2.66129	0.86379	0.11438	0.70673
Inflby3	124	3.08871	0.98783	0.51438	0.59591
Inflby4	124	3.37903	0.94217	0.62183	0.56235
Rinflov1	124	1.88710	0.74582	0.21980	0.67959
Rinflov2	124	3.12903	0.94540	0.07472	0.71657
Rinflov3	124	3.21774	0.99233	0.72113	0.52981
Rinflov4	124	3.66935	0.64671	0.48885	0.60365
Overall		3.00461			

Alpha : Raw = 0.67361

Standardized = 0.67083

Certainty

Item	N	Mean	Std	Item-total corr	Alpha if deleted
	124	3.48387	0.59104	0.263831	0.456738
Cert2	124	3.54032	0.70306	0.235298	0.474877
Cert3	124	3.10484	0.79448	0.261602	0.458168
Cert4	124	3.43548	0.62784	0.160693	0.520620
Cert5	124	3.34677	0.65076	0.478254	0.308426
Overall					

Alpha : Raw = 0.500103

Standardized = 0.504682

Satisfaction

Item	N	Mean	Std	Item-total corr	Alpha if deleted
Satis1	124	2.55645	0.94828	0.26984	0.499207
Satis2	124	2.61290	0.94318	0.347645	0.424758
Satis3	124	3.00806	0.96690	0.289367	0.475950
Satis4	124	3.21774	0.78150	0.360868	0.412817
Overall		2.848788			

Alpha : Raw =0.519130

Standardized = 0.526169

Cooperation

Item	N	Mean	Std	Item-total corr	Alpha if deleted
Coop1	124	3.27419	0.62909	0.202544	0.696558
Coop2	124	2.52419	1.15092	0.467332	0.643765
Coop3	124	2.80645	0.76166	0.402655	0.657189
Coop4	124	2.50806	1.03982	0.438053	0.649886
Coop5	124	3.09677	0.59015	0.374045	0.663016
Benefit2	124	1.90323	1.21253	0.495122	0.637890
Benefit3	124	1.18548	0.49987	0.322026	0.673440
Benefit4	124	1.23387	0.58586	0.439747	0.649533
Benefit5	124	1.80645	0.95149	0.156456	0.705175
Overall		2.25985			

Alpha : Raw =0.681870

Standardized = 0.690812

Commitment

Item	N	Mean	Std	Item-total corr	Alpha if deleted
Comit2	124	3.37097	0.66830	0.248541	0.595244
Comit3	124	3.36290	0.62904	0.502690	0.390865
Comit4	124	3.54032	0.57593	0.381614	0.493032
Comit5R	124	2.86290	1.02279	0.328151	0.535331
Overall		3.28427			

Alpha : Raw =0.546385

Standardized = 0.580283

Opportunistic behaviour

Item	N	Mean	Std	Item-total corr	Alpha if deleted
Opp1	124	2.91129	0.96282	0.461169	0.641034
Opp2	124	3.41935	0.76612	0.344827	0.678563
Opp3	124	2.41935	0.81746	0.471123	0.637718
Rconf1	124	2.75000	0.79250	0.439374	0.648237
Conf2	124	2.65323	0.91992	0.479770	0.634823
Rconf3	124	2.58871	0.84596	0.347997	0.677570
Overall		2.79032			

Alpha : Raw =0.694154

Standardized =0.693605

APPENDIX E

SEM FOR SUB MODELS 1, 2, AND 3

Appendix E (a): SEM for sub model one

Fit criterion				1.1778
Goodness of Fit index (GFI)				0.8296
GFI Adjusted for Degrees of Freedom (AGFI)				0.7116
Root Mean Square Residual (RMSR)				0.1647
Parsimonious GFI (Mulaik, 1989)				0.5882
Chi-square =	144.8740	df = 39	prob>chi**2 =	0.0001
Null Model Chi-square:		df = 55		510.08
RMSEA Estimate		0.1486		90% C.I [., 0.1748]
ECVI Estimate		1.6643		90% C.I [., 2.0118]
Probability of Close Fit				0.0000
Bentler's Comparative Fit Index				0.7673
Normal Theory Reweighted LS Chi-square				132.8533
Akaike's Information Criterion				66.8740
Bozdogn's (1987) CAIC				-82.1170
Schwarz's Bayesian Criterion				43.1170
McDonald's (1989) Centrality				0.6525
Bentler & Bonett's (1980) Non-normed Index				0.6719
Bentler & Bonett's (1980) NFI				0.7160
James, Mulaik, & Brett (1982) Parsimonious NFI				0.5077
Z-Test of Wilson & Hilferty (1931)				7.3448
Bollen (1986) Normed Index Rho1				0.5995
Bollen (1988) Non-normed Index Delta2				0.7753
Hoelter's (1983) Critical N				48

Covariance Structure Analysis: Maximum Likelihood Estimation

Latent Variable Equations Estimates

F8	=	0.5834*F3	+	-0.8031*F6	+	1.0000 D1
Std Err		0. 4281PF8F3		0.3443F8F6		
t Value		1.3628		-2.3326		
F3	=	-0.7121*F6			+	1.0000 D2
Std Err		0. 0845PF3F6				
t Value		-8.4278				

F4	=	0.0004*F8	+	0.3820*F3	+	-0.6011*F6	+1.0000 D3
Std Err		0. 0003PF4F8		0.2842PF4F3		0.0865PF4F6	
t Value		1.6838		1.3441		-6.9472	

Covariance Structure Analysis: Maximum Likelihood Estimation

Equations with standardized coefficients

F8	=	-0.0306*F3	+	-0.0522*F6	+	0.9996 D1
		PF8F3		PF8F6		
F3	=	-0.8819*F6	+			0.4715 D2
		PF3F6				

F4	=	0.00878*F8	+	0.3923*F3	+	-0.4185*F6 + 0.6172 D2
		PF4F8		PF4F3		PF4F6

Squared Multiple correlations

Squared Multiple correlations

Variable	Error Variance	Total Variance	R-squared
1. F8	236.0769	236.2764	0.0008
2. F3	0.144900	0.65192	0.7777
3. F4	0.23534	0.61784	0.6191

Appendix E (b): SEM for sub model two

Fit criterion					1.4302
Goodness of Fit index (GFI)					0.8255
GFI Adjusted for Degrees of Freedom (AGFI)					0.7439
Root Mean Square Residual (RMSR)					0.1913
Parsimonious GFI (Mulaik, 1989)					0.6562
Chi-square	=	175.9206	df = 62	prob>chi**2 =	0.0001
Null Model Chi-square:			df = 78		551.58
RMSEA Estimate			0.1222		90% C.I [., 0.1437]
ECVI Estimate			2.377		90% C.I [., 2.3355]
Probability of Close Fit					0.0000
Bentler's Comparative Fit Index					0.7594
Normal Theory Reweighted LS Chi-square					159.2513
Akaike's Information Criterion					51.9206
Bozdogn's (1987) CAIC					-184.9369
Schwarz's Bayesian Criterion					-122.9369
McDonald's (1989) Centrality					0.6317
Bentler & Bonett's (1980) Non-normed Index					0.6974
Bentler & Bonett's (1980) NFI					0.6811
James, Mulaik, & Brett (1982) Parsimonious NFI					0.414
Z-Test of Wilson & Hilferty (1931)					7.0036
Bollen (1986) Normed Index Rho1					0.5988
Bollen (1988) Non-normed Index Delta2					0.7673
Hoelter's (1983) Critical N					58

Covariance Structure Analysis: Maximum Likelihood Estimation

Latent Variable Equations Estimates

F7	=	-0.2677*F3	+	0.3921*F4	+	1.0000 D1	
Std Err		0.1840 PF7F3		0.1906F7F4			
t Value		-1.4550		2.0565			
F5	=	-0.0108*F7	+	0.6717*F4	+	0.0362*F2	+1.0000 D2
Std Err		0.830PF5F7		0.0878PF54F4		0.0682PF5F2	
t Value		-0.1303		7.6473		0.5313	

Covariance Structure Analysis: Maximum Likelihood Estimation

Equations with standardized coefficients

F7 = -0.0942*F3 + 0.1379*F4 + 0.9961 D1
PF7F3 PF7F4

F5 = -0.0411*F7 + 0.8987*F4 + 0.0485*F2 + 0.4394 D2
PF5F7 PF5F4 PF5F2

Squared Multiple correlations

Variable	Error Variance	Total Variance	R-squared
1. F7	8.01755	8.0797	0.0077
2. F5	0.10784	0.5586	0.8069

Appendix E (c): SEM for sub model three

Fit criterion					1.6056
Goodness of Fit index (GFI)					0.8345
GFI Adjusted for Degrees of Freedom (AGFI)					0.7571
Root Mean Square Residual (RMSR)					0.1554
Parsimonious GFI (Mulaik, 1989)					0.6633
Chi-square	=	197.4907	df = 62	prob>chi**2 =	0.0001
Null Model Chi-square:			df = 78		607.22
RMSEA Estimate		0.1333			90% C.I [., 0.1554]
ECVI Estimate		2.377			90% C.I [., 2.5356]
Probability of Close Fit					0.0000
Bentler's Comparative Fit Index					0.7440
Normal Theory Reweighted LS Chi-square					149.2807
Akaike's Information Criterion					73.4907
Bozdogn's (1987) CAIC					-163.3667
Schwarz's Bayesian Criterion					-101.3667
McDonald's (1989) Centrality					0.5791
Bentler & Bonett's (1980) Non-normed Index					0.6779
Bentler & Bonett's (1980) NFI					0.6748
James, Mulaik, & Brett (1982) Parsimonious NFI					0.5363
Z-Test of Wilson & Hilferty (1931)					7.9331
Bollen (1986) Normed Index Rho1					0.5908
Bollen (1988) Non-normed Index Delta2					0.7515
Hoelter's (1983) Critical N					52

Covariance Structure Analysis: Maximum Likelihood Estimation

Latent Variable Equations Estimates

F2	=	-0.4883*F1	+		1.0000 D2
Std Err		0. 0931 PF2F1			
t Value		-5.2441			
F4	=	0.6779*F1	+	0.3984*F3	+ 1.0000 D1
Std Err		0. 0817 PF4F1		0.0675PF4F3	
t Value		8.02956		5.9004	
F5	=	0.7513*F4	+	-0.0704*F2	+ 1.0000 D3
Std Err		0. 1322 PF5F4		0.1215PF5F2	
t Value		5.6827		-0.05800	

Covariance Structure Analysis: Maximum Likelihood Estimation

Equations with standardized coefficients

F2	=	-0.3758*F1	+			0.9267 D2
		PF2F1				
F4	=	0.6003*F1	+	0.6269*F3	+	0.4966 D1
		PF4F1		PF4F3		
F5	=	0.8689*F4	+	-0.0730*F2	+	0.4594 D3
		PF5F4		PF5F2		

Squared Multiple correlations

Variable	Error Variance	Total Variance	R-squared
1. F2	0.1444	0.5857	0.7534
2. F4	0.3572	0.4159	0.1412
3. F5	0.0818	0.3878	0.7889

APPENDIX F

ITEMS USED TO MEASURE MILLERS' PERCEPTIONS

Millers' dependence on cane growers	Strongly Disagree	Disagree	Agree	Strongly Agree
1. The mill can easily get other cane growers should the present ones decide to terminate their contract. (R)	SD	D	A	SA
2. If cane growers can stop growing sugarcane the mill would be in serous trouble as it would be short of raw material	SD	D	A	SA
3. The mill can buy sugarcane only from the farmers assigned to it by SSA.	SD	D	A	SA
4. The mill's output can be affected if farmers are not contracted to produce sugar cane.	SD	D	A	SA
Certainty:				
1. The mill is assured of a constant supply of sugarcane	SD	D	A	SA
2. The mill is assured of good quality cane from the cane growers.	SD	D	A	SA
3. Farmers have all the technical know how on growing sugarcane	SD	D	A	SA
4. Farmers can always get technical information from the SSA extension department whenever they need it.	SD	D	A	SA
Opportunistic behaviour:				
1. Cane growers try to cheat the mill to get higher price pay	SD	D	A	SA
2. Farmers try to delay harvest in order to gain sucrose content	SD	D	A	SA
3. Farmers honour their supply quota as per their contract.	SD	D	A	SA
4. Farmers do not care whether they meet their quota, as long as they make profit.	SD	D	A	SA
Trust on growers:				
1. The mill has relatively trust on the cane growers.	SD	D	A	SA
2. There is a mutual understanding between the mill and the cane growers	SD	D	A	SA
3. The mill can rely upon cane growers as faithful and just.	SD	D	A	SA

Appendix F: Items used to measure millers' perceptions (cont:)

4. Cane growers try to cheat the mill to get higher price pay.	SD	D	A	SA
5. One has to monitor and double check whatever information the cane growers could claim to have about the sugar industry.	SD	D	A	SA
Commitment:				
1. Given a chance the mill would cancel its sugarcane contract supply with some farmers.	SD	D	A	SA
2. The mill has invested a lot of capital in the establishment of the contract with farmers.	SD	D	A	SA
3. The mill does not care whether farmers meet their quota or not	SD	D	A	SA
Cooperation:				
1. The mill and cane growers' activities are well coordinated.	SD	D	A	SA
2. The mill plans production and delivery schedules with the farmers.	SD	D	A	SA
3. The mill takes farmers concerns seriously	SD	D	A	SA
4. The mill seeks farmers' opinions whenever it considers implementing changes that will affect farmers as well.	SD	D	A	SA
5. Farmers are very much cooperative	SD	D	A	SA
Influence by partner:				
1. Farmers try to dictate terms to the mill	SD	D	A	SA
2. The mill can make buying decisions independently of the farmers (R)	SD	D	A	SA
3. Cane growers should take whatever the mill says because they do not have bargaining power (R)	SD	D	A	SA
4. The mill has more bargaining power than farmers (R)	SD	D	A	SA

ITEM	Very much Dissatisfied	Dissatisfied	Satisfied	Very much Satisfied
Satisfaction:				
1. Quality of sugarcane from farmers.	VMD	D	S	VMS
2. Sucrose content of sugarcane from farmers.	VMD	D	S	VMS
3. Quantity of sugarcane from farmers.	VMD	D	S	VMS
4. Delivery of sugarcane by farmers.	VMD	D	S	VMS

Note: R denotes reversed statements