Asymmetric information, principal-agent behaviour and governance mechanisms in the South African lamb supply chain

by

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Declaration

I, Melissa van der Merwe, hereby declare that this thesis, which I submit for the degree PhD Agricultural Economics at the University of Pretoria is my own work and has not been submitted by me for a degree at any other tertiary institution.

Signature:  Date: May 2017

Acknowledgements

At this time when I'm about to dot the last i's and cross the last t's, I feel a lingering sadness. Concluding this research makes me feel like I am saying goodbye to a good friend. A goodbye I have been looking forward to at the very beginning, especially whilst wrestling through mountains of literature in order to, somehow, reduce it to a research problem and a feasible conceptual framework. Conquering this mountain would, however, have been impossible without the mentorship of my co-supervisor Prof Jacques Trienekens. I met Prof Trienekens for the first time during the first lecture of "An Introduction to Supply Chain Management" at the Wageningen University and Research Centre, in the Netherlands. I was immediately captivated by the intriguing world of agricultural supply chains and pursued a masters thesis at the University of Pretoria in this field. Much later, (I needed some convincing to undertake a doctoral thesis) I revisited the Wageningen University and Research Centre, this time to learn about Institutional Economics and to persuade Prof Trienekens to be my co-supervisor. Knowing that his knowledge and experiences, paired with my willingness to give it my all might, be the perfect combination for a sound doctoral study and a memorable journey of self-discovery. Prof Trienekens, it is impossible to put into words all the valuable lessons that I have learned from you. Thank you for being such an amazing teacher! I will remember the bubbles you made me draw repeatedly in an attempt to make sense of the sea of literature I found myself drowning in. Thank you for never giving me the answers but for asking the right, and often difficult, questions. This taught me how to think critically to find the answers on my own. Thank you for teaching me how to be a good researcher, academic writer, supervisor and reviewer – because of you I am aspiring for greatness.

Finding one's feet in a research proposal for a doctoral thesis is challenge enough. Add to that an unfamiliar environment, with more depressing rainy days than sunny, and you would most likely find yourself absently staring through a rain-splattered window missing home. Without my "Huize Tuit" housemates and close friends, Marjanneke Vijge and Sara Panis, I might still be staring through that window… Thank you for turning each "Huize Tuit" meal into an event not to be missed. Thank you for listening to my frustrations and for sharing your own research experiences with me. Marjanneke, thank you for teaching me the true meaning and value of the phrase "You may trust yourself!".

Visiting a foreign country for the first time is an exciting roller coaster of making new friends and weekend getaways. The second time around, at least in my experience, was a bit more serious with strictly planned weekends around the huge responsibility of a doctoral thesis resting on my shoulders. Nevertheless, my second time in the Netherlands could have turned out to be incredibly lonely if it was not for my very special friend, Tamara Breman. Tamara, thank you for being my home away from home. You made every trip to the Netherlands so much more memorable. Your friendship means the world to me.

After spending three intense months in the rainy Netherlands, I was eager to return to the Karoo region to commence my data collection process. During the data collection process, one of the Karoo farmers' wives told me: "Karoo people only cry twice. The first is when you move to the Karoo and the second time is when you leave the Karoo." At the time, I did not quite grasp what she meant but after a few months in the Karoo, and spending time with its people, I caught myself crying when the last Karoo shrub disappeared in my rear-view mirror. Prof Kirsten, thank you for that first visit to the Karoo region back in 2011, and for igniting a passion for the Karoo, and its people within me. I owe so much of what I have accomplished to you and the support you have provided me. I am honoured that you have invested so much in my growth and development. Thank you for believing in my capabilities when I doubted myself. Reminiscing about my past under your mentorship I find, woven like the hidden symbols on a treasure map, the path that points to a career as an academic. Thank you for your mentorship and (I say this fondly) for turning me into a unique version of yourself.

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As a little girl growing up drawing 'mannies' in the sand and dreaming of a "man wat by O.T.K. werk en lorries regmaak" I would have never imagined that my humble beginnings on a farm in the rural areas of Mpumalanga would lead me to become a Doctor of Philosophy in Agricultural Economics. I owe all of my successes to my parents, Lood and Sarah van der Merwe. Thank you for every learning opportunity that you have given me, I realise that you have sacrificed a lot over the years in doing so, and I am forever grateful. Thank you for arousing an inextinguishable passion for agriculture within me. Thank you for teaching me the value of working hard and persisting to realise your dreams. Thank you for teaching me that nothing, good and bad, lasts forever and that I should make the most of every moment I have. Thank you for your constant support and the words of encouragement in chasing my dreams. The fact that you believe in me carries me through the times when I doubt myself. I am proud to, finally, say… I dedicate this doctoral thesis to you.

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Looking back at my journey as a doctoral candidate, I can honestly say that I have enjoyed every single moment and if I could have a do over I would gladly start again. Do not get me wrong, there were times of frustration, times when I thought of giving up, but then there were the good times, the times of meeting new people, of finally making a breakthrough in figuring out the methodologies, or the blissful feeling of good writing days – man were they GOOD!

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Degree: PhD Agricultural Economics
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Abstract

The recent addition of Karoo Lamb to South Africa's repertoire of products with a regional identity attracted extensive publicity. The news headlines that spoke of challenges to protect the geographical name, discrepancies among supply chain stakeholders and the outright opportunism and exploitation of the geographical name made Karoo Lamb a particularly interesting case study to examine.

Regrettably, the niche product "Karoo Lamb" has not yet come to its own. In an effort to support the development of this initiative, the thesis sets out to address the central question; "How do we increase farmer participation in differentiated product supply chains, whilst discouraging opportunistic behaviour so that the performance of these chains can be optimised?"

The overarching question, mentioned above, is addressed in four independent but related research papers by using the differentiated Karoo Lamb supply chain as a case study. The specific questions considered in these papers are:

- What are the claims most vulnerable to opportunistic behaviour?
- What drives a farmer's tendency to behave opportunistically, and how can these drivers be used to prevent opportunistic behaviour?

- What factors encourage a farmer to participate in a differentiated supply chain?
- What enforcement mechanisms are best suited to prevent the opportunistic behaviour of farmers?
- What governance mechanisms are currently employed to govern the supply chain?
- Are the governance and enforcement mechanisms properly aligned to guarantee the authenticity of the differentiated product?

The thesis employed the principals of agency theory, transaction cost economics, and contract theory to address the practical problems faced by the Karoo Meat of Origin certification scheme.

The thesis combined quantitative and qualitative research methods to analyse the data collected from four primary stakeholders involved in the Karoo Lamb supply chain. From the total population of 209 certified Karoo Lamb farmers, 73 farmers were interviewed on their farms in the Karoo region. In addition to the farmers, five abattoirs, two processors and/or packers and five retail outlets were interviewed.

Results supported the expectation that a farmer's decision to invest in the collective reputational capital of a product is shaped by his/her relationship with the abattoir, and the ease with which business is conducted. The easier it is for the farmer to do business with the abattoir the more likely the farmer is to invest in the Karoo Lamb initiative. Other, more personal attributes, such as the farmer's risk profile, education and his/her network also proved to influence his/her willingness to invest in the collective reputation.

The efforts to increase the membership base of Karoo Lamb contributes to the success story of Karoo Lamb. The success of the initiative, however, remains threatened by opportunism. The investigation revealed the "from the Karoo" and "free range" claims as the most vulnerable to opportunistic behaviour specifically during times of droughts. The study further revealed a lack of information exchange between the farmers and abattoirs, specifically regarding droughts, feeding practices and disease treatments, as the leading driver for opportunistic behaviour. An increase in information sharing, within the farmer network, and with the abattoir, is therefore recommended. This is the main strategy to reduce or eradicate the opportunistic behaviour of farmers.

In addition to broadening farmer investments in the reputational capital of Karoo Lamb and to preventing the opportunistic behaviour of farmers, the success of the Karoo Lamb initiative also requires an alignment between the enforcement and governance mechanisms. The investigation supported the notion that the State-appointed third party is relatively unsuccessful when it specifically comes to the monitoring of the Karoo farmers for compliance with production standards. Due to the failure of the third party, the thesis made an attempt to explore alternative monitoring and enforcement mechanisms. The results indicate that the majority of the Karoo Lamb stakeholders preferred monitoring and enforcement mechanisms that include more frequent monitoring and stricter prosecution strategies to deal with non-compliant stakeholders.

Owing to many years of commodity style operations throughout the supply chain, the correct vehicle for ensuring the proper implementation of the enforcement mechanisms remains a challenge. The assessment of the Karoo Lamb supply chain reveals non-contractual arrangements with qualified partners as being the most frequently utilised governance mechanism. However, this mechanism is not sufficient when the third party fails to monitor and enforce the production standards accurately. Therefore, with a view to ensuring the credibility of Karoo Lamb, a move to toward more hierarchical arrangements, are expected, which would provide a stronger focus on private or mutual enforcement mechanisms. This means that the stakeholders in the supply chain would be jointly responsible for the credibility of the product and therefore jointly responsible for the enforcement of quality and origin standards.

Keywords: Opportunistic behaviour, information sharing, collective reputational capital, transaction difficulties, enforcement mechanisms, governance mechanisms, Karoo Lamb

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Chapter 1:

Introduction

"There is a return to appearing honest, but not to being honest."
(Akerlof, 1983)

1.1 Background and context

It seems like the stakeholders, participating in the South African red meat supply chains, took Akerlof's (1983) quote, "There is a return to appearing honest, but not by being honest." to heart. It is not standard practice for the abattoir to monitor what happens on the farm and it is not common for the farmer to oversee the slaughtering procedures at the abattoir. These two supply chain stakeholders rather trust that the one has the other's best interest at heart, and neither one would behave opportunistically to exploit a vulnerability of the other. In real life, this is however not the case, and we see that whenever there is information asymmetry chances are both the farmer and the abattoir will act opportunistically.

Anecdotal evidence suggests that there exists little trust between the farmers, as the producers of red meat, and the abattoirs. Farmers regularly complain about the prices they receive for slaughtered animals, which, according to them, is mainly because of the incorrect grading of the animals by the abattoir. At the same time, abattoirs do not always trust farmers to comply with the production requirements of differentiated products such as 'free range' and 'no antibiotics'. Abattoirs believe that farmers will violate these protocols if it means they can deliver animals from the feedlot to the abattoir as free-range animals. In doing so, they would not only gain a price premium but also gain from a heavier carcass. This problem is further complicated by many years of commodity style chain operations where the shifting of large volumes is, almost, superior to complying with quality standards.

As long as consumers are offered commodity products, they will continue to make purchasing decisions based on price (Hayes et al., 2004). Within commodity agriculture, numerous opportunities for lucrative niche markets exist through differentiating meat supply chains mainly through the use of specific claims related to production attributes (free-range

or from a particular region) and the use of collective brands (owned by a collective of supply chain stakeholders, for example a regional brand) and proprietary brands (owned by an individual supply chain stakeholder, for example a retailer brand).

One of the latest trends in the food market is the desire among consumers to feel physically or emotionally connected to the geographical origin of the product that they are consuming. This need for origin-based food is playing out in a variety of ways as food processors, and retail outlets are labelling their products according to the origin of the product (van der Merwe & Kirsten, 2015). What is more, the protection of foodstuffs with a geographical origin has recently become a way of promoting agricultural and regional development in developing countries (Donner et al., 2017).

The focus of this thesis on niche or differentiated product supply chains that produce differentiated goods is, therefore, of particular interest for no less than five reasons:

- Firstly, supply chain stakeholders increasingly attempt to upgrade from commodity orientated production towards production for high-end or differentiated markets (Humphrey & Schmitz, 2002). This means that differentiated supply chains are likely to become even more popular.
- Secondly, supply chain stakeholders' attempt to differentiate their products will affect the attributes of the transactions (Zylbersztajn & Farina, 1999) and can thus lead to additional risks within the supply chain. For example, participation in differentiated supply chains can lead to performance measurement difficulties as buyers cannot easily distinguish between differentiated and commodity products.
- Thirdly, supply chain stakeholders, especially final consumers, are even more vulnerable when it comes to the credibility of the credence or experience attributes of differentiated products (Cunningham, 2003; Oude Ophuis & Van Trijp, 1995).
- Fourthly, participation in differentiated supply chains does not only increase the transaction risks to which supply chain stakeholders are exposed to, but it may also limit the contractual options available to stakeholders to manage these risks. This is because differentiation can increase the interdependency between stakeholder's supply side and demand side transactions. The meat industry has been one of the first to develop quality management systems that cover the whole supply chain. Although

such systems can help stakeholders in coordinating quality, they may also, increase the interdependencies in the supply chain further.

- Finally, a wide variety of different types of governance mechanisms is used, not only at different supply chain stages but also across different types of supply chains and between various countries. For example, meat products with a geographical origin are expected to be governed by more hierarchical governance mechanisms (especially at the farmer-abattoir link) compared to the market mechanisms used to govern commodity meat products (Wever, 2012).

However, despite the many opportunities that exist for successful differentiation strategies, farmers do not always find it easy to differentiate their commodity products. Some of the reasons summarised by Hayes et al. (2004), include; (i) commingling and cost disadvantages elsewhere in the supply chain may prevent price incentives from reaching the farmers, (ii) competition among farmers quickly erode potential profits from differentiation, and (iii) relatively small output scales make it difficult for farmers to build and maintain their own unique brands. Moreover, because of the many efforts by farmers and retail outlets to mislead consumers about the origin of products with a regional identity, consumers are often sceptical about the credibility of these differentiated products (van der Merwe, 2012).

That said, the success of differentiated products depend on; (i) the extent to which additional information about the differentiated products can be transmitted from consumers to producers via the price (prices signal the willingness of consumers to pay for certain attributes), (ii) the ease with which a sufficiently large scale of production can be achieved to offset the costs of building and maintaining the differentiated product brand, and (iii) the level of excludability to keep competition low and prevent imitation of the differentiated product (Hayes et al., 2004).

An obvious way to protect a differentiated product from imitation is to link the production of the product to a particular region, based on the specific attributes of the region. In this way, the farmers who collectively own the "brand", can limit the supply of the product and obtain reasonable profits, since production is linked to a saturable region. Farmers who collectively own a brand are also more likely to value their brand and would not be willing to skimp on quality or to allow others in the collective to do so (Hayes et al., 2014).

Regrettably, a successful product is sure to bring imitators, and might even result in farmers who are part of the collective to find sly ways of increasing their output to realise higher profits. This is, according to Hayes et al. (2004), where the role of the State becomes crucial to the success of the differentiated product. The State should be willing and able to provide a legal framework for the farmers to obtain property rights on their differentiated product. This legal framework should also make provisions for the protection of the product through monitoring and enforcement by a public or private entity to protect the reputation of the differentiated product by preventing imitations and curtailing the sly efforts of opportunistic farmers.

From the above discussion it seems like for a differentiated product, in particular, a product with a regional identity, to be successful at least three criteria should hold; (i) the product should be excludable in a sense that only a limited number of farmers should be able to produce the product and therefore collectively own the rights to produce the product, to ensure sensible profits, (ii) it should be relatively easy for eligible farmers to obtain production rights and to participate in the differentiated product supply chain to ensure economies of scale to offset branding costs, (iii) it should be possible to monitor the supply chain and enforce compliance with the protocols of the differentiated product, which implies that parties who unlawfully participate in the supply chain should face legal consequences under the legal framework.

1.2 Problem statement

The efforts to differentiate or upgrade commodity supply chains proved to increase stakeholder interdependencies, and open up opportunities for opportunistic behaviour. Up to now, the discussion revolved around the efforts of stakeholders in meat supply chains, specifically the difficulties that farmers face, to differentiate or upgrade their commodity supply chains to target lucrative high-end markets. The discussion further revealed increased interdependencies between the stakeholders of differentiated supply chains that can potentially lead to additional supply chain risks. One of the significant risks faced by differentiated meat supply chains, especially when performance measurement becomes a problem, is that of opportunistic behaviour. This problem is further complicated due to long years of commodity chain style operations as well as the importance of shifting large volumes of product due to the distance between production regions and the primary markets.

The recent addition of Karoo Lamb to South Africa's repertoire of products with a regional identity attracted extensive publicity. The news headlines that spoke of challenges to protect the geographical name, discrepancies among supply chain stakeholders and the outright opportunism and exploitation of the geographical name makes Karoo Lamb a particularly interesting case study to examine.

The Karoo Lamb supply chain is differentiated in that it identifies and guarantees the Karoo region as the origin of the lamb product but also include claims such as free range, no routine antibiotics, hormone free, good animal practices and full farm-to-fork traceability (KMOO, 2016a). The Karoo, in the Northern Cape Province of South Africa, is a vast semi-arid area that covers almost 50 % of the total area of South Africa (Le Roux et al. in Kirsten et al., 2008). The region is far from urban centres and home to flocks of free roaming sheep. The vegetation of this region comprises a variety of different species of wild herbs with limited grass growth. The lamb reared on the natural indigenous Karoo vegetation is believed to produce meat with a unique flavour (Erasmus et al., 2016). The unique identity of and the geographical value attached to Karoo Lamb makes it possible to sell Karoo Lamb at premium prices above ordinary lamb products. Unfortunately, this unique identity also makes the product vulnerable to opportunistic behaviour by stakeholders, especially farmers, who do not comply with the strict production protocols[1].

Fortunately, many of these opportunistic behavioural problems can be mitigated by imposing monitoring and enforcement mechanisms. In the South African Karoo Lamb supply chain, this role is mostly fulfilled by the Karoo Meat of Origin certification scheme (the certification scheme) established by the Karoo Development Foundation (the foundation) to protect and promote the Karoo region by acting as a custodian of the intellectual property rights that rest in the name Karoo (Kirsten, 2011). The certification scheme is a system of auditing and certification that was launched in an attempt to prevent exploitation of the Karoo as a concept and to guarantee the credence attributes, such as free range, hormone free, no antibiotics and product of origin. It is therefore, the responsibility of the certification scheme to; (i) enforce the Karoo Lamb standards and requirements, (ii) monitor the Karoo Lamb supply chain stakeholders for compliance with the mentioned protocols, (iii) create

[1] See http://www.karoomeatoforigin.com/karoo-standards/ for the complete list of protocols.

sanctions and penalties for malpractices, and (iv) create incentives to reward compliance with the standards and requirements.

At this point in time, it is still unclear which of the Karoo Lamb claims (free range, from the Karoo, or free from hormones and antibiotics) are particularly vulnerable to opportunistic behaviour. What is more, the factors that increase a farmers' tendency to behave opportunistically are also still unknown. Because of these unknowns, it is hard to recommend strategies that are geared towards eliminating opportunistic behaviour, specifically at the farm level.

More concerning is the anecdotal evidence that suggests that the Karoo Lamb supply chain currently functions within the normal practices of a commodity supply chain without the necessary strict alignment between actors in the chain. The embeddedness of the differentiated supply chain within the commodity supply chain indicate that both chains are subject to the same monitoring and enforcement mechanisms and that both chains are governed by the same governance mechanisms. Technically, the differentiated Karoo Lamb supply chain should observe stricter monitoring and enforcement mechanism compared to the commodity supply chain. Given the more rigorous monitoring and enforcement mechanisms recommended for the differentiated chain, hierarchical governance mechanisms with better coordination are expected, as oppose to the market mechanisms observed in commodity supply chains. This indicates a misalignment between the enforcement mechanisms currently imposed on the Karoo Lamb supply chain, and the governance mechanisms used to govern the transactions.

Additionally, the success of the Karoo Lamb product lies in the capacity of the Karoo region to produce the maximum number of lambs to offset the costs of building and maintaining the Karoo Lamb name. In order to saturate the Karoo region's production capacity, it is important that all the lamb farmers in the Karoo region invest in the Karoo Lamb concept by participating in the certification scheme. Part of the success of the Karoo Lamb supply chain, therefore, depends on the extent to which farmers can be encouraged to invest in the certification scheme.

The purpose of this thesis, derived from the discussion, is threefold. Firstly, to find ways to reduce the opportunistic behaviour of Karoo farmers. Secondly, to encourage farmer participation in differentiated lamb supply chains, such as Karoo Lamb. Finally, to streamline the differentiated Karoo Lamb supply chain by aligning the enforcement and governance mechanisms.

1.3 Conceptual framework

The thesis is built on three theoretical pillars, namely, agency theory, transaction cost economics theory, and contract theory as illustrated in Figure 1.1.

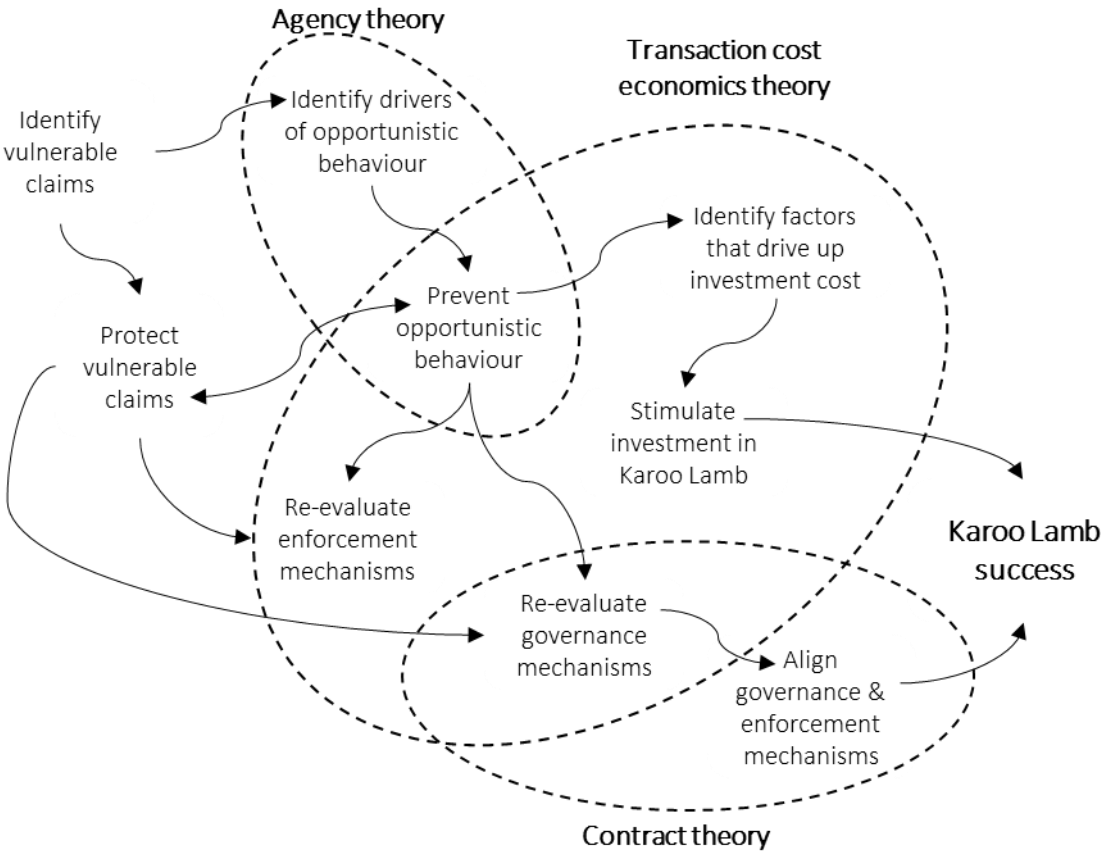

Figure 1.1: Conceptual framework

These three pillars are used to explain, (i) the relationship between the principal[2] (abattoir or to some extent the Karoo Meat of Origin certification scheme) and the agent[3] (farmer), (ii) the investment decision of the farmer based on his difficulty to transact with the abattoir (transaction costs), and (iii) the alignment of the quality and origin enforcement mechanisms with governance mechanisms.

The agency relationship (the relationship between the principal and the agent) is one of the oldest and most common modes of social interaction (Ross, 1973). Typically, a principal-agent relationship arises when one (or more) party (the agent) acts on behalf of the other (the principal). According to Williamson (1975), under conditions of asymmetric information[4] and conflicting interests, these interactions between individuals are likely to suffer from opportunistic behaviour[5]; "self-interest seeking with guile" (Williamson, 1975). Asymmetric information concerning one party's attributes in a transaction is a condition that facilitates opportunistic behaviour as it creates a type of vulnerability that limits the other party's ability to detect that behaviour (Wathne & Heide, 2000), thereby giving the party a chance to behave opportunistically without getting caught (Kirmani & Rao, 2000). As a result, agency theory assumes that people will encounter problems (one or both parties will behave opportunistically) when they attempt to engage in cooperative endeavours (Jensen and Meckling, 1976), especially when asymmetric information prevails.

In addition to agency theory, the thesis aims to look at the Karoo farmer-abattoir relationship through a transaction cost economics lens. According to Williamson (2002; 1985) transaction cost economics examines the comparative advantage of alternative contract types to govern transactions. These types of contracts depend on the characteristics or the attributes (frequency, uncertainty and asset specificity) of the particular transactions, which affect the relative cost of the contract (Williamson, 2000).

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2 The principal is the person or entity that gives the assignment to the agent but has imperfect information about the performance of the agent (Groenewegen et al., 2010).
3 The agent is the person or entity that receives the assignment, and typically has perfect information about his own performance. The agent might use this information asymmetry for his own benefit and to the disadvantage of the principal (Groenewegen et al., 2010).
4 A situation where some, or all of the parties participating in a transaction are unequally informed, or not informed at all (Groenewegen, et al., 2010).
5 A situation where one party deliberately takes advantage of a situation, at the expense of the other party, in pursuit of self-interest (Groenewegen, et al., 2010).

Along with transaction cost economics, as the most frequently used, and robust theory to examine contracting decisions (Wever, 2010) the thesis also builds on the principles of contract theory. Contracts or (governance mechanisms or governance structures) refers to the agreements used to govern transactions. These contracts are typically clustered into three main types; market governance, hybrid governance, and hierarchical governance forms (Ménard, 1996), depending on the transaction attributes and the associated costs. According to Wever (2012), contracts or governance mechanisms should be aligned with the attributes of transactions in an economically efficient way.

As mentioned earlier, for a differentiated product to be successful, the product should be excludable, it should be relatively easy for farmers to join the collective, and the supply chain stakeholders should be monitored for compliance. The thesis aims to test these criteria in the case of Karoo Lamb by expanding on the empirical work in the fields of agency theory, transaction cost economics theory and contract theory.

The thesis applies the principles of agency theory to recommend strategies to prevent the opportunistic behaviour of farmers who produce for Karoo Lamb. To address this objective, it is imperative to identify the claims made by the Karoo Meat of Origin certification scheme that are most vulnerable to opportunistic behaviour. As soon as the vulnerable claims are isolated, the thesis also identifies the most likely factors to motivate a farmer to behave opportunistically. It is expected that the vulnerable claims and the triggers for opportunistic behaviour can be used to re-evaluate the monitoring and enforcement mechanisms to ensure compliance with the Karoo Lamb quality and origin standards.

In addition, the thesis aims to contribute to the empirical work on transaction cost economics in two ways. Firstly, by applying the transaction cost economics framework in a somewhat unconventional way to determine the factors that influence a farmer's decision to invest in a differentiated product. The transaction cost economics framework is employed to analyse the transaction attributes that contribute to the cost that the farmers incur to transact with the abattoir. In doing so, the thesis aims to suggest strategies to lower these cost since more streamlined transactions between the farmer and the abattoir, will increase the farmers' willingness to invest in the Karoo Meat of Origin certification scheme. Secondly, the transaction cost economics framework is applied in the more traditional sense by using it to re-evaluate the enforcement mechanisms currently used to prevent opportunistic behaviour.

According to Williamson (1985), calculative agents will select the governance mechanisms best suited to minimise the costs associated with safeguarding the transaction. For example, if farmers tend to follow the production practices of Karoo Lamb, there would be no need for the abattoirs or certification scheme to monitor the farmers, which implies no impact on transaction costs and the market mechanism would probably suffice. However, if these farmers tend to behave opportunistically, the need for monitoring arise, which drives up the transaction costs, and in turn, the need for a more (cost) efficient governance mechanism arises.

Lastly, the thesis employs the principals of contract theory in combination with those of the transaction cost economics framework. The thesis aims to understand the necessary enforcement mechanisms that are in place and evaluate the governance mechanisms used to mobilise the enforcement mechanisms in the Karoo Lamb supply chain. In general, differentiated product supply chains (such as Karoo Lamb) are expected to be governed by hierarchical mechanisms because the intrinsic attributes of these products requires better alignment between the stakeholders. A proper understanding of the alignment between governance and enforcement mechanisms allows the thesis to recommend alignment strategies to better ensure the credibility of the claims made by differentiated products such as Karoo Lamb.

The dependence between agency theory, transaction cost economics theory and contract theory is evident. The conceptual framework (Figure 1.1) illustrates an interrelated and dynamic process whereby changes in one dimension causes a ripple effect. As soon as farmers behave opportunistically, interventions are required which increases transaction costs and acts as a disincentive for farmers to invest in differentiated products such as Karoo Lamb. This, in turn, leads to the selection of alternative governance mechanisms, geared to reduce said transaction costs, and better regulate the transaction, to potentially also reduce the prevalence of opportunistic behaviour. In turn, a change in governance is likely to have spillover effects in the form of a reduction in transaction costs, altered supply chain relationships, and possibly behavioural changes.

Ultimately, the success of these differentiated products relies on the ability of the supply chain stakeholders to, in a timely manner, adapt to the dynamic environment in which it finds itself.

1.4 Research objectives

The fundamental objective of the thesis originates in an applied policy question. How do we increase farmer participation in differentiated product supply chains, all the while discouraging opportunistic behaviour in an attempt to optimise the performance of these differentiated chains?

The six specific research objectives, geared to enable a proper evaluation of the primary research question, are:

- To identify the differentiated Karoo Lamb product claims most vulnerable to the opportunistic behaviour of, specifically, farmers.
- To find ways to prevent the opportunistic behaviour of farmers participating in the differentiated Karoo Lamb supply chain.
- To determine the factors that drive a farmer's decision to participate in a differentiated lamb supply chain, such as Karoo Lamb.
- To identify the enforcement mechanisms best suited to prevent the opportunistic behaviour of farmers.
- To understand the governance mechanisms currently governing the differentiated Karoo Lamb supply chain.
- To make recommendations for alternative governance mechanisms to govern the transactions between the stakeholders participating in the differentiated Karoo Lamb supply chain.

The thesis addresses these perplexities from six different angles in four different, but related studies. Each paper contains its own unique literature review, objectives and/or hypotheses, methodological approach, and conclusions and recommendations. Every one of the four studies aims to make new discoveries about the differentiated Karoo Lamb supply chain that can be applied to most differentiated meat supply chains.

1.5 Study area and research design

The thesis investigates the four primary stakeholders involved in the Karoo Lamb supply chain, namely the Karoo sheep farmers, the abattoirs, the processors and/or packers as well as the retail outlets that sell Karoo Lamb products. It is important to note that these stakeholders have undergone auditing and are certified to use the Karoo Meat of Origin certification mark. Currently, 209 farmers, five abattoirs, four processors and/or packers, and 17 retail outlets are certified to produce, process, and sell Karoo Lamb products. From the total population of 209 certified Karoo Lamb farmers, 73 farmers were interviewed on their farms in the Karoo region. In addition to the farmers, five abattoirs, two processor and five retail outlets were also interviewed. The farmers were identified by using convenience sampling, specifically the referral sampling method. Although the certification scheme has an elaborate database of their certified members, most of the farmers were unable to provide their GPS coordinates to be captured. This shortcoming made it exceptionally difficult to track down these farmers for interviews.

Data collection was done by means of interviewer-administered questionnaires. The structured questionnaires contain predominantly five-point Likert scale questions ranging from strongly disagree (1) to strongly agree (5).With every questionnaire, an interview was scheduled with the particular stakeholder. In this way, the interviewer could use the opportunity to clarify any uncertainties regarding the questionnaire. In the case where an industry specialist was interviewed, uncertainties about the industry can be clarified (Saunders et al., 2009). From experience, personal interviews provide richer quantitative and qualitative data from which improved conclusions and deductions can be made.

The interviews were conducted based on different questionnaires developed for each of the stakeholders (farmers, abattoirs, processors and/or packers, and retail outlets) involved in the differentiated supply chain (refer to Appendix A for the questionnaires). The structured questionnaire includes both open-ended questions, where the stakeholder is free to answer the question in any way and closed-ended questions, where the stakeholder should choose from a number of alternative options. Additionally, direct observations of the stakeholder's activities and unstructured interviews (where the stakeholder is allowed to share his/her opinion on the topic freely) is also used in an attempt to enrich the primary data collected.

1.6 Methodological approaches

The thesis employs a combination of quantitative and qualitative survey research to address the six specific research objectives. The application of a combination of quantitative and qualitative methods is expected to assist with the interpretation and understanding of the complex reality that the Karoo Lamb supply chain face.

Each of the six specific research objectives makes use of the complete data set in different ways to address the various research objectives. Objective one uses a qualitative approach to identify the claims most vulnerable to opportunistic behaviour. Objective two and three mainly relies on a quantitative technique, the partial least squares approach to structural equation modelling, to find ways to prevent opportunistic behaviour among farmers and to determine the factors that encourage farmer participation in the Karoo Lamb supply chains.

The partial least squares (PLS) approach to structural equation modelling (SEM), initially developed by Wold (1982), has been widely adopted for analysing complex situations where theories are not yet well developed (Garson, 2016; Wong, 2013; Hwang et al., 2010). PLS-SEM does not require normally distributed data, which makes relatively small sample sizes acceptable, especially if the variables are reliable, the effects strong, and the model not overly complex (Sideridis et al., 2014; Iacobucci, 2010). Furthermore, the PLS-SEM approach can handle multicollinearity among the independent variables and is robust in the face of data noise and, depending on the software used, missing data. PLS-SEM also allows for the simultaneous analysis of all structural relationships among many constructs that ultimately leads to more accurate results and stronger predictions (Hair et al., 2014).

The SEM, adopted from Bollen (1998), are represented by the following equations:

$$x = \lambda^x \xi + \delta \quad (1)$$

$$y = \lambda^y \eta + \varepsilon \quad (2)$$

$$\eta = B\eta + \Gamma\xi + \zeta \quad (3)$$

Equations one and two are factor-analytic measurement models that link observable indicators to the unobservable latent constructs. The vectors x and y represent the measures

of the independent and dependent constructs in the vectors ξ and η respectively. The coefficient matrices are represented by λ^x and λ^y with measurement errors contained in the vectors δ and ε. Equation three signifies the path model with path matrices B and Γ denoting the path coefficients between dependent constructs and the coefficients between independent and dependent constructs respectively. The disturbance term ζ represents the errors in the path model equation (Bollen, 1998).

The analysis for objectives two and three is conducted with the SmartPLS3 software (Ringle et al., 2015), which is widely used for PLS-SEM path modelling. The SmartPLS3 algorithm provides empirical measures that are used to determine how well the theory fits the data (Dijkstra, 2010). The SmartPLS3 bootstrapping and blindfolding techniques can furthermore be applied to establish the significance of the relationships and the predictability of the PLS-SEM model respectively (Hair et al., 2014).

Objective four relies on a combination of qualitative and quantitative methods to investigate both the governance and enforcement mechanisms towards making recommendations for enhanced supply chain performance. The investigation of the governance mechanisms relies on in-depth interviews with the supply chain stakeholders to gain a rich understanding of the supply chain governance. The enforcement mechanisms, on the other hand, are investigated by using a combination of in-depth interviews and a conjoint experiment to study alternative monitoring and enforcement mechanisms.

The conjoint experiment allows the modelling of farmer trade-offs between different monitoring and enforcement mechanisms with multiple attributes (Padberg et al., 1997; Malhotra, 1996; Tull & Hawkins, 1993). The conjoint experiment reveals the relative importance that Karoo farmers attach to incentives, monitoring mechanisms, and penalties when participating in the Karoo Lamb supply chain.

In order to conduct the conjoint experiment the following had to be heeded (Ness & Gerhardy, 1994); (i) the monitoring and enforcement mechanisms can be specified by a set of attributes, (ii) variations in the mechanisms can be created by varying the attribute levels, (iii) the sum of the utilities contributed by each attribute level equals total utility, (iv) the farmers base their preference on their derived utility from each attribute level, and (v) preferences are made based on the tradeoffs between attribute level combination.

The analysis of the conjoint results is based on the following additive conjoint model:

$$Y_k = \sum_{j=1}^{J} \sum_{m=1}^{M} \beta_{jm}\, x_{jm}$$

where

Y_k: estimated total utility for product scenario k
C: constant
β_{jm}: partial utility for attribute level m of attribute j
X_{jm}: 1 if scenario k has an attribute level value m for attribute j
0 if else

Finally, objective six uses the transactional model to qualitatively address the alignment between enforcement mechanisms and governance mechanisms in an attempt to streamline the Karoo Lamb supply chain.

1.7 Main contributions of the thesis

Although the research originated from a practical problem of opportunistic behaviour faced by the South African Karoo Lamb supply chain the thesis aims to add to the knowledge base of differentiated supply chains practically as well as theoretically.

The thesis seeks to make an empirical contribution to the theoretically compelling but often limited body of empirical work on agency theory (Steinle et al., 2014), by specifically focusing on opportunistic behaviour. The thesis investigates whether or not information can be successfully employed to reduce opportunistic behaviour. In addition, it also expands on the critical role that trust is believed to play in business relationships, by evaluating the role of trust as a stimulus for information sharing. The research furthermore acts as a point of departure for the development of a set of proxies to detect the primary drivers of opportunistic behaviour among farmers. Following an extensive literature review, this study is believed to be the first of its kind to undertake this endeavour.

Another empirical contribution that the thesis sets out to make is in the field of transaction cost economics, by focusing on the relationship between farmers and abattoirs in the Karoo Lamb supply chain. The focus falls particularly on the transaction cost that the farmer incurs to transact with the abattoir successfully. By using this transaction, the thesis addresses some of the criticisms of transaction cost economics. Specifically the criticism that transaction cost economics often neglect the social context (Uzzi, 1996; Granovetter, 1985) in which transactions occur, and fails to take the entity characteristics into account (Leiblein & Miller, 2003). This is addressed by incorporating the relationship, and the level of trust, between the farmer and the abattoir, the farmer's level of experience, as well as the production uncertainties.

Although many studies have been conducted on supply chain relationships and the impact of reputation on these relationships (see Menapace & Moschini, 2012; Wever, 2010; Han, 2009; Kwon & Suh, 2005 for examples), very few studies evaluated the costs (monetary and otherwise) to invest in the reputation of a collectively owned differentiated product. Research in this field is necessary, especially with the addition of many differentiated food products with credence attributes whose success rely on good reputations and the investment in its reputational capital. Fundamentally, the thesis aims to identify a possible set of investment stimuli to encourage farmers to invest in the reputational capital of differentiated products.

Finally, the research furthermore contributes empirically by analysing the mechanisms used to enforce the quality and origin standards of Karoo Lamb, and by unpacking the mechanisms that govern this unique supply chain. By building on the work done by Raynaud et al. (2005) and Wever et al. (2010), the thesis makes an empirical contribution to the knowledge base of governance mechanisms. This contribution focuses on the alignment of the mechanisms that govern a South African differentiated lamb supply chain with the mechanisms needed to enforce the quality attributes of the product. The paper sets out to understand the way in which supply chain transactions of a lamb product with a geographical indication, such as Karoo Lamb, are governed.

By achieving the above mentioned goals in terms of the theoretical contributions to the existing literature the following practical recommendations can be made to the Karoo Lamb supply chain and possibly the general meat industry; (i) propose enforcement mechanisms

or specific prevention strategies to curb opportunistic behaviour in differentiated meat supply chains, (ii) suggest changes to the strategies of abattoirs, and the meat industry as a whole to encourage farmer investments in the reputations of differentiated product supply chains, (iii) with the required monitoring and enforcement mechanisms in mind, suggest alternative governance mechanisms to obtain optimal performance in the supply chain, and (vi) recommend governance mechanisms that are better suited for differentiated supply chains compared to commodity supply chains.

The aforementioned proves the tremendous value that extensive research in the behavioural and governance dimensions of differentiated meat supply chains contribute to the existing knowledge and research base theoretically as well as practically.

1.8 Thesis outline

The first paper (presented in Chapter 2) sets the scene on which the rest of the papers are built, and identifies the Karoo Lamb supply chain in South Africa as the most suitable case study for analysis. It argues whether or not the certification scheme is able to successfully protect the differentiated Karoo Lamb product from the opportunistic behaviour of farmers. The certification scheme is seen as the first attempt to differentiate and protect a region of origin meat product in South Africa. Although this scheme has come a long way in protecting the value embedded in the name "Karoo", many challenges and loopholes for non-compliance still exist. Because of these difficulties, the certification scheme, and the niche product has not yet come to its own. The purpose of the first paper is threefold. Firstly, to understand the notion of Karoo Lamb as a geographical indication, and the subsequent establishment of the certification scheme. Secondly, to identify and understand both the institutional and supply chain challenges that Karoo Lamb is faced with. Thirdly, to guide the certification scheme to evaluate their modus operandi for better regulation. Ultimately, the managerial decisions are expected to come full circle; if the certification scheme is better-managed consumers may be willing to pay higher premiums which might, in turn, convince farmers to become part of this prestigious certification scheme.

The second paper (Chapter 3) builds on the claims identified in Chapter 2 as the most vulnerable to opportunistic behaviour. It aims to address part of the applied policy question, how to discourage the opportunistic behaviour of farmers that produce differentiated

products? The paper ultimately aims to recommend alternative strategies that can be implemented by the certification scheme to prevent farmers from behaving opportunistically, or alternatively, to follow the production protocol to the letter. By definition, attributes such as free range and from a specific region of origin signal asymmetric information. This information problem which implies that, in the presence of bounded rational individuals with conflicting interests, misconduct in the form of opportunistic behaviour is bound to prevail. It is, however, expected that information exchange through farmer networks should reduce opportunistic behaviour. Paper two, therefore, aims to examine the farmer-abattoir transaction with the purpose of recommending strategies that can be implemented to reduce the farmer's tendency to behave opportunistically. In contrast, to the case study approach followed in paper one, this paper takes a quantitative approach. It employs the Partial Least Squares (PLS) method to Structural Equation Modelling (SEM), to address the six identified hypotheses aimed at understanding the drivers of opportunistic behaviour. These drivers are expected to inform the certification scheme (and possibly the red meat industry as a whole) on possible prevention strategies that can be implemented against the opportunistic behaviour of farmers.

The third paper (Chapter 4) aims to address the other part of the applied policy question, how to increase farmer participation in differentiated product supply chains? For many products, referred to as experience goods, quality can only be assessed after consumption. The investment in collective reputations as a quality signal is, therefore, necessary for food products with geographical indications. Paper three seeks to identify the factors that drive a farmer's decision to invest in the reputational capital of a product with a geographical indication, such as Karoo Lamb, to ultimately enable the certification scheme to use these factors as investment stimuli. It is expected that a farmer's willingness to invest in the collective reputational capital of a product is shaped by his/her relationship with the abattoir, as well as by other more personal attributes, such as the farmer's risk profile, education and his/her network. In order to understand this dynamic, paper four also employs the PLS-SEM methodology to address the hypotheses structured to identify the factors most likely to influence a farmer's decision to invest in the collective reputational capital of Karoo Lamb.

Currently, the Karoo Lamb supply chain is believed to continue to function within the supply chain arrangements of a commodity lamb supply chain without any severe changes to the

governance or enforcement mechanisms to accommodate the ‘unique attributes’ of Karoo Lamb. The last paper contained in the thesis, paper four (Chapter 5), applies a transaction cost economics framework to investigate how supply chain governance mechanisms are aligned with quality (and origin) enforcement mechanisms. The purpose of the paper is twofold. The first objective is to analyse and contrast, by means of a conjoint experiment, the current and preferred monitoring and enforcement mechanisms to ensure that the Karoo Lamb certification mark, as a reliable quality signal, is a source of credibility. The second objective is to unfold the Karoo Lamb supply chain into its different dyadic relationships and to identify the mechanisms that govern each of the transactions by employing a transactional model. The final objective is to understand how the enforcement mechanisms are aligned with the governance mechanisms to ensure that the certification mark, as a quality signal, is a source of credibility and provokes consumer confidence. Upon meeting these objectives, paper four aspires to make recommendations to alter the mechanisms that currently govern the Karoo Lamb supply chain transactions in a way that will better support the monitoring and enforcement mechanisms to guarantee the authenticity of Karoo Lamb products.

Chapter 2:

The Karoo Meat of Origin certification scheme: A silver bullet?[6]

"At first encounter, the Karoo may seem arid, desolate and unforgiving, but to those who know it, it is a land of secret beauty and infinite variety."
(Palmer, 2012)

2.1 Introduction

The farmers in the Karoo region have been boasting about the premium quality and unique sensory attributes of Karoo Lamb for many decades. Families of these farmers, residents from the Karoo as well as the visitors from the wealthy cities, have been raving about the amazing taste and quality of Karoo Lamb. However, as a result of this reputation, many scrupulous businessmen took the opportunity of making a quick buck by selling any lamb as Karoo Lamb. Karoo farmers, on the other hand, were selling this superior product at commodity prices to abattoirs. It was only during a meeting at the farm Dombietersfontein near Victoria West in 2006 when the farmers and researchers were discussing the potential of a geographical indication for Karoo Lamb that the farmers raised their voices and demanded: "We need to protect our Karoo Lamb! We need to prevent people outside the Karoo from misusing our name and selling it falsely."[7] That remark and the subsequent decisions marked the birth of the Karoo Meat of Origin certification scheme (the certification scheme) which came into force in 2011.

The recent culinary boom and consumers' interest in the origin of the food[8] they are consuming provided a considerable amount of support for the Karoo farmers for this certification scheme as they start to realise the uniqueness of their lamb products and the

6 This chapter was accepted for publication in the International Food and Agribusiness Management Review as: van der Merwe, M., Kirsten, J. F., and Trienekens, J. H. The Karoo Meat of Origin certification scheme: A silver bullet?

7 Extract from the minutes of the meeting held in Victoria West in 2006.

8 Other perhaps more well-known examples of products with a geographical indication that are successfully protected and marketed include, amongst many others, Champagne, Prosciutto di Parma and Parmigiano-Reggiano (see *inter alia* Dentoni et al. (2012); Hayes et al. (2004); Arfini et al. (2003); Barjolle & Sylvander (2002); Arfini (2000)).

great marketing potential it possesses. This realisation, however exciting, brought about some frustrations. Due to the vastness of the region, the Karoo farmers struggled to form a collective and could not jointly protect their product's geographical identity that was often exploited by stakeholders with little or no link to the Karoo region. The distance between the rural farmers and their urban target market meant that they struggled to educate their market on their product's unique story and ultimately failed to, successfully, market their product as different from other lamb products.

After that first meeting at Dombietersfontein, the Karoo region, with its untouched beauty and silence, windmills, free roaming sheep and genuine hospitality suddenly became the topic of discussion on many forums. These images and the Karoo's honest way of life are the reason why the Karoo concept became synonymous with quality and purity. This nostalgia attached significant marketing potential to the name "Karoo". Regrettably, the value attached to the Karoo name, and the economic value that belonged to the Karoo people, was misappropriated by role players (abattoirs and retail outlets mainly) in the lamb supply chain, often, with little or no link to the region. The geographical advantage of rearing sheep in the Karoo was lost, an impending disaster for Karoo farmers, and confusing for consumers who had no way of telling the difference before actually tasting the lamb product.

For these reasons, it was necessary, especially for the Karoo farmers, to discuss the means on how to form a geographical monopoly in order to protect the Karoo's assets from misappropriation. And so, on that chilly afternoon in the Great Karoo on the farm Dombietersfontein, with the help of academics and scientists, farmers, abattoir managers, and government officials joined hands to find solutions to protect the valuable heritage vested in the name "Karoo".

2.2 The Karoo region

The Karoo, nested in the Northern Cape Province of South Africa (Figure 2.1), is the vast semi-arid area stretching north-eastwards from the Cape and covers almost 50 % of the total area of South Africa (approximately 46 million hectares). The region is home to flocks of free roaming sheep and is far from major urban centres. The vegetation of the Karoo region is restricted by rainfall and is typically characterised by flat, dry shrubland and limited grass growth (Le Roux, Kotzè, Nel & Glen in Kirsten et al., 2008).

Sheep and lamb produced on these Karoo shrubs are said to be "mouth-wateringly succulent, imbued with the subtle, fragrant flavours of the Karoo bush" (Kirsten et al., 2008). The Karoo vegetation is mostly a combination of different species of wild herbs which provide a distinct taste to Karoo Lamb products. It is this unique quality of Karoo reared lamb that makes the concept of Karoo Lamb most sought after. The exploitation attempts of lamb supply chain organisations with little or no link to the Karoo region is, therefore, not surprising.

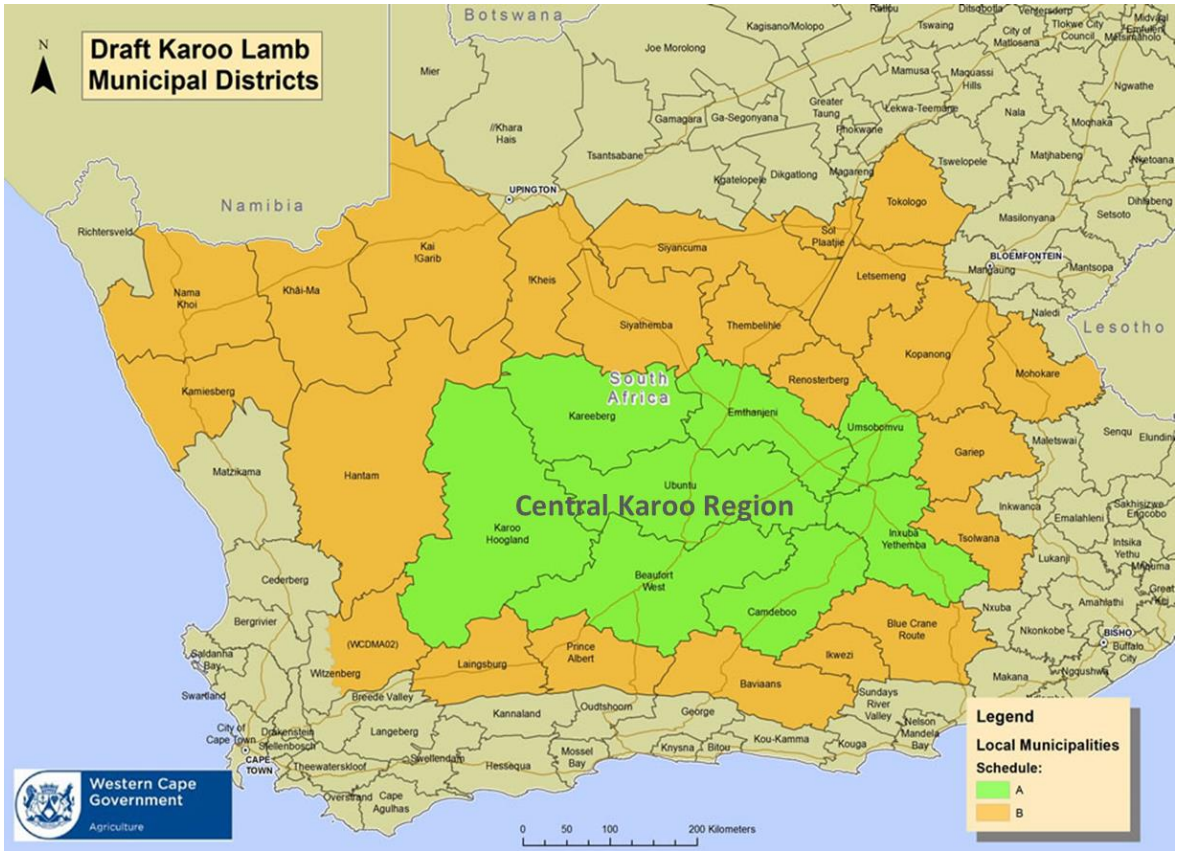


Figure 2.1: The Karoo region in South Africa

Source: KMOO, 2016a

2.3 Lamb production practices in the Karoo

The Karoo region is synonymous with free range lamb production practices and is also the image that comes to the mind of the consumer when thinking about the Karoo – free roaming sheep. The farming system of a typical Karoo sheep farmer (summarised in Table 2.1) is, therefore, that of an extensive and low-input system in a region with poor grazing capacity. Karoo farmers generally operate farms with grazing capacities that range between 5 ha per

ewe, to as much as 13 ha per ewe, depending on the terrain. Most of the farmers producing lamb in the Karoo region operate farms that are larger than 5 000 ha and manage flock sizes above 500 ewes.

Table 2.1: Profile of a typical Karoo farmer and his farming operations[9]

Farmer characteristics
They typical Karoo farmer is older than 45 years of age
Most of the Karoo farmers obtained a tertiary degree (48 %), while 38 % of the farmers completed a secondary education.
Of the farmers surveyed, 61 % have more than 25 years of sheep farming experience in the Karoo region
Farm characteristics
All the surveyed farmers operated farms larger than 5 000 ha, while 6 % of the farmers operated farms of 30 000 ha or more.
Almost half of the farms (49 %) have grazing capacities of between 5 and 9 ha per ewe, with 51 % of the farmers having the arduous task of farming on veldt with a grazing capacity of between 10 and 13 ha per ewe.
Rainfall of 140 to 250 mm was recorded by 55 % of the farmers.
The Karoo farmers indicated autumn (February to May) as the main rainfall season.
Farming characteristics
The Dorper breed is the most common among the Karoo farmers (83 %).
On average, 88 % of farmers typically manage more than 1 000 ewes.
March and May are the main lambing seasons among farmers (76 %), while 63 % of farmers also have a second lambing season during September and October.
The majority of the farmers (91 %) maintain a lambing percentage of more than 90 %.
During times of drought, 89 % of farmers feed their sheep. Sheep are commonly fed either in a feedlot (68 %) or by grazing Lucerne (alfalfa) fields (54 %).
Relationship with the abattoir
The majority of the farmers (61 %) feel that the abattoir is dishonest when grading and weighing lamb carcasses.
Regardless of this, the farmers (87 %) still believe that the abattoir is a trustworthy business partner.
The majority of the farmers (51 %) admitted not to inform the abattoir that the Karoo lambs received supplementary feed.

According to the South African Weather Service (2016), rainfall in the Great Karoo varies between 137 and 315 mm per annum. According to the Karoo farmers, the annual rainfall varies between 75 and 350 mm, but most farmers record rainfall of between 140 and 250 mm per annum. The rainfall season typically starts during January, peaks in March and April, and declines towards May. This relatively low and varied rainfall across the Karoo region impacts significantly on the grazing capacity of the natural veldt and as a result of this farmers are often forced to provide supplementary feed (either as creep feed in the veldt,

[9] The profile of a typical Karoo farmer, summarized in Table 2.1, was based on surveys among 73 Karoo farmers from the Central Karoo region, supplying Karoo Lamb under the Karoo Meat of Origin certification mark during 2015.

or in a feedlot, or on a Lucerne (alfalfa) field) during the extremely dry months of October to February. If sufficient rain fell between the months of March and May, sheep would graze on natural veldt and would not require supplementary feed, at least during the months from April to September.

Consequently, most Karoo farmers plan the breeding season such that lambs would be born in the months following the good rains, during March and April. During these months, the veldt is expected to be in good condition, which would allow ewes to produce enough milk to ensure fast-growing lambs, yielding high-quality carcasses. Some Karoo farmers do, however, follow opportunistic lambing practices where the rams are kept with the ewes on a continuous basis, which ultimately results in lambing intervals of less than 12 months. Due to the high fertility of the Dorper breed, the most common lambing system among the Karoo farmers is to aim for three lamb crops in two years. Karoo farmers, therefore, often plan a second lambing season during September and October. Although these lambs are born in the typically drier months and might require supplementary feed, the higher prices for supplying the Christmas market remains a good incentive.

Keeping the harsh conditions of the Karoo region in mind, it is not surprising to see the Dorper sheep as a common occurrence in the area. Farmers are, despite the Dorper breed's adaptability to arid regions, high fertility and good mothering abilities, in disagreement whether or not the Dorper is, in fact, the best breed. Although the Dorper breed is the most preferred among Karoo farmers, some farmers do, however, prefer to farm with Dohne Merino, Merino, Meat Masters or combinations of these sheep breeds. Dorper lambs are typically marketed from the ewes, at between three and four months of age, for slaughter. Merino lambs, on the other hand, are only marketed after their first shearing, at between five and six months of age. The highest and most sought after carcasses, which realises the highest market prices, are those of the A2 or A3 grade[10], weighing between 18 and 22 kg. Most farmers, therefore, strive to deliver lamb with these specifications, in an attempt to realise the best possible price, thus yielding higher profit margins.

[10] The South African Meat Industry Company classifies carcasses based on age and fatness, where the latter represents the age of the animal (A – youngest to C – oldest) and the number represents the fatness of the animal (0 – no fat to 6 – excessively overfat). A full explanation of the classification system can be found online at the following URL: http://www.samic.co.za/downloads/Redmeat.pdf

2.4 The relationship between the farmer and the abattoir

As with most commodity supply chains, the commodity supply chains in the sheep/lamb industry, are driven by volumes. The popular expression used in the red meat industry, "an abattoir is like a crocodile that will devour you if you do not feed it", tells the story of an industry which is, seemingly, more concerned with profits and bottom lines, rather than obsessions over the claims and protocols of differentiated products. Although abattoirs are faced with very low-profit margins and overhead costs can only be retrieved when slaughtering runs at full or at least near full capacity, this push for higher volumes is never at the expense of the protocols of differentiated products. It is important to note that the abattoirs with whom the Karoo farmers do business have full farm-to-fork, batch level traceability systems in place. According to the abattoir managers interviewed, these traceability systems allow abattoirs to run more than one product line on the slaughtering floor, thereby enabling them to guarantee the authenticity of differentiated meat products such as Karoo Lamb, despite chasing volumes.

South African livestock farmers in general, are often heard complaining about the price they received from the abattoir for their livestock (lamb prices averaged at approximately R60[11] per kilogramme during the data collection period), or that the carcass grades or weights did not meet their expectations. These complaints give the impression that livestock farmers often feel cheated by the abattoirs, and that the farmers did not trust the abattoir when it came to paying a fair price, based on the grade and the weight of the carcass. Contrary to this general observation, this is not the case between the Karoo farmers and the abattoir. Among the Karoo farmers, there is a consensus that the abattoir is trustworthy and does have the farmer's best interest at heart. Admittedly, a few Karoo farmers do feel that the abattoir is dishonest when grading carcasses. These farmers revealed that, in some cases, the actual carcass grade is lesser than the anticipated grade. This assumed mistrust might be attributable to the cognitive bias of the independent grader, responsible for the grading process at the abattoir. In an attempt to reduce the mistrust between the farmer and the abattoir during the grading and weighing process, farmers are allowed to supervise the slaughtering process at the abattoir. Despite this opportunity, very few farmers do take the time to oversee the slaughter process.

[11] Exchange rate of R13.65/USD (08/08/2016)

However, perhaps the problem does not lie with the abattoir which is opportunistic, or the grader who suffers from cognitive bias, but with the farmer who might not know the quality (and expected grade) of his product, before sending it off to the abattoir. This lack of knowledge on the farmer's side might just be the biggest cause for mistrust and a subsequent tainted relationship between the farmer and the abattoir. Experienced, "hands-on" farmers who know their product and is aware of the condition (expected grade, dressing percentage and weight) of the lambs to be marketed have no reason to squabble with the abattoir post-slaughter about "incorrect" grades and weights.

As a result of the relatively small Karoo community and the companionship between the townsfolk, including the farmers and the abattoir, there exist, despite the fact that some farmers feel cheated, a good relationship between the farmers and the abattoir.

2.5 The initial challenge

Since that first gathering, in "die Dorsmasjien" on the Dombietersfontein farm, on that chilly day in August 2006, it was clear that lamb produced in the Karoo is unique. Not only is the lamb organically reared under free range conditions, but the special diet of Karoo herbs gives the meat a unique "spiced-on-the-hoof" taste. The nostalgia of the natural way of farm life, the windmills, and silence as the sun sets over the Karoo and her people, provides Karoo Lamb with a strong geographical and cultural connection.

There is, however, no insignia, no certification and no guarantee that the lamb product truly originates from the Karoo when it is sold as "Karoo Lamb"… Which ultimately means that there is no way of protecting the economic value owed to the Karoo farmers.

The geographical name of the Karoo could potentially be protected by a geographical indication, based on the reputation of quality and flavour in combination with the nostalgia of the Karoo region. However, to protect the geographical name and its associated product, it is critical to establish whether the perceived aroma and taste differences between Karoo Lamb and lamb from other regions can be scientifically measured and proved. Until that winter day, no scientific research on the sensory qualities of Karoo Lamb existed. The situation soon changed, and it was not long before a team of academics and scientists was busy with research project, upon research project, to get the necessary proof to enable the

Karoo farmers to create a geographical monopoly and protect the assets of the Karoo. Ultimately, the farmers wanted to, not only protect the reputation and image of their unique product that could be misappropriated to mislead consumers, but also improve the returns of Karoo Lamb production, through proper marketing and distribution, by using collective certification.

The Karoo farmers finally had a clear plan of action to protect their unique Karoo product and extract the value embedded in the geographical name – a collective structure. However, the vastness and the diverseness of the Karoo region made the functioning of a strong collective structure close to impossible. The Karoo farmers are typically organised in district farmers' unions and are members of the national and provincial Red Meat Producers Organization. There is, however, no collective structure or system, to promote Karoo Lamb as a reputable and unique product. There is also no collective system of quality management and certification for Karoo Lamb.

Up to that point in time, although the Karoo farmers had a clear vision, there was still no assurance, no certification and no label to guarantee the origin of Karoo Lamb. Consumers had to rely solely on their butcher, retailer or restauranteur's word, that they were indeed buying "the real McCoy". This blind reliance soon changed.

2.6 The beginning of "Karoo Meat of Origin"

In 2009 the Karoo Development Foundation was established as an *inter vivos* trust (nr. IT1498/2009) in terms of Section 6(1) of South Africa's Trust Property Control Act (Act 57 of 1988) by the Karoo farmers who were part of that first momentous gathering in 2006. The main purpose of the foundation was to trace, record, protect, and honour the rich heritage of the Karoo, by acting as a custodian of the intellectual property rights that rest in the name "Karoo" (KMOO, 2016a; Kirsten, 2011).

Shortly after the establishment of the foundation, a system of auditing and certification started to take form, to prevent the exploitation of the Karoo as a concept and to protect the geographical value attached to Karoo products. Finally, during 2011, the foundation registered the Karoo Meat of Origin certification mark at the South African Companies and Intellectual Property Commission, and at the South African Department of Agriculture,

Forestry and Fisheries under the Agricultural Products Standards Act (Act 119 of 1990)[12]. The certification scheme also complies with the Consumer Protection Act (Act 68 of 2008)[13]. The Karoo Meat of Origin certification mark qualifies as an approved protocol under South Africa's new labelling regulations[14] that came into operation on 1 March 2012. These regulations aim to prevent the use of "misleading descriptions" on labels and allow the use of quality descriptions, such as Karoo Lamb, only with protocols approved by the Department of Agriculture, Forestry and Fisheries (Kirsten, 2011).

The registration of the Karoo Meat of Origin certification mark (Figure 2.2), effectively meant that it was now illegal to label a product as "Karoo Lamb" if it is not certified under the certification scheme.

Karoo Meat of Origin meat packet label | *Karoo Meat of Origin certification mark* | *Karoo Meat of Origin carcass meat stamp*

Figure 2.2: Karoo Meat of Origin marks

Source: KMOO, 2016a

As a system of auditing and certification, the main responsibility of the certification scheme is to prevent opportunistic behaviour (misleading consumers by selling products with no link to the Karoo region as "from the Karoo" to exploit the marketing potential that rests in the name "Karoo") by the Karoo farmers, the abattoirs, processors and/or packers, and the retail outlets. This responsibility includes; (i) enforcing the Karoo Lamb standards and requirements (ii) monitoring, through the South African Meat Industry Company (an

12 The South African Agricultural Products Standards Act can be accessed online via the following URL: http://www.nda.agric.za/docs/NPPOZA/APS%20Act.pdf.
13 The South African Consumer Protection Act can be accessed online via the following URL: http://www.thenct.org.za/NCTDocs/founding-legislation/f8d6f6aa-994d-4305-b3d0-ea056416bbd0.pdf.
14 The new food labelling regulations of South Africa can be accessed online via the following URL: http://www.danone.co.za/upload/R146%20of%201%20March%202010.pdf.

independent third party), the Karoo Lamb supply chain organisations for compliance with the standards and requirements, (iii) creating sanctions and penalties for malpractices, and (iv) generating incentives to reward compliance with the protocols (Kirsten, 2011).

According to the stipulations of the certification scheme, Karoo Lamb is defined as: "Sheep meat [mutton or lamb] that carries the Karoo certification mark. Sheep meat, regardless of breed, produced and slaughtered in the Karoo region. Only sheep originating from (that is, born in) the Karoo, or, alternatively, that are born outside the Karoo but remained in the area of the Karoo for a continuous period of at least six months immediately before slaughter, and which are free of diseases. Karoo sheep derive from free-range grazing or production on indigenous veld vegetation with access to clean water."

The certification mark guarantees that genuine Karoo Lamb comes from animals reared on natural veldt, with at least two of the six fragrant indigenous shrubs that have been scientifically proven to infuse the meat with a unique herby flavour. These shrubs are; *Plnthus karrooicus* ("Silverkaroo"), *Pentzia spincescens* ("Skaapbossie"), *Eriocephalus ericoides* ("Kapokbossie"), *Salsola glabrescens* ("Rivierganna"), *Pentzia incana* ("Ankerkaroo"), and *Pieronia glauca/rosenia humilis* ("Perdebos") (Vermeulen et al., 2008). The certification mark also guarantees that sheep are free from hormones and routine antibiotics, that slaughter performed humanely and that the meat is traceable from farm to fork.

In accordance with the protocols developed by the foundation and set out by the certification scheme, Karoo farmers are required to comply with at least the following minimum standards[15]:

- Farmers need to provide evidence that their farms are located in the Karoo region. They also need to provide proof that they practice free-range production systems on indigenous Karoo veldt[16], in sizable camps representative of the identified typical Karoo vegetation, and that animals are not grazing on permanent pastures.

[15] The standards to which abattoirs, processors and/or packers, butcheries, retailers and restaurants should comply with is stipulated on the official Karoo Meat of Origin website – www.karoomeatoforigin.com.
[16] Veldt refers to uncultivated grass and shrub land in southern Africa. In the case of the Karoo, veldt refers to a combination of indigenous wild herbs.

- The occasional use of feeding supplements that may contain cereals, silage or any other natural plant matter, provided as supplementary feeding, to assist during times of drought and to improve the condition of animals during the reproductive cycle, may be allowed to a maximum of 30 % of the total daily intake. The supplementary feeding must be given in addition to free-range grazing on the Karoo veldt. Written records of all supplementary feed fed to animals on the farm should be kept. Added antibiotics and other chemical additives are not allowed in the feed.
- Lamb originating from feedlots or planted pastures does not qualify for the use of the name Karoo Lamb. Free range grazing, or production on indigenous veldt, is a specific requirement as it is an acknowledged contributing factor to the sensory attributes of Karoo Lamb.
- All growth stimulants, either hormonal or antimicrobial, are prohibited.
- Animals may be brought off the veld and kept in pens only for, medical treatment, adverse weather conditions, marking/tagging of animals, shearing activities, and/or awaiting loading for transportation.
- In general, good animal practices must be followed regarding animal handling, the monitoring of animals and flock health, management of sustainable camp stocking rates, and the availability of sufficient and clean water sources.
- Transportation of livestock must be in accordance with the regulatory procedures stipulated in the Animal Protection Act[17] (Act 71 of 1962). Also, animals may not be transported further than 250 km from the farm to the abattoir.
- The farmer should complete and sign a declaration of compliance to Karoo Meat of Origin standards after every delivery or pick up. The farmer should keep this document on file for auditing purposes.

Following the establishment of the Karoo Meat of Origin certification mark, producers of Karoo Lamb, abattoirs, processors and/or packers, butcheries, retailers, restaurants and any other outlet can apply to be audited and certified to use the Karoo Meat of Origin certification mark. To join the certification scheme farmers and other interested parties are required to complete an application form and pay a once off application fee. As soon as the application form is received, the certification scheme notifies the South African Meat Industry Company

[17] The South African Animal Protection Act can be accessed online via the following URL: http://www.gov.za/sites/www.gov.za/files/Act%2071%20of%201962.pdf.

of the application, which then sends an official to conduct an audit to ensure compliance with the standards as set out by the certification scheme.

If the entity passed the audit, the certification scheme issues a certificate of compliance after which an annual or monthly membership fee, depending on the type of entity[18], is payable. Farmers are required to pay an application fee of R1 500 and an annual membership fee of R0.17 per hectare (about R850 for an average 5000ha farm). Abattoirs, processors and/or packers are required to pay R3 762 in application fees and a monthly membership fee of R3 600. Retail outlets, including butcheries and in-store retail butcheries, are required to pay annual application (R864) and membership fees (R1 010) excluding the cost of travel for auditing the retail outlet. Although these fees might seem excessive, there are definite profits to be made for participating in the certification scheme. For example, a typical farmer (annually rearing 500 lambs on 5000ha to yield carcass weights of 22kg), assuming a premium for Karoo Lamb of between R1 and R2 per kilogram carcass weight, will realise a net gain of R8 650[19] per annum (approximately 1.3 % of total net farm income) for being part of the certification scheme.

The Foundation has achieved a remarkable milestone with the protection of Karoo Lamb as a geographic indicator. This certification mark is now a well-recognised geographical indicator, providing assurance of the unique credence attributes and origin in the same way that Prosciutto di Parma, Roquefort and Champagne are protected. But, is the certification scheme a silver bullet?

2.7 Karoo Meat of Origin success stories

Up to date, 209 Karoo farmers have been registered, which relates to a total of 417 farms covering close to two million hectares. Of the certified farmers, 97 % agrees that Karoo Lamb is a unique product that deserves a niche market and 94 % of the farmers believed that Karoo Lamb should be traded at a premium. When asked what premium they would be willing to accept, 49 % of the farmers felt that a premium between R0 and R2 per

[18] More information on the application process and fees payable is available online via the following URL: http://www.karoomeatoforigin.com/register/

[19] Income: 500 lambs x 22kg x R1 premium per kg = R11 000 subtract from this the expenses to be part of the certification scheme: R1 500 + (R0.17/ha x 5000ha) = R2 350

kilogramme would be acceptable, and 44 % said that they would prefer a premium of between R3 and R5 per kilogramme. However, most of the Karoo farmers felt that the premium should be justified by what the consumers are willing to pay.

Further down the supply chain, five abattoirs, four processors and/or packers, 17 retail outlets (such as butcheries and delis), and one retail chain are now part of the Karoo Meat of Origin family. Together, this supply chain was responsible for producing, slaughtering, processing and packing, and marketing approximately 13 813 carcasses between February 2015 and February 2016. Although this is but a fraction of the total sheep slaughterings in South Africa (approximately 5.35milllion carcasses per annum (DAFF, 2016), the anticipated capacity of Karoo carcasses is believed to be close to 100 000 carcasses per annum.

The success of the foundation's purpose, through the certification scheme, is evident from newspaper headlines and success stories in popular magazines (Figure 2.3), the launch of Karoo cookbooks, and continuous research publications in scientific journals. A discussion on Karoo Lamb on the television show "Nasie in Gesprek" was also broadcasted, in October 2015, on various South African television channels. Karoo Lamb was also profiled on a local morning show "Espresso" through a cooking demonstration.

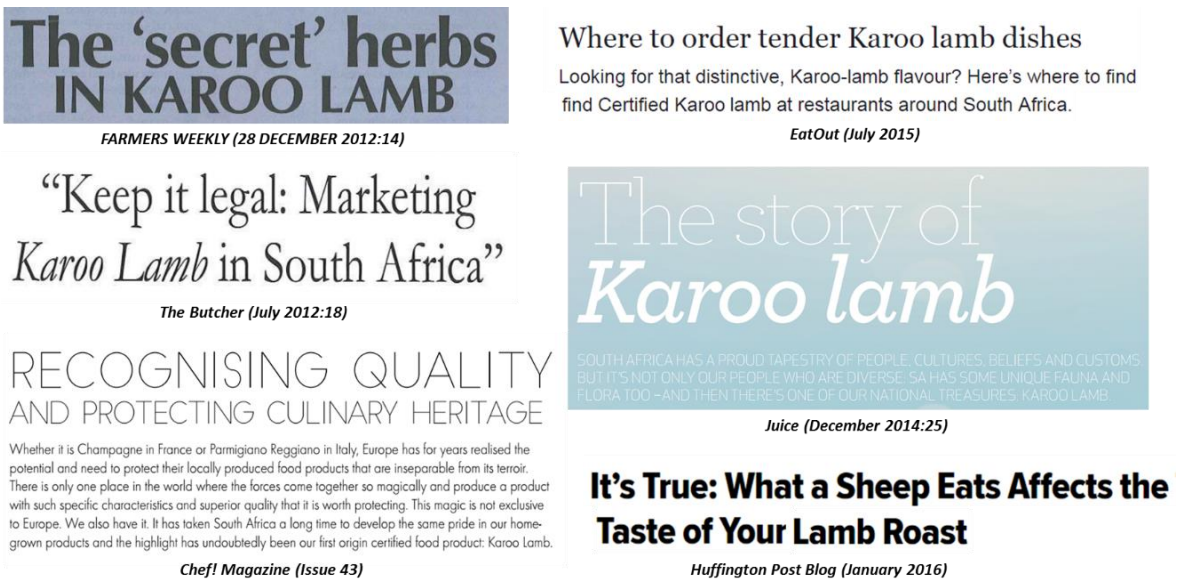


Figure 2.3: Karoo Lamb headlines

Source: KMOO, 2016b

Since the initiation of the certification scheme the Karoo Lamb profile attracted considerable interest, with the Facebook page surpassing the 1000 likes mark and an increasing number of Twitter followers. These social platforms do not only stimulate curiosity and subsequent demand among consumers, but it also provides farmers with the opportunity to educate consumers about the unique attributes of their Karoo Lamb chop. However, tall trees catch much wind, and it is believed that products with exceptional qualities and subsequent premium prices are subjected to higher instances of fraud, which is what makes Karoo Lamb vulnerable to exploitation.

The raising interest in the product and the work that went into protecting the geographical indication paid off in a spectacular way. In August 2015 the first container of Karoo Lamb was exported to Dubai. The Foundation is cautiously excited and hope that this container is the first of many. As a result of this higher demand, higher prices for Karoo Lamb might follow, especially if supply cannot keep up with growing demands.

Very recently, the European Union has recognised Karoo Lamb as a geographical indication and was thus listed as one of the foreign geographical indicators on their list of geographical indicators. As such, the name “Karoo Lamb” are now protected in the European Union. Once the last technical barriers are removed the big demand for this niche product will certainly present great export opportunities for the Karoo farmers with price premiums that will be in the order of R25 and R50 per kilogramme.

Although higher lamb prices are something to get excited about, even more so when you are a farmer, the certification scheme should be vigilant against opportunistic behaviour during these times.

2.8 Vulnerabilities of the certification mark

Trust, transparency, traceability and efficient coordination between farmers, abattoirs, processors and/or packers, retailers, butcheries, delis and restaurants are the pillars on which this certification scheme is built. It is, therefore, imperative that certified members comply with the protocols as set out by the foundation to ensure the integrity of the certification scheme. Although the certification scheme takes every precaution to protect the Karoo Lamb protocols by auditing and certifying the users of the mark, it is possible that some of the

Karoo Lamb claims and protocols might be vulnerable to opportunistic behaviour by the users of the mark.

The pure nature of lamb production practices in the Karoo region puts the free range and "from the Karoo" claims under pressure. As mentioned earlier, the Karoo region is a semi-arid region characterised by unpredictable, below average rainfall, which translates into poor grazing capacities of more than 5 ha per ewe. Karoo farmers are known to provide supplementary feed, *ad libitum*, during the typical dry season (October to February), which is cause for concern. According to the Saunders Comprehensive Veterinary Dictionary (2007), *ad libitum* feeding is described as "food [being] available at all times with the quantity and frequency of consumption being the free choice of the animal". Although a limited amount (approximately 300g of supplementary feed per lamb per day) is allowed according to the protocols, the certification scheme cannot be sure to what extent farmers adhere to this limit, especially when feed is provided *ad libitum*. It might, therefore, be very possible, that the Karoo farmers' feeding practices are directly contradicting the "from the Karoo" protocol, whether intentional or not.

Until recently, studies had not yet been done to determine how many days on alternative feed it takes for a Karoo Lamb to lose the unique flavour derived from the natural Karoo veldt. However, Prof E. C. Webb (2015) (Department of Animal and Wildlife Sciences, University of Pretoria, South Africa) confirmed that, based on recent research, a Karoo Lamb would lose the unique flavour after spending only 30 days off the Karoo veldt, either in a feedlot or on a Lucerne field. It is for this reason that the protocols do not allow for the finishing of lamb on feedlots or Lucerne fields pre-slaughter, since it will change the unique taste of the Karoo Lamb product (also see Erasmus et al. 2016), for which the consumer is willing to pay a significant premium (van Zyl et al., 2013).

What is further worrying is the fact that the drier months (months of low supply) coincide with the South African summer season (October to February), and the Christmas holidays (months of high demand). The supply of Karoo Lamb might not keep up with the high demand during these times, which could make feedlots all the more attractive because of its quick turnaround time, compared to the free range practices of Karoo Lamb. Additionally, this mismatch between the demand and supply of Karoo Lamb might lead to higher prices for lamb carcasses, which would make the production of Karoo Lamb even more profitable.

By keeping the deterrence theory (see Onwudiwe, Odo & Onyeozili, 2004) in mind, farmers might choose to violate the Karoo Lamb protocols; if the gains of supplying feedlot reared lamb under the Karoo Lamb certification mark outweigh the consequences of being caught for non-compliance.

The other important claims, free of routine antibiotics and growth hormones, are usually not vulnerable to non-compliance. These substances are commonly used in feedlot set-ups where animals are kept and fed in pens to finish pre-slaughtering. However, feedlot production practices are, under normal conditions, not common in the Karoo region. The remoteness of the Karoo region, and the subsequent high costs associated to feed and feedlots (attributable to the high transport costs of feed), limit feedlot production practices and therefore, the use of substances such, as routine antibiotics and growth hormones. Be that as it may, never say never. During times of severe droughts and high prices, the benefits of running a feedlot might outweigh the costs, which suddenly requires the certification scheme to be vigilant against the use of growth hormones and routine antibiotics.

It is clear that the reputation of Karoo Lamb, regardless of the presence of the certification scheme will, at times, be vulnerable to non-compliance and opportunism, specifically during times of drought and in times of high demand. Throw in the price premium for authentic, certified Karoo Lamb of between R1 and R2 per kilogramme carcass weight, and there it is – the perfect environment to violate protocol.

The vulnerable claims (free range and “from the Karoo”), and the triggers for opportunistic behaviour (droughts, times of high demand and the premium for Karoo Lamb), as identified above, require proper monitoring and enforcement mechanisms to prevent non-compliance that could cause serious reputational damage. From the measures set out on the Karoo Meat of Origin website it does, however, seem like the certification scheme lacks the modus operandi to monitor compliance with the protocols and to reprimand non-compliance and opportunistic behaviour. Currently, the following measures are in place to deal with non-compliance in the Karoo Lamb supply chain:

- In the event of any critical or unacceptable deviation from the foundation’s guidelines, certification is revoked with immediate effect, and the guilty party would have to cease use of the Certified Karoo Meat of Origin mark.

- Once certification is revoked, the relevant party will have to reapply for permission to use the Certification Mark.
- In the event of a minor deviation, the foundation will issue a Corrective / Preventative Action Request, and will re-inspect or monitor compliance (at the licensee's cost); failing in which case the licence will be revoked as in the event of a critical or unacceptable deviation.

The mere length of the strategies to deal with non-compliance compared to the protocols developed by the foundation begs the question – How serious is the certification scheme about dealing with non-compliance?

2.9 Current challenges

As mentioned earlier, the South African Meat Industry Company (appointed by the certification scheme) audits farmers, abattoirs, meat processors and/or packers, butcheries, and other retail outlets for compliance with the Karoo Meat of Origin protocols. Although the auditing and certification process is a necessary condition for compliance with the protocols, it does not prevent non-compliance by either one of these organisations. For example, referring to the feeding practices of Karoo farmers, it is almost impossible for the South African Meat Industry Company to detect wrongful feeding practices by the Karoo farmers, especially since an announced audit is only done every four years with the promise of random audits (which rarely take place) after that. Although the current auditing system is not necessarily geared to prevent non-compliance, it does increase the probability of being caught, to some extent. However, without consequences for misconduct, these monitoring and auditing systems will not necessarily reduce non-compliance (see Nagin & Pogarsky, 2003).

As mentioned earlier, the consequences involved for non-compliance include the revocation of certification, upon which the relevant organisation should immediately cease the use of the certification mark, and will have to reapply for permission to use the certification mark. Although this is stated on the official website of the certification scheme, very few Karoo farmers are aware of the penalties that are imposed for misbehaving.

In addition to the behavioural challenges, the certification scheme is also faced with a number of other institutional and supply chain challenges. However, a proper understanding of these challenges requires a proper understanding of the Karoo Lamb supply chain and its stakeholders, their objectives and motivations. The Karoo Lamb supply chain currently consists of 209 Karoo farmers, five abattoirs, four processors and/or packers and approximately 17 retail outlets (Figure 2.4), that compete with other niche lamb products such as certified natural[20] and free range.

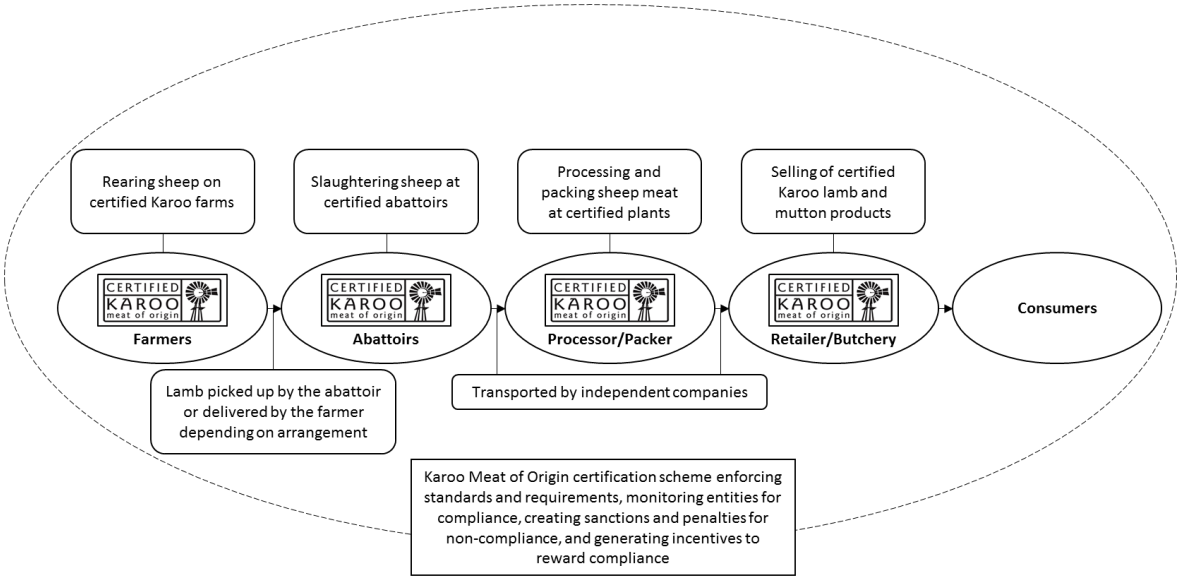


Figure 2.4: Karoo Meat of Origin supply chain certification points

Source: Van der Merwe, 2012

As mentioned earlier the stakeholders participating in the supply chain contributes varying amounts to the certification scheme's fund. Abattoirs, for example, contribute considerably more in application and membership fees compared to farmers and retail outlets. This uneven investment in the collective creates opportunities for institutional challenges such as hold-up and lock-in problems where one party takes advantage of the other party's vulnerability as a result of a relatively higher investment.

Although most of the institutional challenges have been contained, issues pertaining to inconsistencies in especially volumes and regular deliveries, as a result of different stakeholder objectives, proved to be more difficult to manage. If these objectives are not

[20] More information on certified natural can be found at the following URL: www.lawmeat.co.za/frames/certified_natural/history_profile.htm.

aligned towards a common goal of the successful creation and protection of a geographical monopoly by means of vertical and horizontal coordination, it would be impossible for the stakeholders to, successfully, extract the economic value attached to the Karoo name.

At this point in time, only one of the five abattoirs is able to consistently commit to and deliver on each order placed by the retail outlets. Incidentally, this is also the only abattoir that functions within a close community with strong support towards the collective that is proud of their product. The other abattoirs, however, hide behind excuses of small and inconsistent orders which, because of great distances travelled and subsequent high transport costs, cannot regularly be delivered. Other reasons provided are the fact that Karoo Lamb is a seasonal product and might become unavailable during times of severe droughts which makes it difficult to find a market since the abattoir cannot commit to year round consistent supply. Keeping in mind that the successful abattoir is less than 100km from one of its unsuccessful counterpart, and have been successfully servicing a number of retail outlets (Gauteng and the Western Cape that implies 1000 km and 500 km travelled respectively) for a number of years, one has to wonder if perhaps the real reason is a lack of coordination and commitment towards a common goal between the stakeholders in the supply chain. Unfortunately, the relatively uncoordinated nature of the Karoo Lamb supply chain results in uncoordinated marketing strategies which influence Karoo Lamb demand and ultimately spills over to small and inconsistent orders to create supply problems.

Regretfully, the certification scheme is not a silver bullet to market and protect the geographical value embedded in the Karoo name. Although the foundation, through the certification scheme accomplished a lot during the past ten years, the Karoo name remains vulnerable to misappropriation, and because of inconsistent supply, Karoo Lamb is yet to become a household brand.

2.10 What's next?

After that first gathering in the Great Karoo, ten years have passed during which the foundation, through the certification scheme, built the dream of protecting and capturing the geographical advantage of rearing sheep in the Karoo region. It is safe to say that they have (so far) been relatively successful. Not only is the Karoo Meat of Origin's membership on

the increase, but Karoo Lamb is gaining popularity, and has the potential to become the South African (and, the global) lamb consumer's product of choice.

What could possibly go wrong, right? Wrong!

Just below the surface of these successes, the following questions still linger in the minds of the passionate Karoo farmers who were part of that very first gathering. How do we align the objectives of all the stakeholders participating in the Karoo Lamb supply chain? How do we ensure consistent supply and what can we learn from success stories such as Prosciutto di Parma? How do we continuously monitor the compliance of Karoo farmers, but especially during times of drought? What should be done if Karoo farmers are found to be guilty of non-compliance? Can the Karoo Meat of Origin certification scheme *become* a silver bullet?

Chapter 3:

Information sharing as a safeguard against the opportunistic behaviour of South African Karoo Lamb farmers[21]

"Economic man is a much more subtle and devious creature than the usual self-interest seeking assumption reveals."
(Williamson, 1975)

3.1 Introduction

Collaboration throughout the supply chain is improved when information exchange is fast and easy. With higher collaboration between supply chain stakeholders information sharing is likely to increase which might reduce opportunistic behaviour (Van der Vorst et al., 2002; Hobbs & Young, 2000). Empirical research proving this are however limited (Steinle et al., 2014).

According to Williamson (1975), under conditions of asymmetric information and conflicting interests, transactions are likely to suffer from opportunistic behaviour; "self-interest seeking with guile." Williamson (1985) elaborated on this view by describing opportunism as the "incomplete or distorted disclosure of information, especially calculated efforts [by the agent] to mislead, distort, disguise, obfuscate or otherwise confuse" the principal thereby exploiting the information vulnerability of the principal.

The danger for opportunistic behaviour seems to be particularly true for differentiated supply chains that moved from commodity supply chains (driven by autonomous stakeholders) to differentiated product supply chains with a wide array of interconnected complex relationships between stakeholders (Wever, 2012). These differentiated supply chains often focus on differentiated claims based on credence attributes such as "free range", "antibiotic

[21] This chapter has been revised and resubmitted, based on positive reviews, to "Agricultural Economics" (the journal of the International Association of Agricultural Economists) as: van der Merwe, M., Kirsten, J. F., and Trienekens, J. H. Information sharing as a safeguard against the opportunistic behaviour of South African Karoo Lamb farmers.

free", "hormone free" or from a particular "region of origin". These claims, however, bring about several possibilities for opportunistic behaviour as a result of increased information asymmetries surrounding these claims (Wever, 2012).

Although opportunistic behaviour is suspected, and can admittedly cause havoc in differentiated supply chains, it is not always easy to detect, which makes it quite difficult to prevent. A better understanding of the drivers of opportunistic behaviour may, therefore, lead to the development of customised monitoring and enforcement mechanisms to safeguard the product's reputation, the supply chain stakeholders, and the uninformed consumer against exploitation.

3.2 The case of Karoo Lamb

One illustrative case study of a differentiated meat supply chain is Karoo Lamb in South Africa. The Karoo Lamb supply chain is differentiated in that it identifies and guarantees the Karoo region[22] as the origin of the lamb product but also include claims such as free range, no routine antibiotics, hormone free, good animal practices, and full farm-to-fork traceability[23] (KMOO, 2016a).

Lamb reared on natural indigenous Karoo veldt[24] is believed to produce meat with a unique flavour (Erasmus et al., 2016). The unique identity of and the geographical value attached to Karoo Lamb makes it possible to sell Karoo Lamb at a premium price above ordinary lamb products. This unique identity makes the product exceptionally vulnerable to opportunistic behaviour by stakeholders who do not comply with the strict production protocols. The misuse of the name means that the geographic advantage of farmers raising lamb, according to the protocols, in the Karoo region is lost, not only to the farmers but also to the Karoo community. Moreover, this misuse of the name further confuses the consumers, who have no way of authenticating the Karoo Lamb's credence attributes of origin and free range.

[22] The Karoo in the Northern Cape Province of South Africa, is a vast semi-arid area that covers almost 46 million hectares (50% of the total area) of South Africa (Le Roux, Kotzè, Nel & Glen in Kirsten et al., 2008). The region is far from urban centres and home to flocks of free roaming sheep. The vegetation of this region comprises a variety of different species of wild herbs with limited grass growth.

[23] See http://www.karoomeatoforigin.com/karoo-standards/ for the complete list of protocols.

[24] In general veldt refers to uncultivated grass and shrub land in southern Africa. Karoo veldt specifically refers to a combination of different species of indigenous wild herbs.

In an attempt to combat the exploitation of the Karoo name, a group of farmers established the Karoo Development Foundation (the foundation) in 2009, to act as the custodian of the intellectual property rights embedded in the name "Karoo". With the purpose of mobilizing this responsibility, the KDF registered the Karoo Meat of Origin certification mark in 2011, which meant that it was now illegal to label a product as "Karoo Lamb" if it is not certified under the Karoo Meat of Origin certification scheme (the certification scheme) (Kirsten, 2011).

Following the establishment of the certification mark, Karoo farmers, abattoirs, processors, retailers and other outlets can apply to use the certification mark. The certification scheme, as a system of auditing and certification, has the responsibility to prevent supply chain stakeholders from exploiting the marketing potential that rests in the name "Karoo", by selling lamb products, that do not comply with the scheme's protocols, as "Karoo Lamb". The certification of Karoo Lamb furthermore assumes that the consumer is willing to pay a price premium for these products, of between R1 and R2 per kg carcass weight (in previous years) (van Zyl et al., 2013). This potential price premium makes the concept of Karoo Lamb even more attractive for farmers, abattoirs, processors and retail outlets.

Although all the entities in the Karoo Lamb supply chain can act opportunistically (by not complying with the stipulated protocols), and probably do from time to time, the paper focuses mainly on the Karoo farmers' since the essence of the Karoo Lamb product is rooted in the unique production practices. In the Karoo Lamb case, the farmers are found to behave opportunistically specifically by breaching the certification scheme's free range on indigenous Karoo vegetation protocol.

During some initial conversations with the certified Karoo abattoirs, they revealed instances where they had to reprimand opportunistic farmers for violating the Karoo Lamb protocols. These farmers would feed their lambs, either in feedlots or on Lucerne fields, to realise a higher price for a better carcass, and then market the lambs as Karoo Lamb to capture the potential price premium paid for Karoo Lamb.

The opportunistic behaviour of farmers not only increase the risk of reputational damage to the Karoo Lamb name if non-compliance with protocols are revealed but also puts the reputation of the other stakeholders at risk. Continued opportunistic behaviour can

potentially lead to the collapse of the Karoo Lamb name, especially if consumers decide to boycott Karoo Lamb because they feel cheated in that they pay premium prices for commodity lamb products.

Clearly, the opportunistic behaviour of farmers may damage the reputation of Karoo Lamb and could potentially lead to welfare losses to every stakeholder participating in the Karoo Lamb supply chain. Adequate measures to safeguard the Karoo Lamb supply chain will reduce opportunism which will result in absolute gains due to the supply chain stakeholders' complete commitment to the transaction (Williamson, 1999). These safeguards usually include a monitoring system, to monitor supply chain stakeholders for opportunistic behaviour, and enforcement mechanisms, to enforce penalties for opportunistic behaviour and incentives to reward principled behaviour.

Upon its establishment, the certification scheme appointed the South African Meat Industry Company (independent third party) to conduct the audits for certification as well as the follow-up inspections for compliance on behalf of the certification scheme. Currently, it seems like the certification scheme has a handle on ensuring protocol compliance among the abattoirs, processors, and retail outlets; these entities are audited annually with the danger of losing their certification if non-compliance is suspected. However, to monitor and reprimand the opportunistic farmers that are scattered throughout the very remote Karoo region[25] has proven to be more challenging. The measures stipulated to monitor farmers include scheduled audits every four years and the (often empty) promise of an annual unscheduled audit with the danger of losing their certification if opportunism is suspected. Moreover, all the stakeholders are allowed to reapply for permission to use the certification mark if their certification was revoked for whatsoever reason (KMOO, 2016a). Even though the certification scheme stipulated their measures to deal with opportunistic stakeholders on their official website, very few of the stakeholders (specifically the farmers) are aware of these monitoring and enforcement mechanisms.

[25] Up to date, a total of 209 Karoo farmers have been certified, which relates to a total of 417 farms covering close to two million hectares across the almost 46 million hectare Karoo region.

It is in this context that the paper aims to identify measures that can safeguard the farmer-abattoir transaction against the opportunistic behaviour of farmers to assure the credibility of Karoo Lamb, in an attempt to increase the overall success of the Karoo Lamb supply chain.

3.3 The theoretical framework and research hypotheses

Trust, in particular between stakeholders in differentiated supply chains, becomes significantly more important due to the higher degree of interdependencies (La Londe in Kwon & Suh, 2005). The more the supply chain stakeholders trust each other, the more likely they are to share information with each other (Eckerd & Hill, 2012) and the less likely they are to act opportunistically (Wang et al., 2014; Wang et al., 2013). For stakeholders participating in differentiated agricultural supply chains, with increased interdependencies as a result of pooled reputational capital, trust and the importance of information sharing become even more important. Exploring the relationship between information sharing and opportunistic behaviour is therefore postulated.

Hypothesis 1: *Information sharing between the farmer and the abattoir has a negative effect on the opportunistic behaviour of the farmer*

"It is trust – not power, wealth, or even love – that is the most important operational resource in our society. Why? Without trust, we would simply be unable to act." (Eisenegger, 2009). Trust is having confidence in each other's reliability and integrity, and on the expectation that the one has the other's best interest at heart (Jones & George, 1998; Williamson, 1993). Although Fawcett et al. (2007) regard information sharing as the most important factor for successful supply chain relationships and performance, the sharing of information requires trust between supply chain stakeholders (Kwon & Suh, 2005). However, the level of trust between two supply chain stakeholders often dictates the type and detail of the information shared between them. A relationship is, therefore, expected between the trust that the farmer has in the abattoir, and the information that the farmer shares with the abattoir.

Hypothesis 2: *The farmer's trust in the abattoir has a positive effect on the information that the farmer shares with the abattoir*

According to Hines (1995), organisations form networks based on the need to exchange resources. This is especially true in the vast Karoo region, where the townsfolk and surrounding farmers rely heavily on one another. To that end, although relatively isolated, close close-knit communities are formed in which resources and information are shared[26]. By being part of a network, farmers gain access to valuable information. Information obtained and shared within a network function as a mechanism for reducing information asymmetries and subsequent opportunistic behaviour (Lu, 2007). Recent studies that investigated the relationship between networks and information sharing implied that farmer networks might stimulate information sharing for improved technology adoption (Manson, 2016; Burbi et al., 2016; Ward & Pede, 2015), enhanced conservation (Rosman, 2015) and better-performing collectives (Ostrom, 2014) or cooperatives (Bijman et al., 2012). Most of the research did not explicitly focus on the impact of networks on information sharing. However, Jraisat et al., (2013) did find that networks triggered information exchange in supply chains. It is, therefore, expected that farmers who participate in a network are not only more likely to share information within the network but also more likely to share information with the supply chain to achieve their common goal.

Hypothesis 3: *Positive psychographic variables of farmers participating in farmer networks have a positive effect on the information shared between farmers and abattoirs*

Although the farmers' loyalty to the Karoo region and their shared goals, led to the formation of the certification scheme, it is unclear whether or not the farmers are satisfied with the certification scheme's efforts to protect the Karoo name from exploitation. Farmer satisfaction is an important consideration, since a person's satisfaction with a service, is often used to predict future usages of that service (Newman & Werbel, 1973). Satisfied customers are more likely to continue using the service, share their positive experiences and are less receptive to a competitor's offerings. This demonstrates the fact that a relationship between satisfaction and loyalty exist, namely that satisfaction may lead to increased loyalty (Gallarza et al., 2016; Awan & Rehman, 2014). Although studies that focus on the effect of customer

[26] Most of the farmers (92%) belong to a farmer's union that hold monthly meetings during which information on many different aspects are shared either by the community or an expert in the field. Some of the farmers (20%) belong to a smaller study group where more confidential information such as finances are shared among the farmers. These farmer's unions and study groups include both certified Karoo and non-certified farmers.

satisfaction on loyalty are abundant in market research (see *inter alia* Gallarza et al., 2016; Pappu & Quester, 2016; and Mutonyi et al., 2016 for an agricultural study) the relationship between satisfaction and loyalty towards an agricultural collective organization, such as Karoo Lamb, are not researched explicitly. The farmer's satisfaction with the certification scheme's efforts to protect the geographical value of the Karoo Lamb product is, therefore, expected to influence the farmer's loyalty to the certification scheme positively. Moreover, although specific research on the relationship between satisfaction and information sharing is scarce, it is postulated that farmers who are satisfied with the performance of the certification scheme would be (more) willing to share (more) information in an attempt to reach their common goal.

Hypothesis 4: *Farmer satisfaction with the certification scheme has a positive effect on farmer loyalty to the establishment of the differentiated product*

Hypothesis 5: *Farmer satisfaction with the certification scheme has a positive effect on the information shared between the farmer and the abattoir*

The farmers and abattoirs participating in the Karoo Lamb supply chain can be viewed as nodes embedded in a network of organisations that simultaneously facilitate and constrain their interests and actions (Nohria & Eccles, 1992; Powell, 1990). Various definitions for networks are present in the literature (see *inter alia* Claro, 2004; Ménard, 2002; Omta et al., 2001), all of which describe a network as a coalition of organisations that recognise that they can benefit from pooling their resources to achieve a common goal. The effect of loyalty on specifically social network participation has recently received much attention (Zamanian & Khanlari, 2015; Gamboa & Gonçalves, 2014). Since a farmer network is also a type of social network, farmer loyalty is expected to influence farmer participation in the network. Moreover, the close-knit farming community in the Karoo region is rooted in social relationships and is a good example of a network based on mutual trust, loyalty to the cause and their shared goals. It is therefore postulated that the farmers' loyalty to the Karoo region led to the development of farmer networks (study groups, farmer's associations, community networks, and the certification scheme) to achieve their shared goals (protect the Karoo name from exploitation).

Hypothesis 6: *Farmer loyalty to the establishment of the differentiated product and its origin has a positive effect on the general psychographic variables of farmer networks*

The paper aims to make the following theoretical contribution to the knowledge base; to identify and evaluate the different factors that impact (directly or indirectly) on the farmer's behavioural tendencies by using the PLS-SEM approach. The paper is expected to act as a point of departure on which future research can build to enhance the understanding of the somewhat unexplored (especially in the context of agricultural transactions) concept that is opportunistic behaviour (Figure 3.1). In doing so, the paper is able to make a practical contribution; to develop strategies that can be implemented by the custodians of differentiated products and by the broader industries of these products to prevent opportunistic behaviour, at least for now, among farmers.

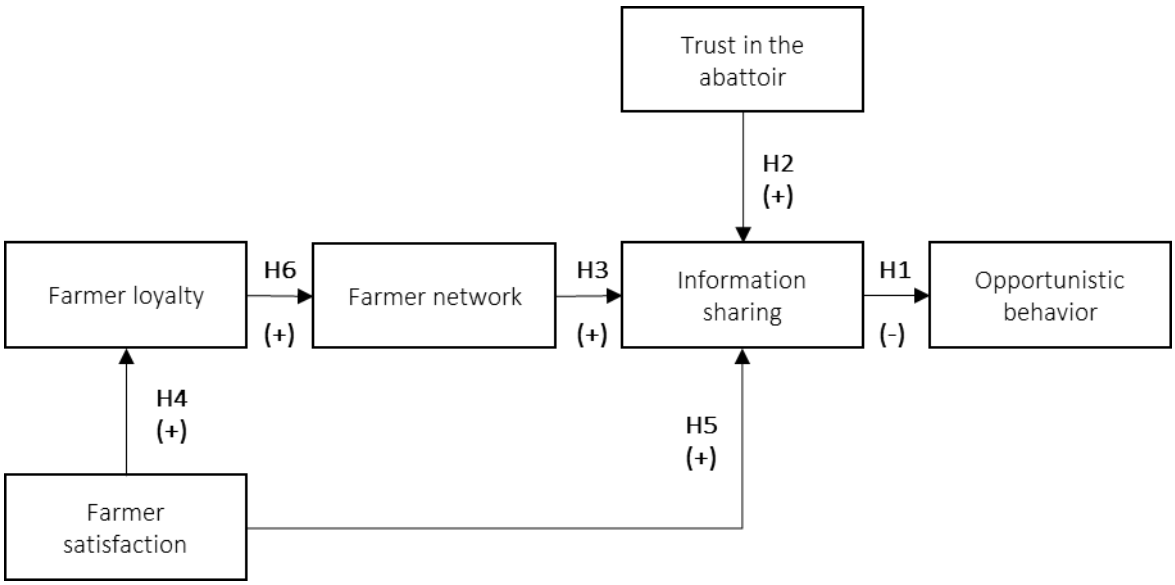


Figure 3.1: Conceptual path model of the factors that impact opportunistic behaviour

3.4 Methodology and research context

3.4.1 Research design

From the total population of 209 certified Karoo Lamb farmers, 73 farmers[27] were interviewed on their farms in the Karoo region. These farmers were identified by using

[27] The sample of 73 farmers comply with both the 10 times rule of thumb fostered by Barcley et al. (1995) as well as the more differentiated rules of thumb for structural equation modelling, presented by Cohen (1992). The sample

convenience sampling, specifically the referral sampling method. Although the certification scheme has an elaborate database of their certified members, most of the farmers were unable to provide their GPS coordinates to be captured. This shortcoming made it exceptionally difficult to track down these farmers for interviews. Keeping the vastness of the Karoo region (totalling 46 million hectares) in mind, endeavouring to locate 73 farmers (farming on a total of approximately two million hectares) would have been a laborious and expensive task if a random sampling method was used instead.

During May of 2015, appointments were scheduled with the managers of three of the five certified abattoirs in the Karoo region. These abattoirs assisted with the identification and locality of the certified farmers in each of the districts surrounding the abattoirs. During June and July of 2015, interviews were scheduled with each of the 73 certified farmers to complete structured questionnaires that contained predominantly five-point Likert scale questions going from strongly disagree (1) to strongly agree (5). These questions (Table 3.3) were developed specifically to be used as indicators to explain the latent variables identified as; farmer satisfaction, trust in the abattoir, farmer loyalty, farmer network, information sharing and opportunistic behaviour.

The questions related to farmer satisfaction mainly focused on the farmer's level of satisfaction with the management of the certification scheme, the way in which the Karoo Lamb product is marketed, and whether or not the farmer felt that he/she gained (financially or otherwise) from being a certified member. The trust in the abattoir construct included questions about the relationship the farmer had with the abattoir, and whether or not the farmer saw the abattoir as a trustworthy business partner with a good reputation in the Karoo community. The farmer loyalty construct referred to the farmer's loyalty towards the Karoo region and the development thereof, his/her loyalty to the certification scheme and to what extent the farmer supported the protection of the Karoo name against exploitation.

The farmer network construct was examined by focusing on the farmer's opinion of his/her neighbouring farmers since these farmers are likely to participate in the same network (farmer association or study group). The questions inquired about their opinion of their neighbours' trustworthiness, reputations, and integrities, to what degree they are loyal to the

size is also in line with the minimum of 50 observations recommended by Sideridis et al. (2014) and Iacobucci (2010) for structural equation modelling.

certification scheme, and to what extent do they support the development of the Karoo region. The questionnaire included a section where the farmers were asked to express an opinion of themselves by using the same criteria, but the results were biased towards strongly agree and were, therefore, excluded from the analysis.

The information sharing construct focused on how well the farmer shares information with the abattoir, as well as the types of information that the farmer is likely to share with the abattoir. These include information on feed, diseases, droughts and the quantity of lamb to be marketed to the abattoir.

Table 3.1: Overview of the constructs and related indicators

Construct/Indicator	Explanation
Farmer loyalty	
Support region development	I support the development of the Karoo region
Loyal to scheme	I am loyal towards the Karoo Meat of Origin certification mark
Support protection	I support the protection of the Karoo name against exploitation
Farmer network psychographics	
Other farmers are trustworthy	The other farmers in my community are trustworthy business
Other farmers good reputation	The other farmers in my community have a good reputation
Other farmers integrity	The other farmers in my community have integrity
Other farmers best interest	The other farmers in my community have other's best interest at
Other farmers support region	The other farmers support the development of the Karoo region
Other farmers loyal to scheme	The other farmers are loyal towards the Karoo Meat of Origin
Farmer satisfaction	
Satisfied scheme managed	I am satisfied with the way in which the scheme is managed.
Satisfied marketing Karoo Lamb	I am satisfied with the way in which Karoo Lamb is marketed.
Gained from being certified	I gained from being part of the certification scheme.
Being certified exceed	Being part of the certification scheme exceeded my expectations.
Trust in the abattoir	
Good relationship with abattoir	I have a good relationship with the abattoir.
Abattoir good reputation	The abattoir has a good reputation in the community.
Abattoir trustworthy	The abattoir with whom I do business is trustworthy.
Information sharing	
Share info supplementary feed	I share information about supplementary feed with the abattoir.
Share info disease	I share information about animal diseases with the abattoir.
Share info drought	I share information about droughts on my farm with the abattoir.
Share info quantity lamb	I share information about the quantity of lambs delivered with the
Exchange info well	The abattoir and I share information well.
Opportunistic behaviour	
Feed in feedlot	I make use of a feedlot when lambs are not market ready.
Feed on Lucerne fields	I have Lucerne fields on my farm for lamb feeding purposes.

In an attempt to prevent measurement error, some of the questions were repeated somewhat differently elsewhere in the questionnaire, especially the questions related to the farmers' tendencies to behave opportunistically. The farmers were asked directly if they have feedlots and Lucerne fields on their farms and whether or not they used these facilities. Later on in the questionnaire, the farmers were asked if they ever marketed lamb from a feedlot or Lucerne field to the abattoir as Karoo Lamb. As a control, they were also requested to comment on their neighbours' tendencies to behave opportunistically by marketing fed lamb to the abattoir as Karoo Lamb. In a further attempt to ensure the honesty of farmers about their behaviour, the reasoning behind the research study was explained as an endeavour to understand the farmers' role in the Karoo Lamb supply chain, without explicitly mentioning opportunistic behaviour.

One after the other, all the questions related to opportunistic behaviour were tested in the PLS-SEM path model, and the results analysed. In the end, the questions related to whether or not farmers have feedlots and Lucerne fields that are in use demonstrated acceptable significance levels and were therefore used as proxy indicators for the latent opportunistic behaviour construct.

In general, the indicator correlation matrix (Table 3.2) demonstrate high positive correlations between the indicators of the same construct. Some of the indicators that showed weaker relationships with other indicators of the same construct include, the relationships between; (i) farmer satisfaction with the marketing of Karoo Lamb and the extent to which the farmer gained from being part of the certification scheme, and (ii) how well the farmer share information with the abattoir and the information about the droughts on the farm.

The correlation matrix showed a weak negative relationship between the utilisation of feedlots and the utilisation of Lucerne fields. This is to be expected since some of the farmers had both facilities on their farms and elected to, at certain times, only use one of the two.

Table 3.2: Indicator correlations

	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6	y7	y8	y9	y10	y11	y12	y13	y14	y15	y16
Farmer satisfaction																							
x1	**1.00**																						
x2	**0.51**	**1.00**																					
x3	**0.33**	**0.15**	**1.00**																				
x4	**0.37**	**0.34**	**0.55**	**1.00**																			
Trust in the abattoir																							
x5	0.41	0.25	0.09	0.03	**1.00**																		
x6	0.26	0.20	0.07	0.06	**0.70**	**1.00**																	
x7	0.35	0.20	0.06	0.11	**0.78**	**0.74**	**1.00**																
Farmer loyalty																							
y1	0.27	-0.09	0.13	0.08	0.16	0.17	0.16	**1.00**															
y2	0.26	0.06	0.27	0.08	0.05	-0.02	-0.01	**0.70**	**1.00**														
y3	0.41	0.11	0.21	0.17	0.02	0.03	0.03	**0.60**	**0.49**	**1.00**													
Farmer network																							
y4	0.21	0.01	0.10	0.17	0.18	0.22	0.16	0.20	0.16	0.24	**1.00**												
y5	0.36	-0.01	0.12	0.14	0.21	0.16	0.25	0.21	0.26	0.33	**0.59**	**1.00**											
y6	0.12	-0.05	-0.01	0.03	0.18	0.23	0.24	-0.03	-0.04	0.14	**0.43**	**0.33**	**1.00**										
y7	0.34	0.12	0.04	0.12	0.17	0.17	0.23	0.17	0.25	0.29	**0.42**	**0.54**	**0.65**	**1.00**									
y8	0.49	0.19	0.07	0.12	0.20	0.17	0.18	0.29	0.33	0.30	**0.37**	**0.50**	**0.50**	**0.75**	**1.00**								
y9	0.31	0.07	0.28	0.21	0.08	0.13	0.15	0.15	0.12	0.43	**0.34**	**0.33**	**0.64**	**0.54**	**0.48**	**1.00**							
Information sharing																							
y10	0.14	0.02	0.12	0.30	0.17	0.05	0.18	0.18	0.12	0.19	0.31	0.15	0.25	0.39	0.35	0.33	**1.00**						
y11	0.22	0.00	0.14	0.29	0.21	0.17	0.26	0.22	0.02	0.23	0.10	0.13	0.25	0.28	0.27	0.36	**0.60**	**1.00**					
y12	0.32	0.16	0.06	0.07	0.58	0.41	0.64	0.09	0.02	0.00	0.17	0.28	0.18	0.28	0.29	0.12	**0.27**	**0.25**	**1.00**				
y13	0.29	0.14	0.26	0.26	0.07	-0.04	0.17	0.17	0.11	0.19	0.21	0.12	0.14	0.22	0.23	0.24	**0.62**	**0.46**	**0.27**	**1.00**			
y14	0.33	0.10	0.21	0.18	0.38	0.28	0.52	0.20	0.19	0.05	0.10	0.26	0.12	0.23	0.33	0.18	**0.35**	**0.19**	**0.43**	**0.32**	**1.00**		
Opportunistic behaviour																							
y15	-0.10	-0.12	-0.04	-0.16	-0.10	-0.00	-0.10	0.11	0.20	0.02	-0.02	0.09	0.02	0.06	0.13	-0.07	-0.18	-0.22	-0.10	-0.14	-0.01	**1.00**	
y16	0.10	-0.04	0.07	0.02	0.13	0.11	0.08	-0.08	-0.16	0.01	0.17	0.14	0.12	-0.09	-0.04	-0.08	-0.25	-0.08	0.20	0.06	-0.02	**-0.05**	**1.00**

Note: N=73. Indicator notation, assigned in Table 3, is used in Table 5. x1 to x7 refer to the indicators of independent constructs (farmer satisfaction and trust in the abattoir) and y1 to y16 refers to the indicators of the dependent constructs (farmer loyalty, farmer network, information sharing and opportunistic behaviour

The descriptive statistics indicated that on average, almost half of the surveyed farmers utilised their feedlots and Lucerne fields to get lambs market ready. Equally troublesome for the certification scheme is the fact that, on average, only some farmers shared information related to animal diseases and supplementary feed fed to lambs with the abattoir (Table 3.3)

Table 3.3: Summary statistics of indicators

Indicators	Mean	Minimum	Maximum	Standard deviation
x1: Satisfied scheme managed	4.20	1.00	5.00	1.19
x2: Satisfied marketing Karoo Lamb	3.87	1.00	5.00	1.38
x3: Gained from being certified	3.48	1.00	5.00	1.79
x4: Being certified exceed expectations	2.96	1.00	5.00	1.68
x5: Abattoir trustworthy	4.85	3.00	5.00	0.40
x6: Abattoir good reputation	4.85	3.00	5.00	0.40
x7: Good relationship with abattoir	4.86	2.00	5.00	0.45
y1: Support region development	4.94	3.00	5.00	0.28
y2: Support protection	4.90	2.00	5.00	0.45
y3: Loyal to scheme	4.86	1.00	5.00	0.61
y4: Other farmers loyal to scheme	4.01	1.00	5.00	0.98
y5: Other farmers support region development	4.34	3.00	5.00	0.79
y6: Other farmers integrity	4.14	2.00	5.00	0.69
y7: Other farmers good reputation	4.12	3.00	5.00	0.73
y8: Other farmers best interest	4.01	2.00	5.00	0.84
y9: Other farmers trustworthy	3.92	1.00	5.00	0.86
y10: Share info supplementary feed	3.15	1.00	5.00	1.86
y11: Share info drought	3.24	1.00	5.00	1.74
y12: Share info quantity lamb	4.90	3.00	5.00	0.34
y13: Share info disease	3.10	1.00	5.00	1.79
y14: Exchange info well	4.36	1.00	5.00	1.10
y15: Feed in feedlot *(binary: 1=yes; 0=no)*	0.51	0.00	1.00	0.50
y16: Feed on Lucerne fields *(binary: 1=yes; 0=no)*	0.52	0.00	1.00	0.50

Note: N=73. Scale responses were used for most indicators except where otherwise indicated.

3.4.2 Empirical method

A structural equation modelling (SEM) approach, specifically the partial least squares (PLS) method was applied to explain the structure among the unobserved latent variables by using observed variables (Hair et al., 2014). The PLS approach to SEM, initially developed by Wold (1982), has been widely adopted for analysing complex situations where theories are not well developed (Garson, 2016; Wong, 2013; Hwang et al., 2010).

PLS-SEM does not require normally distributed data, which makes relatively small sample sizes acceptable, especially if the variables are reliable, the effects strong, and the model not overly complex (Sideridis et al., 2014; Iacobucci, 2010). The PLS-SEM approach can, furthermore, handle multicollinearity among the independent variables and is robust in the face of data noise and, depending on the software used, missing data. PLS-SEM also allows for the simultaneous analysis of all structural relationships among numerous constructs (based on several indicator variables) which ultimately leads to more accurate results and stronger predictions (Hair et al., 2014). Unlike other SEM techniques, PLS-SEM permits the inclusion of single item measures to explain latent variables.

On the other hand, the major and most often referred to shortcoming of PLS-SEM is the inconsistency of the latent variables and the biasedness of the latent variable relationships that are reflected in the path coefficients. The result of this biasedness is that the path coefficients are often underestimated, while the measurement model loadings are typically overestimated. Although this applies in particular to models with small samples, simulation studies found PLS-SEM bias to be present at very low levels and is therefore of limited relevance (Hair et al., 2014). Other disadvantages include difficulty in interpreting the loadings of the latent variables because they are abstract, complex and not directly observable, and the fact that PLS-SEM cannot measure undirected correlation (Fornell & Cha, 1994).

The advancement of PLS-SEM as an analytical tool has recently been applied to a number of studies in the agricultural domain; see *inter alia*, Franken et al. (2017), Ragasa and Golan (2014), Ji (2012), Franken et al. (2010), Han (2009), Dentoni et al. (2009), Van Ittersum et al. (2007), Lu (2007), Pennings and Garcia (2001), and Pennings and Leuthold (2000). However, the application of the PLS-SEM approach to opportunistic behaviour in

agricultural transactions has received limited attention. The application of PLS-SEM to the Karoo Lamb case, primarily to determine the factors impacting on the opportunistic behaviour of farmers, is therefore of particular interest.

The SEM, adopted from Bollen (1998), are represented by the following equations:

$$x = \lambda^x \xi + \delta \quad (1)$$

$$y = \lambda^y \eta + \varepsilon \quad (2)$$

$$\eta = B\eta + \Gamma\xi + \zeta \quad (3)$$

Equations one and two are factor-analytic measurement models that link observable indicators to the unobservable latent constructs. The vectors x and y represent the measures of the independent and dependent constructs in the vectors ξ and η respectively. The coefficient matrices are represented by λ^x and λ^y with measurement errors contained in the vectors δ and ε. Equation three signifies the path model with path matrices B and Γ denoting the path coefficients between dependent constructs and the coefficients between independent and dependent constructs respectively. The disturbance term ζ represents the errors in the path model equation (Bollen, 1998).

The analysis was conducted with the SmartPLS3 software (Ringle et al., 2015), which is widely used for PLS-SEM path modelling. The SmartPLS3 algorithm provides empirical measures that are used to determine how well the theory fits the data (Dijkstra, 2010). The SmartPLS3 bootstrapping and blindfolding techniques can furthermore be applied to determine the significance (by estimating the standard errors for each hypothesised relationship) of the relationships and the predictability of the PLS-SEM model respectively (Hair et al., 2014).

3.5 Results

The evaluation of the empirical results follows a two-step process. The relationships between the indicators and constructs (measurement model), and the relationships between the constructs (structural model) in the PLS-SEM path model are assessed separately but consecutively (Hair et al., 2014).

3.5.1 Measurement model evaluation

The constructs indicate robust internal consistency with most of the composite reliability[28] values well above the 0.7 cut-off point. The constructs furthermore demonstrate mostly high levels of convergent validity[29] with average variance extracted values well above the 0.5 rule of thumb. In addition, the correlation matrix demonstrates mostly positive and strong correlations with indicators of the same construct (indicated in bold in Table 3.2). An assessment of the cross-loadings and the Fornell-Larcker criterion provide evidence for the discriminant validity[30] of the modelled constructs (Table 3.4).

Table 3.4: Summary of the reflective measurement model results

Construct	Composite reliability	Average variance extracted	Discriminant validity
Farmer loyalty	0.893	0.735	Yes
Farmer network	0.891	0.579	Yes
Farmer satisfaction	0.807	0.518	Yes
Trust in the abattoir	0.939	0.837	Yes
Information sharing	0.829	0.494	Yes
Opportunistic behaviour	0.630	0.467	Yes

The empirical results of the reflective measurement model are indicative of a robust model based on reliable and valid measures. The relationships between constructs in the structural model and the model's predictive capabilities can now be evaluated.

3.5.2 Structural model evaluation

The structural model serves to test the relationships between the latent constructs. Because PLS-SEM applies ordinary least squares regression (OLS) to estimate path coefficients a collinearity test is required to prevent biasedness among path coefficients before assessing

28 Composite reliability is a measure for internal consistency reliability, and measures the reliability based on the intercorrelations of the indicator variables. Values between 0.7 and 0.9 are regarded as satisfactory, and values between 0.6 and 0.7 are acceptable for exploratory research.

29 Average variance extracted (sum of the squared outer loadings divided by the number of indicators) is used to determine convergent validity. Convergent validity measures the extent to which one indicator correlates positively with other indicators of the same construct.

30 Discriminant validity is a measure of individuality and measures the extent to which one construct is truly different from another construct to ensure two or more constructs do not capture the same phenomena. The Fornell-Larcker criterion, an approach that compares the square root of the average variance extracted values with the latent variable correlations, is used to determine discriminant validity.

the structural model (Hair et al., 2014). In order to evaluate the collinearity of the structural model, an assessment of the predictor constructs' variance inflation factors are required. The observed variance inflation factors of below 5 indicate that collinearity among the predictor constructs is not a problem, and the systematic evaluation of the structural model is permitted (Table 3.5).

Table 3.5: Summary of the variance inflation factors

	Variance inflation factors			
Construct	**Farmer loyalty**	**Farmer network**	**Information sharing**	**Opportunistic behaviour**
Farmer loyalty		1.000		
Farmer network			1.198	
Farmer satisfaction	1.000		1.000	
Trust in the abattoir			1.120	
Information sharing				1.000

An evaluation of the R^2 values demonstrates the structural model's predictive accuracy. The R^2 value for opportunistic behaviour (R^2=0.070) are considered to be relatively weak, even for studies on agent behaviour, but the exploratory nature of this research renders its inclusion noteworthy. The R^2 values for farmer network (R^2=0.144) and farmer loyalty (R^2=0.113) are considered to be moderate. The R^2 value for information sharing (R^2=0.387) can be seen as high for behavioural studies (Hair et al., 2011). Although the R^2 values are relatively low, including more constructs to the structural model for the sake of increasing the coefficient of determination, will destroy the ultimate goal of model parsimony (Hair et al., 2014).

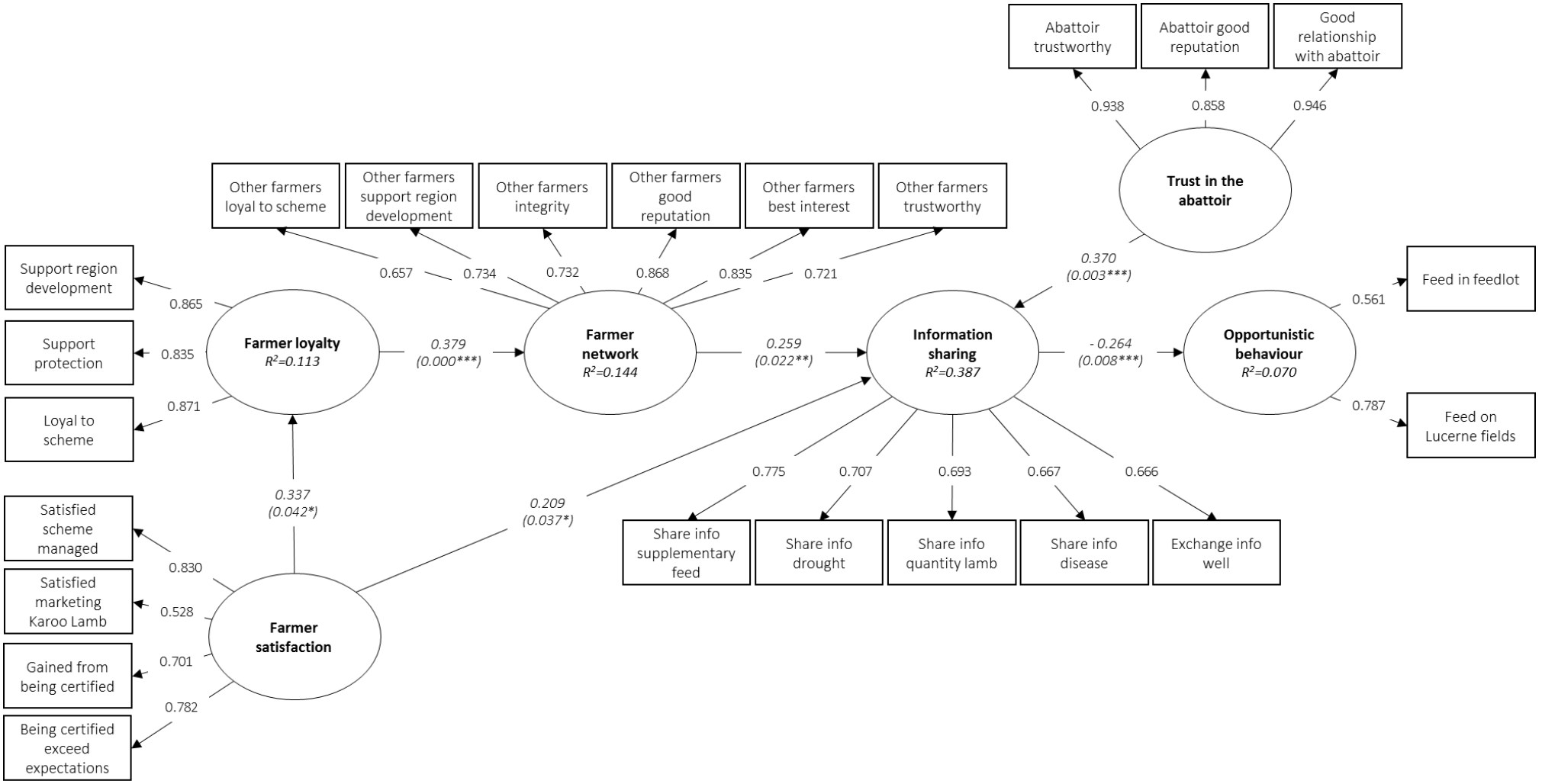
The R^2 value is furthermore used to determine the effect size (f^2). The structural model indicates strong effects between trust in the abattoir and information sharing (f^2=0.200). The medium effects include that of farmer loyalty on farmer network (f^2=0.168), and farmer satisfaction on farmer loyalty (f^2=0.128). The other constructs, on the other hand, demonstrate small effect sizes with f^2 values ranging between 0.092 (farmer network on information sharing) and 0.075 (information sharing on opportunistic behaviour).

The structural model, furthermore, demonstrates predictive relevance since the Q^2 values although small as is expected for theory development (ranging from 0.135 for information sharing to values as low as 0.003 for opportunistic behaviour) is greater than zero (Fornell & Bookstein, 1982).

3.5.3 Evaluating the hypothesised relationships

The path coefficients indicated in the structural model demonstrates relatively robust and significant relationships between all the constructs contained in the model, except for the direct relationship between farmer loyalty and information sharing that are not significant. The indirect relationships between farmer loyalty and information sharing via farmer network and farmer satisfaction are however significant (Figure 3.2).

The PLS-SEM analysis of the structural model revealed a positive relationship between farmer loyalty and farmer networks (β=0.379; p-value=0.000), confirming the hypothesised relationship. The farmer's loyalty to the Karoo region, the unique Karoo Lamb product that they produce, and their determination to protect the geographical value attached to the Karoo name provides them with a shared goal to find like-minded farmers with whom to build networks. Farmer satisfaction furthermore demonstrated a positive relationship with farmer loyalty (β=0.337; p-value=0.042). This hypothesis supports the notion that the farmer's satisfaction with the performance of the certification scheme, to protect the geographical indication, impacts positively on their loyalty to protect the Karoo name against exploitation.



*Note: N=73. p-values are in parenthesis. ***, **, * denote statistical significance at the 1%, %% and 10% level.*

Figure 3.2: Structural model with factor loadings, path coefficients and p-values

One of the reasons why farmers establish networks in farming communities is to share information. The network's common goal, to protect the Karoo name against exploitation, is therefore expected to inspire honest information sharing with the abattoir. The results confirmed the positive effect that farmer networks have on information sharing (β=0.259; p-value=0.022). Farmers who participate in farmer networks are expected to, frequently, share information regarding droughts, feeding practices, and disease treatments, with the abattoir as a dedicated effort to reach the shared goal of the network. Comparably, farmer satisfaction has a positive effect on information sharing (β=0.216; p-value=0.037). Farmers who are satisfied with the efforts of the certification scheme and the abattoir, to protect Karoo Lamb against exploitation, are more likely to build long-term relationships with these stakeholders. Farmer satisfaction, in turn, encourages the farmer to share information, specifically about droughts, supplementary feed, lamb numbers, and diseases. It is especially important that farmers share this information with the abattoir since it relates directly to the free range, and free from antibiotics protocols. If farmers violate these protocols and the abattoir are not informed, the reputation of Karoo Lamb can be harmed. Moreover, trust in the abattoir has a positive effect on information sharing (β=0.371; p-value=0.003). The more the farmer trust the abattoir as a business partner the more likely the farmer will be to share information regarding the production practices with the abattoir.

As the most important factor for successful supply chain relationships, it was expected that information sharing would play a significant role to reduce the opportunistic behaviour of farmers. The PLS-SEM results supported this hypothesis (β=-0.264; p-value=0.008). The more information the farmer shares with the abattoir regarding droughts, feeding practices and disease treatments, the less likely he will be to act opportunistically by, for example, delivering lamb as Karoo Lamb that has in fact been reared in a feedlot or on Lucerne fields. Moreover, the frequent exchange of relevant information is likely to deepen the level of trust between the farmer and the abattoir, which will further reduce the farmer's tendency to behave opportunistically.

3.6 Applicability of the findings

The many efforts to upgrade commodity supply chains to more differentiated chains increased the interdependencies between supply chain stakeholders (in this case the farmer and the abattoir) and increased their exposure to behavioural uncertainties (Wever, 2012). The certification scheme was the first attempt to differentiate and protect a region of origin meat product in South Africa. Although the certification scheme has come a long way in protecting the value embedded in the name "Karoo", many loopholes for opportunistic behaviour still exist. Misconduct on the farmers' side regarding the vulnerable free range (on indigenous Karoo veldt) claim may have disastrous consequences since the essence of the Karoo Lamb product is embedded in this claim.

The purpose of this paper is to suggest, not only to the KDF and the certification scheme, but also the broader red meat industry, strategies aimed at safeguarding farmer-abattoir transactions against opportunistic behaviour in differentiated meat supply chains. This can be achieved by identifying the factors most likely to influence opportunistic behaviour.

Although the results should be interpreted with caution due to the theory development nature of PLS-SEM path modelling, the initial results revealed some interesting findings. The four most important relationships to consider for practical application in differentiated meat supply chains (such as Karoo Lamb) are; the relationships between farmer loyalty and farmer network, farmer network and information sharing, trust in the abattoir and information sharing, and information sharing and opportunistic behaviour.

The successive relationships between farmer network, information sharing, and opportunistic behaviour are indicative of the catalytic effect of farmer networks to improve information sharing among farmers, and with abattoirs. The farmers' loyalty to the abattoirs (60.3 % of the farmers only deliver to one abattoir, and 27.4 % of the farmers have been delivering to the same abattoir for more than 30 years) ensures that the farmers and the abattoirs share information easily. It might, therefore, be in the interest of the certification scheme and the KDF to support farmer networks, to stimulate information sharing between the farmers and the abattoirs to inhibit the opportunistic behaviour of farmers eventually. Opportunistic behaviour is even more likely to be inhibited when information regarding

opportunistic farmers is available, and members of the network are willing to act jointly against the opportunistic farmer. This statement was supported by the surveyed farmers who agreed that opportunistic farmers should be expelled from the certification scheme forever (35.6 %), for five years (26 %), or for three years (38.2 %). As further support, the majority of the farmers (85.7 %) believed that they should be monitored by members of the collective[31].

Additionally, abattoirs should focus on building stronger, trust-centred relationships with the farmers. Stronger relationships are likely to stimulate information sharing with the abattoir, specifically information concerning the deviations from protocols by the farmer, to ultimately safeguard the farmer-abattoir transaction against opportunistic behaviour.

It might furthermore be in the interested of the certification scheme to invest in the collection of certified farmers' GPS coordinates. With these coordinates and satellite technology, such as Google Earth, the certification scheme might be in a position to at least monitor the use of Lucerne fields and feedlots for rearing Karoo Lamb. Unfortunately, this technology will not be able to spot farmers who provide excessive (more than 300g per lamb per day) supplementary feed on the veldt, which remains a problem, especially during times of drought.

Correspondingly, the findings suggest that red meat industries with differentiated product supply chains, through their various associations, should concentrate their managerial efforts to promote information sharing between farmers and the abattoirs. Information sharing between the farmer and the abattoir is crucial especially when it comes to assuring credence attributes such as free range, hormone and antibiotic free or from a specific origin. In supply chains with a strong collective presence, attempts to strengthen communion in farmer networks might be sufficient to encourage information sharing among farmers and with abattoirs. However, in supply chains where a collective organisation is lacking, investments in comprehensive farm-to-fork traceability systems might be required to enforce information sharing. Overall, it is expected that improvements in information sharing would reduce the

[31] The surveyed farmers believed that they should be monitored by members of the collective; the abattoir and its livestock agents (67.1%), by means of self-monitoring (13.9%), and the other Karoo Lamb farmers (4.7%). The rest of the farmers felt that monitoring through the certification scheme (9.4%), by the general farmer's union (4.7%), and by the independent third party currently responsible for the monitoring (1.2%), would be sufficient.

uncertain behavioural dimension, thereby limiting the opportunistic behaviour of farmers and ultimately safeguarding the unacquainted consumers of differentiated products against deception.

3.7 Summary and recommendations for future research

Although the paper originated from a practical problem of opportunistic behaviour faced by the Karoo Lamb supply chain in South Africa, the paper also functions as a point of departure for future studies relating to opportunistic behaviour in other differentiated supply chains. Further research in other differentiated meat supply chains is expected to make exciting discoveries regarding additional factors that influence opportunistic behaviour. These factors are likely to increase the number of indicators per latent variable for more robust structural equation models with higher path coefficients and stronger relationships between latent constructs.

Furthermore, determining the factors that have an impact on opportunistic behaviour is especially challenging since the data focused almost exclusively on the farmer's perceptions, or of the farmer's honesty about his production and marketing practices. It would, therefore, be valuable if future research focuses on additional measures that will produce complementary indicator variables, in particular for the opportunistic behaviour construct. Developing a more comprehensive set of indicator variables will yield higher path coefficients and enhance the robustness of the factors identified as most likely to influence opportunistic behaviour.

Additionally, future studies can explore completely different ways in which to determine whether farmers tend to be opportunistic in their production and marketing decisions. One of the avenues that can be explored includes field experiments, specifically randomised controlled trials (see Saenger et al., 2014 for a field experiment in Vietnam). These randomised controlled trials allow supply chain stakeholders to make decisions in their natural environments. A field experiment approach, although time-consuming and expensive, is sure to bring alternative strategies for preventing opportunistic behaviour among Karoo Lamb farmers.

Opportunistic behaviour can occur throughout the supply chain. This paper, however, only focused on the factors that impact on the farmer's tendency to behave opportunistically. A study that includes all the stakeholders participating in the supply chain might, therefore, be particularly interesting. Specifically to explore the factors that lead other stakeholders to behave opportunistically, which can be utilised to suggest organisation specific strategies to safeguard transactions against opportunistic behaviour.

Finally, future studies could eventually lead to comparative studies to determine the impact of culture, norms and beliefs on the opportunistic behaviour of farmers residing in different countries, governed by different institutions, and participating in numerous differentiated product supply chains.

Chapter 4:

Investing in collective reputation: sheep farmers, geographic indicators and collective action in the Karoo, South Africa[32]

"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."
(Arrow, 1972)

4.1 Introduction

The collective nature of the reputation attached to a geographic indication (owned by the collective) as a quality signal means that the insignia can be used, and its benefits extracted, by all the organisations within the demarcated geographic region that adhere to the code of conduct (Bramley et al., 2009; Costanigro & McCluskey, 2007). "Over time, and particularly during the last decade or two, reputation has become the most important corporate value" (Greenspan in Klewes & Wreschniok, 2009). In agricultural supply chains, reputation can be associated with an individual farmer (private reputation) or the aggregate reputation of a group of farmers or farmers from a particular geographic region (collective reputation) (Costanigro & McCluskey, 2007; Blair & Kaserman, 1994).

By repeatedly fulfilling the promised quality expectation of the consumer, the farmers (collectively) create a reliable reputation (Raynaud et al., 2005). This complete trust in the credibility of the certification mark often sways consumers to pay a price premium (return on the farmers' investment) for the differentiated product carrying the certification mark (Klein & Leffler, 1981). In turn, the price premium ensures that farmers will continuously produce the expected high-quality product (Gaultier-Gaillard et al., 2009). According to Klein (1996), the value of the price premium represents the economic value of the product's reputation or the reputational capital attached to the product.

[32] This chapter will be submitted to an accredited journal for publication.

One geographical indication, celebrated by many South Africans, is Karoo Lamb[33]. In 2009 a group of lamb farmers from the Karoo region in South Africa realised the marketing potential of their uniquely flavoured[34] lamb products. In an attempt to market their authentic product as "from the Karoo" and to protect their product from exploitation by stakeholders with little or no link to the region (Bramley et al. 2009), the Karoo farmers, with the help of the government, established the Karoo Development Foundation (the foundation). The foundation aims to defend the intellectual property rights and collective reputation that rest in the name "Karoo" (KMOO, 2016a).

During 2011 the foundation registered the Karoo Meat of Origin certification mark, managed by the Karoo Meat of Origin certification scheme (the certification scheme) and collectively owned by the users of the mark; farmers, abattoirs, processors and/or packers and retail outlets. This mark allowed the Karoo farmers to signal the authenticity of their high-quality lamb product to the otherwise often misinformed consumers in the hope of establishing consumer loyalty, and ultimately realise a price premium.

The fact that a time delay between the reputational investment made by farmers and the return on the investment in the form of a price premium exists is not yet recognised by all Karoo farmers. Farmers are cautious to make the investment since there is no guarantee of a price premium for their differentiated Karoo Lamb products at this time[35]. Furthermore, due to the limited demand for Karoo Lamb at this stage, they sometimes are not allocated an opportunity to supply the market since the abattoir decides, to a large extent, whose lamb should supply the niche market.

[33] Karoo Lamb is certified lamb sold under a certification mark that vouches for its authenticity. The mark ensures that the lamb is; from the Karoo region in South Africa, raised under free-range conditions on indigenous vegetation, traceable and free from added hormones and antibiotics (KMOO, 2016a).

[34] This flavour is attributed to the distinct vegetation (a combination of wild herbs) of the Karoo region (stretches over 46 million hectares) on which the lamb graze (Erasmus et al., 2016; Kirsten et al., 2012).

[35] Of the certified farmers, 51% receive a return on their investment (price premium) of between R1 and R2 per kilogram, while the remaining 49% of the farmers are still waiting for their returns. The majority of the farmers indicated that a sufficient return on their investment should be between R2 and R5 per kilogram, which is slightly higher than the current return received by some farmers.

This caution to invest does not mean that farmers are unwilling to invest in the reputation and become part of the certification scheme. Rather they are not yet convinced of the return on their investment because the reputational capital of Karoo Lamb is not yet established to a point where consumers are willing to pay a price premium for their product. However, to maintain the Karoo Lamb product's reputation a commitment to invest in the reputational capital of Karoo Lamb is required by the different supply chain stakeholders.

It is expected that a farmer's decision to invest in the collective reputational capital of a product is, to a large extent, shaped by his/her relationship with the abattoir, with the assumption that the abattoir is the first point of control and enforcement of the protocols. An antagonistic relationship between the farmer and the abattoir can, therefore, be a potential constraint on the farmer's decision to invest. Other, more personal attributes, such as the farmer's risk profile, education and his/her network, can potentially also play an important role in his/her willingness to invest in the collective.

In order to understand this dynamic, the paper aims to build on the transaction cost economics framework, by expanding the set of factors that impact on transactions and ultimately the costs (or difficulty) to transact. The impact that these (and other) factors might have on a farmer's decision to invest in the reputational capital of a differentiated product is then evaluated. The paper then proposes the use of these factors as investment stimuli to increase investments in the collective reputational capital of a product (Figure 4.1).

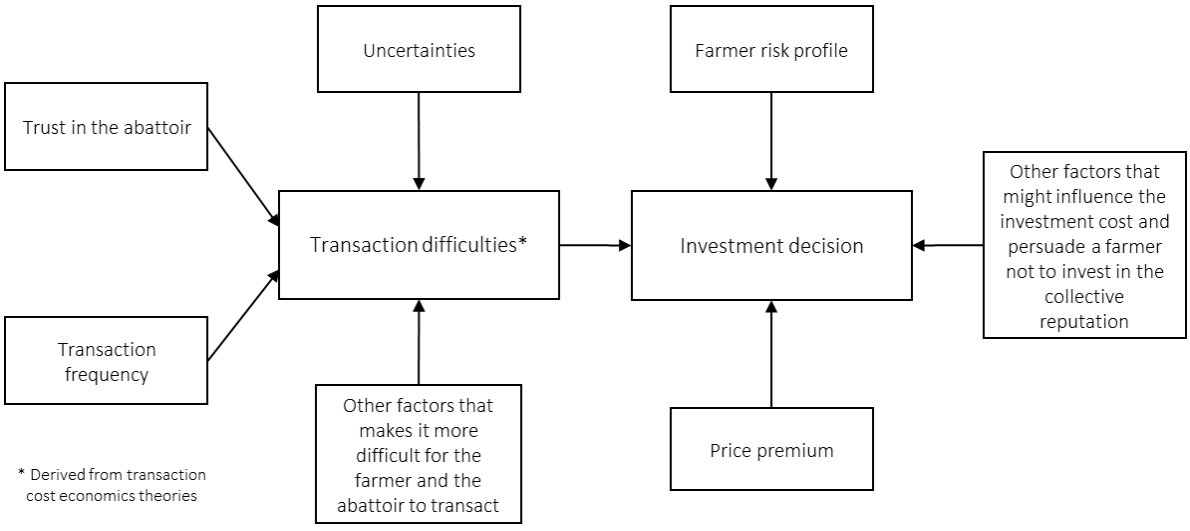


Figure 4.1: Conceptual framework

4.2 Theoretical considerations and research hypotheses

As mentioned earlier, the paper aims to investigate the relationship between the farmer and the abattoir and the associated cost to transact. As a consequence of high transaction costs (or a high level of transaction difficulty), farmers might decide to switch between abattoirs and potentially deliver to a non-certified abattoir, rendering their initial investment in Karoo Lamb null and void. Although farmers are able to switch between certified abattoirs, alternative abattoirs often come at higher costs, attributable to search and transport costs, as well as the time and effort required to establish a new relationship. A good relationship between the certified farmer and the certified abattoir is imperative to the success of the certification mark and the Karoo Lamb product.

Moreover, the certified abattoirs played a significant role in reaching out to the farmers and convincing them to become part of the certification scheme. A good relationship also makes it more likely that the farmer might get a regular spot on the slaughtering schedule. On average, 85 % of the farmers feel that the abattoir is a trustworthy business partner, and 92 % of the farmers agreed that they would be doing business with the abattoir for many years to come. Presumably, this implies that the good relationship between the farmers and the certified abattoirs will bring about good incentives to invest in the collective reputation of Karoo Lamb.

The transaction cost economics framework and the associated transaction characteristics have received much attention over the past few decades (see *inter alia* Wever et al., 2010; Han, 2009; Raynaud et al., 2005; Hobbs & Young, 2000; Hobbs, 1996). However, due to its dichotomous nature, transaction frequency (intensity of exchange and the number of times the same transaction takes place) has been sparsely applied to empirical work in the field of transaction cost economics (Geyskens et al., 2006; Rindfleisch & Heide, 1997). It should, therefore, be interesting to evaluate the effect of transaction frequency on transaction cost (or transaction difficulties).

Frequent transactions between organisations often result in an increased level of trust between the organisations. According to Eisenegger (2009), “trust is based on the experience that an agent has fulfilled our expectations in the past”. Therefore, the more times this

expectation is met (related to transaction frequency), the stronger the trust between the organisations will grow (Sako & Helper, 1998). It is therefore expected that the more the farmer transacts with the abattoir, based on previous successful transactions, the stronger the farmer's trust in the abattoir grows.

Hypothesis 1: *Transaction frequency has a positive effect on trust in the abattoir*

Trust, as defined by Sako and Helper (1998), is the expectation of one organisation that the other will behave in a mutually beneficial way. Trust between organisations is, therefore, expected to lead to longer-term reliance on each other and confidence that future expectations regarding transaction performance will be met (Eisenegger, 2009).

One of the criticisms of transaction cost economics is that it often neglects the implication of trust in buyer-supplier relationships (Rindfleisch & Heide, 1997). Several studies have however confirmed the importance of trust in business relationships. According to Hwang (2006), and Ducos and Dupraz (2007), mutual trust between organisations lead to lower transaction costs, which ultimately reduces transaction difficulties. The fact that organisations trust that the one has the other's best interest at heart leads to lower levels of transaction costs (especially monitoring) to protect their relationship (see *inter alia* Ducos et al., 2009; Mettepenningen et al., 2009). A negative relationship between the farmers' trust in the abattoir and transaction difficulties is therefore expected.

Hypothesis 2: *Trust in the abattoir reduces the transaction difficulties*

According to Williamson (1985), transaction costs (which increase the transaction difficulties) are generally driven by asset-specific investments to participate in a transaction, transaction frequencies and uncertainties surrounding the transaction. Uncertainty refers to the unforeseen changes in the circumstances in which a transaction is embedded (Grover & Malhotra, 2003). Uncertainties relate to both behavioural uncertainties and environmental uncertainties, all of which tend to increase transaction costs (McCann & Claassen, 2016). According to Liu (2012), environmental uncertainties include environmental forces that organisations have little control over but have a potentially large impact on the production and performance of the organisation.

Volume uncertainty generally refers to the inability of an organisation to accurately forecast volumes (Walker & Weber, 1984). Considering the transaction between the farmer and the abattoir, environmental uncertainties (such as droughts), resulting in volume uncertainties (Walker & Weber, 1984), are of particular importance. Lamb production in the Karoo region is highly dependent on sufficient rain and ultimately good veldt[36] conditions to ensure compliance with the "free range" and "from the Karoo" protocols. Although the protocols allow supplementary feed[37], uncertainties and the farmers' lack of knowledge regarding this protocol bring about further costs to safeguard agreements between farmers and abattoirs. Uncertainties surrounding the environmental conditions and the supplementary feed protocols (production uncertainties) are therefore expected to make it more difficult for the farmer to commit and deliver certain quantities of lamb to the abattoir. As a result of these production uncertainties, the volumes produced for the Karoo Lamb certification mark cannot be accurately forecasted.

Hypothesis 3: *Production uncertainties increase the farmer's difficulty to commit and deliver Karoo Lamb to the abattoir*

According to Williamson (1985) and Nooteboom (1993), the (production) uncertainties surrounding a transaction are one of three factors that cause increased transaction costs and make it more difficult to transact. It is therefore expected that the more difficult it is for the farmer to commit and deliver lamb to the abattoir, the more difficult it becomes transact as a result of higher transaction costs[38] to alter agreements and to monitor compliance with the Karoo Lamb protocols.

Hypothesis 4: *The farmer's difficulty to commit and deliver lamb to the abattoir increases the transaction difficulties*

Although some studies, for example, Prokopy et al. (2008), have found the effect of farmer age and experience on transaction costs to be ambiguous, it is expected that older farmers

[36] Veldt refers to uncultivated grass and shrub land in southern Africa. Karoo veldt specifically refers to a combination of different species of indigenous wild herbs.
[37] In times of drought, farmers are allowed to provide limited amounts of supplementary feed and still market the product under the certification mark.
[38] During severe droughts, lambs might receive unlimited amounts of supplementary feed, which violates the protocols and requires additional monitoring.

with more experience will decrease the difficulties when transacting with the abattoir. Older farmers with more experience are expected to be better equipped to mitigate the costs and risks associated with the transaction, which impacts on the transaction difficulties. Moreover, specifically for the Karoo Lamb case, older farmers generally have had long-term relations with one or two preferred abattoirs, which means that long-term trust has rendered the transaction cost expenses, for example, monitoring costs, almost unnecessary.

Hypothesis 5: *Farmer age and experience has a negative effect on transaction difficulties*

Research conducted by Takeshima et al. (2010) found that transaction costs, although not always understood, had a significant negative impact on the farmers' decision to invest. In the same way, it is expected that the more difficult (as a result of costlier transactions) it is for a Karoo Lamb farmer and the abattoir to transact, the less likely the farmer is to make the reputational investment. Therefore, the higher the transaction difficulties are, the higher the farmer will perceive his investment costs to be.

Hypothesis 6: *Higher transaction difficulties lead to higher investment costs to become part of the certification scheme*

In contrast to Williamson's (1985) view that stakeholders participating in transactions are risk-neutral, in reality, transacting stakeholders can be risk averse (values a certain income more than the same income with risk or uncertainty attached), risk-neutral (indifferent between a certain income and an income that has some risk or uncertainty attached) or risk-seeking (prefers a risky or uncertain income to an equal certain income) (Hardaker et al., 2007). Farmers who are risk averse are therefore less likely to invest in a risky prospect if the expected income is uncertain, such as in the case of the certification scheme. These risk-averse farmers will furthermore almost always perceive their investment costs as being higher, compared with the farmers with risk-neutral or risk-seeking profiles.

Hypothesis 7: *Farmer risk averseness has a positive effect on the farmer's investment costs to become part of the certification scheme*

According to Bramley et al. (2009) and based on the findings of Prokopy et al. (2008), educated farmers are more likely to adopt new farming practices, including the practice of

becoming part of a collective geographic indication. It is therefore expected that farmers who are more educated will be more likely to anticipate future benefits (such as a price premium) accruing from being part of a supply chain with a geographic indication product. Farmers who are more educated will, because of their anticipation of future benefits, perceive the costs to invest in the certification scheme as less than that of their less educated counterparts.

Hypothesis 8: *Farmer education has a negative effect on the farmer's investment costs to become part of the certification scheme*

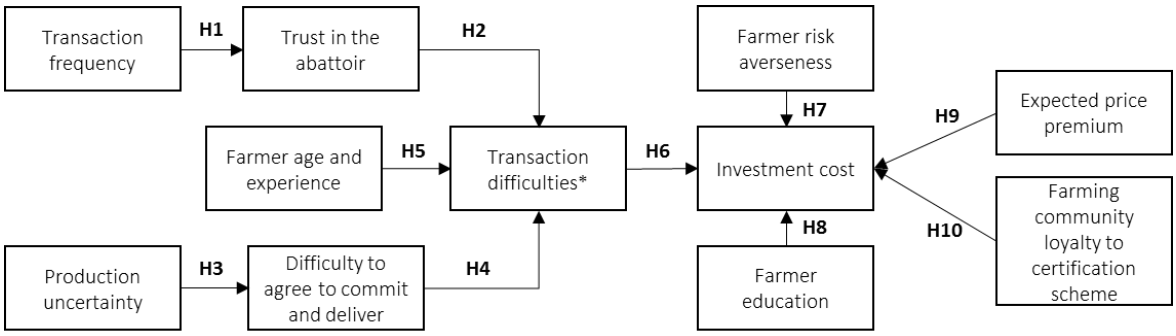
According to Klein and Leffler (1981) and Shapiro (1983), a price premium can be regarded as the return on reputational capital investment. This price premium is derived from a consumer's willingness to pay a higher price for a particular guarantee that he/she will not be deceived (Fernández-Barcala & González-Díaz, 2006). This guarantee, however, and specifically for the Karoo Lamb case, comes at a cost. The supply chain stakeholders who want to participate in the Karoo Lamb supply chain and who wants to gain from the potential future benefits of its reputational capital have to make a number of investments. These investments include application fees, annual membership fees, and monetary and time investments to make the necessary changes in production and marketing to ensure adherence to the protocols. The expectation is therefore that a higher price premium for Karoo Lamb will warrant a higher investment to become part of the certification scheme.

Hypothesis 9: *Expected price premium has a positive effect on the farmer's investment costs to become part of the certification scheme*

Loyalty and the impact of loyalty on social network participation related to branded products have received a considerable amount of attention over the past few years (Zamanian & Khanlari, 2015; Gamboa & Gonçalves, 2014). The effect of a farmer's loyalty to a collective and his/her willingness to invest have, however, received limited attention. Farmers who are loyal to the Karoo region and its certification mark are committed to delivering high-quality Karoo Lamb to the market, thereby protecting its reputational capital. According to Raynaud et al. (2005) and Klein (1996), the reputational capital of a differentiated product serves as an asset for the farmers, which can potentially yield a return on their investments in the form of a price premium. It is expected that farmers who are loyal to the protection of the Karoo

region and who collectively own the certification mark would be likely to invest in the certification scheme responsible for its protection. It is therefore expected that a loyal farmer would be more willing invest to become part of the certification scheme, compared with a farmer who is not as loyal.

Hypothesis 10: *Farmer community loyalty to the certification mark has a positive effect on the farmer's investment costs to become part of the certification scheme*



**Transaction difficulties can also refer to transaction costs*

Figure 4.2: Hypothesised path model

The proposed relational paths (Figure 4.2) between constructs, which are supported by the literature, can now be tested empirically by using the appropriate indicators summarised in Table 4.1.

Table 4.1: Summary of the constructs and the indicators

Construct/Indicator	Explanation
Transaction frequency	
BusinessFrequently	I frequently transact with my abattoir.
Trust in the abattoir	
ABBestInterest	The abattoir has my best interest at heart.
ABGoodReputation	The abattoir has a good reputation in the community.
ABTrustworthy	The abattoir with whom I do business with is trustworthy.
Production uncertainty	
UnfavWeather	Unfavourable weather conditions have no impact on your farming operations.
RegFeedlotKaroo[a]	I am allowed to market lamb from the feedlot as Karoo Lamb as the lambs are born, and are from a farm in the Karoo.
RegFinish1Month[a]	I am allowed to feed lamb in a feedlot one month before slaughtering to get the lamb market ready and still market it as Karoo Lamb.
RegLucerneFreeRange[a]	I am allowed to let lamb feed on Lucerne fields and still market it as Karoo Lamb as long as they roam the fields freely.
Difficulty to commit to deliver	

Construct/Indicator	Explanation
AgreeConditions	I find it difficult to agree on the sales conditions with the abattoir.
CommitDeliver	I find it difficult to commit to deliver to the abattoir.
Farmer age and experience	
Age[b]	How old are you?
Experience[c]	For how long have you been a sheep farmer in the Karoo?
Transaction difficulties[d]	
BetrayalSufferLoss	If my abattoir betrays our relationship in any way, I will suffer a great loss in terms of investments I had to make to build the relationship.
DifficultMonitorBehaviour	I find it difficult to monitor the behaviour of my abattoir in terms of slaughtering, weighing and grading my carcass.
SuitableTrustworthyAB	It is difficult to find a suitable and trustworthy abattoir to transact with.
Farmer risks averseness	
Concern	Other people are concerned with the amount of risk I take.
Gambler	When it comes to risk, I am a real gambler.
Uncertainty	When I think of risk, I think of uncertainty.
Farmer education	
Education[e]	Please indicate your highest qualification
Expected price premium	
PricePremium[f]	Please indicate the price premium you expect for Karoo Lamb.
Farmer community loyalty to the certification scheme	
OFDevKarooRegion	The other farmers support the development of the Karoo region
OFLoyalcertification scheme	The other farmers are loyal towards the certification mark
OFSuppKarooDemand	The other farmers support the efforts to increase the demand for Karoo Lamb
OFSuppProtectKarooName	The other farmers support the protection of the Karoo name against exploitation
Perceived certification scheme investment cost	
ChangesBusinessMarketing	I had to change the way I transact and market lambs to become a member of the certification scheme.
ChangesLambProduction	I had to change my lamb production methods to become a member of the certification scheme.
PhysicalFarmChanges	I had to make many physical on farm changes to become a member of the certification scheme.
InvestMonetary	I had to invest a lot of money to become part of the certification scheme.
InvestResearch	I had to invest a lot of time to do research to become a part of the certification scheme.

a – 1=completely disagree up to 5=completely agree (Test farmer's knowledge of Karoo Lamb protocols – poor knowledge of the protocols indicates production uncertainties as compliance cannot be guaranteed)
b – 1=30 to 39 years of age up to 5=70 years of age or older
c – 1=5 to 9 years Karoo sheep farming experience up to 5=40 years/more Karoo sheep farming experience
d – Transaction difficulties can also refer to transaction costs
e – 1=no formal schooling up to 5=post graduate university
f – 1=premium of R1/kg up to 5=more than R5/kg

4.3 Methodology

The paper used referral sampling[39], a convenience sampling method, to contact 73 farmers[40] from the population of 209 certified Karoo Lamb farmers. The interviews were conducted between June and July of 2015 and were based on structured questionnaires with mainly five-point Likert scale questions going from strongly disagree (1) to strongly agree (5).
In order to identify the factors required to stimulate farmer investment, the paper applies the partial least squares (PLS) method, initially developed by Wold (1982). This method analyses the effect of the transaction characteristics on the way in which transactions are conducted, to ultimately understand the drivers of reputational investment costs of farmers.

PLS is a structural equation modelling (SEM) technique that can develop and test relationships between latent variables by using observed variables (Hair et al., 2014; Wong, 2013). PLS-SEM is commonly used for theory development by evaluating hypothesised causal relationships between latent variables (Rigdon, 2012; Jaccard & Jacoby, 2010; Shmueli, 2010).

The effects of private and collective reputations on food markets have received considerable attention (see *inter alia* Caracciolo et al., 2016; Di Vita et al., 2013; Costanigro et al., 2012; Brentari et al., 2011). However, a thorough literature review found that the application of PLS-SEM is scarcely applied to the drivers for investments in the reputational capital of differentiated products. The application of PLS-SEM to a product such as Karoo Lamb, specifically to determine the factors that might influence a farmer to invest in its reputational capital, is therefore interesting.

4.4 Results

SmartPLS 3 was used for the analysis (Ringle et al., 2015) to identify and analyse the factors impacting on the investment cost construct to, ultimately, understand the drivers for

[39] Although the certification scheme keeps a database of their certified members, only very few farmers provided their GPS coordinates. This shortcoming made it exceptionally difficult to track down these farmers for interviews. Attempting to select and interview a random sample from the vast the Karoo region (totalling 46 million hectares) would be a lengthy and very expensive task.
[40] This is in line with the 10 times rule of thumb suggested by Barcley et al. (1995) for SEM research as well as with the more comprehensive rules of thumb of Cohen (1992).

reputational investment costs. The evaluation of the PLS-SEM results follows a stepwise approach in which the measurement model and the structural model of the path model are evaluated consecutively. An analysis of the measurement model includes an assessment of the indicator reliability (factor loadings), convergent validity (average variance extracted – AVE), internal consistency (composite reliability – CR) and discriminant validity (cross-loadings – DV and the Fornell-Larcker criterion) (Hair et al., 2014).

However, because the PLS-SEM path modelling approach applies ordinary least squares (OLS) regression, the model should be tested for collinearity (VIF values) to ensure unbiased path coefficients before evaluating the relationships. If the model shows no signs of collinearity, the path coefficients between the latent constructs can be analysed based on their degree (coefficient size), nature (coefficient sign), and significance (coefficient p-value). The model furthermore evaluates the amount of variance in the endogenous constructs that are explained by the exogenous constructs by interpreting the coefficient of determination (R^2 values). Based on previous studies (for example Han, 2009, and Chin, 1998), R^2 values greater than 0.3 are considered acceptable. Finally, the impact of the exogenous constructs on endogenous constructs should be evaluated (f^2 effect size values) as well as the model's predictive relevance (Stone-Geisser's Q^2 values) (Hair et al., 2014).

4.4.1 Measurement model results

The measurement model demonstrated internal consistency (CR>0.7), convergent validity (AVE>0.5) and discriminant validity (Table 4.2). The indicators "UnfavWeather", "BetrayalSufferLoss", "SuitableTrustworthyAB", "Uncertainty", and "InvestMonetary" had loading values slightly lower than 0.7 but were retained since their removal did not increase the internal consistency and the convergent validity of the particular construct on which these indicators loaded (Hair et al., 2014). The evaluation of the Fornell-Larcker criterion and the cross-loadings of the indicators supported the discriminant validity of the modelled constructs (Table 4.2).

Table 4.2: Summary of the measurement model's reliability, consistency and validity

Construct	CR	AVE	DV
Transaction frequency	1.000	1.000	NA
Trust in the abattoir	0.903	0.757	Yes
Production uncertainty	0.829	0.550	Yes
Difficulty to commit to deliver	0.895	0.810	Yes
Farmer age and experience	0.927	0.864	Yes
Transaction difficulties	0.765	0.522	Yes
Farmer risk averseness	0.793	0.564	Yes
Farmer education	1.000	1.000	NA
Expected price premium	1.000	1.000	NA
Farmer community loyalty to certification scheme	0.907	0.715	Yes
Perceived certification scheme investment cost	0.868	0.573	Yes

Note: CR – composite reliability; AVE – average variance extracted; DV – discriminant validity. NA – Single indicator constructs are not interpreted based on reliability and validity

4.4.2 Structural model results

The structural model showed no sign of collinearity (VIF<5). The average variances explained for "difficulty to deliver" (R^2=0.565), "transaction difficulties" (R^2=0.438), and "perceived certification scheme investment cost" (R^2=0.349) are significantly higher than the acceptable value of 0.3. Although "trust in the abattoir" (R^2=0.223) yielded a relatively low R^2 value, the construct was retained due to the exploratory nature of the structural model.

The structural model, furthermore, demonstrates strong effects (f^2 values) between "production uncertainty" and "difficulty to commit and deliver" (f^2=1.329), "difficulty to commit and deliver" and "transaction difficulties" (f^2=0.493), and between "transaction frequency" and "trust in the abattoir" (f^2=0.305). The medium and small effects included "trust in the abattoir" and "transaction difficulties" (f^2=0.170), and "farmer age and experience" and "transaction difficulties" (f^2=0.069), "education" and "investment costs" (f^2=0.106), and "transaction difficulties" and "investment costs" (f^2=0.102).

Lastly, the model demonstrates predictive relevance between the exogenous constructs and the endogenous constructs. The construct "difficulty to commit to deliver" showed the highest predictive relevance (Q^2=0.365), followed by "transaction difficulties" (Q^2=0.161),

"trust in the abattoir" (Q^2=0.159), and "investment costs" (Q^2=0.135) which provide support for the model's predictive relevance.

4.4.3 Evaluating the research hypotheses

The hypothesised relationships between the latent constructs were tested and evaluated. The majority of the relationships between the latent constructs are relatively strong and significant (Table 4.3).

Table 4.3: Results summary of the hypothesised relationships

	Hypotheses	Coefficient	p-value	Result
H1	Transaction frequency has a positive effect on trust in the abattoir	0.483	0.002***	Confirmed
H2	Trust in the abattoir reduces the transaction difficulties	-0.305	0.091*	Confirmed
H3	Production uncertainties increase the farmer's difficulty to commit and deliver Karoo Lamb to the abattoir	0.755	0.000***	Confirmed
H4	The farmer's difficulty to commit and deliver lamb to the abattoir increases the transaction difficulties	0.522	0.002***	Confirmed
H5	Farmer age and experience has a negative effect on transaction difficulties	-0.194	0.025**	Confirmed
H6	Higher transaction difficulties lead to higher investment costs to become part of the certification scheme	0.276	0.035**	Confirmed
H7	Farmer risk averseness has a positive effect on the farmer's investment costs to become part of the certification scheme	0.255	0.026**	Confirmed
H8	Farmer education has a negative effect on the farmer's investment costs to become part of the certification scheme	-0.279	0.050**	Confirmed
H9	Expected price premium has a positive effect on the farmer's investment costs to become part of the certification scheme	0.167	0.138NS	Not confirmed
H10	Farmer community loyalty to the certification mark has a positive effect on the farmer's investment costs to become part of the certification scheme	0.212	0.045**	Confirmed

** Significant at 0.1 level; ** Significant at 0.05 level; *** Significant at 0.01 level; Not significant (NS)*

By confirming the hypothesised relationships, the PLS-SEM approach found significant positive relationships between "transaction frequency" and "trust in the abattoir" (β=0.483; p-value=0.002), "production uncertainty" and "difficulty to commit to deliver" (β=0.755; p-value=0.000), and between "difficulty to commit to deliver" and "transaction difficulties" (β=0.522; p-value=0.002). Therefore, the more a farmer transacts with the abattoir, the higher the transaction frequency will be, which ultimately results in a higher level of trust in the abattoir. Moreover, the higher the production uncertainties are regarding the quantity or quality of lamb marketed to the abattoir (influenced by weather-related

uncertainties or uncertainties surrounding the Karoo Lamb protocols), the more difficult it becomes for the farmer to commit to delivering lamb to the abattoir, which ultimately increases the transaction difficulties.

The PLS-SEM approach also found significant negative relationships between "trust in the abattoir" (β=-0.305; p-value=0.091), "farmer age and experience" (β=-0.194; p-value=0.025) and "transaction difficulties". As hypothesised, this higher level of trust in the abattoir ultimately makes it easier for the farmer to transact with the abattoir. In addition, older and more experienced farmers are generally better equipped to optimally manage the difficulties (whether cost related or not) that may arise from transacting with the abattoir.

Based on the interpretation of the PLS-SEM bootstrapping analysis, hypothesis 9 (expected price premium has a positive effect on the farmer's investment costs to become part of the certification scheme) cannot be confirmed at a 10 % level of significance. This suggests that the price premium that farmers expect to gain from marketing Karoo Lamb does not affect the perceived costs of investing in, or committing to, the certification scheme as much as was initially anticipated. This ambiguous result might be attributable to the relatively recent introduction of the certification scheme and the fact that many farmers are yet to receive price premiums.

The PLS-SEM approach confirmed the other hypothesised relationships and found significant positive relationships between "transaction difficulties" (β=0.276; p-value=0.035), "farmer risk averseness" (β=0.255; p-value=0.026) "farmer community loyalty to the certification scheme" (β=0.212; p-value=0.045) and "investment costs". The PLS-SEM results revealed a significant negative relationship between "farmer education" and "investment costs" (β=-0.279; p-value=0.050). These hypotheses indicate that the farmer's perceived cost to invest in the certification scheme is influenced by the cost to transact with the abattoir, the farmer's level of risk averseness, the farmer community's loyalty towards the certification mark, and the farmer's level of education.

The evaluation of the structural model and the related hypotheses revealed "farmer education" and "transaction difficulties" as the constructs with the strongest relationships with "investment costs". The "transaction difficulties" construct is of particular importance

since it is one of the few constructs that can be managed. The difficulties in transacting can be managed by managing the various attributes attached to the transaction, to reduce the farmers' investment costs, thereby, implicitly, encouraging farmers' investments.

4.5 Discussion and conclusion

The PLS-SEM approach revealed trust in the abattoir and farmer age and experience as having a significant but negative relationship with the transaction difficulties. This means that the more the farmer trusts the abattoir, the easier it is for the farmer to transact with the abattoir. Older farmers with more experience also find it easier to transact with the abattoir. The construct difficulty to commit and deliver revealed a significant negative relationship with transaction difficulties. This negative relationship implies that the more difficult it is to commit to delivering lamb to the abattoir (owing to a drought and/or a deviation in the protocol), the more difficult it is to transact with the abattoir as a result of increased monitoring to ensure compliance with the protocols.

Following the evaluation of the factors influencing the transaction difficulties construct, alternative factors that influence a farmer's investment costs to join the certification scheme of a product with a geographical indication was identified. The identification of these factors is critical since the higher the farmer's investment costs are, the less likely he/she will be to invest in the reputation of a geographical indication. The construct farmer education had a significant negative relationship with investment costs. More educated farmers, therefore, perceive the investment in a differentiated lamb supply chain as being lower, compared with less educated farmers.

The remaining constructs showed significant positive relationships between farmer risk averseness and investment costs and farmer community loyalty to the certification scheme and investment costs. More risk-averse farmers, therefore, perceive their investment costs in the certification mark as being higher, compared with the more risk-neutral or risk-seeking farmers. The farmers who are loyal to the certification scheme are expected to invest in the certification scheme, and their investment costs are therefore expected to be higher, compared with those who are not loyal and consequently decided not to be part of the certification scheme. Moreover, a positive and significant relationship was also found

between transaction difficulties and investment costs. When evaluating the relationship between the farmer and the abattoir, it became clear that the more difficult it is for the farmer to transact with the abattoir, the higher the farmer's investment costs would be, and the less likely he will be to invest in the certification scheme.

In order to stimulate farmers' investments in the reputation of a product with a geographical indication, such as Karoo Lamb, the relevant stakeholders should focus on reducing the farmers' reputational investment costs. A reduction in the investment costs can be accomplished by promoting farmer education and providing information sessions regarding the certification mark. This strategy is expected to reduce the feeling of riskiness when investments in the reputational capital of Karoo Lamb are considered. From a managerial perspective, the transaction difficulties construct was identified as being the most influential for reducing investment costs.

The complexity of the transaction difficulties construct allowed for the evaluation of this construct to identify farmer age and experience, trust in the abattoir, and difficulty to commit and deliver as being the most influential factors. By focusing on these influencers, informed strategic decisions can be made to enhance business relationships, and stimulate easier and less costly transactions, and as a result, higher investments. A good working relationship between the abattoirs and farmers is therefore imperative. The certified abattoirs can also encourage the older, more experienced farmers to engage with the younger, less experienced farmers. This interaction is expected to stimulate the transfer of business knowledge to ultimately lead to simpler and less costly transactions between younger farmers and the abattoir.

4.6 Recommendations for future research

The paper set out to contribute empirically to the field of transaction cost economics and made many exciting discoveries. The paper provides insights into the primary drivers linked to a farmer's investment costs in the collective reputation of a product with a geographical indication. The research on Karoo Lamb revealed that a farmer's level of education and the transaction difficulties are important considerations for achieving increased investments in the reputation of Karoo Lamb. Moreover, it was found that the transaction difficulties are

mainly driven by the trust that the farmer has in the abattoir and the difficulties that the farmer faces when lamb should be delivered to the abattoir under a particular set of production uncertainties. By incorporating the relationship and the level of trust, between the farmer and the abattoir, the farmer's level of experience, as well as the production uncertainties, the paper address some of the main criticisms of transaction cost economics.

Even though a positive relationship between a risk-averse farmer and investment costs was found, more research is needed to establish the extent to which a risk-averse farmer will perceive his/her investment costs to be higher, compared with that of a risk-neutral or risk-seeking farmer.

The study serves as a useful point of departure for the expansion of the factors that drive transaction costs. Some of the indicators had poor loadings and were therefore excluded from the final model. This resulted in many of the constructs having single indicators which are not ideal. Future research should, therefore, focus on expanding the set of indicator variables for the frequency, and premium (or in a more general sense, the return on investment) constructs.

By extending the research to other differentiated products in other countries, interesting findings in terms of the difficulty to execute transactions are sure to surface. The difficulty to execute transactions is very much related to the transaction costs. These costs are influenced by uncertainties and trust between stakeholders that are in fact factors of human behaviour shaped by the different institutional environments in which they operate. The paper could furthermore be expanded to other differentiated products. For example, Prosciutto di Parma, to determine whether or not the drivers for reputational investments differ for established versus novel geographical indication products such as Karoo Lamb.

Although the impact of reputation on supply chain relationships has been extensively researched, the paper acts as an attractive point of departure for future research on the costs (monetary and otherwise) to invest in the reputation of a collectively owned differentiated product. Future research can also expand the focus of the paper to include the perceived costs of abattoirs and other stakeholders in the supply chain, to invest in the reputations of collectively owned differentiated products. This is important since the product's reputation

is not only built and vulnerable to misconduct at the farm level but throughout the supply chain.

The inclusion of other stakeholders will reveal whether or not the same drivers affect the investment costs and ultimately the investment decision of all stakeholders in a supply chain. This is particularly important when considering the hold-up problems related to asset-specific investments. In cases where both parties are equally locked into the transaction (i.e. both parties have equal investments in the reputation of the product), hold-up problems are less likely to occur. Comparing the investments of different stakeholders in the reputational capital of a product with a geographical indication will, therefore, inform the custodians of the quality signals to ensure relatively equal investments to safeguard not only the product but also the stakeholders against hold-up or sunk costs as a result of relationship termination.

Chapter 5:

Aligning enforcement and governance mechanisms towards a more streamlined South African Karoo Lamb supply chain[41]

"Alone we can do so little, together we can do so much."
(Keller, 1984)

5.1 Introduction

According to Williamson's (1985) discrete alignment principle, in Ménard and Shirley (2005), "calculative agents operating in a competitive environment will adopt the mode of organisation [governance mechanism] that fits comparatively better with the attributes of the transaction at stake." The governance mechanisms selected to coordinate a supply chain will, therefore, depend on the degree to which the transaction attributes (asset specificity, uncertainty, and frequency) matter, and on the extent to which opportunism and other contractual hazards are present (Hobbs & Young, 2000).

Of these attributes, the uncertainty attribute often requires, especially in food supply chains,[42] the implementation of quality management systems (refer to Wever et al., 2010 for a detailed explanation of these systems) since consumers do not automatically know the quality of a product (Akerlof, 1970). Unfortunately, these quality management systems also increase the associated transaction costs and may lead to economic losses. Based on the findings of Ghosh and John (1999), Raynaud et al. (2005) discovered that different types of quality management systems affect the attributes of the transactions,[43] and ultimately the cost of transacting, in various ways. In an attempt to limit the impact of quality management systems on transaction costs, the use of different governance mechanisms is proposed.

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41 This chapter will be submitted to an accredited journal for publication.
42 These quality management systems are expected to be implemented especially in food supply chains because of the demands of final consumers for quality management systems following recent food crises (Van Plaggenhoef, 2007).
43 The implementation of a quality management system tends to reduce uncertainty, but might increase the asset specificity associated with the transaction.

According to Raynaud et al. (2005), brands, where consumer confidence is supported by reputational capital, are likely to be governed by hierarchical mechanisms. On the other hand, brands, where the source of credibility is public certification, are likely to be governed by market-like mechanisms. Relevant to the current paper and in line with the findings of Raynaud et al. (2005), Wever et al. (2010) find that publically supported quality management systems do not need hierarchical governance mechanisms. Wever et al. (2010) went further to highlight the important link between the governance and enforcement mechanisms for the success of food supply chains. According to Wever et al. (2010), a misalignment between quality management systems and governance mechanisms might not only lead to inefficient quality management systems as a result of higher transaction costs but also to inferior quality final products.

Governance mechanisms (also known as governance structures or contracts) are typically clustered into three main types; market governance, hybrid governance, and hierarchical governance forms (for a detailed review, see Gellynck & Molnár, 2009). A market-type governance mechanism is usually the lowest cost producer of a good or service. With supply and demand at the core, market governance is preferred when transaction costs are low. At the other extreme of the governance continuum, hierarchical governance mechanisms (or systems of vertical integration) are selected to integrate transactions when transaction costs are high, and greater control is required for successful exchange (Williamson, 1991). Hybrid governance mechanisms fall between these polar mechanisms, by simultaneously displaying market-like and hierarchy-like characteristics (Makadok & Coff, 2009), thus enabling supply chain stakeholders to deal with mutual dependence without going as far as integration (Ménard, 1996). In addition to market and hierarchical governance, and building on the work done by other scholars, Gellynck and Molnár (2009) also included; non-contractual relationships (relational contracts) with non-qualified partners, non-contractual relationships (relational contracts) with qualified partners, contractual relationships (formal contracts), relation-based alliances, and equity-based alliances in their typology.[44]

[44] Table 5.5 contains a summary of the details pertaining to these governance mechanisms.

This paper aims to build on the work done by Raynaud et al. (2005) and Wever et al. (2010) by making an empirical contribution to the knowledge base of governance mechanisms. This contribution focuses on the alignment of the mechanisms that govern a South African differentiated lamb supply chain with the mechanisms needed to enforce the quality attributes of the product. The paper sets out to understand the way in which supply chain transactions of a lamb product with a geographical indication, such as Karoo Lamb, are governed. The objective is to examine how the mechanisms that enforce the quality and origin of the lamb product are aligned with the governance mechanisms between supply chain stakeholders. Following this evaluation, the paper aims to recommend alternative governance and enforcement mechanisms towards attaining a more streamlined Karoo Lamb supply chain.

5.2 Background to the Karoo Lamb case

The exceptional quality and unique taste[45] of lamb produced in the Karoo region[46] of South Africa has been part of the South African heritage for as long as there have been farmers in the Karoo region. The assumed quality of the lamb products from the Karoo region means that the Karoo name has considerable value and significant marketing potential waiting to be tapped into. It is precisely this potential that makes the Karoo name much sought after, even by retailers, butcheries and restaurants with little or no link to the Karoo region (Kirsten et al., 2008).

Driven by an increased concern over the misappropriation of the words “Karoo Lamb”, the Karoo Lamb producers had collectively, in 2011, taken the initiative to register the Karoo Meat of Origin certification mark under existing trademark laws in South Africa. The Karoo Meat of Origin certification scheme (the certification scheme) seeks to guarantee that the lamb product originates from the Karoo region, is raised under free-range conditions with good animal practices in mind, without the provision of routine antibiotics and hormones, and is supported by a full farm-to-fork traceability system (KMOO, 2016a).

45 The lamb graze on different species of wild herbs that provide a distinct taste to the meat.
46 Flat semi-arid area with dry shrubland stretching north-eastwards from the Cape (typically far from urban areas) and covers approximately 50 % of the total area of South Africa (Le Roux, Kotzè & Glen, in Kirsten et al., 2008).

Since the establishment of the Karoo Lamb certification scheme, 209 Karoo farmers (farming on about two million hectares) have been certified. Further down the supply chain, five abattoirs, four processors and/or packers, 17 butcheries and one retail chain are certified to use the certification mark. The standards and requirements that participating stakeholders need to adhere to are summarised in Table 5.1.

Table 5.1: Karoo Meat of Origin standards and requirements

Stakeholder	Karoo Meat of Origin standards and requirements
Farmer	• At least two of the six[47] Karoo shrub species should be present on at least 60 % of the farm area. • Pastures should be well managed to prevent overgrazing and camps should be fenced. • Adherence to the Code of Practice of Good Stockmanship, Animal Welfare Practice, and the Animal Protection Act (Act 71 of 1962). • Sheep should feed freely from indigenous Karoo veldt, roam freely in sizable camps, and have access to clean cold and fresh water. • The occasional use of supplementary feed is allowed within reasonable measure. • When sheep are transported, trucks should not be overloaded and should be free from any hazards. • Movement of animals to abattoirs or between farms should be recorded. • Sheep carcasses of class A, AB, B and C, fat classes 1 to 6, and carcass conformation 3 to 5 qualify for certification as Karoo Meat of Origin.
Abattoir	• Should be a sheep-slaughtering abattoir in the Karoo. • Should be registered with the South African Red Meat Abattoir Association. • Traceability systems should be in place that is able to trace the carcass back to the farm of origin. • Carcasses should be safe, of consistent high quality, and should meet all legal requirements as set out by South African law.
Processor/ Packer/ Retailer	• Not limited to the Karoo region. • Should comply with the Food Premises Regulation. • Products should be safe, hygienically processed, of consistent high quality, and should meet all legal requirements as set out by South African law. • Traceability systems should be in place that is able to trace the carcass back to the slaughtering abattoir and processing plant as well as the farm of origin. • The registered Karoo Meat of Origin label should be accurately applied to the packaging.

Source: KMOO, 2016a

Based on the work done by Raynaud et al. (2005), the Karoo Lamb certification mark can in many instances be regarded as similar to the European Union's protected designation of origin (PDO) brands (Table 5.2).

[47] The six Karoo plant species are: *Plnthus karrooicus*, *Pentzia spincescens*, *Eriocephalus ericoides*, *Salsola glabrescens*, *Pentzia incana* and *Pieronia glauca/rosenia humilis* (Kirsten et al., 2008).

Table 5.2: Comparing Karoo Lamb with PDO brands

	PDO brands	Karoo Lamb
Quality signal	Regular quality level and geographical origin	Regular, uniform quality level and geographical origin
Quality standard	Yes and owned by the state (protected by European regulation)	Yes and collectively owned by the users (protected by intellectual property rights)
Quality enforcement	Public certification	Public certification by third party and reputation as collateral

Source: Adopted from Raynaud et al., 2005

It is similar in the sense that the Karoo Lamb system (i) contains uniform quality specifications, (ii) stipulates a particular geographical origin (the Karoo region), (iii) is protected by the State as a trademark under the South African Companies and Intellectual Property Commission, as well as at the South African Department of Agriculture, Forestry and Fisheries under the Agricultural Products Standards Act (Act 119 of 1990), (iv) is collectively owned by the users of the certification mark, and (v) enforces the quality standards by means of a State appointed assignee,[48] who is remunerated by the members of the collective.

The success of Karoo Lamb relies on efficient monitoring mechanisms for every transaction in the supply chain to ultimately ensure the quality and origin of the final product in order to realise a price premium. This is particularly important when asymmetric information on the quality and origin of the product exists. A State-appointed third party is responsible for the enforcement of the quality and origin standards by monitoring the supply chain stakeholders for compliance with the standards and requirements which are set out in Table 5.1.

Generally, the use of State-appointed assignees is, in principle, a sound way of effectively managing quality and origin standards. However, because the budget allocated for the enforcement of these regulations falls short, the State depends on members of the collective (farmers, abattoirs, processors and/or packers, and retail outlets) to pay the assignee to enforce the quality and origin standards. This means that, as long as the assignee is paid, the supply chain stakeholders will be monitored for compliance with standards and will retain their right to sell the specific product.

[48] The most important South African assignees are SAMIC (red meat), PROKON (fresh produce) and PPECB (export products).

The problem with this lies in the incentive structure. By making the supply chain stakeholders responsible for providing the enforcement incentive, the assignees are incentivised to do 'light' inspections in order to retain their clients (and their financial stability), as opposed to strict monitoring. This 'light' monitoring means that consumers, still, have no absolute guarantee of the quality and origin of the particular product. The same situation holds true for the Karoo Lamb supply chain.

In addition to light monitoring, the tight budget means that widely dispersed farmers are often overlooked, and the monitoring and enforcement of standards are focused on the processing levels. Moreover, according to Du Plessis and Du Rand (2012), consumers regard price as the most important attribute, followed by food safety, quality, and then origin when it comes to Karoo Lamb. The State is therefore incentivised to protect those food attributes that are important to consumers, namely food safety and quality. Since food safety and quality problems mainly arise after the farm gate, the enforcement of these attributes mainly occurs at the abattoir and processing stages. Therefore, it seems that although the State-appointed third party is relatively successful in monitoring the abattoirs, processors and/or packers, and retail outlets for compliance, the same cannot be said of the Karoo farmers. The more rigid auditing process of the State-assigned third party during the processing stages of lamb is indicative of a flawed system. The system seems to currently be geared to prevent food safety risks and only ensure quality after the farm gate, without much concern for the product's origin.

Based on the similarities between the Karoo Lamb certification mark and the European PDO brands (Raynaud et al., 2005), the Karoo Lamb supply chain, where consumer confidence is supported by public certification, is expected to be governed by market-like mechanisms. This analogy is investigated in more detail by examining how the mechanisms that enforce the quality and origin of Karoo Lamb are aligned with the mechanisms that govern supply chain.

5.3 Methodology

In order to understand the governance and enforcement mechanisms that govern the Karoo Lamb supply chain, data was collected from various supply chain stakeholders. During June and July of 2015, 73 farmers[49] from the population of 209 certified Karoo Lamb farmers were contacted by way of referral sampling, a convenience sampling method and interviewed on their Karoo farms.[50]

The mechanisms that are in place to govern the Karoo Lamb supply chain were measured in much the same way as by Raynaud et al. (2005) and Wever et al. (2010). This evaluation included semi-structured questions regarding the types of agreements that the various supply chain stakeholders have with one another. During the same time, five certified abattoirs that slaughter Karoo Lamb were also interviewed. The Karoo Lamb product was followed downstream, and data was collected from two certified processors and/or packers and five retail outlets to enable an evaluation of the Karoo Lamb supply chain. The enforcement mechanisms, on the other hand, were investigated by means of a combination of semi-structured questions and a conjoint experiment to examine the current and preferred enforcement mechanisms at the various supply chain stages.

5.3.1 Methodological approach: Enforcement mechanisms

As a result of the 'light' monitoring conducted by the State-appointed assignee, the quality and origin standards of Karoo Lamb are currently poorly enforced, specifically at the farm level. Alternative monitoring mechanisms are therefore investigated by using a conjoint experiment to test, specifically the Karoo farmers'[51] preference, for alternative monitoring and enforcement mechanisms.

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49 This is in line with the 10-times rule of thumb suggested by Barcley et al. (1995) for SEM research, as well as with the more comprehensive rules of thumb of Cohen (1992).

50 Although the certification scheme keeps a database of its certified members, very few farmers have provided their GPS coordinates. This shortcoming made it exceptionally difficult to track down these farmers for interviews. Attempting to select and interview a random sample from the vast Karoo region (totalling 46 million hectares) would be a lengthy and very expensive task.

51 The farmers are the only supply chain stakeholders that participated in the conjoint experiment since they are the only group of stakeholders with a large enough sample to warrant a conjoint experiment.

According to Johnson (1985), a conjoint analysis is a quantitative marketing research method that can be used to measure consumer perceptions and preferences. It enables the researcher to model consumer trade-offs between products or services with multiple attributes, just as the consumer presumably does in reality (Padberg et al., 1997). A conjoint experiment, therefore, measures the relative importance that consumers attach to each product attribute, as well as the utility that consumers attach to the different attribute levels (Malhotra, 1996; Tull & Hawkins, 1993). Before a conjoint experiment can be conducted, the following assumptions should be allowed for: (i) products can be specified by a set of attributes, (ii) product variations can be created by varying attribute levels, (iii) total utility is a function of the utilities contributed by each attribute level, (iv) consumers base their preferences on their derived utility from each attribute level, (v) preferences are made based on tradeoffs between attribute-level combinations (Ness & Gerhardy, 1994).

According to Hair et al. (1995), conjoint analyses have been used extensively in the evaluation of consumer preferences for hypothetical products in food-related marketing research (see *inter alia* Vermeulen et al., 2007; Murphy et al., 2000; Baker, 1999; Van der Pol & Ryan, 1996). This paper, however, aims to adapt the conjoint experiment for a non-conventional application. The conjoint experiment is devoted to better understand the relative importance that Karoo farmers attach to incentives, monitoring mechanisms, and penalties when participating in the Karoo Lamb supply chain.

The conjoint experiment is developed around three essential characteristics required for ideal quality enforcement mechanisms to successfully govern the Karoo Lamb supply chain, and ultimately protect the authenticity of the product. These attributes are the incentive or the price premium received by the stakeholder for one kilogramme of Karoo Lamb; the mechanism utilised to monitor the supply chain stakeholders to ensure compliance with the standards, and the penalty to be imposed on non-complying stakeholders (summarised in Table 5.3).

Table 5.3: The selected levels for each attribute[52]

Attribute	Attribute levels
Incentive[53]	Level 1: R0/kg price premium Level 2: R2/kg price premium Level 3: R3/kg price premium
Monitoring	Level 1: Monitored for compliance with every Karoo Lamb delivery Level 2: Monitored for compliance once a year Level 3: Monitored for compliance during times of drought
Penalty	Level 1: Expelled for three years for non-compliance Level 2: Expelled for five years for non-compliance Level 3: Expelled forever for non-compliance

Following detailed discussions with industry experts[54] and other Karoo Lamb supply chain stakeholders, it was decided to use R0/kg, R2/kg, and R3/kg. Most of the farmers receive a price premium for Karoo Lamb; 20 % receive anything between R1 and R1.70/kg, and 31 % receive R2/kg. However, a substantial 49 % of the farmers receive no premium at all. Upon conversing with the farmers and abattoirs, a R3/kg premium for Karoo Lamb was often mentioned as the "golden number". Moreover, an acceptable price premium for Karoo Lamb, revealed by the surveyed farmers, also hovered around R3/kg.

The monitoring attribute was specified as monitored once a year, monitored during times of drought, and monitored with every delivery. Currently, the certification scheme audits farmers every four years (with the promise of random audits every year) for compliance, while abattoirs, processors and/or packers, and retail outlets are audited annually to ensure compliance with the protocol (KMOO, 2016a). This rendered the inclusion of monitoring once a year necessary. After considering the current monitoring mechanisms set out by the certification scheme and conversing with industry experts, it was evident that the authenticity of the Karoo Lamb product is at its most vulnerable during times of drought.[55] One of the attribute levels was therefore to only monitor stakeholders, particularly the Karoo farmers, during times of drought. However, to ensure the authenticity of Karoo Lamb with one

52 These attributes were developed based on interviews with industry experts and other Karoo Lamb supply chain stakeholders.
53 Exchange rate of R13.65/USD (08/08/2016).
54 The industry experts included an experienced researcher in the lamb supply chain, the chairperson of the Karoo Meat of Origin certification scheme, the chairperson of the Karoo Development Foundation, and the manager of one of the Karoo Lamb abattoirs.
55 During times of drought, lambs might need supplementary feed. According to the Karoo Lamb protocols, 300g of supplementary feed per lamb per day is allowed. However, farmers might be providing feed in excess of this allowance, especially during times of severe droughts. The fact that farmers do not record the supplementary feed provided is even more troubling.

hundred per cent certainty, every batch of Karoo Lamb delivered should ideally be monitored.

In terms of penalising non-compliant stakeholders, the certification scheme basically has two measures in place, one for serious deviations in the protocol and one for slight deviations. In the case of a serious default, the certification will be revoked with immediate effect, and the stakeholder will have to reapply for certification. For minor misdeeds, a request to correct the mistake will be issued, together with a follow-up audit without any major consequences. However, if the mistake has not been rectified, the certification will then be revoked (KMOO, 2016a). Shockingly, 94.5 % of the farmers are unaware of any penalties being imposed for non-compliance. Notwithstanding the penalties set out by the certification scheme, the discussions with industry experts revealed the need for more stringent penalties. The levels for the penalty attribute were therefore identified as; expel for three years, expel for five years, and expel forever.

The total number of hypothetical scenarios for the experiment was 27, three attributes with three levels each. The 27 scenarios were reduced to a fractional factorial design of nine scenarios by means of the Orthogonal Design procedure to make the conjoint experiment more manageable for the surveyed farmers (summarised in Table 5.4).

The full-profile approach was selected for this conjoint analysis, and a user-friendly rank order method was chosen to measure the preferences of the farmers. The farmers were asked to rank the nine options from most preferred (1) to least preferred (9) during an in-depth interview, after which the data were coded and analysed in IBM SPSS Statistics 24.

Table 5.4: The 9 enforcement mechanism scenarios derived from the Orthogonal Design

Option	Incentive attribute	Monitoring attribute	Penalty attribute
1	R3/kg price premium	Monitored for compliance with every Karoo Lamb delivery	Expelled forever for non-compliance
2	R3/kg price premium	Monitored for compliance once a year	Expelled for three years for non-compliance
3	R0/kg price premium	Monitored for compliance during times of drought	Expelled forever for non-compliance
4	R0/kg price premium	Monitored for compliance with every Karoo Lamb delivery	Expelled for three years for non-compliance
5	R2/kg price premium	Monitored for compliance with every Karoo Lamb delivery	Expelled for five years for non-compliance
6	R3/kg price premium	Monitored for compliance during times of drought	Expelled for five years for non-compliance
7	R2/kg price premium	Monitored for compliance during times of drought	Expelled for three years for non-compliance
8	R2/kg price premium	Monitored for compliance once a year	Expelled forever for non-compliance
9	R0/kg price premium	Monitored for compliance once a year	Expelled for five years for non-compliance

The analysis of the conjoint results was based on the following additive conjoint model:

$$Y_k = \sum_{j=1}^{J} \sum_{m=1}^{M} \beta_{jm}\, x_{jm}$$

where

Y_k: estimated total utility for product scenario k

C: constant

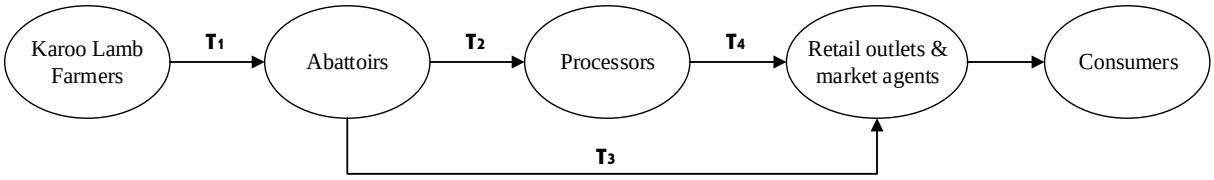
β_{jm}: partial utility for attribute level m of attribute j

X_{jm}: 1 if scenario k has an attribute level value m for attribute j,
0 if else.

5.3.2 Methodological approach: Governance mechanisms

In order to understand the mechanisms that govern the Karoo Lamb supply chain, the paper employs the same approach as Raynaud et al. (2005), and Gellynck and Molnár (2009), by utilising the transactional model.[56] This model disaggregates the Karoo Lamb supply chain into the following dyadic transactions (Figure 5.1) and then fits each transaction with a set of determining variables and ultimately a specific governance mechanism:

- Transaction between Karoo farmers and abattoirs (henceforth referred to as T1)[57]
- Transaction between abattoirs and processors (T2)
- Transaction between abattoirs and retail outlets (T3)
- Transaction between processors and retail outlets (T4)



Note: Retail outlets encompass retailers, butcheries and deli's

Figure 5.1: Karoo Lamb supply chain with transaction numbers

Following the decomposition of the Karoo Lamb supply chain, the responses from the various supply chain stakeholders are matched with the determining variables included in Gellynck and Molnár's (2009) governance mechanism typology (summarised in Table 5.5). By matching the responses to the determining variables, it is possible to identify the typical governance mechanisms that govern each transaction in the Karoo Lamb supply chain.

The governance typology includes spot market (S) and vertical integration (VI) on the two polar ends, and five intermediate forms that are applicable to food chains (Gellynck and Molnár, 2009). These intermediate forms include; non-contractual relationship with a non-

[56] This transactional model integrates five transactions: T1 – the transaction between farmers and their input suppliers, T2 – the transaction between farmers and the first processing stage, T3 – the transaction between the first and second processing stage, T4 – the transaction between the last processing stage and wholesalers, and T5 – the transaction between the wholesalers (or the last processing stages) and retailers (or retail chains).

[57] Since the Karoo Lamb supply chain relies on free range production practices on natural Karoo vegetation, input suppliers are omitted from the transactional model.

qualified partner (S+), non-contractual relationship with a qualified partner (S++), contractual relationship (C), relation-based alliance (RB), and equity-based alliance (JV). After a thorough literature review, Gellynck and Molnár (2009) identified the following nine variables used to explain the various governance mechanisms; "irrelevance of identity", "length", "ex-ante restriction on the choice of partner", "written contract", "contract specifications", "resource sharing", "joint forces for mutual benefits", "focus of control", and "intensity of control".

Table 5.5: Governance mechanisms and their determining variables

	Spot market (market)	Non-contractual relationship		Contractual relationship	Relation-based alliance	Equity-based alliance	Vertical integration (hierarchy)
		with a non-qualified partner	with a qualified partner				
	S	**S+**	**S++**	**C**	**RB**	**JV**	**VI**
Irrelevance of identity	Yes	No	No	No	No	No	No
Length	Short	Medium	Long	Long	Long	Long	Long
Restriction on the choice of partner	No	No	Yes	No	No	Yes	Yes
Written contract	No/Yes	No	No	Yes	No/Yes	Yes	Yes
Contract specifications	Price	General terms and relational objectives	General terms and relational objectives	All or part of each party's obligation	All or part of each party's obligation	Alliance agreement	Governance structure
Resource sharing	Owns own resources	Owns own resources	Owns own resources	Owns own resources	Owns own resources	Each party put resources into new entity	Common ownership
Joint forces for mutual benefit	No	No	No	No	Yes	Yes	Yes
Intensity of control	Low	Low	Low	Moderately Low	Moderate	Moderately high	High
Focus of control	Immediate transaction	Relationship	Relationship	Contract terms	Relationship	Property rights of stakeholders in limited joint entity	Property rights of stakeholders in full entity

Source: Adapted from Gellynck and Molnár, 2009

5.4 Understanding the mechanisms that enforce quality and origin

The data support the notion that the State-appointed third party is relatively unsuccessful when it comes to the monitoring of the Karoo farmers for compliance with quality and origin standards. Surprisingly, the data reveals that 85 % of the farmers believe that they are not monitored for compliance following that initial audit, prior to certification. A mere 15 % of the farmers, although they are somewhat unsure, believe that they are monitored by their abattoirs and their livestock agents for compliance with the Karoo Lamb standards. Of the surveyed farmers, 32.8 % were due for an announced audit by the State-assigned independent third party. Shockingly, none of these farmers knew about this audit, and none of them has been contacted for a follow-up audit at the time of the survey. However, as expected, the abattoirs, processors, and retail outlets confirmed that they are aware of the annual audits and that these audits were indeed being conducted. The recently certified retail outlets were aware that they could be randomly audited at any time.

The conjoint experiment revealed certain alternative solutions that could be applied, specifically at the farm level, to ensure the credibility of the Karoo Lamb product. Before the conjoint analysis was evaluated, the data were assessed for validity (Hair et al., 1995). The external validity (the representativeness of the sample to the research study population) of the sample was confirmed, with 34.9 % of the population being represented by the surveyed sample. Kendall's tau-b correlation coefficient was used to measure the strength and direction of the relationship between the observed and estimated rank order variables with a view to assessing the internal validity (the fit of the model to the data) of the conjoint results. The Kendall's tau-b coefficient was statistically significant at a 1 % probability level of significance for all the farmers who participated in the research. Moreover, the joint Kendall's tau-b coefficient (0.898) is indicative of a representative model. The entire sample of 73 farmers was therefore included in the conjoint analysis.

The range of utility values for each attribute, summarised in Table 5.6, provides a measure of importance to the farmers' overall preference for the various attributes.

Table 5.6: Relative importance values of conjoint attributes

Attribute	Average importance score
Premium	45.862
Monitor	25.826
Penalty	28.312

From the scores of average importance, it is clear that the farmers regard the price premium, as an incentive mechanism, as being the most important attribute when it comes to the enforcement of Karoo Lamb standards. The farmers furthermore preferred a more severe punishment strategy, compared with a more frequent monitoring mechanism, for ensuring compliance with the Karoo Lamb standards.

The additive conjoint equation was used to estimate the utilities (path-worth) scores and the standard errors for each attribute level (summarised in Table 5.7).

Table 5.7: Conjoint analysis utility estimations

Attribute and attribute level	Utility estimate	Standard error
Premium		
R0/kg	-2.042	0.058
R2/kg	0.403	0.058
R3/kg	1.639	0.058
Monitor		
Every delivery	-0.204	0.058
Once a year	0.060	0.058
Drought	0.144	0.058
Penalty		
Three years	0.292	0.058
Five years	0.097	0.058
Forever	-0.389	0.058
(Constant)	5.000	0.041

As expected, the farmers value a higher price premium for Karoo Lamb more than a lower or no price premium (R0/kg). This is clearly reflected in the high positive utility (1.639) for a premium of R3/kg and a large negative utility (-2.042) for no premium. Farmers furthermore regard the inconvenience of continuous monitoring during every delivery and the harsh penalty of being expelled forever for non-compliance as comprising a disutility, at -0.204 and -0.389, respectively.

Given the results of the conjoint analysis, it seems that the Karoo farmers prefer relatively high premiums (R3/kg), being monitored only during times of drought, and a liability to be expelled for only three years if non-compliance is detected. A closer look at the most preferred enforcement mechanisms, to ensure the compliance of farmers with the Karoo Lamb standards, revealed a tie between two of the nine scenario cards. The majority of the surveyed farmers (30 %) preferred enforcement mechanisms that (i) include a relatively high premium (R3/kg), (ii) allow monitoring with every delivery or only during times of drought and, (iii) expel non-compliant farmers forever or for five years (Figure 5.2).

Although statistically significant results for the rest of the supply chain could not be derived by means of a conjoint experiment because of the relatively small sample sizes, the questionnaires revealed the following. The abattoirs prefer relatively high premiums (R2/kg), to be monitored specifically during times of drought, and to be expelled for only three years. The processors revealed the same expulsion preference for three years but preferred higher premiums (R3/kg) and strict annual audits. The retail outlets preferred relatively high premiums (R2/kg) (similar to the abattoirs), and a maximum expulsion of three years (similar to the rest of the supply chain), but preferred to be monitored more frequently for compliance.

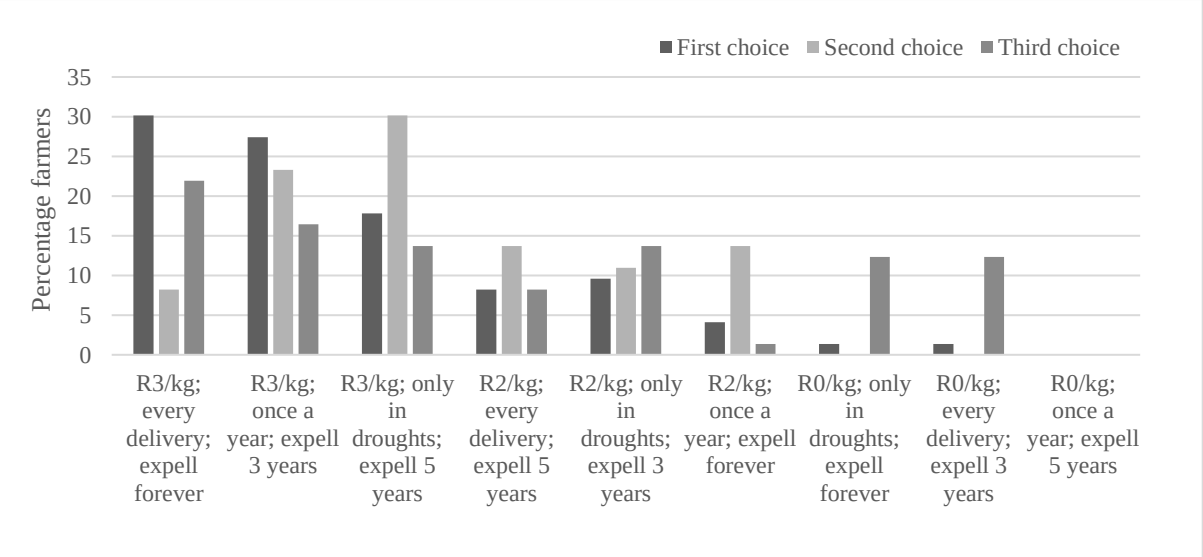


Figure 5.2: Farmers' preferred enforcement mechanisms

Given the results of the conjoint experiment, it might be in the certification scheme's best interest to focus on the enforcement attributes that in fact present a disutility to farmers so as to guarantee compliance with the Karoo Lamb standards. Stricter enforcement mechanisms are expected to provide a disincentive to farmers to behave opportunistically by not complying with the set quality and origin standards. This would shift the emphasis of the certification scheme to ensure continuous monitoring and a very harsh penalty. According to the conjoint analysis, the ideal enforcement mechanism to be rolled out across the supply chain would encompass a relatively high premium (R3/kg), monitoring with every delivery (or at least during times of droughts), and a harsh penalty of being expelled forever, or for at least five years, for non-compliance.

The correct vehicle for ensuring proper implementation of the enforcement mechanisms throughout the supply chain, and not just at processing stages, remains a challenge. According to the findings of Raynaud et al. (2005) and Wever et al. (2010), different quality (and in this case, origin) enforcement mechanisms should be aligned with different governance mechanisms. A detailed understanding of the mechanisms that govern the Karoo Lamb supply chain is therefore needed in order to recommend alternative enforcement strategies, especially at the currently neglected farm level.

5.5 Understanding the Karoo Lamb's unique governance situation

Before the registration of the certification mark in 2011, Karoo Lamb was embedded in the commodity lamb supply chain and marketed as conventional lamb without any differentiation. Owing to many years of commodity style operations, and the importance of shifting large volumes due to squeezed margins, the Karoo Lamb supply chain is still, six years later, believed to be mainly governed by market transactions.

However, the upgrading of the commodity lamb supply chain to a more differentiated supply chain such as Karoo Lamb, with its own set of quality and origin standards, brings about potential contractual hazards. In the Karoo Lamb case, the major hazards to control are the free riding of those stakeholders with no link to the Karoo region (see Lafontaine & Shaw, 2005 for an example in franchising), and the uncertainty that surrounds the measurement of quality performance (Barzel, 1982; Foss, 1996). When the actions of Karoo Lamb supply

chain stakeholders have negative externalities and these externalities are also less observable, market-like governance mechanisms are less efficient. The occurrence of these contractual hazards, therefore, warrants a move from the currently observed market-like mechanisms to more hybrid or even hierarchical mechanisms.

A detailed analysis of the semi-structured questions pertaining to the governance of the Karoo Lamb supply chain revealed that the supply chain is predominantly governed by market-like mechanisms, as opposed to hierarchical governance (Table 5.8).

Table 5.8: Transaction detail subsequent governance mechanism

Transaction	Detail	Governance mechanism
T1	Medium- to long-term relationships.	S++ and RB
	Farmers and abattoirs are certified to produce, process and sell Karoo Lamb.	
	Contracts are verbal and generally negotiated on a weekly basis.	
	Prices are set weekly, based on the market price for conventional lamb with a premium added for Karoo Lamb. Volumes are arranged according to the farmer's capacity – small deviations from the volumes are allowed with prior notice. Although higher prices are realised for better quality carcasses (grade A2 and A3[58]), specifications are not set.	
	Control is relational in nature and is focused on the reputation of the farmer and the abattoir, and the trust between the stakeholders.	
	Some of the farmers in one of the Karoo districts are shareholders in the abattoir. They have long-term relationships with one another and transact for mutual benefit.	
T2	Medium- to long-term relationships.	S++ and VI
	Abattoirs and processors are certified to process and sell Karoo Lamb.	
	Contracts are verbal and negotiated weekly.	
	Prices are negotiated weekly, based on the market price for conventional lamb with a premium added for Karoo Lamb. Volumes are arranged according to the market demand, and deliveries are strictly according to the order. Quality specifications are set according to the market demand, typically A2 and A3 carcasses.	
	Although the contract terms are stricter, the control remains relational in nature and is focused on the reputation of the abattoir and processor.	
	One of the abattoirs holds its own smaller processing plant and is only allowed to process lamb from that particular abattoir. The abattoir has full control over the processor, and jointly makes decisions for mutual benefit.	
T3	Medium- to long-term relationships.	S++
	Abattoirs and retail outlets are certified to process and sell Karoo Lamb.	
	Contracts are verbal and negotiated weekly.	

[58] The South African Meat Industry Company classifies carcasses based on age (A – youngest to C – oldest) and fatness (0 – no fat to 6 – excessively overfat).

Transaction	Detail	Governance mechanism
	Prices are negotiated weekly, based on the market price for conventional lamb with a premium added for Karoo Lamb. Volumes are arranged according to the market demand, and deliveries are strictly according to the order. Quality specifications are set according to the market demand, typically A2 and A3 carcasses.	
	Control between the butcheries and abattoirs are relational in nature and built on trust and reputation. Although control is somewhat stricter when dealing with retail outlets, the particular retail outlets are independently owned and operate under voluntary trading principles. Control, therefore, remains relational.	
T4	Medium to long term.	**S++**
	Processors and retail outlets are certified to process and sell Karoo Lamb.	
	Contracts are verbal and negotiated weekly.	
	Prices are negotiated weekly, based on the market price for conventional lamb, with a premium added for Karoo Lamb. Volumes are arranged according to the market demand, and deliveries are strictly according to the order. Quality specifications are set according to the market demand, typically A2 and A3 carcasses.	
	Although control is somewhat stricter when dealing with retail outlets, the particular retail outlets are independently owned and operate under voluntary trading principles. Control between the processor and retail outlets are therefore relational in nature and supported by trust and reputation.	

Note: T1 – transaction between farmers and abattoir, T2 – abattoir and retail outlets, T3 – abattoir and retail outlets, T4 – processors and retail outlets. S++ – Non-contractual relationship with qualified partner, RB – Relation-based alliance, VI – Vertical integration

The abattoirs are only permitted to procure lamb from certified Karoo Lamb farmers to ensure the authenticity of Karoo Lamb. Similarly, the certified farmers are only permitted to market their lamb as Karoo Lamb to certified abattoirs. The data revealed that most of the farmers deliver to mainly one abattoir (60.3 %). Their reasons for being loyal to one abattoir include: (i) they have long-term relationships with the particular abattoir (25 %), (ii) they prefer to support their town or are shareholders in the abattoir specific (20.7 %), (iii) it is more convenient compared with other abattoirs (17.2 %), (iv) the abattoir offers the best price (12.9 %), (v) the abattoir is trustworthy (12.1 %), and (vi) other reasons, such as good management and good service (12.1 %). On average, these farmers have been delivering to the same abattoir for 22 years, with 27.4 % of farmers being loyal to the same abattoir for 30 or more years. As a rule, the abattoirs do not have preferred farmers, since the only requirement for the sale of Karoo Lamb is that the farmers should be certified to produce Karoo Lamb.

The nature of the relationship between the majority (79.3 %) of the Karoo farmers and abattoirs (T1) is, therefore, a non-contractual relationship with a qualified partner (S++). It is considered 'non-contractual' because the relationship between the farmers and the abattoirs is not governed by a formal contract but by informal verbal agreements, generally initiated by the farmers (72.3 %), either a day (20 % of the farmers) or a week (74.1 % of the farmers) in advance, with only 5.9 % of the farmers making arrangements more than a week in advance. Prices are based on weekly market prices for conventional lamb, to which a price premium for Karoo Lamb, between R1 and R2/kg per kilogramme carcass weight, is added. In general, farmers are free to market any number of lambs, provided that the abattoir has the capacity to slaughter the animals. There is, however, a two-level capacity issue – abattoir capacity and the size of the certified orders. The abattoir will only slaughter Karoo Lamb when they have retail orders for the certified carcasses. The farmers are furthermore allowed slight deviations from the agreed quantities, as long as the abattoir is informed of this before delivery. Depending on the numbers, the farmers can arrange with the abattoir and its livestock agents to collect the lamb from the farm. Of the surveyed farmers, 52 % use this service, while the rest use their own transport. These informal, non-contractual relationships between certified abattoirs and farmers usually expire upon delivery. However, some of the farmers in one of the districts (20.7 % of those surveyed) are shareholders in the abattoir, and their relationship shows characteristics of a relation-based alliance (RB) (Gellynck & Molnár, 2009). These farmers have been loyal to this specific abattoir for many years and transact with the abattoir for mutual benefit.

The second transaction (T2) in the Karoo Lamb supply chain involves one large certified processor and one smaller certified processor whose transactions with the certified abattoirs are governed by two extremes on the governance continuum; non-contractual relationship with a qualified partner (S++) and vertical integration (VI), respectively. The transactions between the abattoirs and the large independent processor are less formalised, non-contractual, and based on mutual trust and the reputations of the stakeholders (S++). This, somewhat informal, relationship is mainly attributable to the fluctuating demand for Karoo Lamb. In addition to the varying quantities of Karoo Lamb traded between the abattoir and processor, these stakeholders also trade conventional lamb that is governed by more formal contracts and control mechanisms. To some extent, these more structured agreements support the less structured Karoo Lamb negotiations. At the other end of the governance continuum, the transactions of the smaller processor are governed by vertical integration

(VI). This particular processor is only allowed to process Karoo Lamb carcasses, slaughtered by its holder abattoir, that originate from its certified farmers. In line with market demand, both the large and smaller processors prefer the A2 or A3 carcass grades. Prices are generally negotiated from the weekly market price, plus margins for costs and profits and an additional price premium for Karoo Lamb, and deliveries are made strictly according to orders placed by the processor.

Currently, Karoo Lamb is mainly sold through independent butcheries and delis, with only one retail chain being certified to sell Karoo Lamb. The relationships between the abattoirs and the retail outlets (T3) are very much relational in nature, with the abattoirs and retail outlets dealing either with one another directly or via a Karoo Lamb marketing agent.

The transactions between the processors and retail outlets (T4) are similar in nature. The Karoo Lamb products processed at the larger certified processor are currently destined for its surrounding certified retail outlets and are governed by non-contractual (relational) arrangements (T4). Similar to T2, smaller retail outlets participating in T4 transactions utilise the existence of more formal control mechanisms, such as the auditing of processors by large retail chains, as a guarantee for the reputation of a larger processor. Unlike the products of the large processor, the Karoo Lamb products processed by the smaller, vertically integrated processor are processed, vacuum packed, boxed (half lamb box or whole lamb box) and frozen for sales direct to consumers via a marketing agent. The box sales rest on the good reputation of the Karoo district from which the lamb originates and on the excellent service of the vertically integrated abattoir and processor.

Both the T3 and T4 relationships depend on the reputation of the stakeholders and the extent to which the orders have been fulfilled, and payments have been successfully made. In very much the same way as in T2, because of market demand, the most popular carcass grades remain A2 and A3 carcasses. Similarly, prices are negotiated weekly, based on the market price of lamb, with a price premium for Karoo Lamb. Although the larger retail chain depends on stricter mechanisms (such as annual audits at the processing facilities) to control the more formal contracts of conventional lamb trades, the Karoo Lamb control mechanisms remain, probably due to small volumes, relational in nature.

The analysis of the Karoo Lamb supply chain reveals non-contractual arrangements with qualified partners as being the most frequently utilised governance mechanism. These mechanisms are similar to the specific mechanisms with which the transactions of the meat PDO supply chains are governed (Raynaud et al., 2005). According to Wever et al. (2010) and Raynaud et al. (2005), these market-like successfully govern the supply chains of products with a geographical indication, provided that reliable public monitoring and enforcement mechanisms are in place to guarantee quality and origin. However, in South Africa, where sporadic, 'light' enforcement of standards mainly beyond the farm gate is at the order of the day, the credibility of Karoo Lamb might be in trouble.

5.6 Aligning the enforcement and governance mechanisms

The compliance of stakeholders with quality and origin standards depends, to a large extent, on the success of the enforcement mechanisms. This statement also holds true for the Karoo Lamb supply chain. However, the fact that the Karoo Lamb standards are enforced by a State-assigned, but stakeholder paid, third party waters down the effectiveness of the enforcement mechanism. In fact, it is in the third party's own best interest not to strictly monitor the supply chain stakeholders, but rather to conduct 'light' monitoring and 'light' enforcement thereby ensuring a steady income stream. More worrying is the fact that the assignee does not enforce the Karoo Lamb standards at the farm level since there is no incentive (driven by the consumers) to warrant this monitoring. Public monitoring by the State assignee, therefore, appears to be insufficient for the needs of Karoo Lamb, at least at the farm level.

In order to ensure the credibility of Karoo Lamb, better enforcement mechanisms are specifically required at the farm level, in which the origin attribute of the product is embedded. The conjoint experiment revealed that the farmers experience disutilities for stricter penalties and continuous monitoring, which means that the most appropriate enforcement mechanism would include these attributes. This is also a convenient and cost effective mechanism for the assignee since every batch of Karoo Lamb delivered by the farmer could be continuously monitored at the abattoir with relative ease.

However, this change in the enforcement of the Karoo Lamb standards towards stricter and perhaps private enforcement means that the governance mechanism should be revised. Currently, the Karoo Lamb supply chain operates within the conventional lamb supply chain, with the only difference being that certified farmers should be used to procure lamb and that the lamb can only be processed and sold at certified stakeholders. The Karoo Lamb supply chain is therefore mostly governed by non-contractual relationships between qualified partners (S++). However, according to Wever et al. (2010) and Raynaud et al. (2005), this mechanism does not seem to be sufficient when public monitoring is insufficient. A move to towards a more hierarchical mechanism is therefore expected, which would ensure a stronger focus on private or mutual enforcement mechanisms. This means that the stakeholders in the supply chain would be jointly responsible for the enforcement of the quality and origin standards, and therefore the credibility of Karoo Lamb.

During the data collection process, it became clear that those farmers who are shareholders in the abattoir that they deliver to are more loyal to their abattoir and to the certification scheme. These farmers aim to supply lambs of exceptional quality and are proud of their unique Karoo product. The adoption of governance mechanisms that resemble relation-based alliances (RB), where stakeholders are mutual owners and feel mutually responsible for an exceptional product, seems plausible. It is expected that the collectively owned Karoo Lamb initiative, is better off being governed by mechanisms that rely on the mutual control of the stakeholders and on the mutual benefit accruing from complying with the Karoo Lamb standards (Table 5.9).

These recommendations are in line with the findings of Raynaud et al. (2005), Gellynck and Molnár (2009), and Wever et al. (2010). These authors suggest greater coordination at T1 (joint venture or contract) and T2 (vertical integration, contract or verbal agreement), and less coordination between T3 (contract, verbal agreement, non-contractual or spot market) and T4 (contract, verbal agreement, or spot market).

Table 5.9: Proposed changes in the governance mechanisms

Transaction	Current governance mechanism[59]	Proposed governance mechanism	Reason suggested change
T1	S++ and RB	RB	RB alliances are based on mutual trust. RB brings about mutual benefits as a result of a common interest in producing top quality lamb. Currently, the few transactions governed by RB seem to be more successful, compared with the transactions governed by S++.
T2	S++ and VI	RB or VI	VI would allow a proper alignment of the abattoirs' and processors' marketing strategies and the alignment of their quality management systems to produce top quality lamb. RB with control in the relationship rather than in property rights (as is the case with VI) might be equally efficient in aligning marketing strategies and quality management systems without seriously having to restructure the transaction.
T3 and T4	S++	S++ or C	The fluctuating consumer demand for Karoo Lamb dictates the T3 and T4 relationships. In future, a more stable demand for Karoo Lamb could allow a change in the governance mechanism from a S++ to a C mechanism. C will allow high-quality lamb to be regularly supplied with short lead times.

Note: T1 – transaction between farmers and abattoirs, T2 – abattoirs and retail outlets, T3 – abattoirs and retail outlets, T4 – processors and retail outlets. S++ – Non-contractual relationship with qualified partner, C – Contractual relationship, RB – Relation-based alliance, VI – Vertical integration

5.7 Concluding remarks and recommendations for future research

The paper revealed that, although Karoo Lamb seemed to rely on public certification, similar to the European PDO brands, the monitoring and enforcement of Karoo Lamb's quality and origin standards by a State-appointed third party seems to be biased. Because of this biasedness, the market-like mechanisms normally recommended to govern products supported by public certification might be unsuccessful. Interestingly, the monitoring and enforcement of Karoo Lamb's quality and origin standards are particularly troubling at the farm level. More coordinated governance mechanisms, especially at T1, are therefore required to adequately enforce the Karoo Lamb standards to attain a more streamlined supply chain.

Although the somewhat difficult question, should Karoo Lamb be governed by market-like or hierarchical governance, was sufficiently addressed in this paper, the biggest limitation was encountered in the small population of abattoirs, processors, and retail outlets. The small population made conjoint experiments at each level of the supply chain impractical, and

[59] The current governance mechanisms referred to in Table 5.9 are explained in detail in Table 5.8.

statistical significant inferences could not be made on the abattoirs', processors' and retail outlets' preferences for enforcement mechanisms. It is expected that conjoint experiments with larger populations at each level of the differentiated product supply chain (such as those analysed by Wever et al. (2010) and Raynaud et al. (2005)), would reveal interesting results about the preferred enforcement mechanisms.

Another interesting angle for future research and this is in line with what Raynaud et al. (2005) did, is to contrast the enforcement and governance mechanisms of various differentiated products. In doing this, the influence of different production factors, different marketing factors, and different stakeholder attributes, amongst other things, on the enforcement and governance mechanism will be revealed. In Wever et al. (2010), the suggestion was made to relate enforcement mechanisms and the related governance mechanisms with the performance of the supply chain. This paper supports this suggestion. A measure of supply chain performance related to governance mechanisms is expected to inform and support managerial decisions better when recommendations toward more market or hierarchical governance mechanisms are made.

This Karoo Lamb case study acts as a point of departure for future studies on the protection of various products with a geographical indication, specifically in developing countries. Subsequent research can build on this work, by analysing regional products from other developing countries, to gain a better understanding of the different ways in which these products are protected within a particular country's institutional framework. The distinct institutional environments of these different countries are also expected to bring about differing enforcement and governance mechanisms, which are sure to reveal interesting findings. The research can also be expanded to a dynamic approach that will shed light on the consequences of the selection of different governance choices.

Chapter 6:

Summary, conclusion and directions for future research

"Old truths have been relearned; untruths have been unlearned. We have always known that heedless self-interest was bad morals; we know now that it is bad economics. Out of the collapse of a prosperity whose builders boasted their practicality has come the conviction that in the long run, economic morality pays. We are beginning to wipe out the line that divides the practical from the ideal, and in so doing we are fashioning an instrument of unimagined power for the establishment of a morally better world."
(Rooseveldt, 1937)

6.1 Summary of the problem and subsequent research questions

The recent addition of Karoo Lamb to South Africa's repertoire of products with a regional identity attracted extensive publicity. The news headlines that spoke of challenges to protect the geographical name, discrepancies among supply chain stakeholders and the outright opportunism and exploitation of the geographical name, made Karoo Lamb a particularly interesting case study to examine.

For a differentiated product with a regional identity, such as Karoo Lamb, to be successful at least three criteria should hold; (i) the product should be excludable in a sense that only a limited number of farmers should be able to produce the product to ensure sensible profits, (ii) it should be relatively easy for eligible farmers to obtain production rights to participate in the differentiated product supply chain to ensure economies of scale to offset branding costs, (iii) it should be possible to monitor the supply chain and enforce compliance with the protocols of the differentiated product, which implies that parties who unlawfully participate in the supply chain should face legal consequences.

The Karoo Lamb supply chain is differentiated in that the lamb reared on the natural indigenous Karoo vegetation produces meat with a unique flavour (Erasmus et al., 2016). The Karoo Lamb certification mark furthermore identifies and guarantees the Karoo region as the origin of the lamb product but also include claims such as free range, no routine

antibiotics, hormone free, good animal practices and full farm-to-fork traceability (KMOO, 2016a). The success of the Karoo Lamb product lies in the capacity of the Karoo region to produce the maximum number of lambs to offset the costs of building and maintaining the Karoo Lamb reputation. In order to saturate the Karoo region's production capacity, it is important that all the lamb farmers in the Karoo region invest and participate in the Karoo Lamb supply chain.

Unfortunately, the unique identity of Karoo Lamb also makes the product vulnerable to imitators and to the opportunistic behaviour of stakeholders, who do not comply with the strict production protocols.

Fortunately, many of these opportunistic behavioural problems can be mitigated by imposing monitoring and enforcement mechanisms. However, anecdotal evidence suggests that the Karoo Lamb supply chain currently functions within the regular practices of a commodity supply chain without the necessary strict alignment between the stakeholders in the chain. Technically, the differentiated Karoo Lamb supply chain should observe more rigorous monitoring and enforcement mechanism compared to the commodity supply chain. Given the more stringent monitoring and enforcement mechanisms recommended for the differentiated chain, hierarchical governance mechanisms with better coordination are expected as opposed to the market mechanisms observed in commodity supply chains. This indicates a misalignment between the enforcement mechanisms and the governance mechanisms currently imposed on the Karoo Lamb supply chain.

The fundamental objective of the thesis originated in an applied policy question. How do we increase farmer participation in differentiated product supply chains, all the while discouraging opportunistic behaviour in an attempt to optimise the performance of these differentiated chains? The thesis tackled this complex applied policy question by addressing six specific objectives in four different but related papers; (i) to identify the differentiated Karoo Lamb product claims most vulnerable to opportunistic behaviour, (ii) to find ways to prevent the opportunistic behaviour of specifically farmers, (iii) to determine the factors that drive a farmer's decision to participate in these differentiated product supply chains, (iii) to identify the enforcement mechanisms best suited to prevent opportunistic behaviour, (iv) to discover the governance mechanisms that currently govern the differentiated Karoo Lamb supply chain, and (v) to make recommendations for alternative governance mechanisms

towards improved alignment between the enforcement and governance mechanisms for a more streamlined supply chain.

6.2 Theoretical contributions

Although the research originated from a practical problem of opportunistic behaviour faced by the South African Karoo Lamb supply chain, the thesis made the following theoretical and empirical contributions.

The research made an empirical contribution to the limited body of empirical work on agency theory (Steinle et al., 2014), by specifically focusing on opportunistic behaviour. The thesis investigated whether or not information can be successfully employed to reduce opportunistic behaviour. In addition, it also expanded on the critical role that trust is believed to play in business relationships, by evaluating the role of trust as a stimulus for information sharing. The investigation revealed that a better exchange of information could indeed be employed to reduce opportunistic behaviour. Trust was also found to play an integral part in the willingness of stakeholders to share information.

In analysing the opportunistic behaviour, the thesis continued to develop a set of ideal proxies to detect the primary drivers of opportunistic behaviour. Practically, the factors identified as the drivers of opportunistic behaviour can be employed by the custodians of geographical indications to design strategies to prevent this behaviour. As the first of its kind to investigate the opportunistic behaviour of farmers in a differentiated product supply chain, the research acts as a point of departure for future research avenues.

The success of any differentiated product with some sort of credence attribute lies in its reputation and the capital attached to this reputation. The survival of these products, therefore, depends on the willingness of farmers (and other stakeholders) to invest in its (collective) reputational capital. In light of this, the research managed to identify a set of investment stimuli that can be used to encourage farmers to invest in the reputational capital of these products. The most significant stimulus being the relationship between the farmer and the abattoir, and the ease with which the farmer conducts business with the abattoir.

Finally, the research also contributed empirically to the governance mechanism knowledge base by building on the work done by Raynaud et al. (2005) and Wever et al. (2010). This was achieved by analysing the mechanisms used to enforce the quality and origin standards of Karoo Lamb, and by unpacking the mechanisms that govern this unique supply chain. This contribution focuses on the alignment of the mechanisms that govern a South African differentiated lamb supply chain with the mechanisms needed to enforce the quality attributes of the product. The paper sets out to understand the way in which supply chain transactions of a lamb product with a geographical indication, such as Karoo Lamb, are governed. The thesis continues to make recommendations to change some of the governance mechanisms for better alignment with the enforcement mechanisms to enable a more streamlined Karoo Lamb supply chain.

6.3 Concluding remarks

After that first gathering in the Great Karoo, ten years have passed during which the dream of protecting and capturing the geographical advantage of rearing sheep in the Karoo region was built. It is safe to say they have (so far) been relatively successful. Not only is the Karoo Meat of Origin's membership on the increase, but Karoo Lamb is gaining popularity among the South African lamb consumers.

The thesis supported the expectation that a farmer's decision to invest in the collective reputational capital of a differentiated product is shaped by his/her relationship with the abattoir, and the ease with which business is conducted. Positive and significant relationships indicate that the farmer's perceived cost to invest in the certification scheme is influenced by the cost to transact with the abattoir, the farmer's level of risk averseness, and the farming community's loyalty to the certification mark. A significant positive relationship between the expected price premium and perceived investment costs were expected but not confirmed. It seems like the price premium that farmers expect to gain from marketing Karoo Lamb do not affect the perceived costs of investing in or committing to the certification scheme. This ambiguous result might be attributable to the relative novelty of the certification scheme and the fact that many farmers are yet to receive price premiums.

As the indicator with the strongest positive relationship with perceived cost to invest in the certification scheme, the transaction difficulties construct was further unpacked. As expected the more difficult it is for a farmer to commit and deliver lamb to the abattoir as a result of production uncertainties the more difficult it becomes to transact with the abattoir. On the contrary, older and more experienced farmers, and higher levels of trust between the farmer and the abattoir makes it easier for the farmer to transact with the abattoir and reduces the transaction difficulties. It is, therefore, imperative to the success of Karoo Lamb that transaction difficulties are kept as low as possible to encourage farmer participation in the certification scheme.

Unfortunately, despite the efforts to increase the membership base of Karoo Lamb, the vulnerable "from the Karoo" and "free range" claims that are not yet well protected against the opportunistic behaviour of farmers threatens the success story of Karoo Lamb.

As the most important factor for successful supply chain relationships, the thesis supported the notion that information sharing plays a significant role to reduce the opportunistic behaviour. The thesis furthermore found that farmers who participate in farmer networks are expected to, frequently, share information, with the abattoir as a dedicated effort to reach the common goal of the network. The more information the farmer shares with the abattoir regarding droughts, feeding practices and disease treatments, the less likely he/she will be to act opportunistically by, for example, delivering lamb as Karoo Lamb that has in fact been reared in a feedlot or on Lucerne fields. Moreover, the frequent exchange of relevant information is likely to deepen the level of trust between the farmer and the abattoir, which will further reduce the farmer's tendency to behave opportunistically.

Comparably, farmer satisfaction encourages the farmer to share information, specifically about droughts, supplementary feed, and diseases. Additionally, farmer satisfaction with the performance of the certification scheme, to protect the geographical indication, impacts positively on their loyalty to protect the Karoo name against exploitation. In turn, a positive relationship between farmer loyalty and farmer networks was confirmed. The farmer's loyalty to the Karoo region, their unique product, and their determination to protect the geographical value attached to the Karoo name provides them with a shared goal to build farmer networks.

The success of Karoo Lamb furthermore requires proper monitoring and enforcement mechanisms to prevent opportunistic behaviour that can cause serious reputational damage.

The investigation supported the notion that the State-appointed third party is relatively unsuccessful when it comes to the monitoring of the Karoo farmers for compliance with production (quality and origin) standards. This is evident in the fact that 85 % of the farmers believe that they are not monitored for compliance following the initial audit. On the other hand, the abattoirs, processors, and retail outlets confirmed that they are aware of the annual audits and that these audits were indeed being conducted.

The thesis attempted to address the failure of the State-appointed third party to effectively monitor the Karoo farmers for compliance accurately, by suggesting an alternative modus operandi. The majority of the surveyed farmers (30 %) preferred enforcement mechanisms that (i) include a relatively high premium (R3/kg), (ii) allow monitoring with every delivery or only during times of drought and, (iii) expel non-compliant farmers forever or for five years. The abattoirs prefer relatively high premiums (R2/kg), to be monitored specifically during times of drought, and to be expelled for only three years. The processors revealed the same expulsion preference for three years but preferred higher premiums (R3/kg) and strict annual audits. The retail outlets preferred relatively high premiums (R2/kg) (similar to the abattoirs), and a maximum expulsion of three years (similar to the rest of the supply chain), but preferred to be monitored more frequently for compliance.

The correct vehicle for ensuring proper implementation of the enforcement mechanisms throughout the supply chain, and not just at processing stages, remains a challenge. Owing to many years of commodity style operations, and the importance of shifting large volumes of product due to squeezed margins, the Karoo Lamb supply chain is still, six years later, mainly governed by market-like transactions. Currently, the transactions between the majority (79.3 %) of the Karoo farmers and abattoirs (T1) resemble a market transaction, specifically a non-contractual relationship with a qualified partner (S++). It is considered ‘non-contractual’ because the relationship between the farmers and the abattoirs is not governed by a formal contract but by informal verbal agreements. Some of the farmers in one of the districts (20.7 % of those surveyed) are shareholders in the abattoir, and their relationship shows characteristics of a relation-based alliance. These farmers have been loyal to this specific abattoir for many years and transact with the abattoir for mutual benefit.

The second transaction (T2) in the Karoo Lamb supply chain involves one large certified processor and one smaller certified processor whose transactions with the certified abattoirs are governed by two extremes on the governance continuum; non-contractual relationship with qualified partners (S++) and vertical integration (VI), respectively. The transactions between the abattoirs and the large independent processor are less formalised, non-contractual, and based on mutual trust and the reputations of the stakeholders (S++). At the other end of the governance continuum, the transactions of the smaller processor are governed by vertical integration (VI).

Currently, Karoo Lamb is mainly sold through independent butcheries and delis, with only one retail chain being certified to sell Karoo Lamb. The relationships between the abattoirs and the retail outlets (T3) are very much relational in nature, with the abattoirs and retail outlets dealing either with one another directly or via a Karoo Lamb marketing agent.

The transactions between the processors and retail outlets (T4) are similar in nature. The Karoo Lamb products processed at the larger certified processor are currently destined for its surrounding certified retail outlets and are governed by non-contractual arrangements that are relational in nature (T4). Similar to T2, smaller retail outlets participating in T4 transactions utilise the existence of more formal control mechanisms, such as the auditing of processors by large retail chains, as a guarantee for their trust in the reputation of a larger processor.

The analysis of the Karoo Lamb supply chain revealed non-contractual arrangements with qualified partners as being the most frequently utilised governance mechanism. However, this mechanism is not sufficient when ‘light’ enforcement of standards mainly beyond the farm gate is at the order of the day. With a view to ensuring the credibility of Karoo Lamb, better enforcement mechanisms are specifically required at the farm level, in which the origin attribute of the product is embedded. A move to toward more hierarchical arrangements is therefore expected, with a strong focus on private or mutual enforcement mechanisms. This means that the stakeholders in the supply chain would be jointly responsible for the credibility of the product and for the enforcement of quality and origin standards.

6.4 Managerial implications

In order to stimulate farmers' investments in the reputation of a product with a geographical indication, such as Karoo Lamb, farmers' reputational investment costs should be reduced. A reduction in the investment costs can be accomplished by promoting farmer education and providing information sessions for reducing the feeling of riskiness towards investments in the reputational capital of Karoo Lamb.

From a managerial perspective, the transaction difficulties construct was identified as being the most influential for reducing investment costs.

The complexity of the transaction difficulties constructs allowed for the evaluation of this construct to identify farmer age and experience, trust in the abattoir, and difficulty to commit and deliver lamb as being the most influential factors. By focusing on these influencers, informed strategic decisions can be made to enhance business relationships, to stimulate easier and less costly transactions, and as a result, higher reputational investments. The certified abattoirs can also encourage the older, more experienced farmers to engage with the younger, less experienced farmers. In doing so, the business knowledge of older farmers is transferred to younger farmers to ultimately lead to simpler and less costly transactions between younger farmers and the abattoir. Less costly transactions, in turn, encourage stronger relationships between the farmers and abattoirs to ultimately encourage farmers to invest in the reputational capital of Karoo Lamb.

As important as it is to encourage farmer investments in the reputational capital of Karoo Lamb, the success of Karoo Lamb relies heavily on the certification scheme's strategies to reduce or eliminate opportunistic behaviour. The successive relationships between the constructs farmer network, information sharing, and opportunistic behaviour are indicative of the effect of farmer networks to improve information sharing and reduce opportunistic behaviour. It might, therefore, be in the interest of the certification scheme to support farmer networks and information sharing to inhibit the opportunistic behaviour of farmers. Opportunistic behaviour is even more likely to be inhibited when information regarding opportunistic farmers is available, and members of the network are willing to act jointly against the opportunistic farmer.

Additionally, abattoirs should focus on building stronger, trust-centred relationships with the farmers. Stronger relationships are likely to stimulate information sharing with the abattoir, specifically information concerning the deviations from protocols by the farmer to safeguard the farmer-abattoir transaction against opportunistic behaviour.

On a more technical note, it might be in the interested of the certification scheme to invest in the collection of certified Karoo Lamb farmers' GPS coordinates. With these coordinates and satellite technology, such as Google Earth, the certification scheme might be in a position to at least monitor the use of Lucerne fields and feedlots for rearing Karoo Lamb. Unfortunately, this technology will not be able to spot farmers who provide excessive supplementary feed on the veldt, which remains a problem, especially during times of drought.

In terms of recommendations to the broader red meat industries, it is crucial that they, through their various associations, concentrate their managerial efforts to promote information sharing between the farmers and abattoirs. The exchange of information between the farmer and the abattoir is especially important when it comes to assuring credence attributes such as free range, hormone and antibiotic free or from a particular origin. In supply chains with a strong collective presence, efforts to strengthen communion in farmer networks might be sufficient to encourage information sharing among farmers and with abattoirs. However, in supply chains where a collective organisation is lacking, investments in comprehensive farm-to-fork traceability systems might be required to enforce better information sharing. Overall, it is expected that improvements in information sharing would reduce the uncertain behavioural dimension, thereby limiting the opportunistic behaviour of farmers, and ultimately safeguarding the unacquainted consumers of differentiated products against deception.

The compliance of stakeholders with production requirements depend, as set out by the certification scheme, to a large extent, on the success of the enforcement mechanisms. This statement also holds true for the Karoo Lamb supply chain. The investigation into the enforcement mechanisms revealed that the farmers experience measures of disutility for stricter penalties and continuous monitoring, which means that the most appropriate enforcement mechanism would include these attributes. This is also a convenient and cost effective mechanism for the assignee since the continuous monitoring of every batch of

Karoo Lamb delivered by the farmer to the abattoir can be conducted at the abattoir level with relative ease.

Unfortunately, the fact that the Karoo Lamb standards are currently enforced by a State-assigned, but stakeholder paid, third party is biased and waters down the effectiveness of the enforcement mechanism. Because of this biasedness, the market-like mechanisms normally recommended to govern products supported by public certification might be unsuccessful. Interestingly, the monitoring and enforcement of Karoo Lamb's standards are especially troubling at the farm level. More coordinated governance mechanisms, in particular between the farmer and abattoir, are therefore required to adequately enforce the quality and origin standards of Karoo Lamb for attaining a more streamlined supply chain.

6.5 Limitations and direction for future research

The thesis made a number of exciting discoveries. The thesis provided insights into the primary drivers linked to a farmer's investment costs in the collective reputation of a product with a geographical indication. The research on Karoo Lamb revealed that a farmer's level of education and the transaction difficulties are important considerations for achieving increased investments in the reputation of Karoo Lamb. Although a positive relationship between a risk-averse farmer and investment costs was found, more research is needed to establish the extent to which a risk-averse farmer will perceive his/her investment costs to be higher, compared with that of a risk-neutral or risk-seeking farmer.

By extending the research to other differentiated products in other countries, interesting findings in terms of the difficulty to execute transactions are sure to surface. The difficulty to execute transactions is very much related to the transaction costs, influenced by uncertainties and trust between stakeholders that are factors of human behaviour shaped by different institutional environments. The research can be further expanded to other differentiated products, for example, Prosciutto di Parma, to determine whether or not the drivers for reputational investments differ for established versus novel geographical indication products such as Karoo Lamb.

The thesis is also an interesting point of departure for future research on reputational investments specifically related to the effect of a differentiated product's reputation on the investment decision. Future research can expand the focus of the research to the abattoirs and other stakeholders in the supply chain. This is important since the product's reputation is not only built at the farm level, but stakeholders throughout the supply chain contribute to the reputation. The inclusion of other stakeholders will reveal whether or not the same drivers affect the investment costs and ultimately the investment decision for all supply chain stakeholders. Comparing the investments of different interested parties in the reputational capital of a product with a geographical indication will, therefore, inform the custodians of the quality signals to ensure relatively equal investments to safeguard not only the product but also the stakeholders against hold-up or sunk costs as a result of relationship termination.

Although the thesis originated from a practical problem of opportunistic behaviour faced by the Karoo Lamb supply chain in South Africa, the paper also functions as a point of departure for future studies relating to opportunistic behaviour in other differentiated supply chains. Further research in other differentiated meat supply chains is expected to make exciting discoveries regarding additional factors that influence opportunistic behaviour. These factors are likely to increase the number of indicators per latent variable for structural equation models. In turn, this will yield higher path coefficients and stronger relationships between the latent constructs. The exercise to determine the factors that have an impact on opportunistic behaviour is especially challenging. The data focused almost exclusively on the farmer's perceptions, or of the farmer's honesty about his production and marketing practices. It would, therefore, be valuable if future research focuses on identifying complementary indicator variables in particular for the opportunistic behaviour construct. Developing a more comprehensive set of indicator variables will enhance the robustness of the factors identified as most likely to influence opportunistic behaviour.

Opportunistic behaviour can occur throughout the supply chain. This thesis, however, only focused on the factors that impact on the farmer's tendency to behave opportunistically. Research that includes all the stakeholders participating in the supply chain might, therefore, be particularly interesting. These results can then be utilised to explore the factors that lead other stakeholders to behave opportunistically to suggest organisation specific strategies to safeguard transactions against opportunistic behaviour.

Although the somewhat difficult question, should Karoo Lamb be governed by market-like or hierarchical governance, was sufficiently addressed in this thesis, the biggest limitation was encountered in the small population of abattoirs, processors, and retail outlets. The small population made conjoint experiments at each level of the supply chain impractical, and statistical significant inferences could not be done on the abattoirs', processors' and retail outlets' preferences for enforcement mechanisms. It is expected that differentiated product supply chains, with larger populations at each level, would reveal interesting results about the preferred enforcement mechanisms in a conjoint experiment.

Another interesting angle for future research is to contrast the enforcement and governance mechanisms of various differentiated products. In doing this, the influence of different production factors, different marketing factors, and different stakeholder attributes, amongst other things, on the enforcement and governance mechanism will be revealed. Previous studies suggested that enforcement mechanisms and the related governance mechanisms be linked with the performance of the supply chain, the thesis supports this suggestion. A measure of supply chain performance related to governance mechanisms is expected to inform and support managerial decisions better when recommendations toward more market or hierarchical governance mechanisms are made.

The research conducted on the Karoo Lamb supply chain, acts as a point of departure for future studies on the protection of various products with a geographical indication, specifically in developing countries. Subsequent research can build on this work, by analysing regional products from other developing countries, to gain a better understanding of the different ways in which these products are protected within a particular country's institutional framework. The distinct institutional environments of these different countries are expected to bring about differing enforcement and governance mechanisms, which are sure to reveal interesting findings, to expand the knowledge base further.

Finally, although this research makes many fascinating discoveries the survival of Karoo Lamb as a geographical indication depends on the adjustment of the stakeholders to the dynamic environment in which it operates. Therefore, although this thesis took a static approach to the analysis of the supply chain relationships to recommend alternative modes of governance, a dynamic approach will shed light on the consequences of selecting different governance choices.

References

Akerlof, G. A. 1970. The market for "lemons": Quality uncertainty and the market mechanism. *The Quarterly Journal of Economics*, (1970): 488-500.

Akerlof, G. A. 1983. Loyalty filters. *The American Economic Review*, 73(1): 54-63.

Arfini, F. 2000. The value of typical products: the case of Prosciutto di Parma and Parmigiano Reggiano cheese. In: Sylvander B., Barjolle D., Arfini, F. (eds.). *The Socio-Economics of Origin Labelled Products in Agro-Food Supply Chains: Spatial, Institutional and Co-ordination*. INRA 17 (2000).

Arfini, F., Giacomini, C. and Mancini, M. C. 2003. *Quality and traceability as a tool for a new common agriculture policy in EU*. Project of Research of National Importance. The forthcoming WTO negotiations on agriculture and the reform of CAP in European Union.

Arrow, K. 1972, Gifts and Exchanges, *Philosophy and Public Affairs*, (1972), 343-362.

Awan, A. G. and Rehman, A. U. 2014. Impact of customer satisfaction on brand loyalty-an empirical analysis of home appliances in Pakistan. *British Journal of Marketing Studies*, 2(8): 18-32.

Baker, G. A. 1999. Consumer preferences for food safety attributes in fresh apples: Market segments, consumer characteristic and marketing opportunities. *Journal of Agricultural and Resource Economics*, 24(July 1999): 80-97.

Barcley, D. W., Thompson, R. and Higgins, C. 1995. The partial least squares approach to causal modelling: personal computer adoption and use as an illustration. *Technology Studies: Special Issue on Research Methodology*, 2(2): 285-309.

Barjolle, D. and Sylvander, B. 2002. Some factors of success for origin labelled products in agri-food supply chains in Europe: market, internal resources and institutions. *Économies et Sociétés*, 25(9-10): 1441.

Barzel, Y. 1982. Measurement cost and the organization of markets. *The Journal of Law and Economics*, 25(1): 27-48.

Bijman, J., Iliopoulos, C., Poppe, K. J., Gijselinckx, C., Hagedorn, K., Hanisch, M., Hendrikse, G. W. J., Kühl, R., Ollila, P., Pyykkönen, P. and Van der Sangen, G. 2012. *Support for farmers' cooperatives: final report*. Wageningen University. The Netherlands.

Blair, R. D. and Kaserman, D. L. 1994. A note on incentive incompatibility under franchising. *Review of Industrial Organization*, 9(3): 323-330.

Bollen, K. A. 1998. *Structural Equation Models*. John Wiley, New York.

Bramley, C., Biénabe, E. and Kirsten, J. F. 2009. The economics of geographic indications: towards a conceptual framework for geographic indication research in developing countries. *The Economics of Intellectual Property*, (2009): 109.

Brentari, E., Levaggi, R. and Zuccolotto, P. 2011. Pricing strategies for Italian red wine. *Food Quality and Preference*, 22 (8):725–732.

Burbi, S., Baines, R. N. and Conway, J. S. 2016. Achieving successful farmer engagement on greenhouse gas emission mitigation. *International Journal of Agricultural Sustainability*, 14(4): 466-483.

Caracciolo, F., D'Amico, M., Di Vita, G., Pomarici, E., Dal Bianco, A., and Cembalo, L. 2016. Private vs. collective wine reputation. *International Food and Agribusiness Management Review*, 19(3): 191-210.

Chin, W. W. 1998. The partial least squares approach to structural equation modelling. In: Marcoulides, G. A. (eds.). *Modern methods for business research*. Psychology Press, Mahwah, NJ, USA.

Claro, D. P. 2004. *Managing business networks and buyer-supplier relationships: How information obtained from the business network affects trust, transaction specific investments, collaboration and performance in the Dutch potted plant and flower industry.* PhD Thesis. Wageningen University and Research Centre. The Netherlands.

Cohen, J. A. 1992. A power primer. *Psychology Bulletin*, (112): 155-519.

Costanigro, M., Bond, C. A. and McCluskey, J. J. 2012. Reputation Leaders, Quality Laggards: Incentive Structure in Markets with Both Private and Collective Reputations. *Journal of Agricultural Economics*, 63(2): 245–264.

Costanigro, M. and McCluskey, J. J. 2007. Collective versus Brand Reputations for Geographic Indication Labelled Foods. [Online] Available at: http://idei.fr/sites/default/files/medias/doc/conf/inra/papers_2007/mccluskey.pdf [accessed July 9, 2016].

Cunningham, C. 2003. *The impact of information on willingness-to-pay for bison.* Saskatoon: MSc. Thesis, Deptartment of Agricultural Economics, University of Saskatchewan.

Dentoni, D., Menozzi, D. and Capelli, M. G. 2012. Group heterogeneity and cooperation on the geographical indication regulation: The case of the "Prosciutto di Parma" Consortium. *Food Policy*, 37(3): 207-216.

Department of Agriculture, Forestry and Fisheries (DAFF): Directorate Information and Knowledge. 2016. Trends in the Agricultural Sector 2015. [Online] Available at: http://www.daff.gov.za/Daffweb3/Portals/0/Statistics%20and%20Economic%20Analysis/Statistical%20Information/Trends%20in%20the%20Agricultural%20Sector%202015.pdf [accessed November 4, 2016].

Dijkstra, T. K. 2010. Latent variables and indices: Herman Wold's basic design and partial least squares. In: Vinzi, V. E., Chin, W. W., Henseler, J. and Wang, H. (eds.). *Handbook of partial least squares: Concepts, methods and applications*. Springer. Heidelberg, Dordrecht, London, New York.

Di Vita, G., D'Amico, M., La Via, G. and Caniglia, E. 2013. Quality Perception of PDO extra-virgin Olive Oil: Which attributes most influence Italian consumers? *Agricultural Economics Review*, 14(2): 46–58.

Donner, M., Fort, F. and Vellema, S. 2017. From geographical indications to collective place branding in France and Moroco. In: Van Caenegem, W. and Cleary, J. (eds.). *The importance of place: Geographical indications as a tool for local and regional development.* Springer International Publishing.

Ducos, G. and Dupraz, P. 2007, June. *The asset specificity issue in the private provision of environmental services: Evidence from agri-environmental contracts.* In 8th International Meeting of the Association for Public Economic Theory, Vanderderbilt University, Nashville, July (Vol. 25).

Ducos, G., Dupraz, P. and Bonnieux, F. 2009. Agri-environment contract adoption under fixed and variable compliance costs. *Journal of Environmental Planning and Management*, 52(5): 669-687.

Du Plessis, H. J. and Du Rand, G. E. 2012. The significance of traceability in consumer decision making towards Karoo Lamb. *Food Research International*, 47.2 (2012): 210-217.

Eckerd, S. and Hill, J. A. 2012. The buyer-supplier social contract: information sharing as a deterrent to unethical behaviours. *International Journal of Operations & Production Management*, 32(2): 238-255.

Eisenegger, M. 2009. Trust and reputation in the age of globalisation. In: Klewes, J. and Wreschniok, R. (eds.). *Reputational capital: Building and maintaining trust in the 21st century*. Springer. Heidelberg, Dordrecht, London, New York.

Erasmus, S. W., Muller, M., van der Rijst, M. and Hoffman, L. C. 2016. Stable isotope ratio analysis: A potential analytical tool for the authentication of South African lamb meat. *Food Chemistry* (192): 997-1005.

Fawcett, S. E., Osterhaus, P., Magnan, G. M., Brau, J. C. and McCarter, M. W. 2007. Information sharing and supply chain performance: the role of connectivity and willingness. *Supply Chain Management: An International Journal*, 12(5): 358-368.

Fernández-Barcala, M. and González-Díaz, M. 2006. Brand equity in the European fruit and vegetable sector: A transaction cost approach. *International Journal of Research in Marketing*, 23(1): 31-44.

Fornell, C. and Bookstein, F. L. 1982. Two structural equation models: LISREL and PLS applied to consumer exit-voice-theory. *Journal of Marketing Research*, 19(4): 440-452.

Fornell, C. and Cha, J. 1994. Partial least squares. In Bagozzi, R. P. (editors). *Advanced Methods of Marketing Research*. Oxford: Blackwell.

Foss, K. 1996. Transaction costs and technological development: the case of the Danish Fruits and Vegetable Industry. *Research Policy*, 25: 531-547.

Franken, J., Parcell, J., Patterson, D., Smith, M., Poock, S. 2010. Cow-calf producer interest in retained ownership. *Journal of Agribusiness*, 28(1): 49-59.

Franken, J. R., Pennings, J. M. and Garcia, P. 2017. Risk attitudes and the structure of decision-making: Evidence from the Illinois hog industry. *Agricultural Economics*, 48(1): 41-50.

Gallarza, M. G., Arteaga-Moreno, F., Del Chiappa, G., and Gil-Saura, I. 2016. Intrinsic value dimensions and the value-satisfaction-loyalty chain: a causal model for services. *Journal of Services Marketing*, 30(2): 165-185.

Gamboa, A. M. and Gonçalves, H. M. 2014. Customer loyalty through social networks: Lessons from Zara on Facebook. *Business Horizons*, 57(6): 709-717.

Garson, G. D. 2016. *Partial Least Squares: Regression and structural equation models.* Statistical Associates Blue Book Series, Statistical Associates Publishing, Asheboro, USA.

Gaultier-Gaillard, S., Louisot, J. and Rayner, R. 2009. Managing reputational risk – From theory to practice. In: Klewes, J. and Wreschniok, R. (eds.). *Reputational capital: Building and maintaining trust in the 21st century*. Springer. Heidelberg, Dordrecht, London, New York.

Gellynck, X. and Molnár, A. 2009. Chain governance structures: the European traditional food sector. *British Food Journal*, 111(8): 762-775.

Geyskens, I., Steenkamp, J. B. E. and Kumar, N. 2006. Make, buy, or ally: A transaction cost theory meta-analysis. *Academy of Management Journal*, 49(3): 519-543.

Ghosh, M. and John, G. 1999. Governance value analysis and marketing strategy. *Journal of Marketing*, (1999):131-145.

Granovetter, M. 1985. Economic Action and Social Structure: The Problem of Embeddedness. *American Journal of Sociology*, 91(3): 481-510.

Grover, V. and Malhotra, M. K. 2003. Transaction cost framework in operations and supply chain management research: theory and measurement. *Journal of Operations Management*, 21(4): 457-473.

Hair, J. F., Anderson, R. E., Tatham, R. L. & Black, W. E. 1995. *Conjoint analysis*. Multivariate data analysis with readings. Fourth edition. Upper Saddle River, New Jersey: Prentice-Hall, Inc.

Hair, J. F. (Jr.), Hult, G. T. M., Ringle, C. M. and Sarstedt, M. 2014. *A primer on partial least squares structural equation modelling (PLS-SEM).* SAGE Publications, Inc. USA.

Hair, J. F., Ringle, C. M. and Sarstedt, M. 2011. PLS-SEM: Indeed a silver bullet. *Journal of Marketing theory and Practice*, 19(2): 139-152.

Han, J. 2009. *Supply chain integration, quality management and firm performance in the pork processing industry in China.* PhD Thesis. Wageningen School of Social Sciences. Wageningen University. The Netherlands.

Hardaker, J. B., Huirne, R. B. M., Anderson, J. R. and Lien, G. 2007. *Coping with risk in agriculture.* Second edition. CABI Publishing. Oxfordshire, UK.

Hayes, D. J., Lence, S. H. and Stoppa, A. 2004. Farmer-owned brands? *Agribusiness* 20(3): 269-285.

Hines, P. 1995. Network sourcing: A hybrid approach. *International Journal of Purchasing Materials Management*, 31(2): 18-24.

Hobbs, J. E. and Young, L. M. 2000. Closer vertical co-ordination in agri-food supply chains: a conceptual framework and some preliminary evidence. *Supply Chain Management: An International Journal*, 5(3): 131-143.

Humphrey, J. and Schmitz, H. 2002. How does insertion in global value chains affect upgrading in industrial clusters? *Regional Studies*, 36(9): 1017-1027.

Hwang, P. 2006. Asset specificity and the fear of exploitation. *Journal of Economic Behaviour & Organization*, 60(3): 423-438.

Hwang, H., Malhotra, N. K., Kim, Y., Tomiuk, M. A. and Hong, S. 2010. A comparative study on parameter recovery of three approaches to structural equation modelling. *Journal of Marketing Research*, 47 (4): 699-712.

Iacobucci, D. 2010. Structural equations modelling: Fit Indices, sample size, and advanced topics. *Journal of Consumer Psychology*, 20(1): 90-98.

Jaccard, J. and Jacoby, J. 2010. *Theory construction and model-building skills*. The Guilford Press: New York, NY.

Jensen, M. C. and Meckling, W. H. 1976. Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of financial economics*, 3(4): 305-360.

Ji, C. 2012. *Governance structure choices in supply chain management: Evidence from Spanish and Chinese pork.* PhD Thesis. University of Madrid. Madrid, Spain.

Johnson, K. 1985. Psychometric methods in the measurement of consumer perceptions and preferences. *Encyclopaedia of Statistical Sciences*, (5): 235-238.

Jones, G. R. and George, J. M. 1998. The experience and evolution of trust: Implications for cooperation and teamwork. *Academy of Management Review*, 23(3): 531-546.

Jraisat, L., Gotsi, M. and Bourlakis, M. 2013. Drivers of information sharing and export performance in the Jordanian agri-food export supply chain: A qualitative study. *International Marketing Review*, 30(4): 323-356.

Karoo Meat of Origin (KMOO). 2016a. *Minimum standards: Minimum requirements to qualify for certification (farmers).* [Online] Available at: http://www.karoomeatoforigin.com/karoo-standards/ [accessed March 4, 2016].

Karoo Meat of Origin (KMOO). 2016b. *Karoo News.* [Online] Available at: http://www.karoomeatoforigin.com/ karoo-news/ [accessed June 3, 2016].

Keller, H. 1984. *I was dumb now I speak*. In: Conversation Pieces by Brown, D. June 28, 1984. Times Daily (p. 13A, column 2.), Florence, Alabama.

Kirmani, A. and Rao, A. R. 2000. No pain, no gain: A critical review of the literature on signaling unobservable product quality. *Journal of Marketing*, 64(2): 66-79.

Kirsten, J. F. 2011. Protecting a product's unique qualities. *Farmer's Weekly*, Volume 11037: 40. 7 October 2011.

Kirsten, J. F., Troskie, D., Vermeulen, H., Schönfeldt, H. C. and Bramley, C. 2008. *The potential for Karoo Lamb as origin based meat and a Geographical Indication.*

Research Report, Department of Agricultural Economics, Extension and Rural Development, University of Pretoria, South Africa.

Kirsten, J. F., Vermeulen, H., Van Zyl, K., Du Randt, G., Du Plessis, H. and Weissnar, T. 2012. *The economic potential for an origin based marketing and certification system for a meat product in South Africa: Perceptions, preferences, and experiment*s. Presented as a poster paper for International Association of Agricultural Economists (IAAE) Triennial Conference in Foz do Iguaçu, Brazil, 18-24 August, 2012.

Klein, B. 1996. Why hold-ups occur: the self-enforcing range of contractual relationships. *Economic Inquiry*, 34(3): 444-463.

Klein B. and Leffler K. B. 1981. The role of market forces in assuring contractual performance. *The Journal of Political Economy*, (1981): 615-41.

Klewes, J. and Wreschniok, R. 2009. Reputation capital building and maintaining trust in the 21st century: Introduction. In: Klewes, J. and Wreschniok, R. (eds.). *Reputational capital: Building and maintaining trust in the 21st century*. Springer. Heidelberg, Dordrecht, London, New York.

Kwon, I. W. G. and Suh, T. 2005. Trust, commitment and relationships in supply chain management: A path analysis. *Supply Chain Management: An International Journal*, 10(1): 26 – 33.

Lafontaine, F. and Shaw, K. 2005. Targeting managerial control: Evidence from franschising. *RAND Journal of Economics*, 36(1): 131-150.

Leiblein, M. J. and Miller, D. 2003. An empirical examination of transaction- and firm-level influences on the vertical boundaries of the firm. *Strategic Management Journal*, 24(9): 839-859

Liu, B. 2012. Why is there a need for uncertainty theory? *Journal of Uncertain Systems*, 6(1): 3-10.

Lu, H. 2007. *The role of guanxi in buyer-seller relationships in China: A survey of vegetable supply chains in Jiangsu province.* PhD Thesis. Wageningen School of Social Sciences. Wageningen University. The Netherlands.

Makadok, R. and Coff, R. 2009. Both market and hierarchy: An incentive-system theory of hybrid governance forms. *Academy of Management Review*, 34(2): 297-319.

Malhotra, N, K. 1996. *Multidimensional scaling and conjoint analysis*. Marketing Research – An applied orientation. Second edition. Upper Saddle River, New Jersey: Prentice Hall, Inc.

Manson, S. M., Jordan, N. R., Nelson, K. C. and Brummel, R. F. 2016. Modeling the effect of social networks on adoption of multifunctional agriculture. *Environmental Modelling & Software*, 75(2016): 388-401.

McCann, L. and Claassen, R. 2016. Farmer Transaction Costs of Participating in Federal Conservation Programs: Magnitudes and Determinants. *Land Economics*, 92(2): 256-272.

Menapace, L. and Moschini, G. 2012. Quality certification by geographical indications, trademarks and firm reputation. *European Review of Agricultural Economics*, 39(4): 539-566.

Ménard, C. 1996. On clusters, hybrids, and other strange forms: the case of the French poultry industry. *Journal of Institutional and Theoretical Economics*, 152(1): pp.154-183.

Ménard, C. 2002. *The economics of hybrid organizations*, Presidential Address. International Society for New Institutional Economics. MIT, USA. September.

Ménard, C. and Shirley, M. M. eds., 2005. *Handbook of new institutional economics* (Vol. 9). Springer. Heidelberg, Dordrecht, London, New York.

Mettepenningen, E., Verspecht, A. and Van Huylenbroeck, G. 2009. Measuring private transaction costs of European agri-environmental schemes. *Journal of Environmental Planning and Management*, 52(5): 649-667.

Murphy, M., Cowan, C., Henchion, M. and O'Reilly, S. 2000. Irish consumer preferences for honey: A conjoint approach. *British Food Journal*, 102(8): 585-597.

Mutonyi, S., Beukel, K., Gyau, A. and Hjortsø, C. N. 2016. Price satisfaction and producer loyalty: the role of mediators in business to business relationships in Kenyan mango supply chain. *British Food Journal*, 118(5): 1067-1084.

Nagin, S. D. and Pogarsky, G. 2003. Experimental Investigation of Deterrence: Cheating, Self-Serving Bias, and Impulsivity. *Criminology Journal* 41(1): 167.

Ness, M. R. and Gerhardy, H. 1994. Consumer preferences for quality and freshness attributes of eggs. *British Food Journal*, (96)3: pp.26-34.

Newman, J. W. and Werbel, R. A. 1973. Multivariate analysis of brand loyalty for major household appliances. *Journal of Marketing Research*, (November): 404-409.

Nohria, N. and Eccles, R. G. 1992. Face to face: Making network organizations work. In: Nohria, N. and Eccles, R. G. (eds.). *Networks and organizations: Structure, form and action*. Boston, Harvard Business School Press.

Nooteboom, B. 1993. Firm size effects on transaction costs. *Small Business Economics*, 5(4): 283-295.

Omta, S. W. F. O., Trienekens, J. H. and Beers, G. 2001. Chain and network science: A research framework. *Journal on Chain and Network Science*, 1(1):1-6.

Onwudiwe, I. D., Odo, J. and Onyeozili, E. C. 2004. Deterrence Theory. In: Bosworth, M. (ed.). *Encyclopedia of prisons and correctional facilities*. Sage Publications.

Ostrom, E. 2014. Collective action and the evolution of social norms. *Journal of Natural Resources Policy Research*, 6(4): 235-252.

Oude Ophuis, P. and Van Trijp, H. 1995. Perceived quality: A market driven and consumer oriented approach. *Food Quality and Preference*, 6(3): 177-183.

Padberg, D. I., Ritson, C. and Albisu, L. M. 1997. *Agro-food marketing*. New York: CAB International.

Palmer, E. 2012. *Plains of Camdeboo: The Classic Book of the Karoo*. Published by Penguin Books (South Africa) (Pty) Ltd. Rosebank, Johannesburg, South Africa.

Pappu, R. and Quester, P. 2016. Brand Innovativeness Effects on Perceived Quality, Satisfaction and Loyalty. In: Pappu, R and Quester, P. (eds.). *Looking Forward, Looking Back: Drawing on the Past to Shape the Future of Marketing*. Springer International Publishing.

Pennings , J. M. E. and Garcia, P. 2001. Measuring producers' risk preferences: A global risk-attitude construct. *American Journal of Agricultural Economics*, (83): 993-1009.

Pennings, J. M. and Leuthold, R. M. 2000. The role of farmers' behavioural attitudes and heterogeneity in futures contracts usage. *American Journal of Agricultural Economics*, 82(4): 908-919.

Powell, W. W. 1990. Neither market nor hierarchy: Network forms of organization. *Research in Organizational Behaviour*, 12(1190): 295-336.

Prokopy, L. S., Floress, K., Klotthor-Weinkauf, D. and Baumgart-Getz, A. 2008. Determinants of agricultural best management practice adoption: evidence from the literature. *Journal of Soil and Water Conservation*, 63(5): 300-311.

Ragasa, C. and Golan, J. 2014. The role of rural producer organizations for agricultural service provision in fragile states. *Agricultural Economics*, 45(5): 537-553.

Raynaud, E., Sauvee, L. and Valceschini, E. 2005. Alignment between quality enforcement devices and governance structures in the agro-food vertical chains. *Journal of Management & Governance*, 9(1): 47-77.

Rigdon, E. E. 2012. Partial least squares path modelling. In: Hancock, G. R., Mueller, R. O. (eds.). *Structural Equation Modelling: A Secondary Course* (Volume 2). Information Age Publishing, Charlotte, NC.

Rindfleisch, A. and Heide, J. B. 1997. Transaction cost analysis: Past, present, and future applications. *The Journal of Marketing*, (1997): 30-54.

Ringle, C. M., Wende, S. and Becker, J-M. 2015. *SmartPLS 3*. Boenningstedt: SmartPLS GmbH. [Online] Available at: http://www.smartpls.com [accessed July 18, 2015].

Roosevelt, T. 1937. Second Inaugural Address January 20, 1937.Roosevelt, F.D., 1974.

Rosman, H. T. 2015. *The farmer and farm networks: an examination of conservation adoption in the US corn belt*. Dissertation. Iowa State University. USA.

Ross, S.A., 1973. The economic theory of agency: The principal's problem. *The American Economic Review*, 63(2): 134-139.

Saenger, C., Torero, M. and Qaim, M. 2014. The impact of third-party contract enforcement in agricultural markets—A field experiment in Vietnam. *American Journal of Agricultural Economics*, 96(4): 1220-1238.

Sako, M. and Helper, S. 1998. Determinants of trust in supplier relations: Evidence from the automotive industry in Japan and the United States. *Journal of Economic Behaviour and Organization*, 34(3): 387-417.

Saunders Comprehensive Veterinary Dictionary. 2007. *"ad libitum feeding"*. 3rd Ed. 2007. Elsevier, Inc. [Online] Available at: http://medical-dictionary.thefreedictionary.com/ad+libitum+feeding [accessed June 3, 2016].

Saunders, M., Lewis, P. and Thornhill, A. 2009. *Research methods for business students*. 5th ed. Harlow, Essex: Pearson Education.

Shapiro, C. 1983. Premiums for high quality products as returns to reputations. *The Quarterly Journal of Economics*, 98(4): 659-679.

Shmueli, G. 2010. To explain or to predict? *Statistical Science*, 25(3): 289-310.

Sideridis, G., Simos, P., Papanicolaou, A., Fletcher, J. 2014. Using structural equation modeling to assess functional connectivity in the brain power and sample size considerations. *Educational and Psychology Measurement*, (74): 733-758.

South African Weather Service. 2016. *District Rainfall*: *Central Karoo.*

Steinle, C., Schiele, H. and Ernst, T. 2014. Information asymmetries as antecedents of opportunism in buyer-supplier relationships: Testing principal-agent theory. *Journal of Business-to-Business Marketing*, 21(2): 123-140.

Takeshima, H., Adeoti, A. I. and Salau, S. 2010. *Measuring the effect of transaction costs for investment in irrigation pumps: Application of unobserved stochastic threshold model to the case of Nigeria* (No. 15). International Food Policy Research Institute (IFPRI).

Tull, D. S. and Hawkins, D. I. 1993. *Derived attitude scales*. Marketing research: Measurement and method. Sixth edition. New York: Macmillan publishing company.

Uzzi, B. 1996. The Sources and Consequences of Embeddedness for the Economic Performance of Organizations: The Network Effect, *American Sociological Review*, 61(4): 674-698.

Van der Merwe, M. 2012. *Evaluating traceability systems within the South African sheep meat supply chain*. Master's dissertation. Department of Agricultural Economics, Extension and Rural Development. Pretoria: University of Pretoria.

Van der Merwe, M. and Kirsten, J. F. 2015. Traceability systems and origin based meat products in the South African sheep meat industry. *Agrekon*, 54(1): 53-69.

Van der Pol, M. and Ryan, M. 1996. Using conjoint analysis to establish consumer preferences for fruit and vegetables. *British Food Journal*, 98(8): 5-12.

Van der Vorst, J. G. A. J., Van Dongen, S., Nougier, S. and Hilhorst, R. 2002. *E-business initiatives in food supply chains; Definition and typology of electronic business models.* International Journal of Logistics (5:2).

Van Ittersum, K., Meulenberg, M. T., Van Trijp, H. and Candel, M. J. 2007. Consumers' appreciation of regional certification labels: a Pan-European study. *Journal of Agricultural Economics*, 58(1): 1-23.

Van Plaggenhoef, W. 2007. *Integration and self-regulation of quality management in Dutch agri-food supply chains*. Wageningen: Wageningen Academic Publishers.

Van Zyl, K., Vermeulen, H. and Kirsten, J. F. 2013. Determining South African consumers' willingness to pay for certified Karoo lamb: An application of an experimental auction. *Agrekon*, 52(4): 1-20.

Vermeulen, H. 2007. *Genetically modified white maize in South Africa: Consumer perceptions and market segmentation*. Master dissertation. Department of Agricultural Economics, Extension and Rural Development. Pretoria: University of Pretoria.

Vermeulen, H., Schönfeldt, H. C. and Kirsten, J. F. 2008. *The reputation of Karoo mutton/lamb: A sensory and consumer perspective.* Research Report, Department of Agricultural Economics, Extension and Rural Development, University of Pretoria, South Africa.

Walker G. and Weber D. 1984. A transaction cost approach to make-or-buy decisions. *Administrative Science Quarterly*, (1984): 373-91.

Wang, Q., Li, J. J., Ross Jr, W. T. and Craighead, C. W. 2013. The interplay of drivers and deterrents of opportunism in buyer–supplier relationships. *Journal of the Academy of Marketing Science*, 41(1): 111-131.

Wang, G., Zheng, Y. and Li, R. 2014. The impact of relation-specific investments on channel performance: Focusing on mediators. *Journal of Marketing Channels*, 21(2): 87-99.

Ward, P. S. and Pede, V. O. 2015. Capturing social network effects in technology adoption: the spatial diffusion of hybrid rice in Bangladesh. *Australian Journal of Agricultural and Resource Economics*, 59(2): 225-241.

Wathne, K. H. and Heide, J. B. 2000. Opportunism in interfirm relationships: Forms, outcomes, and solutions. *Journal of Marketing*, 64(4): 36-51.

Wever, M. 2012. *Chain wide consequences of transaction risks and their contractual solutions. Managing interdependencies in differentiated agri-food supply chains.* PhD Thesis. Wageningen School of Social Sciences. Wageningen University. The Netherlands.

Wever, M., Wognum, N., Trienekens, J., and Onno, O. 2010. Alignment between chain quality management and chain governance in EU pork supply chains: A transaction cost economics perspective. *Meat Science*, 84(2010): 228-237

Williamson, O. E. 2000. Strategy research: Competence and Governance Perspectives. In: Foss, N and Mahnke, V (eds.). *Competence, Governance and Entrepreneurship*. Oxford University, Press, New York, NY.

Williamson, O. E. 1999. Strategy research: governance and competence perspectives. *Strategic Management Journal*, (20): 1087–1108.

Williamson, O. E. 1996. Theories of economic organization: the case for candor. *The Academy of Management Review*, 21(1): 48-57.

Williamson, O. E. 1993. Calculativeness, trust, and economic organization. *The Journal of Law and Economics*, 36(1): 453–486.

Williamson, O. E. 1991. Comparative economic organisation: The analysis of discrete structural alternatives. *Administrative Science Quarterly*, (1991): 269-296.

Williamson, O. E. 1988. Corporate finance and corporate governance. *The Journal of Finance*, 43(3): 567-591.

Williamson, O. E. 1985. *The economic institutions of capitalism: Firms, markets, relational contracting*. Macmillan: London.

Williamson, O. E. 1981. The economics of organization: The Transaction Cost Approach. *The American Journal of Sociology*, 87(3): 548-577.

Williamson, O. E. 1975. *Markets and Hierarchies: Analysis and Anti-trust Implications: A Study in the Economics of Internal Organization*. Free Press: New York.

Winfree, J. A., and McCluskey, J. J. 2005. Collective reputation and quality. *American Journal of Agricultural Economics*, 87(1): 206–213.

Wold, H. 1982. Systems under indirect observation using PLS. In: Fornell, C. (ed.). *A second generation of multivariate analysis*. Praeger, New York.

Wong, K. K. K. 2013. Partial least squares structural equation modelling (PLS-SEM) techniques using SmartPLS. *Marketing Bulletin*, 24(1): 1-32.

Zamanian, S. and Khanlari, A. 2015. Electronic word of mouth marketing: Relationship between brand loyalty and electronic word of mouth in social marketing networks. In: Khanlari, A. (ed.). *Strategic Customer Relationship Management in the Age of Social Media*. Business Science Reference. IGI Global, USA.

Zylbersztajn, D. and Farina, E. 1999. Strictly coordinated food-systems: exploring the limits of the coasian firm. *International Food and Agribusiness Management Review*, 2(2): 249-65.

Appendix A

Appendix A1: Farmer questionnaire

DATE	2	0	1					

Respondent number				

QUESTIONNAIRE – Karoo Lamb farmers

Thank you for your willingness to complete this survey. The purpose of the survey is to gain a better understanding of the Karoo Lamb supply chain, how transactions are governed and decisions are made. The survey should not take more than 90 minutes to complete. This is a confidential survey and the answers you provide will be used for research purposes only. Data analysis will be based on pooled results from the total sample of Karoo Lamb farmers.

Please answer <u>all</u> questions. There are no right or wrong answers. We are interested in understanding the detail surrounding your farm business and the abattoirs you do business with.

<u>Farmer information</u>:

Name and surname:	
Closest town (District):	
Phone number:	
Email address:	

SECTION A

1. How old are you? _____years
2. Please indicate your highest qualification.

No formal education	Primary School	Secondary School	Tertiary Institution: Grad degree	Tertiary Institution: Post grad degree

3. For how long have you been a sheep farmer in the Karoo? _____years
4. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	**1**	**2**	**3**	**4**	**5**
a	I am a real gambler					
b	I always do research before making risky decisions					
c	When I hear the word risk I immediately think of loss					
d	Other people are concerned about my level of risk taking					
e	When I hear the word risk I immediately think of uncertainty					
f	I will take greater risk for a greater payoff					
g	When I hear the word risk I immediately think of opportunity					
h	I only take risks if I absolutely have to					
i	I am a real risk avoider					

5. You are on a TV game show, which one of the following lotteries would you play?

100% chance of winning R10 000	
50% chance of winning R50 000	
25% chance of winning R80 000	
5% chance of winning R100 000	

6. The game show now requires you to invest R 2 000, which one of the lotteries would you play?

100% chance of winning R 10 000	
50% chance of winning R50 000	
25% chance of winning R 80 000	
5% chance of winning R100 000	

7. To which abattoir(s) do you market your lamb? What percentage of lambs do you market to each? Do you prefer one in particular? How far is this preferred abattoir from your farm? For how long have you been doing business with this abattoir?

	Preferred abattoir?	**Second abattoir?**	**Third abattoir?**
Abattoir			
Percentage			
Distance (km)			
Commitment (years)			

8. Why is this your preferred abattoir?

Closest proximity	Longest Commitment	Best price	Pick up service	Certified Karoo abattoir	No alternative	Other:

9. Are you part of a study group of farmers? How big is the group? What is their main purpose? How often do you meet?

Yes	No

Size of the group:

Main purpose:

Daily	Weekly	Biweekly	Monthly	Bimonthly	Quarterly	Annually

10. Are you part of a farmers' association? How big is the group? What is their main purpose? How often do you meet?

Yes	No

Size of the group:

Main purpose:

Daily	Weekly	Biweekly	Monthly	Bimonthly	Quarterly	Annually

SECTION B

11. How many ewes and rams do you currently have in your breeding flock?
_____ewes and _____rams
12. What breed of sheep do you farm with?

Breed	Dorper	Merino	Dohne Merino	Afrino	Damara	Other
Percentage						

13. During what month(s) of the year are lambs typically born? _____
14. What is the lambing percentage? _____%
15. During what month(s) of the year are the lambs typically weaned? _____
16. What is the weaning percentage? _____%
17. If lambs are only weaned twice per year, do you market them all at once regardless of the fact that some of them might be graded A0/A1? Or do you finish them off in a feedlot or Lucerne field before slaughter?

18. How many lamb were marketed in 2014? _____lamb
19. How many of these where marketed as Karoo lambs? _____lamb

20. How often do you market lamb? _____
21. Mortalities aside what is the maximum number of lamb that can potentially be marketed per year? _____lamb
22. Do you have your own delivery truck or do you make use of the abattoir or agent's pick up service? What percentage is own, abattoir and agent?

Own	Abattoir	Agent
%	%	%

23. If you deliver your own lambs, how many can you deliver at a time? _____lambs
24. What does the abattoir/agent charge for pick up?

R /kg

25. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	**1**	**2**	**3**	**4**	**5**
a	Unfavourable weather conditions e.g. drought has no impact on my business					
b	High input costs e.g. supplementary feed and medicine has no impact on my business					
c	Predators have no impact on my business					
d	Unstable political environment has no impact on my business					
f	Stock theft has no impact on my business					
g	Animal diseases have no impact on my business					
h	Low lamb prices have no impact on my business					
i	New regulations pertaining to animal welfare have no impact on my business					
j	Other:					

26. Do you provide supplementary feed to lambs on the veldt during droughts? If yes, approximately how much per lamb?

Yes	No

27. Do you have Lucerne fields or planted pastures on your farms? If yes, how big is the fields? For what purpose do you have the fields? What are the average days spent on the fields? If no, why not?

Yes	No
ha	

Feed lambs permanent	Only for times of drought	Only for cutting/ pelleting	Only for finishing	Only for lambing ewes	Only for sick animals	Ewes twins/ triplets	Other:
days	days	days	days	days	days	days	days
Why not:							

28. Do you have feedlot facilities on your farms? If yes, what is the capacity? For what purpose do you have the fields? What are the average days spent on the fields? If no, why not?

Yes	No
lambs	

Feed lambs permanent	Only for times of drought	Only for finishing	Only for lambing ewes	Only for sick animals	Ewes twins/ triplets	Other:
days	days	days	days	days	days	days
Why not:						

SECTION C

29. What is the farm(s) name? And what is the size of the farm(s)? Owned vs rented?

Farm name								
Size (ha)								
Own/Rented	Owned	Rented	Owned	Rented	Owned	Rented	Owned	Rented

30. What is the ownership structure of the farm?

Sole Propriety	Partnership	CC	Trust	Company	Other:

31. What is the average carrying capacity of your farm(s)? _____ha/ewes
32. What is the average annual rainfall on your farm(s)? _____mm
33. When is the rainfall season? _____

34. Do you have a perennial river on your land? Do you utilise it in anyway?

Yes	No

Irrigation for Lucerne fields	Livestock water source	Other:

SECTION D

35. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	**1**	**2**	**3**	**4**	**5**
a	I see myself as a trustworthy business partner					
b	I see myself as a leading farmer in the community					
c	I see myself as someone who has others' best interests at heart					
d	I have a good reputation in the community					
e	I see myself as someone with integrity					
f	I am committed to developing the Karoo region					
g	I am loyal towards the KMOO mark					
h	I am committed to promoting the demand for Karoo Lamb					
i	I am committed to protect the Karoo name from exploitation					

36. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	**1**	**2**	**3**	**4**	**5**
a	The farmers in my community are trustworthy business partners					
b	The farmers in my community are leading farmers in the community					
c	The farmers in my community have others' best interests at heart					
d	The farmers in my community have good reputations in the community					
e	The farmers in my community have integrity					
f	The farmers in my community are committed to developing the Karoo region					
g	The farmers in my community are loyal to the KMOO mark					
h	The farmers in my community are committed to promoting the demand for Karoo Lamb					
i	The farmers in my community are committed to protect the Karoo name from exploitation					

37. Thinking about your preferred abattoir. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	1	2	3	4	5
a	I trust that the abattoir has my best interest at heart					
b	I have a good relationship with the abattoir					
c	I trust that the abattoir gives me the best possible price					
d	The abattoir that I do business with is trustworthy					
e	The abattoir is 100% honest when grading my carcasses					
f	The abattoir is 100% honest when weighing my carcasses					
g	The abattoir is 100% honest when pricing my carcasses					
h	The abattoir that I do business with has a good reputation					
i	I expect to do business with the abattoir for many years to come					
j	The abattoir never makes mistakes on my invoices					

38. In your opinion what will be the best way of preventing abattoirs from being dishonest in terms of the price, grading and weighing of lamb carcasses?

39. Are you aware of the fact that you are allowed to supervise the slaughtering, grading and weighing process at the abattoir? | Yes | No |
Do you supervise these processes? If no, why not? | Yes | No |

40. Keeping your preferred abattoir in mind. How much higher should a competing abattoir's price be for you to consider switching abattoirs? R_____/kg

SECTION E

41. Thinking about your preferred abattoir and the information you share with the abattoir. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	1	2	3	4	5
a	I always share my intent to deliver lamb with the abattoir					
b	I always try and negotiate a better price with the abattoir					
c	I always share the quantity of lamb to be marketed with the abattoir					
d	I always share the "condition" or expected grade of lamb to be marketed with the abattoir					
e	I always share the gender of the lamb to be marketed with the abattoir					
f	I always share information on droughts with the abattoir					
g	I always share information on supplementary feed provided with the abattoir					
h	I always share information on diseases with the abattoir					

42. Thinking about your preferred abattoir and the information the abattoir share with you. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	1	2	3	4	5
a	The abattoir always share information on price with me					
b	The abattoir always share information on the grade demanded with me					
c	The abattoir is always willing to negotiate a better price					
d	The abattoir always share information on the quantity of lamb demanded					
e	The abattoir always share information on new opportunities such as increased seasonal demand or niche markets					
f	I am highly satisfied with the quality of the information that the abattoir shares with me					

43. How is price information communicated between you and the abattoir? How often do you communicate?

Phone	Sms	Email	Face to face visit	Other:
Daily	Weekly	Monthly	Annually	Other:

44. How is other information communicated between you and the abattoir? How often do you communicate?

Phone	Sms	Email	Face to face visit	Other:
Daily	Weekly	Monthly	Annually	Other:

SECTION F

45. How do you keep record of the births, deaths etc. of your flock?
Do you keep the information on batches or individual ID numbers? Please indicate what information is captured in this system.

Diary	Computer	Other:				
ID nrs	Batches					
Births	Purchases	Deaths	Sales	Medication	Vaccination	Other:

46. Thinking of the claims made by the KMOO certification mark. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	1	2	3	4	5
a	I am allowed to buy in lamb from outside the Karoo region and still market them as Karoo Lamb long as they spent at least 6 months in the Karoo before slaughter					
b	I am allowed to administer hormones to promote growth					
c	I am allowed to round my lamb in a feedlot 1 month before slaughter and still market it as Karoo Lamb					
d	Only lamb that is born in the Karoo will qualify to be sold as Karoo Lamb					
e	In times of drought I am allowed limited supplementary feed in the veldt and still market my lamb as free range and from the Karoo Lamb					
f	I am allowed to sell any lamb as Karoo Lamb as long as they spent a minimum of 1 month grazing on the Karoo veldt before marketing					
g	I am allowed to feed the lamb Lucerne and market it as Karoo as long as they roam freely on the Lucerne					
h	In times of drought I am allowed to provide as much supplementary feed in the veldt as I feel necessary and still market my lamb as Karoo Lamb					

	Statement	1	2	3	4	5
i	Only lamb that roam freely on Karoo veldt can be slaughtered and marketed as Karoo Lamb					
j	I am allowed to administer routine antibiotics and market sheep as Karoo Lamb if I keep the necessary withdrawal periods in mind					
k	I am allowed to administer growth hormones and slaughter lamb as Karoo Lamb as long as I tell the abattoir about this					
l	Lamb that roam freely on a Lucerne field on a Karoo farm can be slaughtered and marketed as Karoo Lamb					
m	The mark guarantees full traceability from farm to retailer					
n	The Karoo Lamb mark includes a good animal practices claim which for example limit the distance over which I am allowed to transport lamb					
o	Growth hormones and routine antibiotics are not allowed at all					
p	Lamb can be marketed from the feedlot as Karoo Lamb as long as it is from a Karoo farm					

47. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	1	2	3	4	5
a	The protocols/rules in terms of supplementary feed is too strict					
b	The protocols/rules in terms of free range is too strict					
c	The protocols/rules in terms of growth hormones is too strict					
d	The protocols/rules in terms of routine antibiotics is too strict					
e	The protocols/rules in terms of traceability is too strict					
f	The protocols/rules in terms of GAP is too strict					
g	The protocols/rules in terms of the Karoo origin is too strict					
h	The protocols/rules per the KMOO significantly differs from the other protocols such as Certified Natural Lamb					

48. If you indicated that the KMOO protocols differ from other protocols please elaborate on your answer.

SECTION G

49. Do you receive a premium for Karoo Lamb? If yes, how much is the premium?	Yes	No
R /kg		

50. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	1	2	3	4	5
a	Karoo Lamb is a unique product					
b	Karoo Lamb deserves a niche market					
c	The Karoo name should be protected					
d	Karoo Lamb deserves to trade at a premium					

51. In your opinion, how much should this premium be? R_____/kg

52. In your opinion what are the chances that a farmer will send feedlot/Lucerne lamb to the abattoir as Karoo Lamb? _____%

53. In your opinon what are the chances that a farmer will be caught sending feedlot/Lucerne lamb to the abattoir as Karoo Lamb? _____%

54. In your opinion, who should monitor the farmers to make sure that marketed lamb are indeed Karoo Lamb and not from a feedlot or Lucerne field?

SAMIC	Abattoir	Farmers association	KMOO	Other:

55. In your opinion how should monitoring happen?

Unannounced farm visits	Rumen samples at abattoir	Liver and kidney samples at abattoir	Other:

56. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	1	2	3	4	5
a	If consumers where to find out Karoo Lamb comes from a feedlot/Lucerne field it would ruin the reputation of Karoo Lamb					
b	If consumers where to find out Karoo Lamb comes from a feedlot/Lucerne field it would ruin the reputation of the Karoo farmers					

57. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	1	2	3	4	5
a	The price premium for Karoo Lamb is the main reason why farmers would sell lamb from a feedlot/Lucerne field as Karoo Lamb.					
b	Droughts is the main reason why farmers would sell lamb from a feedlot/Lucerne field as Karoo Lamb.					
d	The low profit margins is the main reason why farmers would sell lamb from a feedlot/Lucerne field as Karoo Lamb.					
e	The combination of droughts, low profit margins and the price premium for Karoo Lamb is the main reason why farmers would sell lamb from a feedlot/Lucerne field as Karoo Lamb.					

58. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	1	2	3	4	5
a	I have sent feedlot/Lucerne field lamb to the abattoir as Karoo Lamb in the past.					
b	I am of the opinion that my neighbours have sent feedlot/Lucerne field lamb to the abattoir as Karoo Lamb in the past.					
c	It is impossible to get lamb market ready (A2/A3 carcass) on only Karoo veldt					
d	Lamb need to be finished in a feedlot/Lucerne field for the optimal carcass grade and weight.					

SECTION H

59. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	1	2	3	4	5
a	Regulations for marketing Karoo Lamb changes frequently					
b	Abattoir demand for Karoo Lamb change frequently					
c	Competition for space to slaughter Karoo Lamb is fierce among farmers					
d	You and your abattoir exchange business information well					
e	You and your abattoir do business frequently					

f	Your abattoir is reliable					
g	Long term trust between you and your abattoir is well established					
h	If you are no longer able to deliver Karoo Lamb you will lose a lot of investments that you had to make to become a member					
i	If you switch to an alternative abattoir you will lose a lot of investments in time and efforts in establishing relationship with your abattoir					
j	You invest a lot of time and effort in maintaining a collaborative relationship with your abattoir					

SECTION I

60. When transacting with the abattoir, what type of agreement do you have?

Informal agreement: Verbal	Formal agreement: Written	No agreement	Other:

61. What is the duration of this agreement?

Expires on delivery	Weekly agreement	Annual agreement	Continues until cancelled	Other:

62. Please explain your current relationship/contract with the farmer. E.g. Is it a short term relationship with a market related price or is it more of a long term relationship based on trust.

63. What type of contract/relationship would you prefer between you and the abattoir?

64. How is the price for lamb per kg determined?

Spot market price	Announced price	Fixed contract price	Negotiated spot price	Other:

65. How many days before delivery is the price determined? _____days

66. Do you have a minimum or maximum number of lamb that you are required to deliver to the abattoir? If yes, how many?	Yes	No

67. Are you allowed to deviate from the number of lamb?	Yes	No

68. How far in advance is delivery of lamb to the abattoir scheduled? _____days

69. Which party initiates the contact?	Farmer	Abattoir	Agent

70. Is there any monitoring mechanisms that you know of to ensure that the KMOO protocols are adhered to? If yes, who is responsible? And please explain how this works?	Yes	No

Farmer	Abattoir	KMOO	SAMIC	Other:

71. Is there any penalties in place that you know of when someone do not comply with the KMOO protocols? If yes, who is responsible? And please explain how this works?	Yes	No

Government	Abattoir	KMOO	SAMIC	Other:

72. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	1	2	3	4	5
a	It took a big monetary investment to become part of the KMOO certification scheme					
b	It took a lot of my time to become part of the KMOO certification scheme					
c	I had to do a lot of research to become part of the KMOO certification scheme					
d	I had to make many physical on farm changes to become part of the KMOO certification scheme					
e	I had to change my way of doing business and marketing lambs to become part of the KMOO certification scheme					
f	I had to change my lamb production practices to become part of the KMOO certification scheme					

SECTION J

73. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	1	2	3	4	5
a	It is very difficult to find information about the KMOO protocols					
b	It is very difficult to find a suitable and trustworthy abattoir					
c	It is very difficult to obtain info and contact details of other KMOO certified abattoirs					
d	It is very difficult to exchange information with your abattoir					
e	It is very difficult to find slaughter space at my abattoir for Karoo Lamb					
f	It is very difficult to negotiate a reasonable price with your abattoir					
g	It is very difficult to agree on the conditions of the contract with your abattoir					
h	It is very difficult to commit to deliver to your abattoir					
i	It costs you a lot of effort (time, funds, etc.) to finally commit to deliver lamb to your abattoir					
j	It is very difficult for you to monitor the behaviour of your abattoir					
k	If your abattoir betrays the relationship in any way you suffer great loss					
l	Abattoir or agent pick up impacts heavily on my lamb price/kg					

SECTION K

74. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	1	2	3	4	5
a	Doing business with your preferred abattoir brings about logistical advantages that you won't find elsewhere					
b	Payment between you and your abattoir always realise quickly					
c	The cost of doing business with your abattoir is lower compared with other abattoirs					

d	You and your abattoir share information about cost, price, product safety, quality and quantity etc.					
e	You and your abattoir use the fastest and most convenient way to communicate					
f	You have great willingness to know your preferred abattoir's preference for lamb					
g	You and your abattoir strive to deliver the best quality of Karoo Lamb					
h	You and your abattoir strive to maximize your joint value					

SECTION L

75. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	**1**	**2**	**3**	**4**	**5**
a	My abattoir is satisfied with the quality of lamb I produce					
b	I am happy with the price the I receive per kg lamb delivered					
c	It is less effort for me to deal with my abattoir compared to another					
d	It costs me less to deal with my abattoir compared to another					
e	The benefits to produce and deliver Karoo Lamb is more than the costs					
f	I am satisfied with the way the KMOO certification scheme is managed					
g	I benefit from being part of the KMOO certification scheme					
h	I am satisfied with the KMOO certification scheme's efforts to promote Karoo Lamb					
i	I think 100% of consumers that consume lamb is aware of Karoo Lamb					
j	To be part of the KMOO certification scheme exceeded my expectations					
k	The certified farmers gain from being part of the KMOO certification scheme					
l	The certified abattoirs gain from being part of the KMOO certification scheme					

SECTION M

76. Keep your preferred abattoir (A) in mind. You have 50 marketable lambs available for slaughter. On Sunday evening abattoir B (not your preferred abattoir) phones you and asks to deliver lamb for R55/kg. You phone abattoir A and inquire about the price. Abattoir A is willing to pay R55/kg. You are responsible for the transport of the lamb to the abattoirs.
    After hearing you wanted to deliver to abattoir A, abattoir B phones you…
    Abattoir B now offers you R55.30/kg. Will you move?
    Abattoir B now offers you R55.50/kg. Will you move?
    Abattoir B now offers you R55.80/kg. Will you move?
    Abattoir B now offers you R56.00/kg. Will you move?
    Abattoir B now offers you R56.50/kg. Will you move?

77. It is about a month before you are planning on marketing 50 free range lambs. You will be delivering the lambs to the abattoir. You would like to deliver all A2/A3 carcasses between 18 and 20 kg to receive the highest possible income. You are now faced with the decision to market the lamb from the veld, to provide them with supplementary feed on the veldt, or to feed them in a feedlot. Please arrange the following strategies in the order of most preferred to least preferred. Keep in mind the costs and income are calculated for 50 lambs. And the percentages of different grades in the bundle of 50 lambs are captured in the income.

	Strategy A	Strategy B	Strategy C	Strategy D	Strategy E
Feeding costs	Veldt: R0	Supplement feed: R1 260	Supplement feed: R1 680	Supplement feed: R2 100	Feedlot: R4 200
Income (grade price*weight*50)	Income: R46 238	Income: R50 380	Income: R50 187	Income: R50 574	Income: R53 364
Grades	A0/A1: 10%	A0/A1: 2%	A0/A1: 2%	A0/A1: 1%	A0/A1: 0%
	A2/A3: 90%	A2/A3: 95%	A2/A3: 95%	A2/A3: 96%	A2/A3: 95%
	A5/A6: 0%	A5/A6: 3%	A5/A6: 3%	A5/A6: 3%	A5/A6: 5%
Which one will you choose?					

78. If you chose strategy E as your preferred choice indicate why?

79. You are a free range lamb farmer and have the opportunity to deliver free range lamb to the abattoir. The abattoir offers you various contracting options containing different premiums and different rules regarding the monitoring as well as penalties for delivering free range lamb. Please arrange the cards from most preferred contract to the least preferred contract.

Option	**Incentive attribute**	**Monitoring attribute**	**Penalty attribute**
	R3/kg price premium	Monitored for compliance with every Karoo Lamb delivery	Expelled forever for non-compliance
	R3/kg price premium	Monitored for compliance once a year	Expelled for three years for non-compliance
	R0/kg price premium	Monitored for compliance during times of drought	Expelled forever for non-compliance
	R0/kg price premium	Monitored for compliance with every Karoo Lamb delivery	Expelled for three years for non-compliance
	R2/kg price premium	Monitored for compliance with every Karoo Lamb delivery	Expelled for five years for non-compliance
	R3/kg price premium	Monitored for compliance during times of drought	Expelled for five years for non-compliance
	R2/kg price premium	Monitored for compliance during times of drought	Expelled for three years for non-compliance
	R2/kg price premium	Monitored for compliance once a year	Expelled forever for non-compliance
	R0/kg price premium	Monitored for compliance once a year	Expelled for five years for non-compliance

80. Another abattoir also wants you to deliver your free range lamb to him. He offers you four contracts. Which one would you chose? You are allowed to pick none of them (E).

	Contract A	Contract B	Contract C	Contract D
Premium	R4/kg	R3/kg	R2/kg	R1.50/kg
Deliver/Pick Up	Deliver	Deliver	Pick Up	Pick Up
Monitoring	Every delivery	Once a year	Times of drought	None
Penalty	Expelled forever	Expelled 5 years	Expelled 3 years	None
Which one will you choose?				

***** *Thank you for your participation* *****

Appendix A2: Abattoir questionnaire

DATE	2	0	1					
Respondent number								

QUESTIONNAIRE – Karoo Lamb abattoirs

Thank you for your willingness to complete this survey. The purpose of the survey is to gain a better understanding of the Karoo Lamb supply chain, how transactions are governed and decisions are made. The survey should not take more than 90 minutes to complete. This is a confidential survey and the answers you provide will be used for research purposes only. Data analysis will be based on pooled results from the total sample of Karoo Lamb abattoirs.

Please answer all questions. There are no right or wrong answers. We are interested in understanding the detail surrounding your business and the relationships you have with the farmers and the processor/packer/retailer/butcheries and the abattoirs you do business with.

Respondent information:

Abattoir name:	
Name and surname:	
Position at abattoir:	
Closest town (District):	
Phone number:	
Email address:	

SECTION A

1. How old are you? _____years
2. Please indicate your highest qualification.

No formal education	Primary School	Secondary School	Tertiary Institution

3. For how long have you been the manager/owner of the abattoir? _____years
4. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	**1**	**2**	**3**	**4**	**5**
a	I am a real gambler					
b	I always do research before making risky decisions					
c	When I hear the word risk I immediately think of loss					
d	Other people are concerned about my level of risk taking					
e	When I hear the word risk I immediately think of uncertainty					
f	I will take greater risk for a greater payoff					
g	When I hear the word risk I immediately think of opportunity					
h	I only take risks if I absolutely have to					
i	I am a real risk avoider					

5. You are on a TV game show, which one of the following lotteries would you play?

100% chance of winning R10 000	
50% chance of winning R50 000	
25% chance of winning R80 000	
5% chance of winning R100 000	

6. The game show now requires you to invest R 3 250, which one of the lotteries would you play?

100% chance of winning R 10 000	
50% chance of winning R50 000	
25% chance of winning R 80 000	
5% chance of winning R100 000	

7. Do you have preferred farmers who regularly deliver Karoo Lamb? If yes, how many farmers? How many lambs do they deliver in total per week? Why do you prefer these farmers above others? On average for how long have these farmers been delivering to you?

Yes	No

Number of farmers	
Number of lambs per week	
Reason for preference	
Commitment (years)	

8. To whom do you market Karoo Lamb? What percentage of total sales do you market to each? Do you prefer one in particular? How far is this preferred market from your abattoir? For how long have you been doing business with the preferred market?

Market to?			
Percentage			
Prefer			
Distance (km)			
Commitment (years)			

9. Why is this your preferred market?

Closest proximity	Longest commitment	Best price	Pick up service	Certified Karoo market	No alternative	Other:

10. Do you get the same price from processors/packers/retailers/butcheries? If no, on average what market provides the lowest and highest price? And what influences this price?

Yes	No

Lowest price: Highest price: Influence price:

11. Are you part of an abattoir community or network? If yes, how big is the group? What is their main purpose? How often do you meet?

Yes	No

Size of the group: Main purpose:

Daily	Weekly	Biweekly	Monthly	Bimonthly	Quarterly	Annually

SECTION B

12. What is the ownership structure of the abattoir?

Sole Propriety	Partnership	CC	Trust	Company	Other:

13. What is the capacity of the abattoir? _____lambs/day

14. Do the abattoir run on full capacity? If no, what is the average number of animals slaughtered per day?

Yes	No

animals/day

15. How old is the abattoir? _____years

16. What is the capital investment required to build a replica of this abattoir?
R_____

17. Do the abattoir only slaughter sheep? If not, what else? Please indicate the percentages of each category of animal slaughtered.

Yes	No

Lamb	Goats	Cattle	Pigs	Ostrich	Venison	Horses/Donkeys
%	%	%	%	%	%	%

18. What percentage of lamb slaughtered is slaughtered as Karoo Lamb? _____%

19. Are there certain procedures to be followed when delivering lamb for slaughter? For example can a farmer deliver without arranging with the abattoir or are lambs only allowed if and when recruited by the abattoir agent? Please explain the process in as much detail as possible.

20. Do the abattoir provide a pick-up service? On average what is the pick up costs per kg to transport lamb to the abattoir? How does it impact the price paid to the farmer?

Yes	No

R /kg

21. Is this pick up service available to all the farmers? If no, why only to certain farmers?

Yes	No

22. On average how soon after slaughter are the carcasses sold? _____ days
23. What is the average shelf life of a lamb carcass? _____ days
24. On a scale of 1 to 5, where 1=Extremely Significant, 2=Significant, 3=Neutral, 4=Insignificant and 5=Extremely Insignificant, please indicate how significant the following risk factors are to your business.

	Statement	**1**	**2**	**3**	**4**	**5**
a	Low lamb supply due to droughts, diseases etc.					
b	High overhead costs					
c	Unstable electricity supply					
d	High electricity prices					
e	Unstable political environment					
f	New legislation in terms of meat safety and hygiene					
g	Changing consumer needs					
h	Low lamb prices					
i	New regulations pertaining to animal welfare					
j	Other:					

SECTION C

25. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	**1**	**2**	**3**	**4**	**5**
a	I see myself as a trustworthy business partner					
b	I see myself as a leader in the community					
c	I see myself as someone who has others' best interests at heart					
d	I have a good reputation in the community					
e	I see myself as someone with integrity					
f	I am committed to developing the Karoo region					
g	I am loyal to the KMOO brand					
h	I am committed to promoting the demand for Karoo Lamb					

i	I am committed to protect the Karoo name from exploitation					

26. Thinking about your farmers and the relationship you have with them. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	**1**	**2**	**3**	**4**	**5**
a	I have the farmers' best interest at heart					
b	I have good relationships with the farmers					
c	I give my farmers the best possible price					
d	The farmers that I do business with is trustworthy					
e	The farmers that I do business with have good reputations					
f	I expect to do business with the farmers for many years to come					
g	The abattoir never makes mistakes on farmers' invoices					
h	The abattoir is 100% honest when grading the carcasses					
i	The abattoir is 100% honest when weighing the carcasses					
j	The abattoir is 100% honest when pricing the carcasses					

27. In your opinion what will be the best way of preventing abattoirs from being dishonest in terms of the price, grading and weighing of lamb carcasses?

Pricing: Grading: Weighing:

28. Thinking about your preferred market. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	**1**	**2**	**3**	**4**	**5**
a	I trust that the processor/packer/retailer/butchery has my best interest at heart					
b	I have a good relationship with the processor/packer/retailer/butchery					
c	I trust that the processor/packer/retailer/butchery gives me the best possible price					
d	The processor/packer/retailer/butchery that I do business with is trustworthy					
e	The processor/packer/retailer/butchery that I do business with has a good reputation					
f	I expect to do business with the processor/packer/retailer/butchery for many years to come					
g	The processor/packer/retailer/butchery never makes mistakes on my invoices					

29. In your opinion, in what ways can the processor/packer/retailer/butchery mislead you? And in what ways can the processor/packer/retailer/butchery mislead the consumer when it comes to Karoo Lamb? How can this be prevented?

SECTION D

30. Thinking about your farmers and the information the **farmers share** with you. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	1	2	3	4	5
a	The farmer always share his intent to deliver lamb					
b	The farmer always try and negotiate a better price					
c	The farmer always share the quantity of lamb to be marketed					
d	The farmer always share the "condition" or expected grade of lamb to be marketed					
e	The farmer always share the gender of the lamb to be marketed					
f	The farmer always share information on droughts					
g	The farmer always share information on supplementary feed provided					
h	The farmer always share information on diseases					
g	I am highly satisfied with the quality of the information that the farmer shares with me					

31. Thinking about your farmers and the information **you share** with them. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	1	2	3	4	5
a	I always share information on price with the farmers					
b	I always share information on the grade demanded with the farmers					
c	I always share information on the fat percentage demanded with the farmers					
d	I am always willing to negotiate a better price with the farmer					
e	I always share information on the quantity of lamb demanded with the farmer					
f	I always share information on new opportunities such as increased seasonal demand or niche markets with the farmer					

32. Thinking about your market and the information the **market shares** with you. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	1	2	3	4	5
a	The processor/packer/retailer/butchery always share information on price with me					
b	The processor/packer/retailer/butchery always share information on the grade demanded with me					
c	The processor/packer/retailer/butchery is always willing to negotiate a better price					
d	The processor/packer/retailer/butchery always share information on the quantity of lamb demanded					
e	The processor/packer/retailer/butchery always share information on new opportunities such as increased seasonal demand or niche markets					
f	I am highly satisfied with the quality of the information that the processor/packer/retailer/butchery shares with me					

33. Thinking about your market and the information **you share** with the market. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	**1**	**2**	**3**	**4**	**5**
a	I always share my intent to deliver lamb with the processor/packer/retailer/butchery					
b	I always try and negotiate a better price with the processor/ packer/retailer/butchery					
c	I always share the quantity of lamb to be marketed with the processor/packer/retailer/butchery					
d	I always share the grade of lamb to be marketed with the processor/packer/retailer/butchery					
e	I always share the gender of the lamb to be marketed with the processor/packer/retailer/butchery					
f	I always share information about potential lamb shortages with the processor/packer/retailer/butchery					
g	I always honestly share information on claims (such as free range etc) or the lack thereof with the processor/packer/ retailer/butchery					

34. How is price paid to farmers determined?

35. What is the premium paid to farmers for Karoo Lamb? R_____/kg

36. How do you determine if the farmer is eligible to receive the premium for Karoo Lamb?

37. Do you pay any other or additional premiums? If yes for what? | Yes | No

38. How do you communicate price information to the farmer? How often do you communicate?

Phone	Sms	Email	Face to face visit	Other:	
Daily	Weekly	Monthly	Quarterly	Annually	Other:

39. How is other information communicated between you and the farmer? How often do you communicate?

Phone	Sms	Email	Face to face visit	Other:	
Daily	Weekly	Monthly	Quarterly	Annually	Other:

40. How does the processor/packer/retailer/butchery determine the price paid to you?

41. What is the premium that you receive for Karoo Lamb? R_____/kg

42. What is the average price that you pay farmers for an A2/A3 carcass? R_____/kg

43. What is the average price that you receive for an A2/A3 carcass? R_____/kg

44. Do you receive any other or additional premiums? If yes for what? | Yes | No

45. How do the processor/packer/retailer/butchery communicate price information with you? How often do you communicate?

Phone	Sms	Email	Face to face visit	Other:	
Daily	Weekly	Monthly	Quarterly	Annually	Other:

46. How is other information communicated between you and the processor/packer/retailer/butchery? How often do you communicate?

Phone	Sms	Email	Face to face visit	Other:	
Daily	Weekly	Monthly	Quarterly	Annually	Other:

SECTION E

47. Do you have a traceability system in place? If yes do you capture information based on individual or batch ID numbers? Please indicate what is captured in this system.

Yes	No
ID nrs	Batches

48. Thinking of the claims made by the KMOO certification mark. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	**1**	**2**	**3**	**4**	**5**
a	Farmers are allowed to buy in lamb from outside the Karoo region and still market them as Karoo Lamb long as they spent at least 6 months in the Karoo before slaughter					
b	Farmers are allowed to administer hormones to promote growth					
c	Farmers are allowed to round lamb in a feedlot 1 month before slaughter and still market it as Karoo Lamb					
d	Only lamb that is born in the Karoo will qualify to be sold as Karoo Lamb					
e	In times of drought farmers are allowed limited supplementary feed in the veldt and still market lamb as free range and from the Karoo Lamb					
f	Farmers are allowed to sell any lamb as Karoo Lamb as long as they spent a minimum of 1 month grazing on the Karoo veldt before marketing					
g	Farmers are allowed to feed the lamb Lucerne and market it as Karoo as long as they roam freely on the Lucerne					
h	In times of drought farmers are allowed to provide as much supplementary feed in the veldt as they feel necessary and still market lamb as Karoo Lamb					
i	Only lamb that roam freely on Karoo veldt can be slaughtered and marketed as Karoo Lamb					
j	Farmers are allowed to administer routine antibiotics and market sheep as Karoo Lamb if they keep the necessary withdrawal periods in mind					
k	Farmers are allowed to administer growth hormones and slaughter lamb as Karoo Lamb as long as the abattoir is informed					
l	Lamb that roam freely on a Lucerne field on a Karoo farm can be slaughtered and marketed as Karoo Lamb					
m	The mark guarantees full traceability from farm to retailer					
n	The Karoo Lamb mark includes a good animal practices claim which for example limit the distance over which farmers are allowed to transport lamb					
o	Growth hormones and routine antibiotics are not allowed at all					
p	Lamb can be marketed from the feedlot as Karoo Lamb as long as it is from a Karoo farm					

49. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	1	2	3	4	5
a	The protocols/rules/regulations in terms of supplementary feed is too strict					
b	The protocols/rules/regulations in terms of free range is too strict					
c	The protocols/rules/regulations in terms of growth hormones is too strict					
d	The protocols/rules/regulations in terms of antibiotics is too strict					
e	The protocols/rules/regulations in terms of traceability is too strict					
f	The protocols/rules/regulations in terms of GAP is too strict					
g	The protocols/rules/regulations in terms of the Karoo origin is too strict					
h	The protocols/rules/regulations as per the KMOO significantly differs from the other protocols such as Certified Natural Lamb					

50. If you feel the protocols for KMOO differ significantly from other protocols such as Certified Natural Lamb please explain why.

SECTION G

51. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	1	2	3	4	5
a	Karoo Lamb is a unique product					
b	Karoo Lamb deserves a niche market					
c	The Karoo name should be protected					
d	Karoo Lamb deserves to trade at a premium					

52. In your opinion how much should this premium paid to you be? R_____/kg
53. What are the chances of a farmer selling feedlot lamb as Karoo Lamb? _____%
54. What are the chances of a farmer being caught selling feedlot lamb as Karoo Lamb? _____%
55. What are the chances of a farmer selling Lucerne fed lamb as Karoo Lamb? _____%
56. What are the chances of a farmer being caught selling Lucerne fed lamb as Karoo Lamb? __%
57. In your opinion who should monitor whether farmers sell Lucerne fed or feedlot lamb as Karoo Lamb?

SAMIC	Abattoir	Farmers association	KMOO	Other:

58. In your opinion, how should monitoring be done?

Unannounced farm visits	Rumen samples at abattoir	Liver and kidney samples at abattoir	Other:

59. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	1	2	3	4	5
a	If consumers where to find out lamb sold as Karoo lamb are from a feedlot or Lucerne field it will completely destroy the KMOO reputation					
b	If consumers where to find out lamb sold as Karoo lamb are from a feedlot or Lucerne field it will completely destroy the reputation of the Karoo farmers					

	If consumers where to find out lamb sold as Karoo lamb are from a feedlot or Lucerne field it will completely destroy the reputation of the Karoo abattoirs					

60. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	**1**	**2**	**3**	**4**	**5**
a	The premium for Karoo Lamb is the main reason why farmers would market feedlot lamb as Karoo Lamb					
b	The premium for Karoo Lamb is the main reason why farmers would market lamb from the Lucerne fields as Karoo Lamb					
d	Drought is the main reason why farmers would market feedlot lamb as Karoo Lamb					
e	Drought is the main reason why farmers would market lamb from the Lucerne fields as Karoo Lamb					
f	Low profit margins is the main reason why farmers would market feedlot lamb as Karoo Lamb					
e	Low profit margins is the main reason why farmers would market Lucerne fed lamb as Karoo Lamb					
f	The combination of the premium for Karoo Lamb, drought conditions and low profit margins lead to farmers marketing feedlot or Lucerne fed lamb as Karoo Lamb					

61. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	**1**	**2**	**3**	**4**	**5**
a	The premium for Karoo Lamb is the main reason why abattoirs would market feedlot lamb as Karoo Lamb					
b	The premium for Karoo Lamb is the main reason why abattoirs would market lamb from the Lucerne fields as Karoo Lamb					
d	Unavailability of Karoo Lamb is the main reason why abattoirs would market feedlot lamb as Karoo Lamb					
e	Unavailability of Karoo Lamb is the main reason why abattoirs would market lamb from the Lucerne fields as Karoo Lamb					
f	Low profit margins is the main reason why abattoirs would market feedlot lamb as Karoo Lamb					
e	Low profit margins is the main reason why abattoirs would market Lucerne fed lamb as Karoo Lamb					
f	The combination of the premium for Karoo Lamb, unavailability of Karoo Lamb and low profit margins lead to farmers marketing feedlot or Lucerne fed lamb as Karoo Lamb					

62. On a scale of 1 to 5 where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	**1**	**2**	**3**	**4**	**5**
a	In the past I have sent feedlot fed lamb to the processor/packer/retailer/butchery as Karoo Lamb					
b	In the past I have sent Lucerne fed lamb to the processor/packer/retailer/butchery as Karoo Lamb					
c	I am of the opinion that farmers have sent feedlot lamb to the abattoir to be slaughtered as Karoo Lamb					
d	I am of the opinion that other abattoirs have sent Lucerne fed lamb to the processor/packer/retailer/butchery as Karoo Lamb					

	Statement	1	2	3	4	5
e	It is impossible to finish lamb to an A2/A3 carcass on natural Karoo veldt					
f	It is crucial that lamb is finished off in a feedlot for optimum grade and weight					
g	It is crucial that lamb is finished off on a Lucerne field for optimum grade and weight					

SECTION H

63. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	1	2	3	4	5
a	Regulations for marketing Karoo Lamb change frequently					
b	Demand of the clients buying Karoo Lamb is uncertain					
c	Competition among farmers for abattoirs are fierce					
d	You and your farmers exchange business information well					
e	You and your farmers do business frequently					
f	Your farmers are reliable					
g	Long term trust between you and your farmers is well established					
h	If you switch to alternative farmers you will lose a lot of investments in time and efforts in establishing a relationship with your farmers					
i	Competition among abattoirs for a market for Karoo Lamb are fierce					
j	You and your processor/packer/retailer/butchery exchange business information well					
k	You and your processor/packer/retailer/butchery do business frequently					
l	Your processor/packer/retailer/butchery are reliable					
m	Long term trust between you and your processor/packer/retailer/butchery well established					
n	If you switch to selling conventional lamb rather than Karoo Lamb you will lose a lot in terms of abattoir investments					
o	If you switch to an alternative processor/packer/retailer/butchery you will lose a lot of investments in time and efforts in establishing a relationship with your processor/packer/retailer/butchery					
p	You invest a lot of time and effort in maintaining a collaborative relationship with your farmers					
q	You invest a lot of time and effort in maintaining a collaborative relationship with your processor/packer/retailer/butchery					

SECTION I

64. When transacting with the farmers, what type of agreement do you have?

Informal agreement: Verbal	Formal agreement: Written	No agreement	Other:

65. What is the duration of this agreement?

Expires on delivery	Weekly agreement	Annual agreement	Continues until cancelled	Other:

66. Please explain your current relationship/contract with the farmer. E.g. Is it a short term relationship with a market related price or is it more of a long term relationship based on trust.

67. What type of contract/relationship would you prefer between yourself and the farmer?

68. How is the price for lamb per kg determined?

Spot market price	Announced price	Fixed contract price	Negotiated spot price	Other:

69. How many days before delivery is the price determined? _____days

70. Do you have a minimum or maximum number of lamb that the farmer need to deliver? If yes, how many?

Yes	No

71. Are they allowed to deviate from the number of lamb?

Yes	No

72. How far in advance is delivery of lamb to the abattoir scheduled? _____days

73. Which party initiates the contact?

Farmer	Abattoir	Agent

74. Are there certain protocols that farmers need to adhere to to deliver Karoo Lamb? If yes, what are these?

Yes	No

Free Range	Karoo region	No routine antibiotics	No hormones	Traceability	Good animal practices	Other:

75. When transacting with the processor/packer/retailer/butchery, what type of agreement do you have?

Informal agreement: Verbal	Formal agreement: Written	No agreement	Other:

76. What is the duration of this agreement?

Expires on delivery	Weekly agreement	Annual agreement	Continues until cancelled	Other:

77. Please explain your current relationship/contract with the processor/packer/retailer/butchery. E.g. Is it a short term relationship with a market related price or is it more of a long term relationship based on trust.

78. What type of contract/relationship would you prefer between yourself and the processor/packer/retailer/butchery?

79. How is the price for lamb per kg determined?

Spot market price	Announced price	Fixed contract price	Negotiated spot price	Other:

80. How many days before delivery is the price determined? _____days

81. Do you have a minimum or maximum number of lamb that you need to deliver? If yes, how many?

Yes	No

82. Are you allowed to deviate from the number of lamb?

Yes	No

83. How far in advance is delivery of lamb to the processor/packer/retailer/butchery scheduled?
_____days

84. Which party initiates the contact?

Abattoir	Processor/Packer/Retailer/Butchery

85. Are there certain protocols that you as the abattoir need to adhere to, to deliver Karoo Lamb? If yes, what are these?

Yes	No

86. Are there any monitoring mechanisms such as on farm inspections or abattoir tests employed to monitor adherence to KMOO protocols? If yes, who is responsible for the monitoring process? Please explain these mechanisms.

Yes	No

Farmer	Abattoir	KMOO	SAMIC	Retailer	Other:

87. Are there any penalties for non-compliance with the mentioned production practices? If yes, who is responsible for enforcing the penalties? Please explain these penalties.

Yes	No

Government	Abattoir	KMOO	SAMIC	Retailer	Other:

88. Thinking of the investments (time and money) you had to make to participate in the KMOO certification scheme. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	**1**	**2**	**3**	**4**	**5**
a	It took a very high monetary investment to become a member of the KMOO certification scheme					
b	I had to invest a lot of my time to become a member of the KMOO certification scheme					
c	I had to do a lot of research to become a member of the KMOO certification scheme					
d	I had to make a lot of physical changes to the abattoir to become a member of the KMOO certification scheme					
e	I had to make a lot of changes regarding my business strategy and my way of doing business to become a member of the KMOO certification scheme					
f	I had to make a lot of changes regarding the slaughtering process to become a member of the KMOO certification scheme					

SECTION J

89. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	**1**	**2**	**3**	**4**	**5**
a	It is very difficult to obtain information about the KMOO protocols					
b	It is very difficult to find suitable and trustworthy farmers					
c	It is very difficult to get information about certified Karoo Lamb farmers (e.g. location, contact details)					
d	It is very difficult to exchange information with farmers					
e	It is very difficult to come to an agreement with the farmers					

	Statement	1	2	3	4	5
f	It is very difficult to negotiate a reasonable price with the farmers					
g	It is very difficult to agree on the conditions of the contract with the farmers					
h	It costs you a lot of effort (time, funds, etc.) to finally get a farmer to commit to deliver Karoo Lamb					
i	It is very difficult for you to monitor the behaviour of the farmers					
j	If the farmers betrays the relationship in any way you suffer great loss					
k	Picking up lamb impacts heavily on my price per kg					
l	It is very difficult to find a suitable and trustworthy processor/packer/retailer/butchery to market Karoo Lamb to					
m	It is very difficult to get information about the certified Karoo Lamb processor/packer/retailer/butchery (e.g. location, contact details etc.)					
n	It is very difficult to exchange information with the processor/packer/retailer/butchery					
o	It is very difficult to negotiate a reasonable price with the processor/packer/retailer/butchery					
p	It is very difficult to agree on the conditions of the contract with the processor/packer/retailer/butchery					
q	It is very difficult to commit to deliver to the processor/packer/retailer/butchery					
r	It costs you a lot of effort (time, funds, etc.) to finally commit to deliver Karoo Lamb to the processor/packer/retailer/butchery					
s	It is very difficult for you to monitor the behaviour of the processor/packer/retailer/butchery					
t	If the processor/packer/retailer/butchery betrays the relationship in any way you suffer great loss					
u	Transporting lamb to the processor/packer/retailer/butchery impacts heavily on my lamb price/kg					

SECTION K

90. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	1	2	3	4	5
a	Doing business with your preferred farmers brings about logistical advantages that you won't find elsewhere					
b	Payment between you and your farmers always realise quickly					
c	The cost of doing business with your farmers is lower compared with other farmers					
d	You and your farmers can share information about cost, price, product safety, quality and quantity etc.					
e	You and your farmers could use the fastest and most convenient way to communicate					
f	You and your farmers collaborate to adopt good quality management practices quickly					
g	You and your farmers strive to produce high quality Karoo Lamb					
h	You and your farmers strive to maximize your joint value					
i	Doing business with your preferred processor/packer/retailer/butchery brings about logistical advantages that you won't find elsewhere					

j	Payment between you and your processor/packer/retailer/butchery always realise quickly					
k	The cost of doing business with your processor/packer/retailer/butchery is lower compared with other processor/packer/retailer/butchery					
l	You and your processor/packer/retailer/butchery can share information about cost, price, product safety, quality and quantity etc.					
m	You and your processor/packer/retailer/butchery could use the fastest and most convenient way to communicate					
n	You and your processor/packer/retailer/butchery collaborate to adopt good quality management practices quickly					
o	You and your processor/packer/retailer/butchery can jointly establish good practices to ensure food safety					
p	You have great willingness to know your preferred processor/packer/retailer/butchery's preference for lamb					
q	You and your processor/packer/retailer/butchery strive to produce high quality Karoo Lamb					
r	You and your processor/packer/retailer/butchery strive to maximize your joint value					

SECTION L

91. On a scale of 1 to 5, where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, please indicate to what extent do you agree or disagree with the following statements.

	Statement	**1**	**2**	**3**	**4**	**5**
a	I am satisfied with the quality of lamb delivered by farmers					
	The processor/packer/retailer/butchery is satisfied with the quality of lamb I deliver					
b	I am happy with the price I receive from the processor/packer/retailer/butchery					
c	It takes less effort to sell to my preferred processor/packer/retailer/butchery compared to others					
d	It costs me less to deliver to my preferred processor/packer/retailer/butchery compared to others					
e	The benefits of selling Karoo Lamb as oppose to conventional lamb far outweighs the costs					
f	I am happy with the way in which the KMOO is managed					
g	I gained from being part of the KMOO					
h	I am happy with the marketing and exposure the Karoo region gets					
i	I think 100% consumers who purchase lamb are aware of Karoo Lamb					
j	Being part of KMOO exceeded my expectations					
k	The certified Karoo Lamb farmers gained from being part of the KMOO					
l	The certified Karoo Lamb abattoirs gained from begin part of the KMOO					
m	The certified Karoo Lamb processor/packer/retailer/butchery gained from being part of the KMOO					

SECTION M

92.	Can you easily switch between delivering to a processor/packer/retailer/butchery when delivering Karoo Lam? If yes, what should the price difference be for you to switch?	Yes	No

93.	Can you easily switch between farmers that deliver Karoo Lamb to you? If yes, under what circumstances would you switch?	Yes	No

4.	Do farmers easily switch between abattoirs based on price differences? How would farmers switching between abattoirs impact the relationship they have with the abattoirs?	Yes	No

95. Please explain in as much detail as possible how would you proceed if a farmer delivered Karoo Lamb at the abattoir and you realized that it is in fact feedlot lamb?

96. You are a Karoo Lamb abattoir and have the opportunity to deliver Karoo Lamb to the processor/packer/retailer/butchery. The processor/packer/retailer/butchery offers you various contracting options containing different premiums and different rules regarding the monitoring as well as penalties for delivering Karoo Lamb. Please arrange the following from your most preferred contract to the least preferred contract.

Option	Incentive attribute	Monitoring attribute	Penalty attribute
	R3/kg price premium	Monitored for compliance with every Karoo Lamb delivery	Expelled forever for non-compliance
	R3/kg price premium	Monitored for compliance once a year	Expelled for three years for non-compliance
	R0/kg price premium	Monitored for compliance during times of drought	Expelled forever for non-compliance
	R0/kg price premium	Monitored for compliance with every Karoo Lamb delivery	Expelled for three years for non-compliance
	R2/kg price premium	Monitored for compliance with every Karoo Lamb delivery	Expelled for five years for non-compliance
	R3/kg price premium	Monitored for compliance during times of drought	Expelled for five years for non-compliance
	R2/kg price premium	Monitored for compliance during times of drought	Expelled for three years for non-compliance
	R2/kg price premium	Monitored for compliance once a year	Expelled forever for non-compliance
	R0/kg price premium	Monitored for compliance once a year	Expelled for five years for non-compliance

97. Another processor/packer/retailer/butchery also wants you to deliver your Karoo Lamb to him. He offers you four contracts. Which one would you chose. If you decline all four contracts please indicate why you declined.

	Contract A	Contract B	Contract C	Contract D
Premium	R4/kg	R3/kg	R2/kg	R1.50/kg
Deliver/Pick Up	Deliver	Deliver	Pick Up	Pick Up
Monitoring	Every delivery	Once a year	Times of drought	None
Penalty	Expelled forever	Expelled 5 years	Expelled 3 years	None
Which one will you choose?				

***** *Thank you for your participation* *****

Appendix A3: Processor questionnaire

DATE	2	0	1					
Respondent Number								

QUESTIONNAIRE – Karoo Lamb processing plant

Thank you for your willingness to participate in this questionnaire. The reason for this questionnaire is to better my understanding of the Karoo Lamb supply chain as well as the business decisions at the processing level. The questionnaire will take approximately 60 minutes to complete. The questionnaire is confidential and will be treated as such. The answers provided in the questionnaire will only be used for research purposes. Questionnaires completed by all the Karoo Lamb processing plants will be aggregated to generate results.

Please answer <u>all</u> the questions. There is no right or wrong answer. We are interested in understanding your business decisions and want to gain insights of your relationship with the abattoir and the markets that you deliver to.

<u>Processing plant information:</u>

Processing plant name:	
Closest town:	
Name and surname:	
Age:	
Position in processing plant:	
How long have you been in this position:	
Telephone number:	
Email address:	

SECTION A

1. As what type of business entity do you conduct business?

Sole proprietor	Partnership	CC	Trust	Company	Other:

2. What is the capacity of the processing plant? _____ carcasses/day
3. What is the average amount of carcasses that you process and pack per day?

Carcasses/day

4. What do you process/pack? Please indicate the percentage of each category processed and packed.

Lamb	Goats	Cows	Pigs	Ostrich	Game	Chicken
%	%	%	%	%	%	%

5. What percentage of lamb processed is Karoo Lamb? _____%
6. How many days after cutting is meat sold? _____ days
7. What is the average shelf life of cut meat? _____ days
8. Do you have a traceability system in place? If yes, do you keep track in batches or individual packages or cuts? Please explain the processes by highlighting the point at which information is captured and the type of information captured.

Yes	No
ID nrs	Batches

SECTION B

9.	Do you have preferred farmers that delivers Karoo Lamb? How many farmers? How many carcasses do they deliver per week? Why do you prefer this abattoir? For how many years have this abattoir been delivering to you?	Yes	No

Number of farmers	
Number of lambs per week	
Reason for preference	
Number of years	

10. With your preferred farmers in mind and the relationship that you have please answer the following statements on a scale of 1 to 5 where 1=Completely disagree to 5=Completely agree.

	Statement	**1**	**2**	**3**	**4**	**5**
a	The abattoir I do business with has my best interests at heart					
b	I have a good relationship with the abattoir					
c	The abattoir that I do business with is trustworthy					
d	The abattoir I do business with has a good reputation					
e	I expect to do business with the abattoir for many years to come					
f	The abattoir shares information relating to claims such as “free range” and “from the Karoo” with me					
g	The abattoir is always willing to negotiate better prices					
h	I am happy with the quality lamb that the farmers deliver					

11. How and when is the prices to be paid to farmers determine?

12. What is the average price that you pay to farmers for an A2/A3 carcass? R _____/kg

13. What is the premium that you pay to farmers for Karoo Lamb? R_____/kg

14.	Do you pay any additional premiums? If yes, for what?	Yes	No

15. How do you communicate price information to the abattoir? How often do you communicate?

Phone call	SMS	Email	In person	Other:
Daily	Weekly	Monthly	Annually	Other:

16. Please explain in as much detail as possible how the transaction between you and the abattoir works? Who initiates the transactions? Is the transaction based on a verbal agreement? Is there a formal contract? Do you renegotiate prices and quantities with every transaction or do you have a long term agreement? Do you order fixed volumes at fixed times? How do you deal with deviations in quality or quantity? And with cancellations?

17. What type of relationship or contract would you prefer to have with the abattoir?

18.	Is it easy to switch between farmers that delivers Karoo Lamb? How does a temporary switch influence the relationship that you have with your farmers?	Yes	No

19. Does farmers shift between processing plants based on different prices? How does this influence the relationship between the abattoir and the processing plant?	Yes	No

20. On a scale of1 to 5, where 1=Completely disagree to 5=Completely agree, please indicate to what extent do you agree with the following statements.

	Statements	1	2	3	4	5
a	To do business with my preferred abattoir holds logistical advantages that I won't find elsewhere					
b	Payment between me and the abattoir realise quickly					
c	The cost of doing business with my abattoir is lower than with another abattoir					
d	My abattoir and I exchange information about costs, price, product safety and hygiene, quality and volumes					
e	My abattoir and I exchange information well					
f	My abattoir and I strive to produce high quality Karoo Lamb					
g	My abattoir and I do business often					
h	My abattoir is trustworthy					
i	Long term trust between my abattoir and I is well developed					

SECTION C

21. To who do you market Karoo Lamb? What percentage of your total sales do you market to each? Do you prefer one above another? How far is your preferred market from the processing plant? For how many years have you been doing business with your preferred market?

Market to?			
Percentage			
Preference			
Reason for preference			
Distance (km)			
Years			

22. Do you get the same price from supermarkets, butcheries and delis? If not who pays the least and who pays the most? What influences the price?	Yes	No
Lowest price: Highest price: Influence price:		

23. Keep your preferred supermarket/butchery in mind. On a scale of 1 to 5 where 1=completely disagree to 5=completely agree please indicate to what extent do you agree with the following statements.

	Statements	1	2	3	4	5
a	The supermarket/butchery has my best interest at heart					
b	I have a good relationship with the supermarket/butchery					
c	The supermarket/butchery with whom I do business is trustworthy					
d	The supermarket/butchery with whom I do business has a good reputation					
e	I expect to do business with the supermarket/butchery for many years to come					
f	I always share information about claims such as 'free range' and 'from the Karoo' with the supermarket/butchery					

g	The supermarket/butchery is happy with the quality of lamb that I deliver					
h	I am happy with the price that I receive from the supermarket/butchery					

24. How and when is the price paid to you determined?

25. What is the average price that you get per kilogram A2/A3? R _____kg
26. What is the premium that you receive for Karoo Lamb? R_____/kg
27. Do you receive any additional premiums? If yes, what for? | Yes | No |

28. How does the supermarket/butchery share price info with you? How often do you communicate?

Phone call	SMS	Email	In person	Other:
Daily	Weekly	Monthly	Annually	Other:

29. Please explain in as much detail as possible the transaction between the processing plant and the supermarket/butchery. Who initiates the transaction? Is it a verbal or written agreement? Is it based on a formal contract? Do you renegotiate the terms with every transaction or is it a long term contract? Are the quantities and qualities ordered fixed? How do you manage changes in volumes ordered or cancelations?

30. What type of relationship or contract would you prefer to have with the supermarket/butchery?

31. Is it easy to switch between supermarkets/butcheries that sell Karoo Lamb? How does this influence the relationship that you have with the supermarket/butchery? | Yes | No |

32. Do supermarkets/butcheries switch between processing plants based on price differences? If yes, how does this influence the relationship between the processing plant and the supermarkets/butcheries? | Yes | No |

33. On a scale of 1 to 5 where 1=Completely disagree to 5=Completely agree indicate to what extent do you agree with the following statements.

	Statement	**1**	**2**	**3**	**4**	**5**
a	To do business with my supermarket/butchery holds logistical advantages that I won't find elsewhere					
b	Payment between my supermarket/butchery and I realises quickly					
c	The cost to do business with my preferred supermarket/butchery is lower compared with other farmers					
d	My supermarket/butchery and I easily exchange information regarding the cost, price, product safety and hygiene, quality and volumes					
e	My supermarket/butchery and I exchange information well					
f	My supermarket/butchery and I strive to deliver high quality Karoo Lamb					

g	My supermarket/butchery and I do business often					
h	My supermarket/butchery is reliable					
i	Long term trust between myself and my supermarket/butchery is well developed					

SECTION D

34. On a scale of 1 to 5 where 1=Completely disagree to 5=Completely agree please indicate to what extent do you agree with the following statements.

	Statements	**1**	**2**	**3**	**4**	**5**
a	I support the development of the Karoo region					
b	I am loyal towards the Karoo Lamb certification mark					
c	I support the promotion of Karoo Lamb products to increase demand					
d	I support the protection of the Karoo name against exploitation					
e	Karoo Lamb is a unique product					
f	Karoo Lamb deserves a niche market					
g	The Karoo name should be protected					
h	Karoo lamb deserves to be traded at a premium					

35. In your opinion, how much should the premium paid to you be? R_____/kg

36. In your opinion, who should monitor the farmers to ensure the lambs that are marketed are sold as Karoo Lamb and does not come from a feedlot or a region outside the Karoo?

SAMIC	Supermarket/Butchery	KMOO	Other:

37. In your opinion, how should the monitoring process be conducted?

Unscheduled visits	Audit kilograms (Karoo Lamb kg in = kg out)	Meat samples at processing plants	Other ideas:

38. On a scale of 1 to 5, where 1=completely disagree to 5=completely agree, please indicate to what extent do you agree to the following statements

	Statements	**1**	**2**	**3**	**4**	**5**
a	Regulations for the marketing of Karoo Lamb change often					
b	Supermarket/butcheries' demand for Karoo Lamb change often					
c	If suddenly you cannot market Karoo Lamb anymore you will suffer huge losses because of investments and changes you had to make to the processing plant to supply Karoo Lamb					
d	It took a lot of time and effort to build a relationship with the abattoir and it would be a loss if I suddenly had to build a relationship with another abattoir					
e	It took a lot of time and effort to build a good relationship with the supermarket/butchery that I supply Karoo Lamb to and it would be a waste if I suddenly have to rebuild a relationship with another supermarket/butchery					
f	You invest a lot of time and effort to build a good relationship with your preferred abattoir					
g	You invest a lot of time and effort to build a good relationship between your preferred supermarket/butchery					

39. Is there any mechanisms in place such as audits or laboratory tests to ensure that you comply to the KMOO protocols? If yes, who is responsible for these tests? Explain the mechanisms used.

Yes	No

Supermarket/butchery	KMOO	SAMIC	Other:

40. Is there any fines in place if you do not keep to the protocols? If yes, who is responsible for it? Please explain the fines implemented.

Yes	No

Government	KMOO	SAMIC	Supermarket	Other:

41. Keep the investments (time and money) in mind that you had to make to participate in the KMOO certification scheme. On a scale of 1 to 5 where 1=completely disagree to 5=completely agree, to what extent do you agree with the following statements.

	Statement	1	2	3	4	5
a	It took a great monetary investment to become part of KMOO					
b	It took a lot of my time to become a member of the KMOO					
c	I had to do a lot of research to become part of the KMOO					
d	I had to bring about a lot of physical changes to the processing plant to become a member of KMOO					
e	I had to bring about a lot of changes to my business strategy and the way in which business is conducted to become a member of KMOO					
f	I struggle to find a market for Karoo Lamb					

42. On a scale of 1 to 5, where 1=completely agree to 5=completely disagree, please indicate to what extent do you agree with the following statements.

	Statement	1	2	3	4	5
a	The advantages to supply Karoo Lamb are greater than the costs					
b	I am happy with the way in which KMOO are managed					
c	I gain from being part of KMOO					
d	I am happy with the exposure that the Karoo region and its product enjoys					
e	I think 100% of consumers are aware of Karoo Lamb					
f	To be part of KMOO exceeded my expectations					
g	The certified Karoo farmers gain from being part of KMOO					
h	The certified Karoo farmers gain from being part of KMOO					
i	The certified Karoo processing plants gain from being part of KMOO					
j	The certified Karoo supermarkets/butcheries gain from being part of KMOO					

SECTION E

43. You are a Karoo Lamb processing plant and have the opportunity to supply lamb to a supermarket/butchery. The supermarket/butchery provides you with a few options containing different stipulations for premiums, monitoring mechanisms and penalties. Please arrange the following from your first to your last choice.

Option	Incentive attribute	Monitoring attribute	Penalty attribute
	R3/kg price premium	Monitored for compliance with every Karoo Lamb delivery	Expelled forever for non-compliance
	R3/kg price premium	Monitored for compliance once a year	Expelled for three years for non-compliance
	R0/kg price premium	Monitored for compliance monthly	Expelled forever for non-compliance
	R0/kg price premium	Monitored for compliance with every Karoo Lamb delivery	Expelled for three years for non-compliance
	R2/kg price premium	Monitored for compliance with every Karoo Lamb delivery	Expelled for five years for non-compliance
	R3/kg price premium	Monitored for compliance monthly	Expelled for five years for non-compliance
	R2/kg price premium	Monitored for compliance monthly	Expelled for three years for non-compliance

	R2/kg price premium	Monitored for compliance once a year	Expelled forever for non-compliance
	R0/kg price premium	Monitored for compliance once a year	Expelled for five years for non-compliance

44. Another supermarket also wants you to supply Karoo Lamb to him. He gives you a choice of the following three contracts. Pease arrange them from your first to your last choice. You are allowed to refuse all four contracts.

	Contract A	Contract B	Contract C	Contract D
Premium	R4/kg	R3/kg	R2/kg	R1.50/kg
Monitoring	Every delivery	Once a year	Monthly	None
Monitoring	Unscheduled	Unscheduled	Schedulled	None
Penalty	Expelled forever	Expelled 5 years	Expelled 3 years	None
Which one will you choose?				

*** * * * *** ***Thank you for your participation*** *** * * * ***

Appendix A4: Retail outlet questionnaire

DATE	2	0	1					
Respondent Number								

QUESTIONNAIRE – Karoo Lamb Retail outlet (supermarket/butchery/deli)

Thank you for your willingness to participate in this questionnaire. The reason for this questionnaire is to better my understanding of the Karoo Lamb supply chain as well as the business decisions at the retail level. The questionnaire will take approximately 60 minutes to complete. The questionnaire is confidential and will be treated as such. The answers provided in the questionnaire will only be used for research purposes. Questionnaires completed by all the Karoo Lamb retailers (butcheries, supermarkets, delis etc.) will be aggregated to generate results.

Please answer ALL the questions. There is no right or wrong answer. We are interested in understanding your business decisions and want to gain insights of your relationship with the abattoir and the markets that you deliver to.

Retail outlet information:

Retail name:	
Closest town:	
Name and surname:	
Age:	
Position in retailer:	
How long have you been in this position:	
Telephone number:	
Email address:	

SECTION A

1. As what entity do you conduct business?

Sole proprietor	Partnership	CC	Trust	Company	Other:

2. How many kilograms of lamb do you sell per day? _____kg/day

3. What other meat products do you sell? Please indicate the percentage of each.

Lamb	Goats	Cattle	Pigs	Ostrich	Game	Chicken
%	%	%	%	%	%	%

4. What percentage of lamb is sold as Karoo Lamb? _____%
5. On average, how many days after purchase do you sell lamb? _____ days
6. What is the average shelf life of cut meat? _____ days
7. Do you have a traceability system in place? If yes, is information recorded at batch or individual level? Please provide some information on the type of system that you have, for example, can you trace each meat cut back to the carcass and the animal on the farm?

Yes	No
ID nrs	Batches

SECTION B

8. Do you have preferred farmers or processors that delivers Karoo Lamb regularly? If yes, how many farmers or processors? How much lamb do they deliver per week? Why do you prefer these abattoir or processors? For how many years have you been doing business with them?

	Yes	No
Number of farmers		
Number of lambs per week		
Reason for preference		
Number of years		

9. Keep your preferred farmers/processing plant in mind. On a scale of 1 to 5, where 1=completely disagree to 5=completely agree, please indicate to what extent do you agree with the following statements.

	Statements	**1**	**2**	**3**	**4**	**5**
a	The farmers/processors have my best interests at heart					
b	I have a good relationship with the farmers/processors					
c	The abattoir/processors I do business with is trustworthy					
d	The farmers/processors I do business with have good reputations					
e	I expect to do business with the farmers/processors for many years to come					
f	The farmers/processors share information with regards to claims such as “free range” and “from the Karoo” with me					
g	The farmers/processors are always willing to negotiate a price with me					
h	I am happy with the quality of lamb that the farmers/processors deliver to me					

10. When and how are prices payable to the farmers/processors determined?

11. What is the average price per kilogram A2/A3 lamb that you pay to the abattoir/processor?
R _____/kg

12. What is the premium that you pay to the abattoir/processors for Karoo Lamb?
R_____/kg

13. Do you pay any other premiums to the farmers/processors? If yes, for what? | Yes | No |

14. Please explain in as much detail as possible the workings of the transaction between you and the abattoir/processor. Who initiates the contract? Who determines the price? When is the price determined? Is the price and quantities based on a verbal agreement? How fixed are these quantities? Do you order fixed quantities at fixed times? Do you renegotiate the terms for every transaction or do you have a long term agreement? How do you handle cancellations or problems with quantities?

15. What type of relationship/contract would you prefer to have with the abattoir/processor?

16. Can you easily shift between farmers/processors that supply Karoo Lamb? If yes, how does such a move influence the relationships that you have? | Yes | No |

17. Do farmers/processors shift easily between supermarkets/butcheries based on price differences? If yes, how does such a move influence the relationships that you have?

Yes	No

18. On a scale of 1 to 5, where 1=completely disagree to 5=completely agree, please indicate to what extend do you agree with the following statements.

	Statement	1	2	3	4	5
a	To do business with my preferred abattoir/processor holds logistical advantages that I cannot get elsewhere					
b	Payment between me and the abattoir/processor realises quickly					
c	The cost to do business with my preferred abattoir/processor is lower than with other farmers/processors					
d	My preferred abattoir/processor and I easily share information regarding costs, price, product safety, quality, hygiene and volumes					
e	My preferred abattoir/processor and I exchange information well					
f	My preferred abattoir/processor and I strive to deliver a high quality Karoo Lamb product					
g	My preferred abattoir/processor and I do business often					
h	My preferred abattoir/processor are reliable					
i	Long term trust between you and your abattoir/processor is well developed					

SECTION C

19. How do you determine the asking price for lamb?

20. What is the average price that you get for a kilogram A2/A3? R _____/kg
21. What is the premium that you ask for Karoo Lamb? R_____/kg
22. Is there any other types of premiums that you have on lamb products? If yes, please explain what for.

Yes	No

SECTION D

23. On a scale of 1 to 5, where 1=completely disagree to 5=completely agree, please indicate to what extent do you agree with the following statements.

	Statements	1	2	3	4	5
a	I support the development of the Karoo region					
b	I am loyal towards the Karoo Lamb certification mark					
c	I support the promotion of Karoo Lamb products to increase demand					
d	I support the protection of the Karoo name against exploitation					
e	Karoo Lamb is a unique product					
f	Karoo Lamb deserves a niche market					
g	The Karoo name should be protected					
h	Karoo Lamb deserves to be traded at a premium					

24. In your opinion how much should the premium for Karoo Lamb be? R_____/kg
25. In your opinion, who should monitor the farmers/processors for compliance with the Karoo protocols to ensure lambs marketed under the certification mark are really from the Karoo region?

SAMIC	Supermarket/butchery	KMOO	Other:

26. In your opinion, how should monitoring be conducted?

Unscheduled visits	Audit kilograms (Karoo Lamb kg in = kg out)	Meat samples	Other:

27. In your opinion, who should monitor the supermarket/butchery to ensure compliance to the Karoo Lamb protocols?

SAMIC	KMOO	Government	Other:

28. In your opinion, how should monitoring be conducted?

Unscheduled visits	Audit kilograms (Karoo Lamb kg in = kg out)	Meat samples	Other:

29. On a scale of 1 to 5, where 1=completely disagree to 5=completely agree, please indicate to what extent do you agree or disagree with the following statements.

	Statements	**1**	**2**	**3**	**4**	**5**
a	Regulations for the marketing of Karoo Lamb change often					
b	Supermarket/butcheries' demand for Karoo Lamb change often					
c	Karoo Lamb supply is inconsistent					
d	Inconsistent supply of Karoo Lamb can be problematic					
e	If suddenly you cannot market Karoo Lamb anymore you will suffer huge losses because of investments and changes you had to make to supply Karoo Lamb					
f	It took a lot of time and effort to build a relationship with the abattoir/processor and it would be a loss if I suddenly had to build a relationship with another abattoir/processor					
g	You invest a lot of time and effort to build a good relationship with your preferred abattoir/processor					

30. Are there any mechanisms in place, such as audits, to ensure that the supermarket/butchery complies with the KMOO protocols? If yes, who is responsible for this? Please explain the mechanisms used.

Yes	No

Government	KMOO	SAMIC	Other:

31. Are there any fines or penalties in place for when you don't comply with the protocols? If yes, who is responsible for this? Please explain the mechanisms used.

Yes	No

Government	KMOO	SAMIC	Other:

32. Keep the investments (monetary and non) in mind that you had to make to become part of the certification scheme. On a scale of 1 to 5, where 1=completely disagree to 5=completely agree, please indicate to what extent do you agree with the following statements.

	Statement	**1**	**2**	**3**	**4**	**5**
a	It took a great monetary investment to become part of KMOO					
b	It took a lot of my time to become a member of KMOO					
c	I had to do a lot of research to become part of KMOO					
d	I had to bring about a lot of physical changes to become a member of KMOO					
e	I had to bring about a lot of changes to my business strategy and the way in which business is conducted to become a member of KMOO					
f	I struggle to sell Karoo Lamb					

33. On a scale of 1 to 5, where 1=completely disagree to 5=completely agree, please indicate to what extent do you agree with the following statements.

	Statement	1	2	3	4	5
a	The advantages to supply Karoo Lamb are greater than the costs					
b	I am happy with the way in which KMOO are managed					
c	I gain from being part of KMOO					
d	I am happy with the exposure that the Karoo region and its product enjoys					
e	I think 100% of consumers are aware of Karoo Lamb					
f	To be part of KMOO exceeded my expectations					
g	The certified Karoo farmers gain from being part of KMOO					
h	The certified Karoo farmers gain from being part of KMOO					
i	The certified Karoo processors gain from being part of KMOO					
j	The certified Karoo supermarkets/butcheries gain from being part of KMOO					

SECTION E

34. You are a supermarket/butchery certified to sell Karoo Lamb. The abattoir/processing plant gives you the following contract options that include different premiums, rules about monitoring mechanisms as well as penalties. Arrange the following from your first to your last choice.

Option	Incentive attribute	Monitoring attribute	Penalty attribute
	R3/kg price premium	Monitored for compliance with every Karoo Lamb delivery	Expelled forever for non-compliance
	R3/kg price premium	Monitored for compliance once a year	Expelled for three years for non-compliance
	R0/kg price premium	Monitored for compliance monthly	Expelled forever for non-compliance
	R0/kg price premium	Monitored for compliance with every Karoo Lamb delivery	Expelled for three years for non-compliance
	R2/kg price premium	Monitored for compliance with every Karoo Lamb delivery	Expelled for five years for non-compliance
	R3/kg price premium	Monitored for compliance monthly	Expelled for five years for non-compliance
	R2/kg price premium	Monitored for compliance monthly	Expelled for three years for non-compliance
	R2/kg price premium	Monitored for compliance once a year	Expelled forever for non-compliance
	R0/kg price premium	Monitored for compliance once a year	Expelled for five years for non-compliance

35. Another abattoir/processing plant wants you to buy Karoo Lamb from him and gives you the following four contract options. Please arrange the following from your first to last choice. You are allowed to refuse all the contracts.

	Contract A	Contract B	Contract C	Contract D
Premium	R4/kg	R3/kg	R2/kg	R1.50/kg
Monitoring	Every delivery	Once a year	Monthly	None
Monitoring	Unscheduled	Unscheduled	Schedulled	None
Penalty	Expelled forever	Expelled 5 years	Expelled 3 years	None
Which one will you choose?				

* * * * * ***Thank you for your participation*** * * * * *