Australian Lamb/Sheepmeat – Commodity or Premium Product?

Moving from a supply chain to a value chain

A report for

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Executive Summary

The Australian sheep/lamb meat industry is at an exciting point in development. Australia exports a multitude of products to over 65 countries, while also continuing to supply 45% to the higher value domestic market. Australia's reputation internationally is "clean and green" and a key comparative advantage.

Australia has not experienced issues like the horse meat scandal, FMD or BSE but there are challenges, particularly in relation to how chains coordinate to capture and create consumer value. The nature of Australia's climatic variation has created a production led, not a consumer driven chain. Animal variation, combined with speculative pricing and a history of distrust between producers and processors has seen the evolution of the physical saleyard system as the dominant way animals are transacted and prices established. This mechanism has a traditional history and has worked to provide processors with supply and a simple method for producers to ensure perceived competition.

The challenge for industry is whether this system is the best long-term mechanism for creating a quality focussed industry. Can it give producers transparent price signals to incentivise value on farm, which may be difficult to distinguish outside the normal ebb and flow of price variability relating to supply associated with Australia's climate variability? Unlike global competitors, saleyards have become the cornerstone of Australia's system, as illustrated by the main price indicator (ESTLI) being based on reported saleyard prices.

The problem with the saleyard system is it averages animals on guestimates of live weight, fat cover and dressing percentage. It creates additional transaction costs, with yard fees, transport costs and buyers and agents on both sides of the transaction. This limits understanding and communication flow. On a collective industry level, saleyards increase biosecurity and welfare risk, while also damaging the product through unnecessary stress of loading and unloading of animals.

So, with these unnecessary additional costs of transacting product this way, why is over 60% of finished product transacted through saleyards which then directly filters into how the over-the-hook prices are established?

For producers, the reasons are varied, but focus on the following key areas:

- Lack of trust going direct with processors that animals are trimmed and not harshly discounted.
- Costs of saleyards outweighed by the additional upside benefits of perceived competition.
- Simplicity and tradition that saleyards offer smaller lot sizes.
- The advice from agents to gain maximum competition in saleyards.

Saleyards are reflective of a larger more systemic risk of the systems that have evolved over time, where perfectly rational behaviour at an individual level destroys potential collective chain value. There will always be a role for saleyards, store markets and secondary product, but the key question for industry to decide is: Should this averaging system be the mechanism to set the price of the finished animal?

This report concludes that if the Australian sheep/lambmeat industry wants to build its reputation for quality and further differentiate itself in the world market, then it is imperative that transaction/pricing signals reflect metrics around processing efficiency and measurable eating quality attributes, which saleyards will struggle to do.

New technologies will objectively measure value creating characteristics relating to consumer attributes, such as juiciness, tenderness and flavour. These can be measured through carcase tracking during processing with intramuscular fat, eye muscle depth and fat cover.

Processors will be able to measure the useable meat yield (lean meat yield) of each carcase to improve operating efficiency and profitability. Producers will receive pricing signals on quality metrics around genetics, management techniques and feed sources used. Industry, through its service provider MLA, has invested heavily in developing objective measurements that are starting to come to fruition. The challenge now is to ensure those systems can be completely relied upon for their accuracy and that they can be used to re-engineer how the product is transacted within the chain.

Industry should foster a virtual mechanism for processors to secure supply of animals direct from farm, while improving communication and linkages within the chain whilst reducing transaction costs of transport, yard and agent fees for producers. The price discovery mechanism should be based on three components that balance the needs of producers, processors and consumers:

- Hot Standard Carcase Weight (HSCW).
- Lean Meat Yield (LMY).
- Eating Quality (EQ) metrics of a Meat Standards Australia (MSA) Score (Intramuscular Fat, Fat Cover and Eye Muscle Depth).

The value proposition must be clear and not be perceived as one part of the chain gaining advantage over another. The key to change is creating the right incentives for each to see value in the alternative and achieving a critical mass in the method of creating price itself.

In a perfect world, the industry would not need to focus on an open outcry system for creating price but move to long-term contractual relationships where price is determined by input cost parameters and processors could be confident of securing the right supply for customers, while also developing relationships up and down the chain built on trust and communication. However, due to the nature of Australia's production system and the variability associated

with climate and production systems, both producers and processors have been conditioned into a “push driven” method of determining prices based predominately on supply. This system has created an outcome where the livestock market is seen as separate to the finished consumer product. Using a price discovery mechanism that aligns goals is the way to counteract this and build on Australia’s reputation of a quality producing country.

If the inertia of industry is not to change because of culture and vested interest, then perhaps the answer lies in a disruptive process. Traceability has been a hotly debated issue within the industry. The cost of moving from a mob-based system to an individual animal tracing system through the use of Electronic Identification Devices (EID) was seen as too great for perceived benefit e.g. reputation of Australia’s product and its ability to deal with an emergency animal disease outbreak that can trace animals quickly and minimise the spread of disease and hence cost. Industry and government should be thinking about this collectively in terms of how the issue can assist industry in moving to more vertically coordinated supply chains that create incentives, through price signals, for correct behaviour. If real costs of traceability lie with saleyards, then why would government encourage their continued use by investing in traceability? The key is ensuring objective measurements and hook tracking on individual carcases can work and can be trusted. The benefits are:

- Enhancing Australia’s product by having a scientific based methodology to ensuring the consumer has a consistently positive experience.
- Processors sourcing animals with tighter product specification which can allow focus on cost saving technology, example e.g. robotics.
- Producers receive improved information flow and price incentives linking management, genetics and feed source to end product.

If an evolutionary process of change cannot occur because of vested interests, then occasionally the old adage of “you have to break a few eggs to make an omelette” applies.

For the industry to position itself as premium protein, it should embrace transformational institutional change that can work within the culture that has evolved from existing systems through incentives at the right place. It is part of an evolutionary process towards building long-term relationships within the chain that align goals on creating a quality, consumer focused industry. It is effectively a hybrid model, between value chain and supply chain, but with focus on value created collectively. Industry can create incentivised cultural change that focusses participants on value creation, reducing unnecessary transaction costs. These resources could be better utilised by producers through management investments to help manage the biggest risk of all, mother nature.

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Foreword

I operate a farm business in Western Victoria, yet I don't really consider myself a farmer, as I didn't grow up on a farm. My background was in economics/accounting, combined with some practical experience having worked in early stage wool processing. The experience in the wool industry gave us the drive for a career change in 2000 to "go farming" and focus on wool in a beautiful locality, great for raising a family.

We set about monitoring individual animal production to establish if we could achieve our production goal. Through the use of electronic tags, individual fleece scanning, body weighing and other methods we were able to learn through genetic selection and management to decrease micron to the desired level, while increasing fleece weight, but SS and VM were very difficult to manage because of our underlying land and soil type.

After the 2007 drought, and realising we couldn't grow the right type of wool, we began rebalancing the business by increasing cropping to 25%, and diversifying into lamb production through joining 50% of our 12,000 Merino ewes to terminal meat breeds. In transitioning away from wool towards a more sheepmeat focus we have learned how to finish animals to a target weight and condition score through the use of lucerne pasture and grain stubbles/rations. Yet, despite being closer to the consumer, unless watching every animal being slaughtered and hung up, we didn't know whether we were producing a quality article for the consumer. The only information we receive is Hot Standard Carcass Weight (HSCW) and a Fat Score. The pricing signals received are dependent on the supply and demand within the physical price discovery of a collection of saleyards through the benchmark of the Eastern States Trade Lamb Index (ESTLI). Even if the product is going direct to slaughter, known as over the hooks (OTH), price grids, which do give some discounts for fat cover and weight range are directly related to the ESTLI. The saleyard price, where over 60% of finished animals are sold, is a guestimate of body weight, dressing percentage and fat cover, as animals are not weighed.

Acknowledgments

As many Nuffield Scholars have explained, the Nuffield experience can be life-changing, which I must agree with.

I would like to thank my beautiful wife Jane, and our two boys Lachlan and Campbell, who endured my spasmodic seven months of travel. Time away from home makes one realise how special home is and it also makes the family realise that “the old fella” actually does do a bit around the place.

I would particularly like to thank Jane for holding the fort and taking on the financial administration of the property and making me stop procrastinating on how to write this report.

I would also like to thank my Livestock Manager Sean Harvey, whom I have the pleasure to work with.

Abbreviations

AHA	Animal Health Australia
CAP	Common Agricultural Policy
CWT	Carcase Weight Tonnes
ESTLI	Eastern States Trade Lamb Indicator
FMD	Foot & Mouth Disease
HGPs	Hormone Growth Promotants
LPA	Livestock Production Assurance
MIEG	Meat Industry Excellence Group
MLA	Meat & Livestock Australia
MSA	Meat Standards Australia
NGOs	Non-Government Organisations
NSHMP	National Sheep Health Monitoring Program
NZ	New Zealand
OJD	Ovine Johnes Disease
OTH	Over the Hooks
PIC	Property Identification Code
PPP	Profit Partnership Programs
US	United States
WTO	World Trade Organisation

Objectives

1. To understand the challenges of moving from a supply chain to a value chain and what are the enablers and dis-enablers of change.

2. Investigate and discuss options for improving vertical coordination within the Australian lamb/sheep supply chain, particularly in relation to producers' role in the production chain.

Introduction

In an attempt to understand how industry moves from a supply chain to a value chain and what the potential enablers or dis-enablers of change are, this issue was researched from a two-dimensional perspective:

- Individual producer/processor/value chain perspective; and
- Whole of industry/institutional perspective.

It was important to understand where other sheep/lamb meat industries were at, particularly in terms of similar cultural attributes, how industry and individuals were adapting and what systems worked to achieve outcomes, or not.

The author spent considerable time in New Zealand, Ireland, Wales and England talking to producers, processors, retailers and exporters.

Visiting the US and Canada allowed the chance to look at their sheep industries, but also boundary scan of other agricultural protein industries to understand issues associated with increased vertical coordination within these chains.

Germany, Belgium and the Netherlands were also visited to look at similar issues.

The most interesting conference attended was in Maastricht which looked at the future of the "Cultured Meat" industry. Effectively it is taking stem cells from the best genetics and growing meat in a lab, avoiding all the environmental and welfare issues that potentially threaten the red meat industry. However, it is outside the scope of this report.

Chapter 1: Supply Chain

1.1 Nature of Supply Chain Relationships

Nuffield Scholars have looked extensively at the nature of agricultural supply chains (Ransford, B (2008), Neumann, M (2012)). These reports have highlighted the challenge of aligning goals collectively within a commodity chain. It will always be difficult when a large profit incentive of all participants up and down the chain is to buy low and sell high, with each chain partner competing for their slice of the pie.

James Parsons 2009 NZ Nuffield report "Supply Chain Relationships and Value Design", gave an interesting analogy of supply chains to marriages. He described the short-term nature of relationships within a supply chain that are dominated by physical auctions being similar to a public forum for one-night stands, where the relationship is very temporal with no guarantee of repeat business. Whereas long term relationships between chain partners is more like a marriage, built on communication and trust. In discussions with James, who at the time of writing was Chair of New Zealand Beef and Lamb, he still described the frustration of chain participants within NZ's lamb industry of the continuation of this type of behaviour. But on the other hand, this was perfectly rational behaviour within the type of supply chains that have evolved. The challenge is to move to a new paradigm of thinking and behaviour.

Before focusing on the issues, d it is important to understand the continuum of the types of supply chain relationships that have evolved and the decisions chain participants make.

1.2 Spectrum of Supply Chain Relationships

Various agricultural supply chains were visited and a common theme was apparent. Where there was genuine value creation either from improved raw material supply, or where there was increased consumer value creation, supply chains had evolved towards improved vertical coordination.

From an agribusiness perspective the types of sourcing strategies were well summarised by discussions with Edwin Van Raalte (July 2015) and the resulting summary from "The Future of Farming- The Rise of the Rural Entrepreneur" (2014). These strategies can be grouped into three categories:

1. Increasing control of physical sourcing.
2. (Examples include investing directly in production systems, or creating quality assurance programs and agreements that ensure supply is destined for that chain.
3. Focussing on market power.
4. Adopting (internal) business strategies to reduce, or possible circumvent supply risks.

In these situations, companies seek niche markets, ingredient substitution or provide tolling. Tolling involves offering processing steps as a provider on the basis of 'cost plus' pricing agreements without direct profit or loss exposure to raw material flow.

The Strategic Sourcing Continuum (Figure 1) illustrates the interaction between business risk and supply risk of these different strategies. It should be noted often agribusinesses will use a combination of all three strategies.

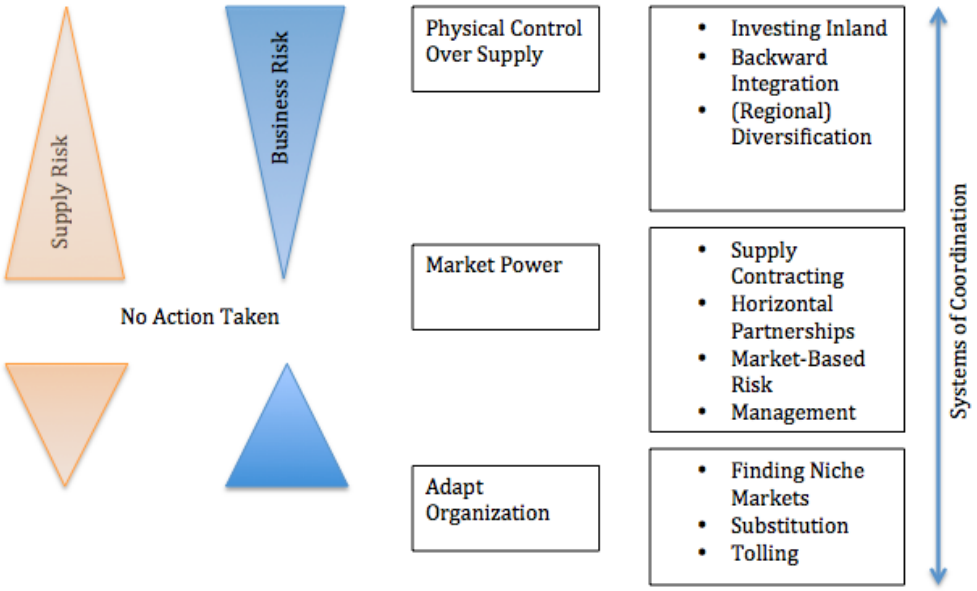


Figure 1: Strategic Sourcing Continuum. (Source: The Future of Farming, The Rise of the Rural Entrepreneur)

The other side of the coin is from the producer's perspective. Farmers have been associated with being price takers and over time they have made the decision how to manage this risk.

Figure 2 "The Producers Strategic Choice Continuum" summarises this interaction between freedom and cooperation and the types of products produced, while also outlining the types of management strategies and contracts used. It is important to highlight the nature of the type of culture that is created amongst producers of competitive bulk commodities, where there is a high focus on individual freedom.

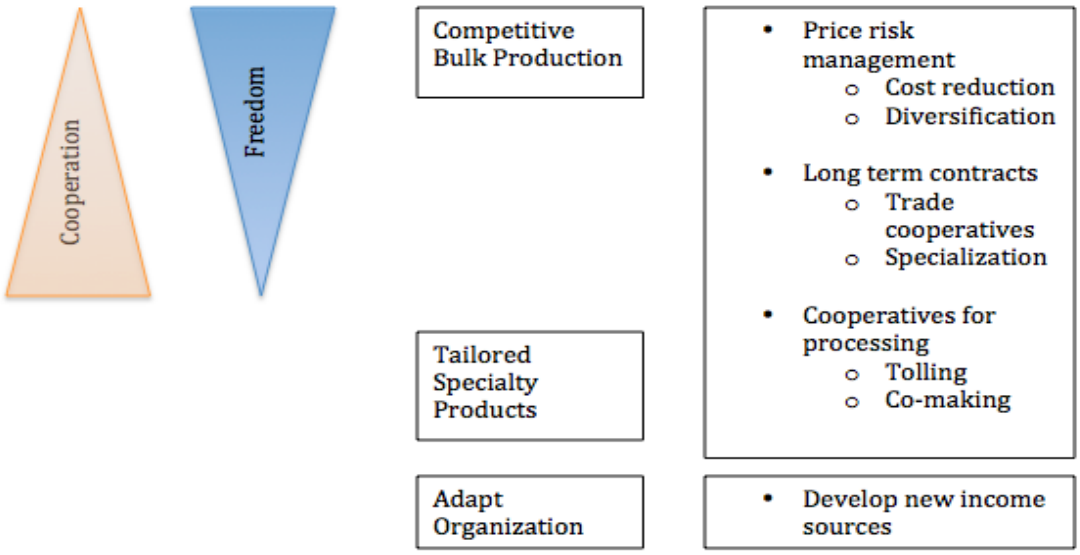


Figure 2: Producers Strategic Choice Continuum. (Source: The Future of Farming, The Rise of the Rural Entrepreneur)

The culture that is created from individual freedom, and the rational behaviour of the individual to focus on their slice of the pie, means the farmer is more focussed on efficiency gains on farm, as Figure 3 illustrates. The retail value creation point seems too far away and producers often feel disconnected from it. The focus becomes the price for their slice of the product. To do that, they need to maximise competition through open outcry auctions, which creates the distrustful "one-night stand" culture.

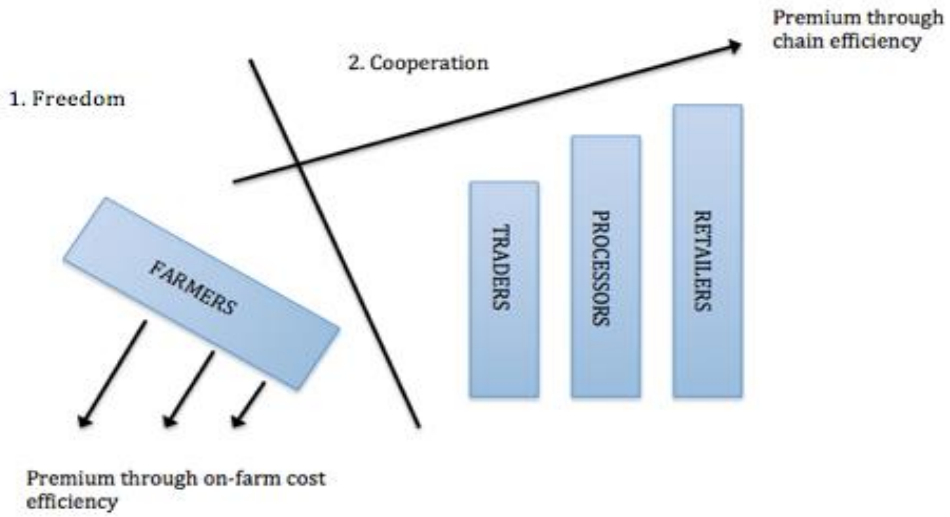


Figure 3: farmers Strategic Choices. (Source: The Future of Farming, The Rise of the Rural Entrepreneur)

1.3 How to Profit from Peak Meat?

We have heard the term “peak oil”, but probably not “peak meat”. According to Professor David Hughes’s (2015), who termed the phrase, it refers to the opportunities to agricultural protein supply chains with the expected growth in the middle class, particularly in Asia. The middle class in Asia alone is expected to rise from 525 million to 2.1 billion within the next 25 years (Pezzini, 2012). According to Professor Hughes there are some key consumer trends emerging:

- Rise of the natural and organic product and “the movement away from processed products”.
- Importance of convenience and the visual; consumers buy with their eyes and wallets.

One of the risks discussed by many supply chain participants and researchers interviewed (Cahill, A (September 2015), Hughes, D (July 2015), Fennel, D September (2015)) was “food fraud”, a growing risk to both supply chains and their brands. The instances of product contamination and substitution can cause massive disruption and loss of consumer loyalty, as both the 2013 horse meat scandal in Europe, and the 2008 infant baby formula/melamine scandal in China showed.

1.4 From Coordination to Integration

Other protein supply chains have moved from chain coordination to more fully integrated supply chains. Examples include the chicken and pork industries world-wide (Western, 2015). As Professor Mike Boehlje (August 2015) described it, “when the pork and chicken industries started moving to indoor confined systems, their systems moved from an art form to a science”. When all the variables within the production system could be controlled the chains became more integrated and concentrated. It is then a simple process of establishing an adequate rate of return on the investment in that section of the chain.

There were also other reasons for industries to become more integrated. According to Professor Boehlje and Roger Mercer, a prominent pig producer and Chairman of Nuffield International (March 2015) similar situations in North America and the European pig industries occurred in the late 1980s and early 1990s. With stricter environmental and welfare regulations, combined with the growing production efficiencies being created from increasing economies of scale and improved information flow of product processing, the capital raising markets had an effect on the supply chain relationships within the chains. After the financial crisis of 1987 capital markets had a lower risk aversion to lending on speculative cash flow forecasts. While the capital demands of increasingly capital intensive larger production systems were increasing then lenders wanted to see producers have risk management strategies around their income estimates, hence an increase in the uptake of contract agreements. The requirement for lenders to have assurance of production income is only natural when one considers they are predominately lending on cash flows alone. If a sow business goes out of business the capital asset of the shed may have depreciated substantially and be purely salvage value. This is different to the case in extensive livestock systems in

Australia where lenders are predominately lending for land acquisitions, which normally have capital growth.

There are risks to producers of losing freedom within the chain in going down a more integrated supply chain path. A prominent chicken producer in Europe, who didn't wish to be named, discussed this risk in depth with the illustration that his production profitability in a contract growing system was determinant on the type of birds and their genetic feed conversion efficiency that were supplied by the processor. If producers stepped out of line with any criticism of the processor or the brand, they could easily suffer financially with the type of birds supplied to them the next year.

To summarise the level of integration and coordination shown in different protein industries the following diagram tries to capture the issues associated with this continuum (Figure 4).

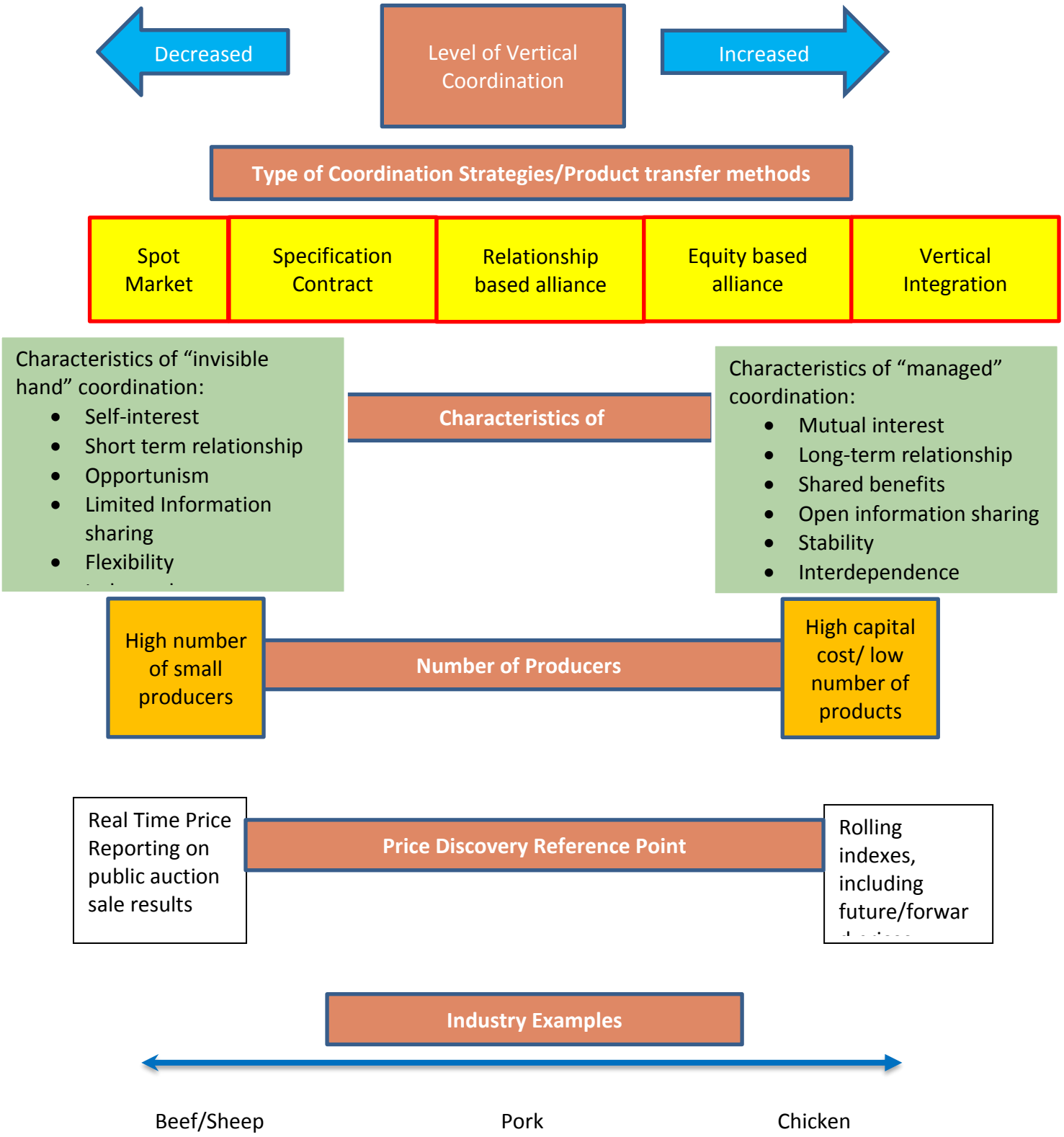


Figure 4: The Coordination Integration Supply Chain Continuum (Source: Author)

Chapter 2: Australian Industry Overview

The Australian Industry

In the 1980s the Australian lamb/sheepmeat industry was predominantly a small, domestically focused industry and viewed as a by-product of wool (Mc Donnell, 2016). There were consumer perception issues the product was fatty and difficult to prepare. It was losing market share. However, with the demise of the reserve price scheme for wool in the early 1990s, combined with the development of the lamb Industry Strategic Plan (1995),the industry has seen long-term sustained growth, increasing over the subsequent 25-years (Joseph, 2015), as shown in Table 1. This is a rare situation in agricultural commodities as normally productivity improvements outstrip demand growth. The rising star of the lamb industry is shown in Figure 5 through a comparison with other Australian agricultural products indexed to 1994 levels.

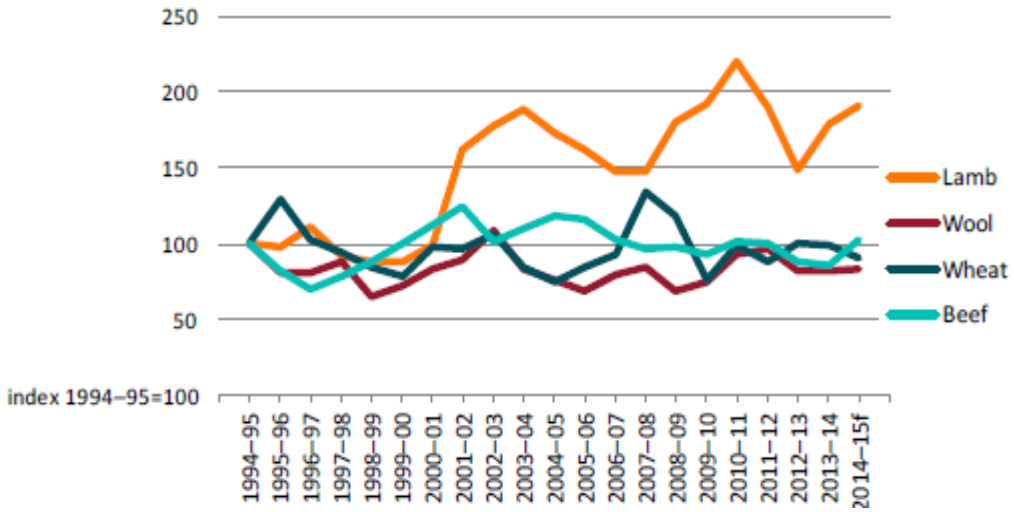


Figure 5: Index of real commodity prices 1994-95 to 2014-2015

Source: ABARES, Financial performance of slaughter lamb producing farms, 2012-13 to 2014-15.

On farm value has grown from $1.39 billion in 1990, with production of 285,600 tonnes carcase weight tonnes (cwt) of lamb and 365,000 tonnes cwt of mutton to $3.2 billion in 2015 with 506,605 tonnes cwt of lamb and 214,446 tonnes cwt of mutton (ABARES Agricultural Commodities Report September 2015), as Figure 6 illustrates. This improvement was a result of a comprehensive collaborative effort at an industry level and their respective R&D service and marketing providers. A multiprong approach was used with such programs as the “Trim Lamb” campaign for the domestic market, which introduced new cuts and trimming practices to address the versatility of the product. A multitude of other reasons also contributed to the growth, including a reduction in trade barriers and tariff rates, improvements in freight services and ensuring all sheep and lamb products are certified Halal, critical for the cultural attributes of many customers (Cullen, 2015).

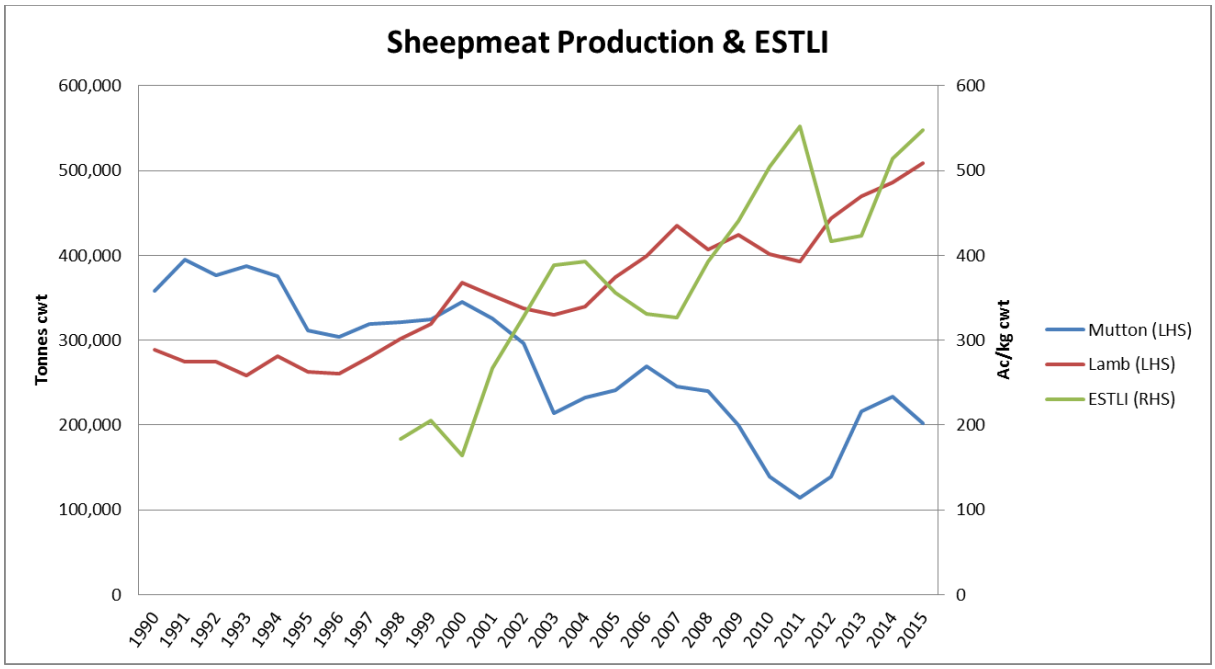


Figure 6: Growth of The Australian Lamb Industry

Source: ABARES: Financial Performance of Slaughter Lamb Producing Farms Report 2014-15

On farm, many producers transitioned from low profitability in the wool industry to a greater meat focus through joining 30-50% of their ewe base to terminal meat breeds. Many producers have chosen to go to a complete meat breeding operation with a second terminal cross. Combined with improved product specifications, the average lamb carcase increased substantially from 18.2kg cwt in 1990 to 22.1 kg in 2015 as shown in table 1 (ABARES, 2015).

Year	Sheep numbers c (million head)	Lambs slaughtered b ('000)	Slaughter weight (kg/hd)	Lamb meat production ab (kt)	Lamb meat exports a (kt)
2004–05	101	17 331	20.4	354	146
2005–06	91	18 666	20.5	382	173
2006–07	86	20 158	20.5	413	179
2007–08	77	20 529	20.9	428	194
2008–09	73	20 395	20.4	416	184
2009–10	68	19 478	21.2	413	190
2010–11	73	17 880	21.9	391	188
2011–12	75	18 879	22.2	419	207
2012–13	76	21 122	21.6	457	235
2013–14	73	21 899	21.5	474	265
2014–15f	70	22 500	22.1	487	273
Percentage change between 2004–05 and 2014–15	–31%	30%	8%	38%	87%

a Carcass weight. b Data from 2007 do not include farm kills. c As at 30 June. f ABARES forecast.
Source: Australian Bureau of Statistics

Table 1: Sheep Numbers and Average Lamb Slaughter Weight 2014-15

Source: ABARES: Financial Performance of Slaughter Lamb Producing Farms Report 2012-13 to 2014-15

2.1 Production Characteristics – Diversified Business

One key aspect of the Australian sheep/lamb production sector compared to other countries is the diversified nature of production, both from a geographical perspective and from a within business level. Figure 7 highlights the diversified nature of the type of businesses lamb production comes from. Marketing choices around these bulk commodity production systems that focus on freedom and maximising competition are perfectly logical, but it can create a producer culture that may struggle with the concept of supply chain coordination to create consumer value.

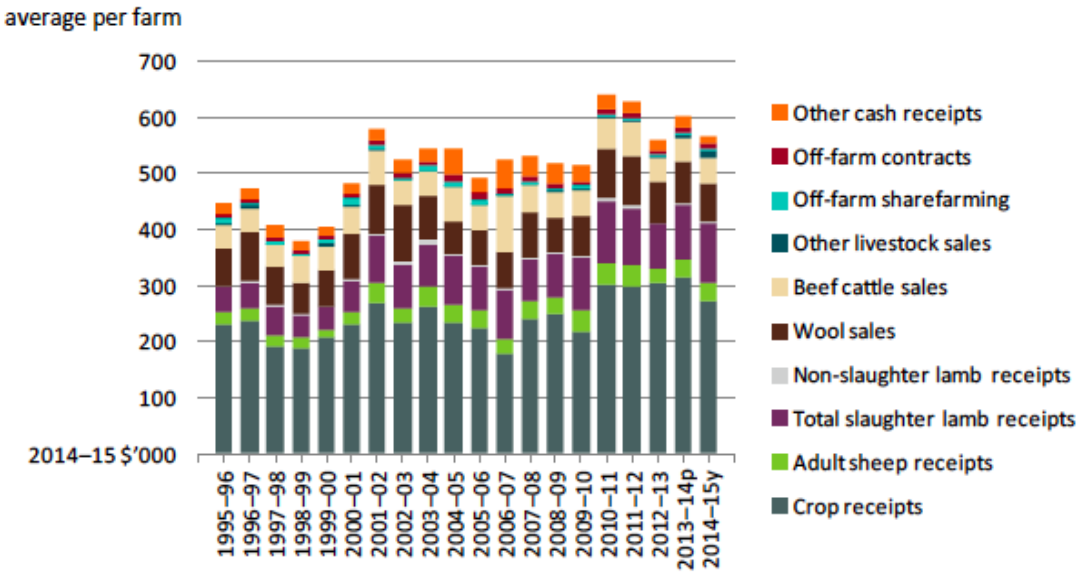
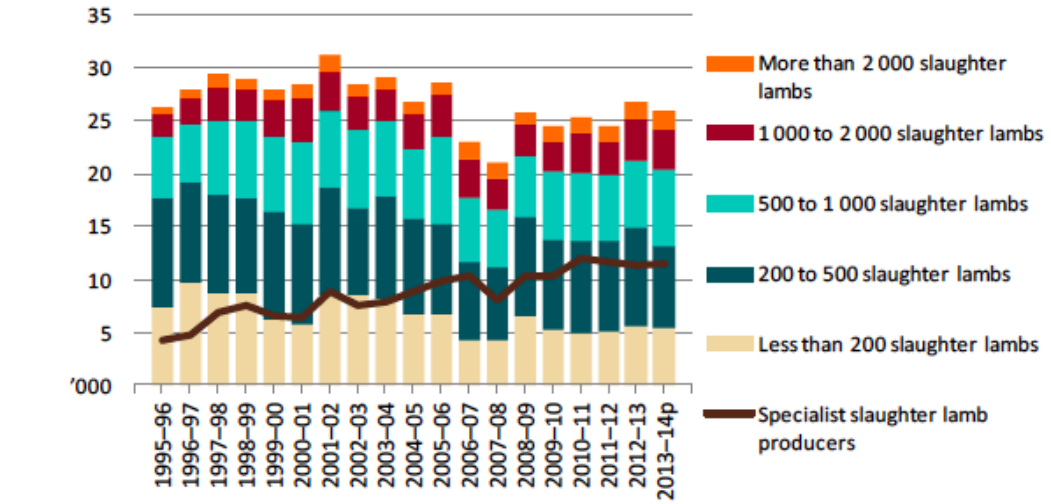


Figure 7: Composition of receipts, slaughter lamb producers, Australia 1995-96 to 2014-2015

Source: ABARES: Financial Performance of Slaughter Lamb Producing Farms Report 2012-13 to 2014-15.

2.2 Nature of Production and Producer Segmentation

Over time there has been the development of a dedicated lamb production sector and a degree of consolidation. As Figure 8 illustrates over the preceding ten years the number of farms selling less than 200 lambs has declined by around 50%, while the number of lambs selling between 1000 and 2000 lambs have increased over 50%, and over 80% for farms selling more than 2000.



p Preliminary estimate.
Source: ABARES Australian Agricultural and Grazing Industries Survey

Figure 8: Number of Farms Selling Slaughter Lambs

Source: ABARES Australian Agricultural and Grazing Industries Survey 2014-15

The composition of the Australian sheep flock has changed as a result of the reduction in the wool focus. As Figure 9 illustrates, the ewe portion of the flock has increase as the wether portion has decreased. Producers now place increasing emphasis on fertility traits and lamb survival to assist in meat production, rather than on a wool alone.

A key difference of the Australian producer sector compared to other international competitors is the Australian ewe base is predominately Merino. Discussions with producers overseas would highlight that the Merino could be a major disadvantage, because the evolution of a wool focused animal has meant the Australian producer suffers from lower fertility rates and total meat production per Ha. The Merino does offer a dual-purpose role that allows for a level of income diversification and improved environmental risk management suited to Australia's higher level of seasonal variability. Currently, the issues around taste and flavour are purely subjective and anecdotal. If Australia could measure these factors and link it back through a price signal, it may give the Australian product a competitive advantage.

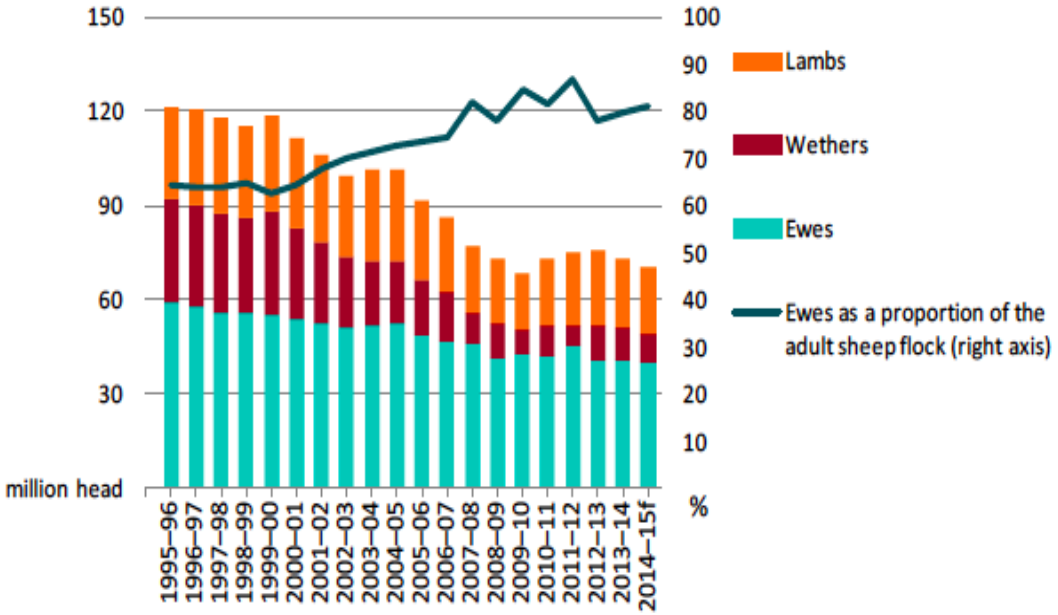


Figure 9:Composition of the Australian Flock 1995-96 to 2014-15

Source: ABARES: Financial Performance of Slaughter Lamb Producing Farms Report 2012-13 to 2014-15

2.3 Australia's Competitive Advantages

2.3.1 Product integrity – "True Aussie"

Australia's big draw card for its product is reputation and price. This was on display at ANUGA 2015 in Cologne, the world's leading food fair for the retail trade with over 160,000 trade visitors from 192 countries. Discussions with retail representatives from China, the Middle East and America, consistently made note of Australia's reputation as a safe food source. As was often heard, "perception is reality in the meat game". The perception that Australia has never had a major food fraud scare is a competitive advantage. The product is often related back to the iconic images of Australia, a land of sweeping plains, a culture of outdoor living. So, the decision for MLA to brand red meat as "True Aussie" acts as an underpinning brand for the commercial brands.

2.3.2 Low Cost Production Systems

Discussions during the research often focused on value and profitability of the land. One of the key competitive advantages Australia has is its extensive production system that allows for low cost production due to lower land cost. This conclusion is based upon an evaluation of land values and running capacity equated into Australia's Dry Sheep Equivalent (DSE) as shown in Table 2. Of interest is NZ, as between Australia and NZ these two exporting countries account for 66% of the world's exporting quantity (MLA, 2015). It should be noted China is the largest lamb/sheep meat producer in the world with over 200 million sheep, however because of its massive domestic population it is still a net importer.

	Australia	NZ	UK
Avg DSE Land Value (Dry Sheep Equivalent, 50kg wether eating 7.3ME/day)	$350	$540	Minimum $1000
Australia's Capital Cost Competitiveness		➢ 50%	300% and up to 1000%
Main Reasons for Land Value Differences	• Higher levels of climatic variability	• Competition for land from the dairy sector • More reliable rainfall patterns	• Distortion from the Common Agricultural Policy (CAP) through subsidies • Lack of land and the massive urban/population density competition

Table 2: DSE Land Value Comparison (Source: Author)

2.3.3 Flexibility – A Range of Products for a Range of Markets

To the credit of Australian exporters and retailers they have adjusted to a production lead system by developing products for a range of markets, both domestic and international. Figure 10 shows the market segmentation of the variety of lamb carcases that have evolved in Australia.

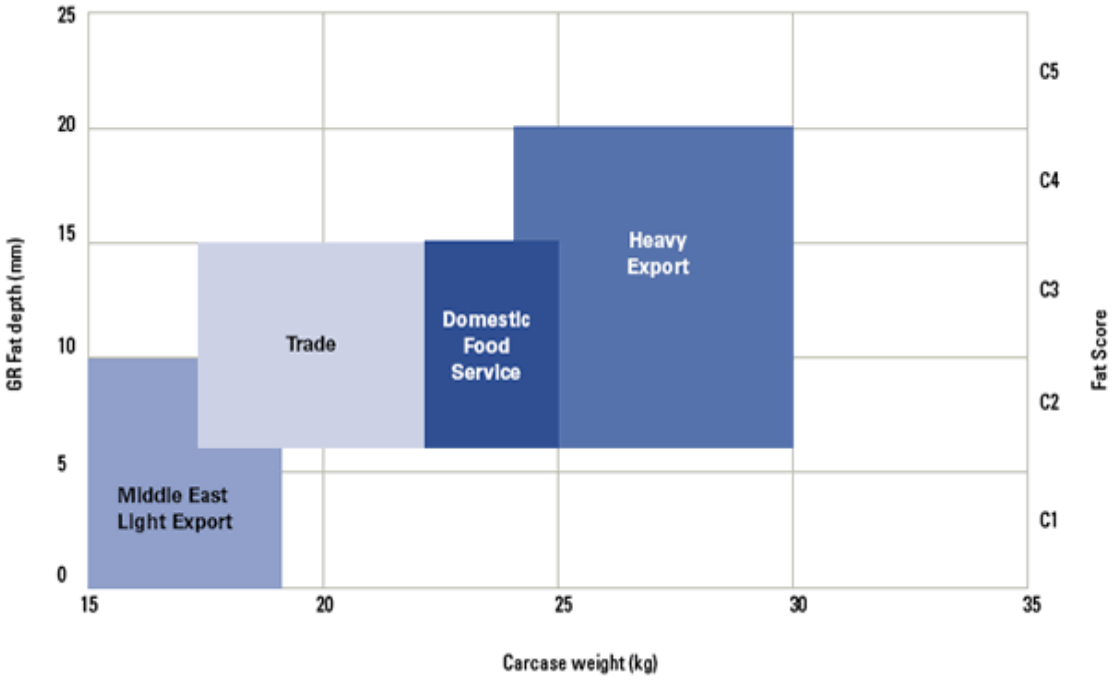


Figure 10: Market Specification for Lamb

Source Sheep CRC: Making more from Sheep

The flexibility that the different market segments offers Australian producers is critical for managing mother nature and the variability of the Australian production system. An interesting quote from one exporter was "We would rather supply ten customers in ten

countries, than just have one customer alone" (Mc Lean, 2015). This reflects an advantage for the industry that monopoly behaviour is difficult to exhibit from the international retail level because processing is still maintained in Australia. However, it does pose some hidden challenges that often producers are unaware of around higher labour and compliance costs for processors in Australia, particularly compared to NZ (Inglis, 2015).

2.4 Selling and Price Discovery Methods

Figure 11 illustrates the flow of physical animals through the Australian supply chain and the importance of the saleyard system in transacting animals. According to ABARES's figures, on average 66% of sheep slaughtered in Australia are transacted through saleyards. According to some observers it is a "…*fantastic, just-in-time supply chain management system that achieves the required outcomes for both parties, maximising competition for producers and securing the desired type of supply for processors*" (Leach 2015).

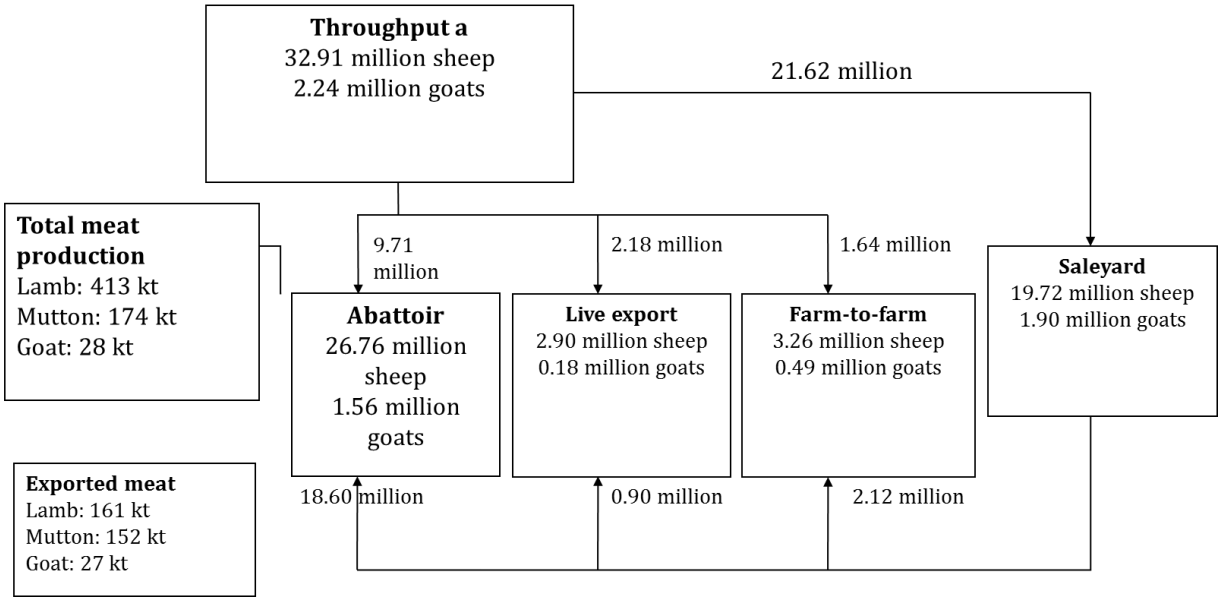


Figure 11: Sheep and Goats Moving through the Supply Chain (2008-2015 Avg)

Source: ABAREs "Decision Regulatory Impact Statement Implementation of Improvements to the NLIS for Sheep and Goats"

2.4.1 Saleyards – Where Prices Are Set

Australian saleyards transact animals on a dollar/head basis with buyers making a physical estimate of weight and fat cover. Saleyards have a history in Australia and the perception is they provide a transparent way to sell animals, with buyers competing in an open environment. For processors, they provide an opportunity to ensure supply by amalgamating animals from a variety of different producers into a consistent type they require.

Both Figures 12 and 13 reflect the dominance of the saleyard system through the decisions producers make when choosing how to transact their product in the supply chain. Figure 12 shows that a higher percentage of adult sheep are sold through the saleyards, compared to a

growing percentage of lambs going direct, as Figure 13 highlights. This highlights a growing desire of specialist lamb producers to reduce transaction costs and receive feedback on their product.

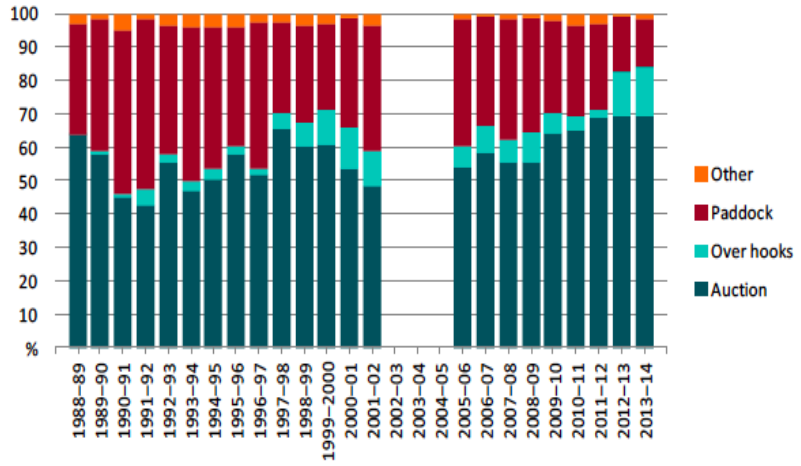


Figure 12: Adult sheep selling methods, slaughter producing farms

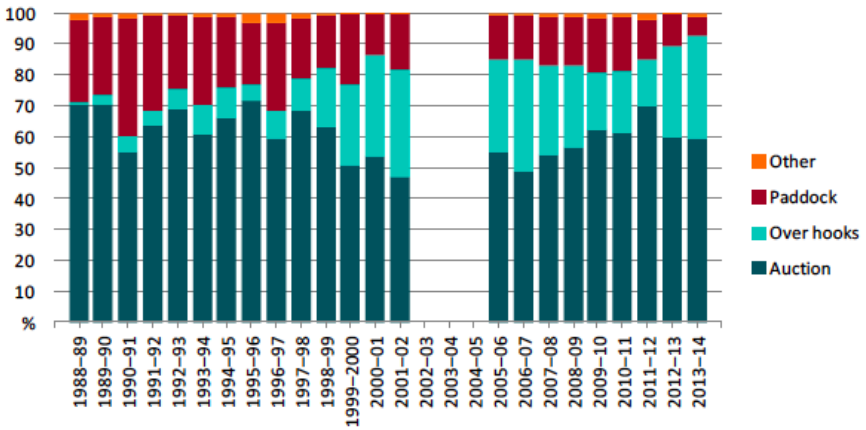


Figure 13: Lamb Selling methods, Slaughter Lamb Producing farms

Source: ABARES: Financial Performance of Slaughter Lamb Producing Farms Report 2012-13 to 2014-15

2.4.2 Why Do Producers use Saleyards?

It is quite natural that the Australian system has evolved to rely on saleyards to transact product and create price. It reflects the producers desire to maintain freedom because of a lack of trust. When discussing this issue, the following issues continually get raised:

1. **Simplicity, Competition and the Store Market**

   A variety of animals can be delivered from different sellers and purchased by processors/store buyers/contract buyers/domestic supermarkets, who can combine the animals for an efficient quantity of a specified quality. It provides freedom for producers to sell animals at whatever stage they are at, with confidence that there will be enough critical mass of to ensure maximum competition.

2. Catering for all Sizes

Animals don't all finish at the same time. Saleyards provide the opportunity for smaller producers to then sell animals in smaller lots as they finish.

3. Agent Advice

When producers are asked how they make marketing choices, they often defer to their agent. This reflects a high level of personal trust in agents. Producers will often feel they don't have their "finger on the pulse" so rely on their agent. The agents themselves often then just defer to the logic that saleyards maximising competition.

4. A Degree of Anonymity

Saleyards provide anonymity at the processing point. Once animals are sold "under the hammer" in saleyards, they are combined and processed in batches. In most processing plants, individual animals, and their matching Property Identification Code (PIC) cannot be identified within the batched saleyard mobs as the heads are removed, which contain the visual mob based tracing tag, before the carcases and offal are inspected for any diseases. So, for producers who are aware of potential problems with animals such as carcase damage from poor vaccination hygiene, grass seed contamination, or diseases selling them through the saleyards ensures they don't get penalised for them.

5. A Lack of Trust in Trimming Practices

A commonly heard complaint from producers was that they didn't trust how processors trimmed the product. When processors pay on an Over the Hook Carcase weight, rather than on live weight, producers take the risk of how much fat and excess the processor trims off. There was a level of confusion with both producers and agents in understanding of whether the carcase weight paid for included the removal of channel fat and kidneys, which was dependent on the type of (generally) export market being supplied for.

6. Producers Take the Risk

Though the industry is moving towards a higher level of specialist producers focussing on lamb production, the average producer is still relatively small and as Figure 7 showed, the percentage of income associated from lamb and sheep sales is only approximately 22% of total income. Producers who have a diversified income source often believe a saleyard is worth the additional transaction costs of freight and yard fees, in the hope of purchasers paying additional premiums, not necessarily for quality attributes, but purely for the tightness of supply and the need for processors to secure supply to keep plants operating.

7. Tradition and Social Factor

Saleyards have a rich social history and tradition in Australian regional centres, particularly as many are owned by local councils. Open a rural paper and the livestock section shows a farmer with pen of animals in a saleyard. Some take pleasure in the social gratitude of

displaying their stock and having the prices published locally. A similar observation was made about Irish farmers by the editor of the Irish Farm Journal, Justin Mc McCarthy.

2.4.3 Do Saleyards Give Signals on Quality Outside of Supply and Demand

Many processors commented that they realised the product was "compromised", i.e. quality was reduced, when sourced through saleyards (Inglis, Radford, Dickenson, October 2015). The saleyard product has a greater level of variability, which creates wastage from requiring more trimming, thereby also adding to their cost base through additional labour and decreased chain speed. Processors realise they are averaging prices, while also guessing/estimating liveweight, fat cover and dressing percentage, but they accept this compromise to ensure they have supply. So, on the processors side of the equation they are acting quite rationally. However, from a macro industry pricing/signals perspective the questions that must be asked:

- Can saleyards identify animals that can create additional value, either in the form of consumer value or improved processing attributes?
- Are there positive price signals for creating value?

According to many (Dickenson, Pethick, Vallance, 2015) the simple answer is no. Saleyards propagate short-term behaviour from both sides, which is rational, but prevents the industry creating real price signals around consistency and quality. If the market pricing mechanisms respond purely to supply and demand, then high price signals will eventually create oversupply. If there are no industry systems to create higher prices for higher quality, then the market effectively treats the product as a commodity.

Another issue that price discovery at the saleyards create is that rarely animals are sent home because of increased costs (freight and yarding fees) and potential biosecurity concerns. So effectively producers become price takers of what the market will offer on the day. This captured market effect increases short-term price variability (Herman 2015) for producers. There is also another issue of potential collusion between buyers, as was alleged in the cattle industry, with the potential boycotting of buyers from the Barnawatha saleyards in February 2015 over the issue of moving from pre-sale weighing to post-sale weighing (Condon, 2015).

2.4.4 AuctionsPlus

AuctionPlus originated from a system known as CALM (Computer Aided Livestock Marketing). It was created in 1986 by the former R&D levy service provider known as Australian Meat & Livestock Corporation (AMLC). The system was probably ahead of its time, it was initiated before the internet took hold in the early 1990s. In 1997, during an industry restructure CALM was sold to agency stakeholders as it had struggled to gain commercial viability and market pull through because the system was relatively cumbersome to use. A key stipulation in the sale agreement was that it would be open for use by all agents. The program was re-branded in 2000 as AuctionsPlus and did not become commercially profitable until 2006 (Gary Dick, retired AuctionsPlus CEO). Currently it is owned by the three major pastoral houses of Elders, Landmark and Ruralco.

The system bases itself as the Helmsman system of simultaneous auctioning of lots where the whole offer board is closed off only after a certain interval during which no bids have being lodged. Animals are assessed by an independent assessor and can be purchased on a live weight basis, over the hook price and on a per head basis. With the evolution of the "smart phone" generation and the technology becoming more user friendly the system has grown, particularly in the cattle industry. It currently accounts for 8% of the sheep transacted in Australia. However, 85% of those stock are store animals traded between producers. The development of the system was focussed on the finished segment of the market. However, it has become predominately a store activity with the advantage of drawing buyers from a wide range of distance and providing them with the knowledge of knowing exactly where the stock originated from. General concerns were around the consistency and reliability of the assessment and description of the stock. Critical mass is still in the saleyards and because the sale of various meat products is relatively short-term, processors cannot allow their competitors to source cheaper animals through the saleyard and gain a competitive price advantage. Also, the fact producers have to use an agent to be able to facilitate an AuctionsPlus sale restricts its uptake as the same agent fee still applies. The agency network took ownership of AuctionsPlus, to maintain its margin control over the industry and prevent a potentially more cost-effective transaction model flourishing (Vallance 2015).

2.4.5 Over the Hooks Sales

Australia and NZ have a similar grid system for payment of carcases supplied direct to processors. The over the hooks price (OTH) are based on a Fat Score, manually assessed over the twelfth rib, and a dressed-out carcase weight (cwt), with premiums and discounts depending on what the target market.

2.4.6 How Are Prices Reported

Prices are reported by MLA through the National Livestock Reporting Service (NLRS) which provides daily market summaries. Both AuctionsPlus, over the hooks and saleyard prices are reported. The predominate reference point is the Eastern States Trade Lamb Indicator (ESTLI) that relies heavily on saleyard prices. These summaries are heavily relied upon by both agents and producers to make their marketing decisions (Lovell, 2015). Decisions are based on estimates and if there are premiums for quality direct to suppliers they are not identified in the wider public because price reporting is not mandatory, an issue that at the time of writing is being hotly debate in the Australian beef industry with a price transparency review being conducted by the Australian Consumer and Competition Commission (ACCC).

2.4.7 Meat Standards Australia - Stage One in Driving Quality

Meat Standards Australia (MSA) for sheepmeat is following on from the system developed for the Australian beef industry. According to the MSA Manager, Mick Crowley, "of the 21.8 million lambs slaughtered in 2015, 3.2 million were processed using MSA pathways through 20 licenced processors". The program is focussed upon ensuring the management of animals on farm and pre-slaughter, to optimise the eating quality of the animal. Producers register and agree to certain conditions:

- Animals are not off feed for greater than 48 hours (for on farm curfew, transport and lairage) before they are slaughtered.
- Stress, and the resulting glycogen loss is minimised through reducing time between mustering and slaughter and allowing access to water at all times.
- Animals must be a minimum of two weeks off shears and two weeks on the consignment property.

According to David Pethick, a respected meat scientist from Murdoch University, the program has tightened the distribution curve and removed problem carcases. For most producers who register they are already filling these requirements and it is a simple "ticking the box" exercise to comply with processor requirements. For industry, it provides a by-product of a market driven program that creates positive animal welfare outcomes using science to underpin the product (Jackson 2015). MSA has not created any distinguishable premiums for producers, but provides a structure to link production attributes to the consumer. The next challenge is to link production and price to a cuts-based classification for cooking method, as done in the beef industry.

2.4.8 Intermediaries- Role of the Agent

High levels of trust in agents is often remarked by processors as being a barrier to improving direct relationships with producers. Agents' fees account 4-5.5% of the gross proceeds of sale. For that they provide marketing advice, transactional invoicing and the guaranteeing of payment. Agents tend to be paid on a commission basis which in theory guarantees their goal alignment with producers to maximise prices received, but when producers are asked, they must use an agent to transact their products through saleyards. With the advent of modern technology there is a plethora of information available to producers on marketing. A new business model for the agency network could be for knowledge transfer around product eating quality and allow technological adaptation within the chain.

2.4.9 Challenge for Australia's Agency Network

The clear difference of Australia's market compared to other countries visited is the high level of third party agent involvement. A challenge for the Australian industry is the way the agency network itself operates. It relies upon individual agents with clients that they represent. Effectively, agents are competing against each other for producer loyalty, which reduces their ability to work collaboratively to provide a critical mass of animals of a specific type. The large pastoral houses could create efficiency through acting as collection and distribution agents for processors, thereby removing the transaction costs of freight, buyer costs, yard fees and product loss of stress to animals. The benefit to industry may be of real value, however to the pastoral houses there is a potential risk of losing both agents and clients. The agents could be perceived as working on both sides of the transaction and therefore not maximising competition. The issue around trust and culture of competition at all levels of the chain, including agents, are a genuine challenge for how industry evolves.

2.5 What Does a Value Chain Look Like?

Peter Bailey (March 2015), previously a lamb specialist with the Victorian Department of Environment & Primary Industries (VIC DEPI) described what a value chain would look like for the whole of the Victorian lamb industry:

- Consumer lead, market driven, and is “short” and has less interventions.
- Has a communications feedback loop via database and software and is integrated from end to end, by using inventory management and individual EID to link information and allow breeding products to specification.
- Specific contracts and pricing for products to specification to drive investment and management decisions on farm, rather than “playing the market”.
- Has market compliance and food security advantages.

The Australian industry is in a transition period, as it moves towards a greater meat production focus. With increasing supply, there is the potential to harm the consumer’s perception of it, largely because of the current transaction and price discovery models within the chain. Previous Nuffield Scholars (Marriott (2014), Gubbins (2015)) have outlined how there is potential to improve on farm productivity with objective management systems by linking information within the chain. It is important to understand how other countries are managing a similar challenge compared to Australia.

Chapter 3: New Zealand Lamb/Sheepmeat Industry

Overview

The NZ industry is distinctly different to Australia's industry with over 53% of processing owned by two producer cooperatives. Although the NZ industry exports a similar amount of product as Australia, the actual number of breeding ewes have halved in the past 25 years as a result of competing land use profitability from the dairy industry. Some argue this has reduced the capability levels within the industry as the better producers have left. But to the industry's credit in 2014 NZ farmers produced the same amount of sheepmeat from 28 million sheep as what it did from 70 million in 1984, when subsidies where abolished (R. Davidson 2015). The industry is 92% export focussed with a small carcase, averaging around 18.3 kg, which allows cuts to fit the European market during their off-season production. According to Mike Peterson, former chair of NZ Beef and Lamb and at the time a current director of ANZCO, this has meant *"…at least 80% of production is produced within a designated QA program for the individual supermarkets*" (March 2015).

The other distinct difference about the industry is how animals are transacted between producers and processors. Very few finished animals are transacted through saleyards. Craig Hickson, founder of Progressive Meats and 2015 Entrepreneur of the Year as well as 2012 NZ Agribusiness Person of the Year, summed it up: "For us Saleyards wouldn't make sense as they only hurt the product and we pay on a dead weight, the industry worked that out years ago" (July 2015).

The decreased reliance on saleyards was partially a result of quality assurance program's requiring animals to be on the same farm for at least 60 days prior to slaughter. There are more direct relationships, as illustrated with over 80% of animals for Alliances' Dannevirke Plant being sourced and paid directly to farmers with no third-party agent involvement (Miller, D, July 2015). James Parsons (July 2015) still agreed with his summary from his Nuffield report in 2009 that "the greatest barrier to a NZ meat and wool industry transformation is the fierce culture of independence, poor communication and mistrust endemic in the industry".

Murray Taggart, Chairman of "Alliance" one of the two biggest cooperative processors, made an interesting quote: "farmers control the behaviour within the industry.". To a degree, producers have viewed the livestock market as being disconnected from the retail point and rational human behaviour to find the highest price has added unnecessary transaction costs. Jessica Bensemann, who compiled a Master's thesis on Marketing Decisions of Sheepmeat Producers in NZ described a similar situation to the Australian producers. Often producers were very dislocated from the market and relied heavily on the personal connection with their agent representative. It was a relationship built on trust.

3.1 Differences to Australia

3.1.1 Castration

A far lower level of castration was observed. Nearly all NZ wether lambs remain with their testicles intact up unto the point of slaughter, whereas in Australia nearly 100% are castrated. Whether this gives NZ producers a competitive production advantage because of quicker growth through increased testosterone, or whether it possess a "tainting taste issue" is to be quantified. As NZ lamb has a smaller average carcase weight than Australia it is argued that it is unlikely to have an effect on eating quality because animals never came close to reaching puberty. Interesting comparisons to the UK and Irish markets can be made at this point, where approximately 50% of males are castrated (Burke 2015), which can cause major issues around meat tainting and consumer acceptance.

The NZ market also has a different definition of lamb to Australia as it allows for potential eruption of adult teeth. However, due to lower carcase weight these points were apparently rarely reached. In Australia, although the research has proven there is no effect on eating quality (Gardner 2015) at the point of teeth eruption, the industry still maintains a stricter standard ensuring that once any teeth are showing then the animal drops from the lamb to the mutton category, and the resulting 35-40% price reduction. With the evolution of the Australian sheep industry away from wool towards a more meat focus, a change of the lamb definition to allow eruption could be advantageous to the Merino wether product to allow animals to be held longer and more weight gained. The counter argument is Australia has a clear line in the sand, and the subjective nature of when teeth are either erupting or when they are in wear could put at risk the brand value of Australian lamb and the potential perception of food fraud. An alternative method of lamb definition was witnessed in the US market at Superior Farms in Dixon California. The Break Joint method looks at the degree of maturity through the level of ossification on the second joint. This allows larger and older carcases to fit lamb definition and had the benefit that the grading could take place in the chiller, as opposed to the dentition method that requires an assessment just before slaughter, or before head is removed.

3.1.2 Seasonality

NZs lamb supply suffers far greater production seasonality than Australia, as Figure 8 illustrates. The NZ system doesn't have the ability to finish animals on grain because availability is low and expensive. Fed out grain costs in NZ at the time of writing were approximately $440/t, compared to $260 in Australia. NZ seasonality of production creates major processing challenges around maintaining capacity and labour in the chain.

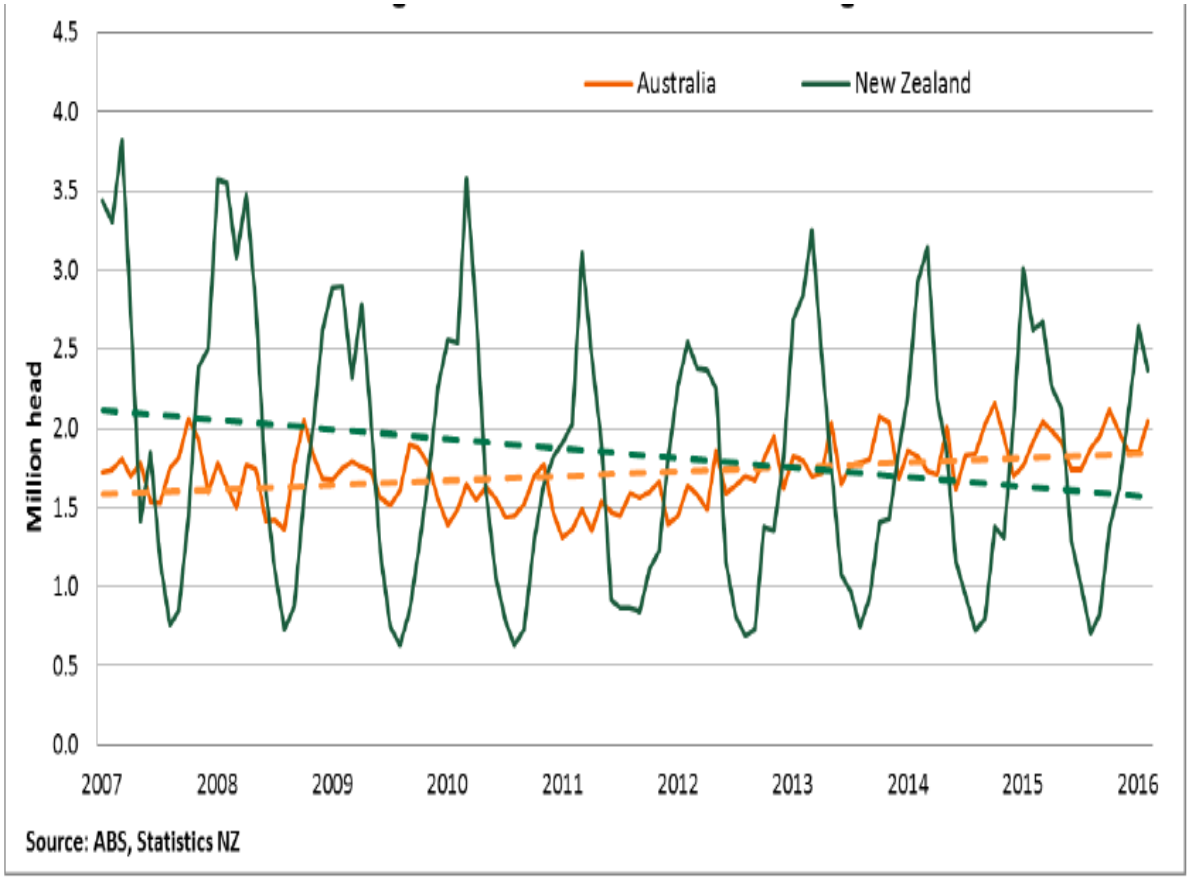


Figure 14: Australian and New Zealand Lamb Production

Source: MLA

3.1.3 Industry R&D Levy

From a whole of industry perspective, the NZ industry has lower producer R&D and marketing levies to fund research than Australia does. A one-off processing levy is applied of 60c/head in NZ, whereas Australia has a transactional fee of 2% up to the value of $75 equalling $1.50 per lamb transaction and 20c for mutton alia. Murray Taggart highlighted that the NZ model is more specifically targeted towards the development of competitive advantage within the processing chain. This raises a fundamental question for Australia of how can collective levy spend create a greater net gain than what the individual supply chains may be able to if they could access that investment.

3.1.4 Producing to Competing Countries

In 2008, the top three customers the NZ market were the UK, France and Germany. Since then an explosion of the Chinese market has seen China, the UK and the USA now on top (Davidson 2015). As the NZ industry has been reliant on producing for the out of season UK market, with the advent of cheaper freezing capacity, supermarkets have been able to still supply the commercial shelves well into the UK production period. In some instances, this has created animosity from domestic farming lobby groups towards the individual supermarket chains that are always concerned by bad press.

3.2 Future of NZ's Industry

New Zealand's is at a different point in its development compared to Australia. Its industry has reduced due to competitive pressures from the dairy industry. Since deregulation, it also operates in a different export market. It doesn't have the options of a high value domestic market that can insulate it from external currency fluctuations, while also not having the feeding and finishing options the Australian market has. Many argue the industry has been suffering from over competition, and effectively self-cannibalising itself as ewe numbers decline. Attempts to change direction have struggled to gain traction. The competitive price pressures that Australia creates as a competing exporter, creates a major obstacle towards improved profitability.

It is this hard-balancing act that many agricultural industries face, knowing when to compete and when to collaborate. The competition theorist would argue "the market will find itself and the best will survive". Collaborative theorists would argue that too much pain is inflicted as the market weeds itself out. Meanwhile the real value in growing the "consumer pie" is lost through an over focus on "within chain" competition.

An interesting dynamic of the NZ industry is the role of cooperatives as part of the solution, or the problem. At the time of the writing, Silver Fern Farms, the second largest cooperative owned processor was awaiting government approval for a 50% investment from the largest Chinese meat processor. The proposal had garnished unanimous board approval and over 80% of the 16,000-shareholder approval.

Chapter 4: UK, Ireland and EUROP System

Australia's involvement in the EU's lamb and sheepmeat market has being limited because of trade negotiations that occurred in the early 1980's that restricted Australia's EU quota to only 19,600t, compared to New Zealand's 226,000t. EU producers face a different operating environment to Australian producers due to high land prices. The drive for efficiency and increased profitability is reduced because of the inability to source cost effective land. CAP payments make up to 20% of farm income, which can reduce the competitive desire for innovation (Aberystwyth University 2015). The market is quite different to Australia's, but there are key aspects and learnings.

4.1. EUROP Grid

Both the UK and Irish markets are currently part of the EU, and with the other 26-member states they have agreed a consistent approach to how lamb is graded, known as the EUROP grid. The difference to the Australian system is that not only is the fat cover assessed ("1" being too lean, and "5" being over fat), but also the overall confirmation of the carcase. For confirmation, "E" is given to the better conformed carcases and "P" to poorly conformed carcases. The dressed-out percentage of the animals are then given these premiums or discounts to the final carcass weight.

Confirmation Classification						
Fat Classification		**E**	**U**	**R**	**O**	**P**
	1	-15	-15	-25	-35	-50
	2	+10	+5	Base	-10	-40
	3L	+10	+5	Base	-10	-40
	3H	+5	+3	-5	-15	-40
	4L	-25	-25	-25	-25	-40
	4H	-40	-40	-40	-40	-40
	5	-60	-60	-60	-60	-60

Table 3: A typical EUROPE grid showing bonuses and penalties

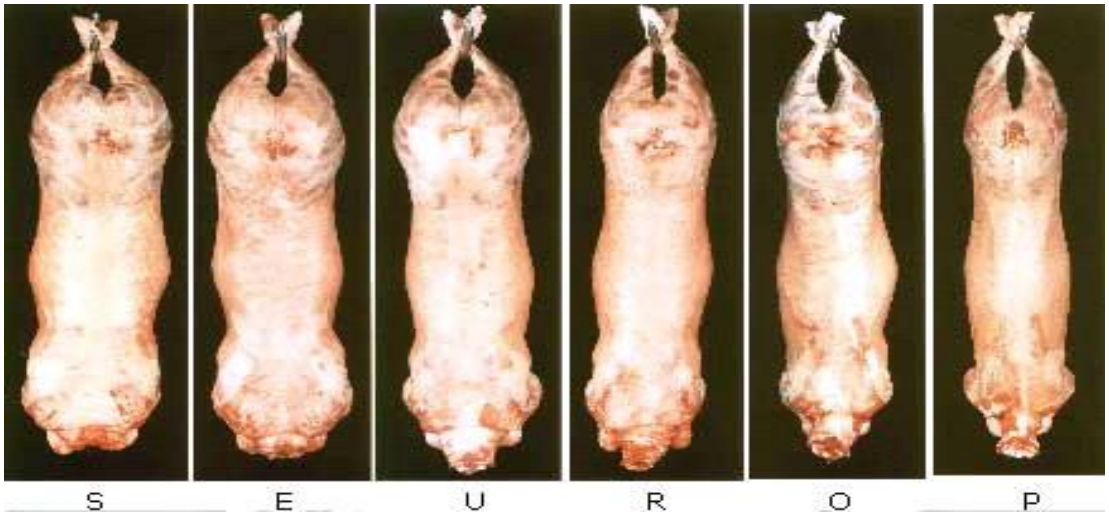


Figure 15: Fat Class of the EUROP Grid

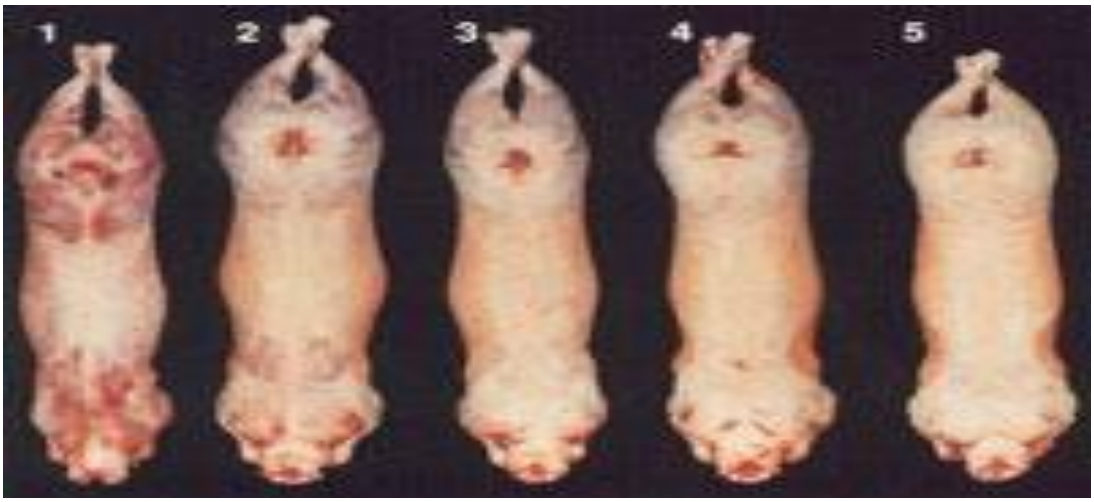


Figure 16: Conformation Class of the EUROP Grid (Source: Author)

Discussions with UK and Irish exporters highlighted the advantage of the EUROP grid in having a consistent approach for EU member countries to how producers are paid. This positive view was in stark contrast to some in the production sector. Keith Williams' 2014 Nuffield Scholar report looked extensively at the issues around the EUROP grid. An interestingly parallel to Australia is the similar lack of trust between producer and processor, which is reinforced when the carcase category system is purely subjective through individual graders opinion. Graders are paid by the processors. An interesting observation made about the EUROP grid was the potentially distorting on-farm effect that these price signals set. In search of higher per head returns, producers had used extensive terminal genetics in their maternal breeds, while also focussing on extremely muscled sires. According to Huw Davies, who looked at welfare levels in his 2009 Nuffield Scholarship report, "The EUROP grid can create problems for on farm animal welfare outcomes, because farmers focus on the "big butt" type sheep, which require more lambing interventions" (Davies 2015).

4.2. Disruption - Catalyst for Change?

According to Dr Charles Milne, who was a Chief Regional Veterinarian Officer in Scotland at the time of the first FMD outbreak in 2001, challenges of how sheep were transacted through the chain increased the problems experienced during the outbreak. Charles commented that

some of the supply chain arrangements, particularly sale marts, either disappeared overnight, or adapted with improved biosecurity measures. For some producers, it was a transformative disruption of how they transacted. What emerged was the increasing prevalence of collection centres, effectively allowing smaller producers to coordinate to supply regular and specified animals to processors at a guaranteed minimum price. An interesting example of this arrangement was witnessed near Gloucestershire at the Upleadon Court Collection Centre on Henry Dunn's property. The collection centre has grown from a 10km radius and around 1000 lambs in 2002, to a 100km radius and 70,000 lambs in 2015. The system is operated on Henry's farm, and he is paid a headage fee by the processor for the facilities and EID scanning. A coordination role between processors weekly requirements and what producers deliver is coordinated by Mike Credland, who is remunerated by a commission fee of 3%. The benefit of the system to the producer is that they know their price and they receive a clear signal from the processor on quality attributes that they can improve on, while also reducing their transaction costs by approximately 30%, compared to the sale marts where they incur transaction costs. The other important function the system provides is what Mike Credland calls "building a bridge over the trust divide". The processors trust the collection centre based on its previous results and they can secure larger supply with provenance benefits of a specified area. The producers trust the centre to do the due diligence on the processors and maximise the producers return. The centre operates exclusively for one processor, Randall Park, while supplying for a variety of retail outlets. According to Graham Perry, Randall Park Sales Manager, the centre works well and they are actively encouraging more centres to improve coordination within the chain.

4.3. Ireland

With a total flock size of 5.16 million (Fennel 2015), Ireland's lambmeat industry is substantially smaller than Australia. However, it has a similar high value domestic market, while exporting the balance of its product. The domestic market accounts for 30% of 63,400 cwt of production, plus 3900 cwt imports from NZ during out of season supply (Bord Bia 2015). The industry has a high concentration of producers, with over 33,000 averaging approximately 160 ewes per flock, with a very small percentage having flocks over 1500 (Fennel 2015). Processing has consolidated to five main processors and the transaction models are similar to Australia in that 45-50% of animals are transacted through the 89 livestock marts. Some interesting differences to Australia is the reduced number of third-party agents and a greater use of producer groups, with over 38 producer groups interacting directly with processors.

4.3.1 Producer Groups

Whether as a result of the FMD outbreaks, or industry evolving in the direction of producer groups due to improved marketing power for producers, is difficult to answer. Some producer groups have tripled in size in recent years. For example, the Mayo Black Face Group has increased from 2000 lambs in 2013 to 10,000 in 2015 with 240 members. Loyalty of producers is maintained through a 50 Euro membership fee that shows genuine commitment of producers, which pays all administration costs. In return, producers receive a loyalty bonus of approximately 5% and it guarantees them kill space. According to John Noonan, Chairman of

the group, it also provides a much-needed social mechanism for producers to interact and discuss production drivers and encourage innovation and collaboration. For the processor, Kildare Chillers, it provides a mechanism for ensuring consistency of supply and knowing where the product came from for provenance marketing benefits.

Discussions with other producer group coordinators (Hutchinson 2015, Chambers 2015, Dean 2015) highlighted that the biggest challenge in making these groups work is building trust between producer and processor. According to John Lewinsky, Chair of the Irish Farmers Association Sheep Committee, “Short-term price seeking behaviour for higher prices often resulted in the breakdown of these systems, and often the underlying challenge was the lack of knowing what prices were…the media tends to be behind by a week or two.”

Chapter 5: Disruptive Technology- A Way to Change the Status Quo of Price Discovery

At the 2015 NZ Red Meat Industry Association Conference Dr Mary Quin (CEO of Callaghan Innovation NZ) discussed how technological innovation can disrupt and change market transacting mechanisms, providing there is effective value creation on both sides of the equation. Further discussions with both Dr Quin and Murray Taggart (chair of Alliance) explored how the NZ industry had experienced minor adjustment to its price discovery mechanism with the introduction of Video Imagine Analysis (VIA) Technology. VIA scan is a computerised carcase measurement system that allows processors to estimate Lean Meat Yield (LMY) and distribution of meat within the carcase. The measurement is done at chain speed as it passes through slaughter chain. The LMY can be calculated from algorithms created from previous physical boning out calibrations performed. The system exhibited in the Alliance plants, where all lamb carcases were VIA Scanned, allowed for premiums to be paid for total LMY broken down into the three primals of leg, loin and shoulder, as shown in Figure 18.

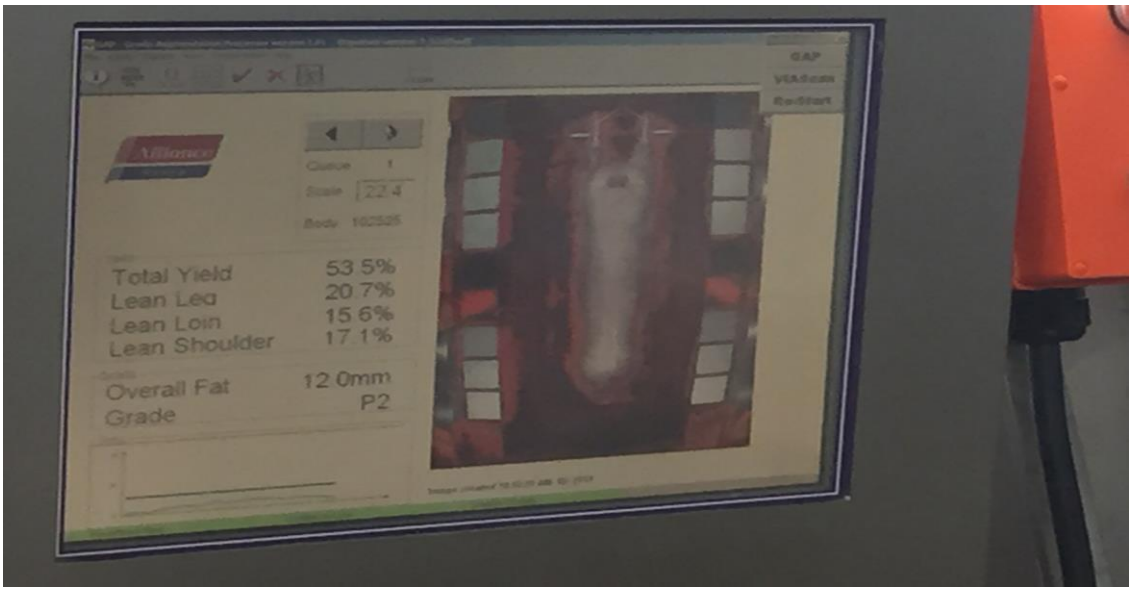


Figure 17: Via Scan in use at the Alliance Dannevirke Plant (Source: Author)

To move price discovery to the point of LMY would make logical sense for both producer and processor as it aligns goals of improving processing efficiency in the boning room. It appeared NZ processors were aware of this goal alignment and understood additional value that it could then create in improving sorting and segmentation of carcases in the chiller. Whether this was a result of the cooperative model, or a more mature processing industry under more competitive pressure is hard to distinguish. Mike Boehlje (August 2015), who has extensive experience in price discovery in the North American pork industry, summed it up well: "*Moving to paying on a yield basis will be hard if current systems are so entrenched, and in the processors eyes they are probably gaining more from price trading, than they would from giving a price signal to help improve their processing efficiency, even though it would be the right thing to do as a chain, the short-term behaviour naturally wins*".

5.1. Why did it fail in Australia?

VIA, so frequently seen in NZ abattoirs, was developed in Australia by Australian producers' levy dollars in the late 1990's by Systems Intellect Pty Ltd and VQA Australia as part of the Australian Sheep Meat Research Corporation 'Objective Carcase Measurement' program (Pearce, 2015). Despite a total investment of $17m the system was sold by MLA in 2004 for $500,000 with the belief that it would be taken up by the private sector and would help change the price discovery mechanisms used in Australia. However as of March 2016, despite some processors having it on the chain floor, not a single machine was in operation in Australia.

The response is twofold. The accuracy levels were not good enough, with only 47% repeatability according to the Sheep CRC (Pearce, 2016). A practical response from processors was why pay more for something than you have to. This reflects the culture that profitability within the chain is determined by purchasing price rather than goal alignment of efficiency. In addition, according to Professor Pethick (October 2015) the commercialisation model used for Via Scan limited uptake as fee structures were based on a per head fee and in the early days there was a logistical challenge of having to send images to Brisbane from analysis.

5.2. Objective Measurements – Holy Grail for Australian Industry

Over the hooks sales from producer to processors are generally paid on a HSCW and a manually palpated fat score which can give a prediction of LMY. The problem of this system is the subjective nature of the measurement and according to the Sheep CRC's work it only has an accuracy level of 20%. The industry has invested heavily to move away from subjective measurement and the resulting low accuracy levels of LMY.

The Danish Meat Research Institute reported an improvement in average pork carcase yields of 2.28% over a 10-year period after the installation of accurate yield measurement and reward systems. According to Hamish Chandler, Manager of Sheep Genetics Australia, the Australian industry is only achieving around a 1% improvement per year.

Extensive work has been conducted with hyperspectral imaging, computer tomography (CT) scanning, 2-D X ray scanning and more recently with positive results a combination of 2D X ray with Dual Energy, known as DEXA. The DEXA system is currently in trial in three abattoirs in Australia, and combined with four hook tracking programs in Victoria, the future for objective carcase grading looks positive. Industry has also tried to ensure there are a variety of options that do not prevent some smaller processors from being pushed out from not being able to afford the capital cost of the technology.

5.2.1The Consumer – Eating Quality is Key

According to Dr Alex Ball the industry is fortunate to be following in the footsteps of other industries that have focussed on improving LMY as it learns from its mistakes. Dr Ball cited the pork industry as an example of creating a negative externality by focusing predominately on improving processing efficiency (i.e. through LMY) to the detriment to the consumer. The pork industry found that while it was improving processing efficiency through creating price incentives around LMY, it was reducing consumer appeal by reducing the intramuscular fat

(IMF) that create the juiciness and flavour within the meat. As research has proven by the sheep CRC, sheep are no different to pigs and as LMY increases, IMF decreases with a high correlation of 50%, and IMF in sheep has an 80% genetic correlation with increased tenderness of the final product for the consumer (Pearce, 2016). So, the industry has been aware of this issue and has not focussed its whole objective measurements program on improving lean meat yield alone. The work being developed on a Lean Meat Yield Eating Quality Index (LMYEQ) will try to balance the natural antagonism between LMY and EQ.

5.3. Feedback Linked to Price Signals Will Drive Change

The Sheep CRC has researched genetic drivers to improve both LMY and EQ. Information is now available through Livestock Data Link (LDL), which was developed for both the Australian Sheep and Beef industry by MLA. This web-based program links carcase attributes and performance, to outcomes achieved to various grid payments producers can enter, then back to on farm solutions to achieve better dollar outcomes. The uptake of programs like LDL may be a fundamental challenge for industry when the price reporting mechanisms may not be able to indicate the real premiums because of legal issues around ownership of information. The Australian rural media's obsession with price reporting of saleyards, and that of MLA through the National Livestock Reporting Service (NLRS) may have to fundamentally change to drive a quality focussed industry.

Conclusion

The Australian “push driven” supply chain has created a focus on saleyards as the predominate transaction model. Some clear differences that have evolved in the Australian market are:

- A clear lack of brands that link the producer to the consumer.
- A high reliance on third party agents.
- The continued evolution of distrust between produce and processor, thereby reducing the opportunity to create chain value through linkages.

The fundamental conclusion of this report is that industry should improve market signals within the chain by linking price and quality through value-based marketing. This would improve profitability and innovation uptake as price signals drive change. However, to get to the point of value based marketing will not happen through natural evolution.

Traceability has been a hotly debated issue within the Australian sheep industry. The cost of moving from a mob based system to an individual animal tracing system through EID was seen as too great for the perceived benefit. This benefit is the reputation of Australia’s product and its ability to deal with an emergency animal disease outbreak that can trace animals quickly and minimise disease spread and cost.

Industry and government should be thinking about this collectively in terms of how the issue could assist industry in moving to more vertically coordinated supply chains that create incentives, through price signals, for the correct behaviour.

If the real costs of traceability lie with saleyards, then why would governments encourage the continued use of them by investing in traceability for them. The benefits would be:

1. Managing the risk of potential food fraud risks and ensuring the integrity of systems.
2. Enhancing Australia’s product competitive advantage by having a scientific based methodology to ensuring the consumer has a consistently positive experience, i.e. build upon the brand value Australia already has.

The problem for objective measurements and the reasons why systems evolution will not drive this change naturally, is culture created in the sector. This highlights the importance of creating independent, industry funded, verifiable auditing systems to ensure the accuracy of the measurements used. While also highlighting the importance of the production sector’s R&D service provider working in this space.

Recommendations

The industry should create a hybrid model-between auctions and relationships that place quality at the centre of the industry. If the industry can create consumer attributes around eating quality both through on farm management/genetics and within the processing chains, then the current price discovery mechanisms in Australia need to change.

This research recommends that:

1. Industry and government continue to invest in objective measurements around LMY and EQ. If only individual processors invest in objective measurements in an attempt to gain a competitive advantage, either at a processing efficiency or consumer value level then the effective value creation may not be passed on equitably within the chain.
2. Objective measurements and the use of technology are critical to improve linkages between the livestock and retail market. Linking the outcomes to price will drive change. A measurement system would also allow industry to move to an outcome-based EQ prediction. The current dentition system puts Australia's industry at a disadvantage as it doesn't allow for any teeth eruption, whereas other overseas markets do.
3. Industry should investigate a transparent pricing model that includes metrics around EQ (an MSA score), LMY and Hot Standard Carcase Weight (HSCW). HSCW is important because it influences cut size, packaging, distribution and marketing factors.
4. A virtual selling system with a price discovery model based on EQ, LMY and HSCW would reduce the averaging and captured market effect of the current price setting mechanism of saleyards, while reducing transaction costs and improving information flow. Industry should create mobile DEXA machines to accurately measure meat variables on farm. This would allow producers to maintain freedom of marketing decisions on farm, while potentially providing a calibration technique for ensuring trust is built between producers and processors on the accuracy of the objective measurements at the processing point.
5. Industry should learn from past mistakes of selling off R&D investments too early, i.e. Auctions Plus and Via Scan.
6. Price reporting should be focussed on quality attributes, not supply and demand. Move the current short term ESTLI to include metrics around quality and whether this creates a need for mandatory price reporting of all carcases sold.
7. Strong leadership from the production sector enables change. Industry leaders should focus on driving innovation and change through price signals on farm that are linked to quality attributes.
8. A move towards improved traceability requirements for market access is needed. Increased transactional costs of traceability through saleyard mechanisms may reduce their use and reduce their effect on price. Industry should ensure costs lie where risk is created. Government can encourage a more direct transactional model between producers and processor by allowing exemptions for tagging direct to slaughter.

9. A summary of the enablers and dis-enablers of change for moving industry from a supply chain to value chain focus through using objective measurements to create price signals to incentivise value creating behaviour are summarised in Table 7 below.

Enablers of Change	Dis-enablers of Change
Producer leadership/advocacy for change	Culture of distrust and opportunism
Research capacity	Australia's variable climate
- Agency network, assist producer knowledge growth	- Agency network, protecting current business model
Reducing technological cost	- High capital costs of in–processing measurement systems. Industry needs to develop a range of technological options to suite different scale of operations
Government- traceability push	Saleyards and local councils
Australia's high labour and processing cost. Need for automation	
Consumer trends. Increasing desire for provenance and traceability to the farm gate	
Systems accuracy and transparency	Complexity

Table 4 enablers and dis-enablers of change

Finally, there has been two developments in the industry since the research was completed:

1. Victorian Government introduced mandatory Electronic Identification for sheep born after 1 January 2017.
2. MLA, and their 2016 AGM, announced plans to install DEXA machines in all 89 red meat processing plants in Australia. Funding will come from borrowing against producer levies combined with some co-contribution from government. This proposal, known as 'Project 150', has an investment of $150 million. In exchange for the investment of producer levies, industry and producers will have uncontested claims to the data. By making the process independently verified and audited through AUSMEAT, this will not only give improved accuracy, but also independent integrity, compared to the current subjective system where graders are employed by the processor. This is a whole-of-industry response to building a "***bridge over the trust divide***", while also giving processors a potential "free kick" as it could be an enabler to further automation in the boing room. The next part of the jigsaw is getting EQ measurements at plants.
3. The stars may be starting to align. It is exciting but it will take time. The author recommends another sheepmeat producer complete another Nuffield Scholarship in 2025 to research how the Australian red meat industry is performing compared to overseas competitors.

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Plain English Compendium Summary

Project Title:	Australian Lamb/Sheepmeat – Commodity or Premium Product?

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Objectives

1. **To understand the challenges of moving from a supply chain to a value chain and what are the enablers and dis-enablers of change.**
2. **Investigate and discuss options for improving vertical coordination within the Australian lamb/sheep supply chain, particularly in relation to producers role in the production chain.**

Background

The Australian lamb/sheep industry has evolved to become a push driven supply chain because of the variation of Australia's climatic conditions and the resulting production system. Saleyards have become the corner stone to Australia's transaction model and it has worked well as a just in time supply chain mechanism that maximises competition. The problem is it averages and provides few measureable indications about quality outside of the ebb and flow of supply. Are there alternative transaction models for the whole of the industry that will ensure Australia's competitive advantage as a premium protein.

Research

This report looked at how other competing sheep/lamb meat industries coordinate within the chain to create value and distribute that value within the chain. The distinct difference and similarities between other producing countries were outlined. A consistent theme that emerged was the relationship problems between producers and processors and the need to "build a bridge over the trust divide".

Outcomes

This report concludes strongly that for Australia to differentiate itself in the world market and continue to be a premium protein source it needs to embrace objective carcase measurement systems that align goals within the value chain. Producers need to be incentivised for quality and processing efficiency they create through the price they receive. Industry's attempt to have independent objective grading, through a $150 million investment of producer levies, will help create this change.

Implications

Independent and transparent objective carcase measurements, invested on behalf of producers will help build a bridge over the trust divide.

Publications

Presented at the 2016 Nuffield Conference. Findings were presented to the MLA board, Sheepmeat Council of Australia and the Victorian Farmers Federation. Various presentations and publications were made in the rural press.