Australian Farm Business Management Journal
2017, Volume 14, Paper 4
ISSN: 1449-7875

Chain Failure Theory as a Framework for Evaluating Horizontal and Vertical Strategic Alliances among Food Value Chain Participants: A Red Meat Industry Perspective

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Abstract

Useful insights about the operations of value chains can be gained by considering them as "latent clubs", that is, systems having the potential for improvement through collective action. Club theory therefore can be applied to examine ways to increase the economic surplus of a food value chain by participants taking collective action within a club good framework. The results of such action are called "chain goods". If these types of goods are not supplied along the value chain, value chain partners cannot maximise whole-of-chain profit. The result is "chain failure"; a concept analogous to the market failure of public goods in the wider economy. If an opportunity exists for partners in a value chain to collectively provide such goods, forming a club may be an efficient way do so.

Horizontal and vertical strategic alliances are formed among firms, or groups of firms, in the value chain at the same level and/or across different levels. These alliances within a value chain are formed to correct some particular chain failure(s), such as supplying chain goods or internalising chain externalities. Strategic alliances may comprise all or only some chain members. Thus, they are clubs. The theoretical concepts of chain failure, chain goods and chain externalities can be used as a framework for evaluating whether to invest or not in a strategic alliance. The fact that there are existing alliances which appear to be organised in this way suggests that these concepts have practical as well as theoretical merit.

***Key words*:** horizontal alliance; vertical alliance; chain failure; chain good; meat industry.

Introduction

Agricultural economists in the United States in the 1990s identified the changing economic structure of the agricultural sector, often termed "industrialisation", or "agro-industrialisation". These terms refer to "...the process of increased concentration and vertical coordination by agri-food firms through contract and supply chain management, along with increased provision of farm inputs by off-farm businesses" (Plunkett and Kingwell, 2001, 1). Some prominent academic commentators were Barry (1995), Boehlje

et al. (1995) and Goldberg (1993), while government agencies also became involved (Hoppe, 1996; USDA, 1996). For some, a greater role for agricultural co-operatives was proposed as a way to equalise bargaining power for food and fibre producers (Cook, 1995; Fulton, 1995; King, 1995). For others, in parallel with the evolving literature about managing supply chains, strategic alliances were proposed as a vehicle to improve the competitiveness of individual businesses, especially farm businesses, in food and fibre industries (Fearne, 1998; Ricks et al., 1999; Whipple and Frankel, 2000).

These ideas soon appeared in the Australian agribusiness literature. Farrell and Tozer (1996), O'Keeffe (1998), Hayes et al. (1998), Plunkett and Kingwell (2001), Dunne (2001), Nicholas (2001), Johnson (2004), Gall and Schroder (2006) and Taylor (2011) all wrote about the various forms of strategic alliances, including co-operatives. Jie and colleagues (2010, 2011, 2016) analysed supply chain practices in the livestock sectors, focussing on strategic partnerships between suppliers.

There are many potential benefits and costs from forming a strategic alliance in an agricultural industry (see the extensive review by Hayes et al., 1998). But, how might potential members of an alliance decide to join, when there are many different types of alliances (Hayes et al., 1998) and there is no rigorous analytical structure to evaluate the possible consequences of any particular alliance formation? The many potential permutations and combinations of alliance means that using a generic framework for assessing benefits against costs does not provide the credible information decision makers need. This conundrum is being recognised in the agribusiness literature. For example, Gall and Schroder (2006) examined the linkages between a number of business-to-business relationship theories and the design and governance of agricultural cooperatives, as a sub-type of the strategic alliance continuum. They found "a gap in the literature relating to the analysis of alliances with more than two members (such as cooperatives)" (Gall and Schroder, 2006, 26). Bell et al. (2011) also talk about the "managerial relevance gap", and suggest the need to bring different disciplines into analyses of strategic alliances.

In the remainder of this paper the case is made that one way to bridge this gap is to take a whole-of-chain perspective and to use the theoretical concepts of chain failure, chain goods and chain externalities (Griffith et al., 2012) as a framework for evaluating whether to invest or not invest in a strategic alliance.

Strategic Alliances

What is a strategic alliance? To start with, a strategic alliance is a generic concept out of the literature about strategic management (see for example texts such as Das (2012), and papers published in the *International Journal of Strategic Business Alliances*). There are many alternate definitions of the strategic alliance concept (Culpan, 2009). Varadarajan and Cunningham (1995, 282) defined a strategic alliance as "the pooling of specific resources and skills by the cooperating organisations in order to achieve common goals, as well as goals specific to the individual partners". Robinson and Clarke-Hill (1994, 2) more broadly defined a strategic alliance as "a coalition of two or more organisations intended to achieve mutually beneficial goals". Jarratt (1998, 39) observed that alliances "reflect the collective use [of] resources and cross-organisational information flows to assist alliance partners achieve a future desired strategic position". She reproduced a diagram by Robinson and Clarke-Hill (1994, 5) showing a hierarchy of types of alliances, ordered according to degree of commitment and the infrastructure linkage from "tight" to "loose". The types are: controlling interest or full merger with retained identity of subsidiary; partial acquisition and equity participation; joint ventures; equity participating alliances; international alliances with central secretariats; co-market agreements; national buying clubs; and loose affiliations. Jie and colleagues (2010, 2011, 2016) defined strategic supplier partnerships as "long-term

relationships designed to leverage the strategic and operational capabilities of individual participating organisations to achieve significant ongoing benefits to each party."

Alliances may be horizontal (across the same market level) or vertical (up and down the value chain) coalitions; they may be formed privately among partners with a view to maximising their private profits; or formed endogenously within a formal structure with a view to maximising joint profits; or they may be "tight" or "loose" depending on the nature of the legal agreements between the partners.

Twenty-two years ago, Barry (1995) identified seven key factors as the basis for a trend to greater use of strategic alliances in agricultural industries, as follows:

- Consumers' needs have become more specific and the customers more demanding;
- Consumers' preferences have become more specific than traditional price signals in open markets can convey, so retailers use vertical coordination to ensure that product specification meets consumers' demands;
- Some industries such as poultry and pork have developed technologies that provide greater control over product specifications and thus help retailers meet consumers' needs through reproduction, nutrition, health management, product measurement and biotechnology;
- Information about consumers' needs and product attributes has become more important and more valuable and hence more closely guarded;
- Increased competition and increased capital costs associated with larger firms have provided impetus for further improvements in efficiency and especially for greater utilisation of processing capacity through improved security of supply;
- Risk management is becoming one of the key determinants of profitability in the modern business environment where markets are more dynamic, capital investments are greater, margins are smaller than those of the past, and vertical coordination offers a means to reduce these risks for both processors and producers;
- Producers faced with the need for additional capital expenditure find it easier to raise funds if they have more secure marketing arrangements in place in the form of contracts or closer relationships, and some processors may find that provision of finance to suppliers within a strategic alliance is a cost-effective means of securing supply.

The expected benefits of strategic alliances, broadly defined, are the outcomes of dealing with the above set of issues. These benefits, in the context of Australian agribusiness, have been summarised by Hayes et al. (1998) and Nicholas (2001), among others.

Marketing activities can be characterised as being largely about obtaining and using information (Phillips, 1968). Closer business relationships facilitate transmission of information. The quality and quantity of information about, for example, meat through value chains is constrained because meat is transformed significantly, from live animal to carcass to meat cuts to pre-prepared meals; and sequential products are difficult to follow through the chain. Linkages or closer relationships between firms in a business system are appropriate where they create additional net value that could not be created in another way. In commodity markets, where suppliers are unable to differentiate their product or service and the purchase decision is predominantly price-based, closer relationships between seller and buyer can achieve little. The value created is fixed. In the meat industry the pressure for closer relationships or supply chain management derives from the needs of supermarkets for consistent quality, reliable supply and product safety.

Consumer concerns for food safety, as reported in consumer surveys as a main concern, creates benefits from closer relationships in food value chains. Food safety is of value to customers, and it relies on adoption of sound procedures and being able to trace back product through the supply chain. If a retailer can demonstrate that their entire product comes from members of an alliance, and that all members of the alliance follow sound food safety practices, the retailer has a competitive advantage over others who cannot trace the origin of their products.

Horizontal alliances provide the means for producers to collaborate with other producers and offer significant volumes to processors and others along the value chain. Such relationships can improve marketing power and match better the power of large, vertically coordinated processors and retailers. Alliance members discover new technology as well as marketing as a way to increase profit of members. Furthermore, some members of horizontal alliances will choose to be associated with and participate in vertical alliances.

Participation of producers in vertical strategic alliances can help improve their competitiveness by developing a better appreciation of customer needs and improving the efficiency of overall food production: more production meeting specifications and hence less downgrading; more product sold per participant; and, in some situations, more product sold at higher value. The feedback provided through such an alliance is unlikely to be available from any other source. This is because although it may be technically possible to provide feedback when product is provided through the existing chain, the cost of tracking the product through the system would almost certainly be greater than the benefit that it could provide to any producer.

Finally, Hayes et al. (1998) suggest that strategic alliances offer the prospect of reducing the cost of dealing with risk for producers, processors and marketers. Risks would not be eliminated but could be managed better in three main ways:

1. By providing producers with a more secure and certain forward price for their output they allow the producers to budget more accurately and to embark on other efficiency enhancements.
2. By securing a specified level of supply at a certain forward price processors would be more assured of throughput and could invest in other efficiency enhancements in their works, use forward contract sales to reduce their own price risks, and schedule throughput more efficiently.
3. By securing a specified level of supply at a certain forward price retailers or exporters would be assured of throughput and could invest in other efficiency enhancements in their stores, develop more secure marketing programs, and promote the particular brands or types of food supplied by the alliance.

Managing price risks to producers and price and supply risks to processors, retailers and exporters makes it possible for strategic alliances to generate other efficiency improvements.

Other authors have looked beyond the individual businesses. For example, Rolle (2006) observed that horizontal alliances can be particularly useful in developing and applying new skills and technical expertise as a result of sharing RD&E knowledge and experiences. Links with government departments and research institutes can facilitate learning to help chain participants overcome existing technical and knowledge constraints. The Cooperative Research Centre model in Australia promotes these types of linkages. Gulati (1998) examined alliances within broader networks of firms.

There are costs associated with forming alliances. Suppliers lose some control, and mechanisms are needed to share benefits and keep the relationship functioning efficiently. In successful alliances parties have to be able to manage the transition from independence to interdependence, without going from independence to dependence. A firm supplying food participates in an alliance in the hope of providing increased value for the buyer, and hence can expect more secure outlets and sometimes higher net returns for their output. Second, they participate so they can lower their costs. One example is reducing the cost of obtaining information about what their customer (or sometimes the ultimate consumer) wants: the suppliers in an alliance can obtain clear and reliable market signals more cheaply than they would if they were not in an alliance. Strategic alliances offer the opportunity to exploit the complementarities between firms that contribute different component parts to the production and marketing system. Ultimately, the aim of both parties is to manage risks and contain transaction costs.

The various types of benefits and costs are reviewed in detail by Hayes et al. (1998) for the red meat industry in Australia who conclude (p.15) that "The case in support of use of strategic alliances in the red meat industry is stronger than the case against such alliances", and (p.16) "Strategic alliances...offer the prospect of some businesses in the red meat industry to achieve some of the competitive advantage which is necessary to remaining in business". But how do individual businesses know whether their business will be part of the "some" that prosper, and then, whether any net benefit they are able to achieve will be sufficient for them to achieve a competitive advantage?

In the following it is suggested that a useful approach to answering these questions is to start by examining the performance of the whole value chain and identifying any chain failure that may be present, and then assessing whether being part of a strategic alliance would help overcome that failure.

Chain Failure, Chain Goods and Chain Externalities

Value chains

It is now widely accepted that value chains are the preferred way to describe and assess food and agricultural product markets (Griffith et al., 2015; Bokelmann and Adamseged, 2015; Baker et al., 2016).

The performance of a food value chain is measured best by the chain economic surplus (total chain profitability) it creates, captures and distributes among chain members. Chain surplus is the difference between aggregate willingness to pay by customers and the cost to the value chain of meeting their customers' requirements (Chopra and Meindl, 2013, 3). Any action to intervene in the chain, such as improvements to any of the logistics or cross-functional drivers (Chopra and Meindl, 2013, Chapter 3), should be measured by its ability to increase chain surplus. Calls within the chain for improvements are common, such as a greater orientation to satisfying consumers' wants. Such calls often ignore the need for an initial economic assessment of these attempts to improve chain performance. The creation or upgrading of horizontal or vertical strategic alliances is one such potential chain improvement. To assess interventions in the value chain, it is necessary to define the rationale: what is the problem that the intervention will "solve"? The concepts we use for this purpose are derived from what we define as "chain failure".

Chain failure

The concept of chain failure is analogous to the concept of market failure that is used widely in the microeconomics literature. Bannock et al. (1984) defined market failure as a "situation in which economic efficiency has not been achieved through imperfections in the market mechanism" (p. 262), where economic efficiency is the "state of the economy in which no one can be made better off without someone being made worse off" (p. 125), commonly known as Pareto optimality.[1] These concepts are normally applied to a national economy but can be adapted to smaller economic systems such as value chains or larger ones such as the global economy.

Chain failure is defined as the situation where a value chain fails to maximise chain surplus because it supplies a suboptimal level of throughput and value (Griffith et al., 2012). Using the Pareto optimality criterion in the context of value chains, an economically efficient value chain is one in which no chain participant can be made better off without another participant being made potentially worse off. It can be determined by ascertaining where chain economic surplus is at a maximum. The degree to which chain economic surplus is less than its potential maximum value shows the extent of chain failure. In principle this can be determined by application of the standard microeconomic concepts of the production possibilities curve and expected isorevenue curves (Mounter et al., 2016).

Chain failure can occur for many reasons. Sometimes it is simply because of inefficient logistics such as poor transport, processing or storage services. More often, it occurs as a result of the absence in the value chain of processes and services that we call chain goods. These are the cross-functional drivers such as information systems, and grading and certification systems, that allow customer willingness to pay to be more efficiently created, captured and transmitted up and down the chain. Less frequently it may be from the chain bads such as sumptuary goods (cigarettes, fatty foods) that impose social costs on customers. All these factors create positive and negative chain externalities, such that private values diverge from social values, and/or cause asymmetric information leading to adverse selection, moral hazard and the principal-agent problem. Chain failure can also arise from the many forms of market failure originating from outside the chain.

Club goods and chain goods

From a theoretical point of view the concept of chain goods can be considered as analogous to a club good (Buchanan, 1965; McNutt, 1999; Sandler and Hartley, 2001; Sandler, 2013), where the club comprises all or some members of a value chain.

A club good is a sub-type of a public good, and populates the space between a public good and a private good. A public good has three possible attributes: non-excludability; non-rivalry in consumption and (often) non-rejectability in consumption (Bannock et al., 1984, 335). Non-excludability means if one person consumes a good, other people cannot be excluded from consuming it also. Non-rivalry in consumption means that one person's use of a good does not diminish its availability to other consumers. Non-rejectability means that no individual can abstain from consuming the good. The criteria of non-excludability and non-rivalry in consumption are the tests usually applied in assessing whether a good is a public good. Private goods are excludable and rival. McNutt (1999) sees club goods as public goods without non-excludability, while McVitie et al. (2009) note that club goods have private attributes but are rivalrous in use due to congestion.

[1] It is usual to distinguish between an actual and potential Pareto improvement by applying Hicks' criterion, that gainers could compensate losers by bribing them to accept a change so that no one could be potentially made worse off (Hicks, 1939).

Sandler and Tschirhart (1980, 1997) and Sandler (2013) document the five decade history and rationale of club theory, demonstrating how its application informs a wide range of collective actions that benefit club members. None of the examples provided in the most recent review of club theory included value chains or anything close to them. Useful insights can be gained about the operations of value chains by considering them as "latent clubs", that is, systems having the potential for improvement through collective action. Club theory can be used to examine how to increase the surplus of a food value chain using collective action within a club good framework. Such goods are "chain goods".

A categorisation of the various types of public, chain and private goods, along with examples, is provided in Table 1. Note the two other categories of goods, namely a quasi-public good, which is non-rival and excludable, and a common resource, which is rival and excludable.

Chain goods are those goods and services that enable coordination across partners in a value chain. They resemble the facilitating functions of agricultural markets (Kohls and Uhl, 1980, Chapter 2, 25): "The facilitating functions are those that make possible the smooth performance of the exchange and physical functions. These activities are not directly involved in exchanging title or physically handling products, but without them modern marketing systems would not work. The facilitating services might aptly be called 'the grease that makes the wheels of the marketing machine go around'".

Table 1. Six Types of Private and Public Goods

	Excludable	Selectively excludable	Non-excludable
Rival	Global private goods Examples: Rump steak Lamb chops	Private goods in a value chain Examples: Transport Warehousing	Common resources Examples: Tuna in the ocean Public park
Non-rival	Quasi-public goods Examples: Cable TV Toll road	Chain goods in a value chain Examples: Grading system Livestock selling facility	Public goods Examples: National defence Street lighting

Source: Adapted from Hubbard et al. (2012, Figure 15.7).

The four key groupings of facilitating functions are usually categorised as standardisation, financing, risk-bearing, and market intelligence.

If these types of services and processes are missing from the value chain, the chain partners cannot make decisions to increase profit of the whole chain. If chain partners see a chance to provide

collectively such goods and services, then forming a club that comprises the whole chain or a subset of the chain may be an efficient way to do it.

A typology of potential clubs in food value chains therefore includes the following:

1. Horizontal clubs, comprising firms taking collective action across a single cross-section or across multiple cross-sections of a value chain;
2. Vertical clubs, comprising firms taking collective action along a single value chain or along a network of value chains;
3. Clubs taking collective action and focussing on a single product in the value chain or multiple products;
4. Clubs taking collective action and focussing on a single activity in a value chain or multiple activities; and
5. Clubs taking collective action and focussing on a particular firm in a value chain or multiple firms.

This typology infers that the appropriate composition of such clubs will vary according to the particular chain failure being addressed. Horizontal or vertical strategic alliances can be clubs, and the products or services provided by these alliances can be club goods, or in our case, chain goods, provided to ameliorate chain failure.

Chain externalities

A negative chain externality is a cost incurred by a participant in the value chain and which is imposed on a third party not directly engaged in producing, trading in or consuming the good causing the cost, without compensation from those causing the cost. A positive chain externality is defined as a benefit received by a third party who is not directly engaged in producing, trading in or consuming the good providing the benefit, but this third party does not compensate the participant in the value chain for providing the benefit (see also Barling, 2007).

Based on the definitions found in standard microeconomics texts (for example Mankiw, 2015), some economists have argued that chain goods may be treated as extreme cases of goods with positive chain externalities. Public goods (bads) do not have a market because it pays nobody to provide (eliminate) them, whereas chain externalities typically occur in situations in which markets operate, albeit imperfectly from society's viewpoint. Hence, the economic analysis of these concepts will differ.

The existence of negative or positive externalities amongst participants of a value chain can further be explained in terms of the size of the transaction costs of individuals acting to reduce negative externalities or to supply more of something which has positive externalities. It may be that only by acting jointly can the transaction costs per individual be reduced sufficiently relative to the individual's share of benefits that it warrants something that causes a negative externality being reduced or a positive externality being supplied. The long-term absence of uniform grading schemes in the meat value chain has long been considered a case of a chain failure, even though in recent times large individual participants in the meat value chain have experimented with their own grading systems.

Horizontal and Vertical Alliances as Clubs

Given the whole-of-chain perspective promoted here, effective coordination in a value chain requires collective action to meet common objectives. The nature and extent of appropriate collective action

depends on participants agreeing about the strategic scope of the value chain. According to Chopra and Meindl (2013, p. 44), strategic scope (or the scope of strategic fit) "refers to the functions within the firm and stages across the supply chain that devise an integrated strategy with an aligned objective". Fundamental to accomplishing the objective of being aligned is that firms are able to enter into a coalition or an alliance, and given that it is in the context of an integrated strategy, such an alliance must be a strategic alliance.

In the chain good/club framework, horizontal and vertical strategic alliances are used as mechanisms within a value chain to capture chain goods and internalise chain externalities in a manner similar to government intervention to correct market failure. They are formed among firms, or groups of firms, in the value chain at the same level (horizontal alliances – across the network) and across different levels (vertical alliances – up and down the chain). The strategic alliances may comprise all or only some chain members, and they may be formed privately amongst chain members with a view to maximising their private profits, or they may be formed in a club structure with the aim of maximising chain surplus.

Whether a club needs to be formed to deal with chain failure, or whether private coordinated actions would be sufficient to address the issue, depends on transaction costs. Private solutions to chain failure emerge where the benefits of private action outweigh the transaction costs. If the reverse is the case, the formation of a club may enable transaction costs to be reduced to where they are outweighed by the benefits of joint action.

An advantage of using club theory to study the design and operations of food value chains, rather than the more pragmatic strategic alliance framework, is that there is a rigorous analytical framework available to help determine club size, level of provision of goods and services by the club, fees charged, etc. (Sandler and Tschirhart, 1980, 1997; Sandler and Hartley, 2001; Sandler, 2013). Further, there are the related concepts of chain failure, chain goods and chain externalities to help identify impediments in the value chain and opportunities for improvements.

Case Studies of Strategic Alliances in the Red Meat Industries to Address Chain Failure

The red meat industries are a particularly useful case study for a number of reasons, as verified by the large number of papers in the Australian literature which have a meat focus (Farrell and Tozer, 1996; Hayes et al., 1998; Nicholas, 2001; Johnson, 2004; Jie, Parton and Wang, 2010; Jie and Parton, 2011; Jie, Parton and Mustafid, 2016). There are many potential impediments in red meat value chains to the maximisation of chain surplus, and thus many opportunities for improvement, that are amenable to analysis within a chain failure framework. Alliances/clubs are one such vehicle[2].

Horizontal alliances

[2] The wine industry is another relevant case. Calvet (2005) analysed problems facing the wine industry in France based on the theory of club goods and clusters. He demonstrated how, by acting as clubs, wine regions can achieve competitive advantages. Morrison and Rabellotti (2009, pp. 985-986) discussed learning "as a collective, social process involving people who share strong social and cultural values" in an Italian wine cluster. They observed how "Informal relations within the milieu, along with other mechanisms (e.g. spin-offs; labour mobility; user–producer interactions), contribute to sustaining the diffusion of knowledge at local level, which is considered a club good within the boundaries of the cluster".

Simple marketing cooperatives, or horizontal alliances, primarily coordinate aggregation and supply to domestic users so as to achieve scale economies. That is, they are set up to provide a consistent supply of a specified type of cattle or lamb that reduces the risk to processors of purchasing large lots of livestock of variable quality. Sometimes such alliances may also negotiate prices on behalf of members. Plunkett and Kingwell (2001) reviewed different types of horizontal cooperative structures in Australian agriculture. Gall and Schroder (2006) also review Australian agricultural cooperative structures.

It is well known that there are a reasonably large number of informal alliances that operate to secure private benefits for the producers involved. For example, Johnson (2004) notes several lamb marketing alliances, some of which have been long lasting while others have ceased to function after a relatively short period of time. She also talks about both the "opportunities" and the "limitations" of strategic alliances.

However, at the time of these reviews there were very few such horizontal-only alliances related to the red meat industries where the alliance had progressed into a formal club structure. One example is Ebor Beef (http://www.eborbeef.com.au/history.php), where the producer members of the alliance pay a fee to employ a marketing coordinator whose job is to aggregate cattle from members that are ready for market and match these with the needs of local buyers. The chain failure addressed by this type of club is the lack of or poor quality of the supply coordination function.

Vertical alliances

Vertical strategic alliances, including public-private collaboration, with varying degrees of commitment and infrastructure linkage, are formed to address failure to provide chain goods that allow whole of chain coordination. Some examples, taken from Griffith et al. (2014), are RD&E into meat standards within the beef value chain in Australia (Griffith et al., 2010), disease inspection services for Australian meat exports (DAFF, 2013), and quality assurance and traceability systems that are useful in demonstrating particular attributes of the product, such as 'animal friendly', 'environment friendly' or 'antibiotic free' production technologies.

The introduction of improved identification of product qualities has proved extremely difficult in the meat industry in part because of the prohibitively high costs of attempting to maintain some level of product identity through the value chain. Strategic alliances can reduce the product identity problem provided that the product handled by the processor or retailer is predominantly obtained from a small number of strategic alliances. Under alliances, producers supplying livestock with higher potential retail value or lower transformation costs have a better chance of being rewarded by providing greater customer value.

Joint horizontal and vertical alliances

Because alliances between producers and participants further down the chain will only develop and remain active where they deliver greater long-term net profits for all participants, they are much more likely to do so if the producers are also organised in a horizontal alliance (Farrell and Tozer, 1996). These alliances may prove to be one of the most effective ways of demonstrating to customers that particular quality assurance procedures have been followed. As consumers' concerns about food quality and safety become more common, quality assurance systems will increasingly become a basis for product differentiation.

The horizontal and vertical relationships needed to create additional net value along a value chain or system can take various forms including partnerships, alliances or joint ventures. Regardless of the nature of the relationship, such collaborations only persist if additional value is created, for example, by reducing the transaction costs associated with obtaining supply or by improving the quality of product supplied. The attributes of red meat products such as perishability and storability play a role in the nature of the linkages and relationships which develop.

Alliances will be most likely to form with minimal outside support in situations where there is already a high level of concentration in the industry segments of both partners, or there is a shared tight focus on a particular production system or market opportunity. Alliances between individual producers and processors and/or retailers will be the most difficult to establish and maintain. Horizontal alliances between groups of producers and processors and/or retailers are more easily formed and constitute the first step towards improved marketing.

Two important examples of joint horizontal and vertical strategic alliances in the red meat industry are the West Australian Meat Marketing Corporation (WAMMCO) and OBE Beef. WAMMCO (http://www.wammco.com.au/) has a 45 year history. It was first set up in 1971 as the WA Lamb Marketing Board to provide orderly marketing of lamb in WA. Regulation of the market was considered necessary because of the very small domestic market, the heavy reliance on exports and the very large numbers of lamb typically available in the Spring. The Board was replaced by a Corporation in 1986, and WAMMCO was formed in 1999 as a producer-owned cooperative. WAMMCO oversees sheep meat slaughtering, marketing and exporting in parts of WA and NSW, having formed a strategic alliance with Southern Meats Pty Ltd in Goulburn NSW in 2011. Thus WAMMCO is a club, with some 2000 members who fund WAMMCO to provide horizontal and vertical chain goods for the benefit of the whole club.

The organic beef producers group OBE Beef (http://www.obeorganic.com/, also see Nicholas, 2001, 5) has a 20 year history. It was founded in 1995 by a group of beef producers in the Channel Country of QLD and the NT. Some 30 members own over 7 million hectares of organic pastoral country. The objective of OBE Beef is to market organic beef to Japan. They have formed strategic alliances with processors, transport companies and a Japanese wholesaler. It is claimed that they receive a 30 per cent premium for their product in Japan, and part of this is levied to pay for accreditation, aggregation, marketing, education and communication functions. So OBE Beef is also a club, with the members jointly providing horizontal and vertical chain goods for the benefit of the whole club.

Summary

In considering whether horizontal and vertical strategic alliances could be considered as clubs, it was concluded that such alliances are often used as mechanisms within a value chain to capture chain goods and internalise chain externalities, and so overcome chain failure. They are formed among firms, or groups of firms, in the value chain at the same level (horizontal alliances – across the network) and across different levels (vertical alliances – up and down the chain). They can be used in a manner similar to government intervention to provide chain goods and internalise chain externalities. The strategic alliances may comprise all or only some chain members. Therefore the theoretical concepts of chain failure, chain goods and chain externalities, which come from the club goods literature, can be used as a framework for evaluating whether to invest or not in a strategic alliance. The fact that there are existing alliances which appear to be organised in this way suggests that these concepts have practical as well as theoretical merit.

The discussion above noted that alliances (clubs) may be long-lived or short-lived. As an area for further investigation, an assessment of the characteristics of alliances in both categories would be useful information for value chain partners contemplating whether to invest in an alliance[3]. Certainly the case studies mentioned in the previous section have persisted because they have invested in a brand which has been able to generate additional value, and so assist in adapting to changes in market structure, regulation, and the reactions of competitors. Alliances which form just to overcome a specific impediment in the value chain are inevitably short-lived once new technologies or new business models solve the original problem or as competitors follow suit.

Another issue requiring study is the optimal size of an alliance (club). This is particularly relevant in the Australian red meat industry where there are a wide range of business models, from the large supermarket chains and multinational meat processors through to relatively small family farms and meat retailers. Changes in the market will impact these segments differently so the incentives to adapt will be quite different. Alliances may be a good option in one segment or at one time, but not in other segments or at other times.

References

Baker, D., Hamza, K., Parker, W., Scrimgeour, F. and Griffith, G. (2016), "Primary industry chains and networks: analysis of public and private interests", *Systems Research and Behavioural Science.* Available at: http://onlinelibrary.wiley.com/doi/10.1002/sres.2400/pdf.

Bannock, G., Baxter, R.F. and Davis, E. (1984), *Dictionary of Economics*, 3rd edn, Hutchinson, London.

Barling, D. (2007), "Food supply chain governance and public health externalities: upstream policy interventions and the UK state", *Journal of Agricultural and Environmental Ethics*, 20(2), 285-300.

Barry, P.J. (1995), "Industrialization of US Agriculture: Policy, Research and Education Needs", *Agricultural and Resource Economics Review*, 1.

Bassi, F. (2010), "Experiential goods and customer satisfaction: an application to films", *Qualitative Technology and Quantitative Management,* 7(1), 51-67.

Bell, J., Kaats, E. and Opheij, W. (2011), Bridging disciplines in alliances and networks: in search of solutions for the managerial relevance gap", *International Journal of Strategic Business Alliances*, 3(1), 50-68.

Boehlje, M. (1996), "Industrialisation of U.S. agriculture: what are the implications?", *Choices*, Fourth Quarter, 30-33.

Bokelmann, W. and Adamseged, M. (2015), "Contributing to a better understanding of the value chain framework", contributed paper, International Conference of Agricultural Economists, Milan, Italy, July 15.

Buchanan, J.M. (1965), "An economic theory of clubs", *Economica*, 32, 1-14.

[3] The authors thank the referee for making these points.

Calvet, J. (2005), "Les clusters vitivinicoles français à AOC: Une analyse en termes de biens clubs", *Revue d'Économie Régionale et Urbaine,* 4, 481-506.

Culpan, R. (2009), "A fresh look at strategic alliances: research issues and future directions", *International Journal of Strategic Business Alliances*, 1(1), 4-23.

Chopra, S. and Meindl, P. (2013), *Supply Chain Management: Strategy, Planning, and Operation*, Pearson, Harlow.

Cook, M.L. (1995), "The future of U.S. agricultural cooperatives: a neo-classical approach", *American Journal of Agricultural Economics*, 77(5), 1153-1159.

Das, T.K. (Ed) (2012), *Strategic Alliances for Value Creation*, Information Age Publishing Inc., Charlotte, NC.

Department of Agriculture Forestry and Fisheries (DAFF) (2013), Australian export meat inspection system (AEMIS) information package. Downloaded 28 October 2013 from:
http://www.daff.gov.au/biosecurity/export/meat/elmer-3/meat-inspection-aemis-package

Doljanin, A. (2012), Aligning price signals throughout the beef value chain to reflect consumer preferences by assigning economic weights to the Meat Standards Australia (MSA) model inputs, Master of Economics thesis, University of New England, Armidale.

Dunne, A.J. (2001), "Supply chain management: fad, panacea or opportunity?", *Australasian Agribusiness Perspectives* Paper 48.

Farrell, T. and Tozer, P. (1996), "Strategic alliances and marketing cooperatives: a lamb industry case study", *Review of Marketing and Agricultural Economics*, 64(2), 142-152.

Fearne, A. (1998), "The evolution of partnerships in the meat supply chain; insights from the British beef industry", *Supply Chain Management*, 3(4), 120-128.

Fulton, M. (1995), "The future of Canadian agricultural cooperatives: a property rights approach", *American Journal of Agricultural Economics*, 77(5), 1144-1152.

Gall, R.G. and Schroder, B. (2006), "Agricultural producer cooperatives as strategic alliances", *International Food and Agribusiness Management Review*, 9(4), 26-44.

Goldberg, R.A. (1993), "New international linkages in the US food system", *Choices*, Fourth Quarter.

Griffith, G., Fleming, E., Mounter, S. and Malcolm, B. (2014), *Accounting for Externalities in Agriculture and Food Sector Value Chains and Systems: Chain Failure, Chain Goods and Chain Bads*, Final Report to Meat and Livestock Australia on Project B.COM.1086, UNE Business School, The University of New England, Armidale, July.

Griffith, G., Gow, H., Umberger, W., Fleming, E., Mounter, S., Malcolm, B. and Baker, D. (2015), "Refocussing on the value chain perspective to analyse food, beverage and fibre markets", *Australasian Agribusiness Perspectives* Paper 104.

Available at : https://www.agrifood.info/perspectives/2015/Griffith_et_al.pdf

Griffith, G., Thompson, J., Polkinghorne, R. and Gunner, R. (2010), "Meat Standards Australia as an innovation in the Australian beef production and marketing system", Paper presented at the 4th International European Forum on System Dynamics and Innovation in Food Networks, Innsbruck, Austria, 8-12 February.

Griffith, G., Umberger, W., Gow, H. and Fleming, E. (2012), "What is the role of local governments in new global food markets?", Paper presented at the 6th International European Forum on System Dynamics and Innovation in Food Networks, Innsbruck, Austria, 14-18 February.

Gulati, R. (1998), "Alliances and networks", *Strategic Management Journal*, 19, 293-317.

Hayes, G. et al. (1998), "Strategic alliances and the red meat industry in Australia", *Australasian Agribusiness Perspectives*, Paper 12.

Hicks, J.R. (1939), "The foundation of welfare economics", *Economic Journal* 49, 696-712.

Hoppe, R. (1996), *Changes in Farm Organisation*, Economic Research Service, USDA, Washington, DC.

Hubbard, R.G., Garnett, A.M., Lewis, P. and O'Brien, A.P. (2012), *Microeconomics*, 2nd edition, Pearson, Sydney.

Jarratt, D.G. (1998), "A strategic classification of business alliances: A qualitative perspective built from a study of small and medium-sized enterprises", *Qualitative Market Research: An International Journal* 1(1), 39-49.

Jie, F. and Parton K. (2011), "Australian lamb supply chain: a conceptual framework", paper presented at the AARES annual conference, Melbourne.

Jie, F., Parton, K. and Mustafid (2016), "Supply chain performance flexibility in the Australian beef industry", *International Journal of Logistics, Research and Application*, 19(4), 300-317.

Jie, F., Parton, K. and Wang, K. (2010), "Supply chain analysis in the Australian lamb processing industry", paper presented at the 8Th ANZAM Operations, Supply Chain and Services Management Symposium, Monash University, Clayton.

Johnson, S. (2004), "Supply chain management in the lamb industry; an analysis of opportunities and limitations", *Australian Farm and Business Management Journal*, 2(2), 104-109.

King, R.P. (1995), "The future of Canadian agricultural cooperatives in North America: discussion", *American Journal of Agricultural Economics*, 77(5), 1160-1161.

Kohls, R. and Uhl, J.N. (1980), *Marketing of Agricultural Products*, 5th Edition, Macmillan Publishing Co., New York.

Mankiw, N.G. (2015), P*rinciples of Microeconomics*, 7th Edition, Cengage Learning, Stamford, Conneticut.

McNutt, P. (1999), "Public goods and club goods", in B. Bouckaert and G. de Geest, (eds), *Encyclopedia of Law and Economics*. Cheltenham, Edward Elgar. Downloaded on 30 May 2011 from: http://www.scribd.com/doc/239217/0750-Public-Goods-and-Club-Goods

McVitie, A., Moran, D. and Thomson, S. (2009), A review of the literature on the value of public goods from agriculture and the production impacts of the single farm payment scheme, Research report, Rural Policy Centre, Scottish Agricultural College, Edinburgh. Downloaded 1 October 2013 from: http://www.scotland.gov.uk/Resource/Doc/278281/0093368.pdf

Morrison, A. and Rabellotti, R. (2009), "Knowledge and information networks in an Italian wine cluster", *European Planning Studies,* 17(7), 983-1006.

Mounter, S., Griffith, G. and Fleming, E. (2016), "Achieving better strategic fits and higher surpluses for Australian beef value chains by recognising and countering chain failure", *Animal Production Science.* Available at: http://dx.doi.org/10.1071/AN15460.

Nicholas, P. (2001), "A qualitative description of the benefits and costs associated with agribusiness supply chain management: a producer's perspective", *Australasian Agribusiness Perspectives*, Paper 49.

O'Keefe, M. (1998), "Establishing supply chain partnerships: lessons from Australian agribusiness", *Supply Chain Management: An International Journal*, 3(1), 5-9.

Phillips, J. (1968), "A Revised Approach to Marketing", *Review of Marketing and Agricultural Economics*, 36(1), 28-35.

Plunkett, B. and Kingwell, R. (2001), "New generation cooperatives for agricultural marketing and processing in Australia: principles, practicalities and a case study", *Australasian Agribusiness Review*, Volume 9, Paper 9.

Ricks, D. et al. (1999), *Improving Vertical Coordination of Agricultural Industries through Supply Chain Management*, Staff Paper 99-56, Department of Agricultural Economics, Michigan State University, East Lansing, Ill.

Robinson. T.M., and C.M. Clarke-Hill (1994), "Competitive advantage through strategic retailing alliances: An European perspective", Paper presented at the Recent Advances in Retailing and Services Science Conference, Banff, Alberta.

Rolle, R.S. (2006), "Processing of fruit and vegetables for reducing postharvest losses and adding value", in R.S. Rolle (ed.), *Postharvest Management of Fruit and Vegetables in the Asia-Pacific Region*, Asian Productivity Organisation, Tokyo, pp. 32-42.

Sandler, T. (2013), "Buchanan clubs", *Constitutional Political Economy*, 24, 265-284.

Sandler, T. and Hartley, K. (2001), "Economics of alliances: The lessons for collective action", *Journal of Economic Literature*, 39, 869–896.

Sandler, T. and Tschirhart, J.T. (1980), "The economic theory of clubs: An evaluative survey", *Journal of Economic Literature,* 18, 1481–1521.

Sandler, T. and Tschirhart, J.T. (1997), "Club theory: Thirty years later", *Public Choice*, 93, 335-355.

USDA (1996), *Concentration in Agriculture*, a report of the USDA Advisory Committee on Agricultural Concentration, Economic Research Service, USDA, Washington, DC.

Taylor, P. (2011), "Has Australia fallen behind the strategic alliance contracting trend in the global food industry? If so, is government assistance warranted? ", paper presented at the 55th Annual AARES National Conference, Melbourne, Victoria, February.

Varadarajan, P.R. and Cunningham, M. (1995), "Strategic alliances: a synthesis of conceptual foundations", *Journal of the Academy of Marketing Science,* 23(4), 282-296.

Whipple, J. and Frankel, R. (2000), "Strategic alliance success factors", *Journal of Supply Chain Management*, 36(36), 1-21.