Supply Chains in New and Emerging Fruit Industries: the Management of Quality as a Strategic Tool

R. Collins
School of Natural and Rural Systems Management
University of Queensland
Gatton College Q4345
Australia
E-mail: rcollins@uqg.uq.edu.au

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Abstract

The literature on new and emerging industries in horticulture is dominated by studies of the fit between new species and their environment. Very little attention has been paid to how a successfully adapted new species may lead to a successful new industry. In practice, it is the marketplace that converts new products into income, so adaptability and marketability both drive success in new industries. However, studies that integrate both these drivers in a systems view of how a new industry emerges are rare.

Recently, supply chain management has emerged as a conceptual framework for describing and analysing the complex system that links the production of food and fibre products to their consumption. It is a framework that captures the logistical, economic, marketing, technical, information and human resource elements of the production-to-consumption chain.

The relatively few studies of success and failure in new agricultural industries point to three conditions associated with failure: poor orientation to the market; lack of reliable information; and lack of collective behaviour among industry participants. It is possible to address each of these issues using a supply chain management framework, so it is reasonable to question whether adopting such a framework would give a new horticultural industry an improved chance of success.

This paper draws from research over the last eleven years with three new horticultural industries in Australia: sweet persimmons, bamboo and native flowers. It demonstrates how supply chain management principles have provided a strategic framework for a core group to focus collaboratively on its marketing, production and information systems. Paramount to the approach is the need to achieve quality across all the activities of the core group - not just product quality as perceived by the consumer. Results indicate that attention to quality not only satisfies consumers, but it also builds trusting relationships among chain partners. Trusting relationships bind the members of the chain, particularly when facing difficult decisions. As a result of this research, each of these three new industry groups is developing a competitive strategy based around their own high quality ‘hand crafted’ supply chain.

INTRODUCTION

New industries as complex systems

There is a considerable body of literature concerned with new horticultural crops and their commercialisation. This literature is heavily dominated by studies of the adaptability of new species to new environments. Although many of these studies profess to be concerned with commercialisation, most fail to balance biological research with research into markets and consumers. However, new species successfully adapted to new environments do not on their own create successful new industries. Rather, satisfied consumers and satisfied producers, linked together in mutually beneficial ways, create
successful new industries. So although the biology of a new species has an important role to play in giving rise to this mutually beneficial linkage, successful biology on its own has never created a new industry, and it never will.

New horticultural industries in practice are complex systems. They are based on biological sub-systems shaped by technology and science, and social sub-systems shaped by human perceptions and behaviours. Through their dynamic interplay, these sub-systems influence, and are influenced by, the decision-making processes that determine the emergent properties of the system as a whole. Every manager must deal with these complex interactions yet there has been virtually no published research on them in the context of new horticultural industry development.

Away from agriculture, management researchers have concluded that:
• new industry development is not driven exclusively by competition, but also involves co-operation among new industry participants (Astley 1985; Van de Ven 1993); and
• new industries may be seen as social systems (Van de Ven & Garud 1989; Van de Ven 1993).

There has been little attention paid as to whether these characteristics also apply in the case of new horticultural industries.

Drawing from the above arguments, it would therefore seem useful to identify a conceptual framework that satisfies the following criteria:
• it is systems-based, capable of accommodating complex, dynamic interactions among its elements;
• it is capable of integrating across the biological and social dimensions of new horticultural industries; and
• it can accommodate the notion of co-operation among new industry participants.

SUPPLY CHAIN MANAGEMENT

Principles
Supply chain management (SCM) is a relatively recent phenomenon (Dunne 1999). It is promoted in agricultural industries as a business strategy based on better understanding and managing the complex linkages between producers and the consumers of their products (Gifford et al 1998). Typically, supply chain management is described in terms of the supply chain being a system with five sub-systems: production, marketing, finance, human resources and information (Spekman et al. 1998).

SCM has been described as a way of optimising value to consumers while simultaneously optimising returns to stakeholders in the chain linking production with consumption of food products (Fearne 1996). Through adopting SCM principles, it is claimed that whole chains can become competitive units rather than individual firms within chains (Boehlje et al. 1998). Thus chains compete against chains. Rather than growers and marketers competing against each other for their share of returns, those who belong to the same chain co-operate to create more value, and share in that value more equitably. Thus SCM is often described as ‘co-operating to compete’.

In this new way of thinking about the nature of competition, the quality of relationships up and down the chain become key drivers of success (Gifford et al. 1998). Individualistic, independent, opportunistic ways of behaving are replaced by collaboration, transparency, trust and a commitment to openly share information up and down the chain. The better the relationships between chain partners, the greater the opportunity to innovate, lower system costs and create more value (Collins et al. 2002). For many business managers SCM represents a radical change in thinking, and although the benefits of adopting SCM strategies are well documented, many managers are simply unable to make the change. This may help to explain why far more is known about SCM than is reflected in practice.
Application to new horticultural industries

It can be seen from the sections above that supply chain management has a number of characteristics that may make it useful in new horticultural industries: it is a systems based concept; it encapsulates both biological and social elements; and it is based on competition through co-operation. As a business model, SCM has already proved its worth in mainstream agricultural industries, but its role in guiding new and emerging industries is largely unexplored, in spite of its obvious potential contribution.

As if to add further weight to this argument, consider the findings of the little work that has been done to examine causes of success and failure in new agricultural industries. Reviewing the work of a number of authors across several countries, Collins (1997) concluded that three impediments to successful new industry development were:

- lack of reliable information;
- lack of a marketing orientation; and
- lack of collective behaviour.

Now examine these three impediments in relation to effective supply chain management. Clearly an effective supply chain must have reliable information, must adopt a marketing orientation, and must be based on collective behaviour. Thus there appears ample evidence that SCM has much to offer new industry developers in horticulture.

Assume for a moment that SCM has been used to successfully guide the development of a supply chain in a new horticultural industry. For this to have happened, what would have been achieved? In essence, the five supply chain sub-systems of production, marketing, human resources, finance and information would have been developed to a level where their interactions create value for the whole chain, ensure that this value is distributed equitably, and ensure that the whole chain confers greater competitive advantage on its members than would be conferred by any other way of doing business. This would have required a level of knowledge and a willingness to cooperate not usually found in such new industries. That is, the successful adoption of SCM principles requires that knowledge and behaviour be taken to a higher level of quality than in the past.

Conferring a culture of quality

Quality can be interpreted in many ways but it need not be made difficult. Quality is a relative measure of results, always dependent on the presence of a benchmark. In business, the benchmark usually reflects some measure of profit and sustainability. This paper argues that achieving quality is necessary in addition to achieving a supply chain management approach in successful new horticultural industries. That is, adopting supply chain management is a necessary but insufficient precursor of success. Unless it is teamed with a strategic focus on quality, supply chain management is probably no more likely to assist the development of a new industry than any other business model.

The challenge is therefore how to build a supply chain management business model for new horticultural industries, the execution of which is guided and directed by a culture of quality. The literature is virtually silent as to how this might be achieved, but this paper presents a detailed case study of the Australian persimmon industry, arguably the best example of the adoption of such a model in practice. Since the late 1980s an influential core group within this new industry has successfully adopted a supply chain management business strategy that is driven by the attainment of quality results across all dimensions of the chain. The paper also makes reference to examples from two other groups presently adopting similar strategies, one in the flower industry and one in the bamboo industry.

Case study of the Australian persimmon industry

This case is written in the first person because I conceived, initiated and facilitated the development of the group involved.
1. Summary. This case examines the development of the Australian Persimmon Export Company (APEC), the developmental core of the persimmon industry in Australia. As a result of strategic intervention into the new industry in 1989, APEC has grown to represent 40 growers and two-thirds of Australia’s total exports of persimmons, and is the dominant force in persimmon markets during the marketing season (late February to late May). The company owns two brands. APEC growers control and direct it in partnership with their marketer, and accept responsibility for product performance right through the supply chain to the consumer. Returns from the APEC supply chain average consistently above returns from any other way of marketing the product, and growers have a sense of directing the future of their new industry, not being directed by it.

2. Key developmental phases. By the early 1980’s research indicated that non-astringent persimmons would grow well in a number of regions across Australia (George and Nissen 1985). By the mid 1980’s a few growers had made small plantings. By the late 1980’s, the concept of intervening in a new industry by getting the key players together to focus on satisfied consumers as well as successful production, had attracted me to the persimmon industry. Using commonwealth government funds I identified about 40 key players and ran a three day workshop for them in 1989 (Collins 1990). The objective was to help them focus on their preferred future for the industry and what they could do to ensure that future was realised. Together we created the idea that growers could have a stake in creating their own future. As a direct result of the workshop, 12 growers from five states committed to working together to develop persimmon exports. They became APEC’s foundation members.

In the next year I ran two training workshops for these 12 growers. The formal agenda was to learn about export marketing, but the covert agenda was to build a sense of trust, commitment and comfort among group members. Later, this ‘hidden’ agenda was to prove a critical success factor in the group’s development (Collins 1998). In their first year the group exported only 3000 trays to Singapore, valued at about $60 000.

Over the next five years the pattern repeated itself. Workshops (always with the same covert agenda) were held every year to plan the upcoming export season and to analyse the previous season. “Learning by reflecting on experience” was the model adopted. The group quickly accepted that they must grow fruit that met the needs of their consumers and must brand their fruit so consumers could recognise it and repeat their purchases. Brand image was developed from focus groups in Singapore to establish those attributes of the fruit that could be communicated by a brand. The brand “Sweet Gold” was born. It is now the number one brand in Singapore, Malaysia and Thailand during APEC’s marketing season. In Singapore, APEC has captured 75 per cent of the market. Its total exports have risen from 3 000 trays in 1991 to 120 000 trays in 2002, with a value exceeding $2 million.

A pivotal decision of the group after the first three years experience was to incorporate to form the Australian Persimmon Export Company (APEC). This was a sign of long term commitment, a desire to manage their affairs more formally, and of having created intellectual property worth protecting. APEC now has a salaried Executive Director and a board of five grower directors drawn from a minimum of three states. It holds annual shareholders meetings at various locations around Australia. Its exclusive exporter, from Chiquita Brands South Pacific, also sits on the board and attends shareholders meetings. In each of its export markets, APEC gives sole rights to single importers.

Supply chain analysis of the case
Supply chains are commonly analysed from four perspectives: flows of product, flows of information, flows of money, and the existence of relationships (Spekman 1998).

The flows of all APEC product within and from Australia are managed by Chiquita. As the marketer-member of APEC, Chiquita has the responsibility to communicate with growers so that quantities of product available are known and placed in markets in advance at agreed prices. This demands high levels of co-ordination and an
efficient communication system in both directions.

Information flows from grower to marketer keep the marketer informed of product available about a week in advance. In return, the marketer keeps growers informed of market requirements so that product can be packed and directed accordingly. The APEC web site (http://www.sweetgold.com.au) allows growers to complete all documentation such as spray diaries and delivery advices, and to see total sales, prices, and volumes by market, variety and grower number updated every day. In addition, a teleconference of all growers, led by Chiquita, is held once a week during the marketing season. At the end of the season, a complete analysis of performance, grower by grower and market by market, is made available to all growers. During the main part of the season there is also a roster of growers living in the company’s main market, Singapore. Their task is to evaluate the quality of every shipment of APEC fruit as it is received (daily) by the company’s exclusive importer, Freshmart. The principle here is that growers report to growers. Any problems are quickly identified and resolved before they become the importer’s problems. Growers in Singapore also do promotional work such as point of sale demonstrations of the fruit, but their main task is to act as a communication conduit back to other growers and to Chiquita. As far as we know, this is a world first for a new industry.

Financial flows are totally transparent. Any grower can know any return from any market from teleconferences or the web site. Chiquita handles all sales returns through an APEC trust account, which is open to inspection by any shareholder. Payments to growers are made considerably faster than if they were marketing through traditional export agents.

The final perspective on APEC’s activities is through its relationships. The APEC relationship network could be seen as a horizontal alliance between growers and their marketer, integrated into a vertical supply chain that links through importers to retailers and consumers in domestic and export markets. In every direction, there is evidence of relationships providing mutual benefit. Within the horizontal alliance, relationships of trust underpin consistency of performance according to the standards set by APEC. Most growers regard each other as good friends, even though some are thousands of kilometres apart. Within the vertical alliance, APEC growers can work out of the premises of the importer in Singapore or Malaysia. Chiquita was an official guest at the opening of the Malaysian importer’s new premises, and retailers provide more than usual assistance for promotional activities. Each of these examples in some way illustrates the presence of a relationship that pays dividends both ways in the supply chain.

In summary, APEC has created a supply chain that is delivering value for all its stakeholders. In return for their commitment to working together and working in a more market focused way, growers achieve returns consistently higher than they could get through any other means of marketing their fruit. In return for their commitment, marketers get exclusive rights to APEC’s brands. In return for their loyalty through repeat purchases of APEC branded fruit, consumers can be assured of consistently high eating quality at a value for money price.

Quality analysis of the case

Clearly, APEC is performing at a level that is producing quality results. However, these results are driven by whole of chain processes that themselves are based on quality performance. Like the supply chain itself, quality can also be analysed in terms of product, finances, information and relationships.

1. **Product quality.** The quality of product in the APEC case is directed by the company’s quality management system, whose key specifications focus on the consumer experience. These address such questions as how sweet, what skin colour, how large, what packaging, how much blemish. Agreement as to what were the appropriate levels of product quality attributes was eventually reached by a novel process. Over a two day workshop in 1993, the grower members of APEC negotiated face to face with their major importer, from Singapore, as to what were the critical parameters for product quality from a consumer point of view, and what were the critical accept/reject levels for each
parameter. Not surprisingly, the importer was trying to negotiate standards on the higher end of the scale, and growers were trying to negotiate standards downwards. Colour photographs were taken for each negotiated quality parameter and its accept/reject level, and these formed the basis of the first quality manual, which has since been refined with each export season. Since that workshop, the system of monitoring compliance with standards has also involved a novel approach. On a roster basis, APEC growers live in Singapore throughout the export season for 7 to 10 days per grower, their role being to do out-turn reports on product quality for every shipment of APEC fruit consigned to Singapore. As all fruit is handled exclusively by one importer, this entails working at the importer’s premises early each morning before any fruit that has arrived from Australia overnight is sold to buyers. A 100 fruit sample from each grower who has consigned fruit is assessed and results emailed to the grower and the company immediately. This means that any product quality problems are immediately identified and rectified. APEC has a “three strikes and you’re out” policy in terms of compliance with standards. That is, a third failure to comply prohibits a grower from exporting for the rest of the season. Achieving product quality in the pack house is supported by annual training for both new and old members, including Chiquita staff.

2. **Financial quality.** The responsibility for maintaining a focus on quality financial results is shared along the chain. APEC producers have been trained to know and manage their costs of production; APEC marketers do not sell on consignment – prices are negotiated in advance; and retailers are offered special promotions to sell more fruit to more customers. The end results are well managed costs of production and better returns to producers.

3. **Quality information.** Quality information is the lifeblood of the APEC chain. Without adequate and reliable information shared up and down the chain none of the other processes can reach their potential. For these reasons, achieving a quality information system has been a particular focus for the APEC board. Particular emphasis has been placed on information about product performance, consumer response and prices to help growers and marketers make more informed decisions. In the past this has been through a sophisticated paper based system, but a new web-enabled communication platform is being fully tested for the first time in the 2003 export season. Since the inception of APEC, the focus on generating and using the best possible information and sharing it wherever it was needed in the chain has been a guiding principle.

4. **Quality relationships.** Finally, APEC had paid attention to building quality relationships. This has involved extensive business and social interactions among growers and marketers. Regional meetings, annual shareholders meetings, visits to domestic and export markets, social visits and visits to research institutions are examples of the wide range of activities that build both personal and business relationships. Some growers have now been friends for 14 years since the group formed, and the company’s biggest importer, from Singapore, often stays with growers when he visits Australia before each export season. The real test of a quality relationship is when there is a problem to be solved, and in new industries problems are common. APEC has frequently relied on the goodwill between members to solve problems, sometimes at personal cost, but always with a longer term view in mind.

Throughout the whole developmental process there has been very little resistance from chain members. Initially, some growers were sceptical about working together, pooling returns, sharing information and having to learn new ways of thinking and behaving. However, results from the very first season demonstrated that there was more to gain from working together than working alone and scepticism was replaced by enthusiasm. Importers and wholesalers who were granted exclusive rights to handle APEC fruit clearly benefited, but those agents who missed out definitely created resistance. Some offered APEC growers higher prices, and others tried to undermine growers’ confidence that APEC could achieve its goals. But APEC remained determined to overcome such resistance and to be judged by the quality and value that it could deliver to all members of its supply chain.
To recap, unless a level of quality is achieved in adapting supply chain management principles to a new industry, there is a risk that very little will be achieved. Studies of groups in new industries that have failed show not a lack of orientation to their supply chain, but an inability to achieve sufficiently high quality outcomes to justify their continuance (Collins & Dunne 1996). Thus the final question is whether there are processes through which a group in a new horticultural industry can achieve high quality supply chain management outcomes.

Three guiding principles for new industry development

First, a warning that APEC is a single case study, and generalising too far beyond its particular circumstances is inappropriate (Yin 1993). However, not to seek out the principles and practices that explain its success may also be to deprive others of insights they may use in testing its wider applicability.

Three interrelated processes have been identified as the key drivers in the APEC case (Collins 1998). They are strategic intervention, action learning and empowerment. In this case they have been applied to create a quality-oriented supply chain in a new horticultural industry. Their successful application has depended significantly on the development of a network of trusting relationships among the supply chain participants.

1. Strategic Intervention. There is no evidence in either the literature or in practice that new agricultural industries, of their own volition, will adopt a whole of supply chain orientation. Thus it seems reasonable to question whether deliberate intervention could lead to more focused, collective behaviour among new industry participants.

The concept of intervening in the development of groups for providing leadership or building teams has been well documented (Argyris 1970; Tyson 1991), but the concept of strategic intervention as practised in the APEC case has not been reported in the literature. On the basis of this experience, I define this type of strategic intervention as ‘a facilitation process aimed at providing the necessary skills and information to all stakeholders in the supply chain in a way that empowers them to engage in appropriate strategic behaviours’. I assume that in some circumstances, appropriate strategic decisions may include the decision not to grow the crop, or not to market it.

From the experience of this case, I conclude that achieving a high quality result from strategic intervention depends, among other things, on having the right person to do the intervening. If intervention is seen as a form of leadership, then some individuals are more natural candidates to intervene than others. Tyson (1991) states that in a natural candidate, his or her world view, intellectual honesty, authenticity, ethics, temperament, and concern for the best interests of the group members are of vital importance.

There are three lessons about strategic intervention to be learned from the APEC case. First, the whole process should be one of co-operative inquiry, an approach described by Reason (1988) as one where all members work together fully as co-researchers. Strategic intervention must be a process of inquiry with and for its participants, rather than on them. Secondly, the approach has to be one where individuals are personally involved in the process in such a way that they feel ownership of its outcomes. Reason and Heron (1986) warn that ownership of outcomes cannot result from ideas generated exclusively by a researcher and imposed without consultation. The researcher must become part of the search for solutions, and the whole inquiry process should be a collaborative one. Finally, the group has to be given the opportunity, skills and motivation to reflect on and evaluate results so that lessons can be drawn from experiences and used to improve subsequent performance. This is particularly important in maintaining a focus on quality.

2. Action learning. Action learning (Lewin 1946, Revans 1980, Kolb 1984) involves a series of steps, each of which is composed of a cycle of planning, action, and fact-finding about the result of an action, sometimes called an Experiential Learning Cycle (Kolb 1984). In this cycle, a concrete experience is followed by reflective observation on that experience. This leads to the process of abstract conceptualisation, during which reflection on the experience produces general theories or concepts. These theories or
concepts are then used to formulate new plans for action in the active programming phase, which leads to the next iteration, beginning with a new concrete experience, and so on, as illustrated in Figure 1.

The two important advantages of action learning in a new industry/supply chain development environment are that participants engage in it very naturally, and it maintains the focus on quality results. Action learning achieves quality results through learning by reflecting on doing. A by-product of action learning is that it engages the group in collaborative processes that also work to reinforce its social fabric.

3. Focusing on empowerment. There is debate about whether one person can empower another. Some believe that ‘outside help’, particularly from professionals, may be seen as a form of oppression or exploitation (Simon 1990). Others believe that empowerment can be created by intervention, provided that the intervenor does not end up in a position of power over the other, or that a situation of dependence is created (Osborne 1994). Yet others suggest a middle-ground position where people in relationships intended to result in empowerment complement each other through collaborative interaction. Here, new knowledge is constructed as much from the quality of the relationship as from new knowledge or new skills (Dimitrov 1994). This view, empowering relationships based on collaborative interaction, comes closest to describing the approach I adopted in the APEC case.

The goal was to build an empowered core group of stakeholders who could take responsibility for quality decision making for their collective as well as individual benefit. Using action learning as the developmental vehicle facilitated this process. During the reflective phases of each action learning cycle, more and more responsibility was passed to the group to find its own solutions. Gradually, and very naturally, the group took control of strategic decision making approach that balanced two sets of needs: the needs of consumers as expressed through the market place (achieving a marketing orientation); and the needs of the members of the group (achieving commonality of purpose). There was clear evidence of a belief that if the group took responsibility for its product as far as possible down the supply chain, it could generate more value for its members and consumers, and a more trusting relationship with importers and retailers. It was, in fact, drawing on its sense of empowerment to build trusting relationships into its supply chain.

Applying APEC lessons to other cases

There are two current examples in which I am involved where the above principles are being applied to new horticultural industries. They are the GrandiFlora group of Australian native flower growers, and the Australian Commercial Bamboo Corporation (ACBC), a group of growers of fresh bamboo shoots. Each of these cases represents the core group within its industry. Each case is ‘hand crafting’ their own supply chain within an emphasis on high quality production, financial, information and relationship based outcomes. The level of intervention in the GrandiFlora case has been relatively low, but in the ACBC case, there has been on-going intervention for the last three years. All of the principles distilled from the APEC case are being applied with GrandiFlora and ACBC, and so far there have been nothing but positive indications that these principles translate directly into these new applications.

CONCLUSIONS

The success of the Australian Persimmon Export Company, and through it the industry itself, can be traced to a few key elements. They highlight the interaction of biological and social sub-systems in new industry development, and suggest that the persimmon industry approach was not just supply chain oriented, it was quality oriented.

It was significant that the crop was well adapted to production systems in Australia, and that it appeared to have reasonable market potential. Very early intervention was also important. Although little was known about the crop, early intervention meant not having to overcome entrenched negative attitudes and a history of competitiveness among growers and marketers. But intervention needs a focus. In this
case it was to ‘hand craft’ a supply chain based on trust, honesty, reliability and commitment. None of these was more important than the fundamental requirement that the product met consumers’ needs, but all of them collectively led to a sense of empowerment, and empowerment fuelled the desire to ‘get it right’ so that everyone could benefit – and getting it right meant keeping the focus on quality.

Action learning proved to be a natural and effective approach to decision making. If adequate records can be kept, it also provides a rigorous way of documenting the real gains, both financially and socially, from the group’s efforts. After a number of cycles it is easy to forget earlier lessons learned. In the persimmon case some mistakes were made twice because earlier lessons were not well enough understood and had not been documented.

The social development of the group was critical. This point is worth re-emphasising. People initiating the development of a new industry by forming horizontal alliances of producers within vertical supply chains are faced on all sides with uncertainty. Trust is absolutely necessary in overcoming this uncertainty. Trust is built both commercially and socially, so commercial activities should be complemented by social activities.

Finally, the whole of supply chain focus ensured that industry development was not blind to the need to deliver benefits to all stakeholders in the chain. This is where the importance of achieving quality outcomes became most obvious. Achieving quality meant having more value to share in the chain. Ultimately, the equitable sharing of greater value motivates all the members in a chain to commit to working together in the long term – and this is the real source of sustainable competitiveness in a new industry.

Literature Cited

Figures

Fig. 1. Elements of an action learning cycle