



Successful Evolution of a Virtual Trading Community: The Case of the Australian Dairy Industry

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ABSTRACT

Virtual Trading Communities (VTCs) have a very short history. How they work, how they create value for participating individuals and what they can achieve is still not well understood (Kaplan and Sawhney, 2000). The turbulent history of online offerings and the prevalence of failure in these implementations have led researchers and practitioners alike to seek more sustainable models for technology innovation. In this paper, we begin by discussing the concept of 'waves' of innovation and then relate the concept to requirements for establishing sustainable online communities. We then introduce a case study of a recent example of a successfully implemented virtual trading community. The primary role of this VTC is to provide online access to mandatory export documentation for producers in the Australian dairy industry. Two features emerged from the case study as being particularly important to sustainability: adaptation of the system to the target community's internal priorities and to the needs of individual firms within the community. Both these features are related to the ability of the sponsor to facilitate and support user requirements.

INTRODUCTION

Virtual Trading Communities have a very short history. How they work, how they create value for participating individuals and what they can achieve is still not well understood (Kaplan and Sawhney, 2000). The turbulent history of online offerings and the prevalence of failure in these implementations have led researchers and practitioners alike to seek more sustainable models for technology innovation. In this paper, we examine a case study of a successful virtual trading community established between the Australian dairy sector and a government agency in a phased implementation.

A number of unique features distinguish the implementation and outcomes of the dairy industry implementation in this case study from the prior initial implementation of a virtual trading community established between the same government agency and the meat export sector (Wilkins, Swatman and Castleman, 2001). In fact, it is difficult to make sense of the significantly differing outcomes of these two iterations without some consideration of the concepts that underpin them.

Early online B2B implementations have been described as occurring initially in two waves, both of which failed to prosper. These were eventually replaced by a different conceptualization in a third wave of implementations (Berryman and Heck, 2001). We offer the concept of waves of innovation as background to reviewing an in-depth case study of the successful establishment of a G2B virtual trading community between the Australian quarantine department [AQIS] and exporters in the dairy industry. The functionality and limitations of the implementation models that occur in these three waves of development are identified in Figure 4.1 below and referred to in the case study.

Previous studies of online trading communities have grouped these technological innovations according to their origins in the first, second or third wave of eCommerce development (Berryman and Heck, 2001, Hagel and Armstrong, 1997). The idea of three waves of implementation provides a context for reviewing the background, progress and outcomes of virtual trading communities as they have evolved (see Table 1).

Features of first and second wave offerings

First wave implementations were generally established by an independent or neutral sponsor. The strategy was to first capture a significant share of a particular B2B market. The sponsor expected to generate revenue from charging a small fee for matching up buyers and sellers. Most of these independent fee-based market places foundered due to their inability to establish a convincing business model.

Table 1: Emerging Waves Of Ecommerce

Ecommerce Implementations	Business Model	Features	Issues
First Wave One to Many	Sets up independent fee-based marketplace Matches buyers and suppliers. Enables suppliers to trade with one another.	- Catalogue of products. - Systematic sourcing facility. - Spot purchasing facility.	NOT ATTRACTIVE TO LARGER FIRMS - Have their own facilities. - Do not need or want an open market
Second Wave One/Few to Many private exchanges	- Reduce bid-ask spreads - Aggregates orders of buyers to achieve lower prices and clear market quickly and cheaply. - Transforms procurement and sales practices of whole industries. - Power of sponsor(s) forces suppliers to do business this way.	- Electronic matching of buyers and sellers based on product pricing choice. - Industry based consortia.	NOT ATTRACTIVE TO SMEs - Does not incorporate or cater for needs of small to medium size enterprises. - Run by consortia so not seen as neutral.
First And Second Wave Models Focus On Reducing Transaction Costs For Products Required For Specific Industries			
Third Wave Many to many Full e-marketplace capabilities, functionalities.	Integrates existing platform into supply chain management [SCM] systems among various trading partners of a particular company's supply chain. Operates in conjunction with supporting technologies such as customer relationship management [CRM].	Information and data sharing hubs for distinct segments of the supply chain. Market-tested predictions of effect of prices on specific commodities.	Participation is standards-based. Requires adoption of technology standards within and across industries.
Emerging Third Wave Models offer:			
<ul style="list-style-type: none"> o Information And Knowledge Sharing Mechanisms For Various Stakeholders o Personalized Selections For The Participating Industry Or Organization 			

Portals in the second wave aimed to bring together large numbers of buyers. Their proponents assumed that the increased volume of sales would result in lower prices following from new Electronic Markets providing cheaper and faster clearance of goods. Transformation of business practices within industry sectors - particularly in the sales and procurement areas - were expected to follow as a matter of course.

The model for many of these second wave implementations was subject to a number of underlying assumptions that remained largely unquestioned at the time. Significantly more emphasis was placed on efficiency gains than on improving business processes. Second wave models neglected a more granular approach, which would have reached the real decision makers at the level of individual businesses and their managers. In practice, individual firms, not industry sectors act as the prime agents in uptake of innovation systems (Norgren and Hauknes, 1999). Building communities online requires significant levels of trust and long-term commitment between all parties - something that was not given adequate recognition until after the failure of the initial 'wave' of Electronic Markets (Hansen, Mathews, Mosconi and Sankaran, 2001).

Virtual trading communities based on these more recent conceptualisations place much greater priority on user/producer interactions. They emphasise variety and adaptation as the key to sustainability in online ventures.

Features of third wave models for virtual trading communities

Third wave models for virtual trading communities are characterised by a much stronger focus on service and collaboration. They also present a number of strategies for enabling broad-based sharing of information for distinct segments of the supply chain. A third feature is the wide range of opportunities these online communities offer for improving and disseminating knowledge and operations. There is a growing realisation that availability, exchange and management of information collected electronically will increasingly support members of supply chains to improve and disseminate knowledge and operations (Britz, 2001). Virtual Trading Communities - where successful - stimulate connectivity. Stimulating connectivity counters low levels of interaction by organisations in a system and supports a collective vision of the benefits of applying innovative technology and coordination of investment (Lambooy and Boschma, 2001).

Virtual Trading Communities and the Australian Dairy Industry

Virtual Trading Communities originated as innovations based on the feasibility of providing a technology platform to support an online market place. They are particularly attractive to industries that are heavily reliant on competitive global supply chains and markets, such as the food and beverage industry (Devine, Dugan, Semaca and Speicher, 2001). They offer a new way to bring together large numbers of buyers and sellers not possible in the physical world.

Food products make an important contribution to Australia's international balance of trade, accounting for about 13 per cent of all Australian exports and exceeding \$24 billion in value in 2000-01. Australia ranks as sixth largest exporter of unprocessed food and the eleventh largest exporter in terms of shares in the value of world food export trade (Australian Food Statistics, 2000). The top three food exports from Australia are, successively, meat, grains and dairy products.

The food industry has always relied on markets, not only as a mechanism for exchange and goods but equally importantly to transmit information up and down the chain of intermediaries between producers and customers (Fong et al 1997).

In Australia, government departments have responded to the need for structural and administrative change in the food industry made evident in studies showing both horizontal and vertical alliances were not well developed amongst Australian exporters (see for example AFFA 2000). Exporters were competing rather than cooperating with other supply chain members.

Australia's economic dependence on food exports has resulted in strong external pressures for better integration of technology innova-

tion and associated supply chain management techniques. These pressures highlight problems with transparency and trust along all segments of the supply chain. Whilst maintaining industry competitiveness provided an impetus for change, the integration of technology innovation offered benefits evident to leaders in the Australian food industry. Once introduced, the improved information flows that characterise supply chain management (SCM) facilitate market responsiveness, increase trust and commitment, reduce uncertainty, increase flexibility and encourage longer term planning. As specific players are integrated in the chain, overall costs reduce over time. Increased control of processes in turn offers opportunities for product differentiation.

Apart from such generic benefits, an export focus has proven to be an important specific incentive for adopting SCM. Coviello and McAuley (1999) found that successful internationalisation of firms depends on the strength of the relationships they can establish. Recognition of chain interdependencies underpins the ability to establish business relationships. Establishing SCM techniques requires prioritising knowledge transfer and transparency in business dealings.

Low 'chain awareness' within targeted food industry sectors continues to be a key barrier to the development of more competitive demand/supply chains. Less than enthusiastic responses to industry initiatives such as the promotion of commercial clusters within recipient businesses suggest that the move from commodity to supply chain thinking is still in the early stages of maturity (AFFA 2002).

The Structure of the Dairy Sector in Australia

The Australian dairy sector has a total of some 152 registered establishments (AQIS, 2003). The sector has the advantages of leadership by dedicated and vertically integrated exporters within organisations that have a depth of skills and think globally. Dairy does not suffer from the fragmentation and scaling up issues evident in commodity sectors such as Fish and Horticulture (Food and Fibres Chain, 2001).

Agricultural cooperatives are the dominant marketers/processors in the dairy industry (Plunkett and Kingwell, 2001) The giants amongst Australian cooperatives are the three major dairy cooperatives, Bonlac Foods (now a Parmalat partner), Murray Goulburn and Dairy Farmers' Group. Their turnover - between \$500 and \$1billion per annum - places them in the big business category in Australia.

The dairy industry prides itself on having a culture of willingness to act cooperatively. Cooperatives rely on this culture for access to their members' produce on an ongoing basis and the ability to provide an assured market in return. Since their limited access to capital and expertise limits their ability to expand downstream, cooperatives must seek their opportunities where they do have strengths.

The response by cooperatives to structural pressures and increasing market complexity bears a strong relationship to their capacity to absorb and diffuse technology throughout the dairy sector. In the Canadian context, Holmlund and Fulton (1999) found evidence showing farmer involvement in the industry leads to greater innovation.

As well as encouraging innovation, it now appears that consumer confidence in the food supply may also be better sustained by maintaining farmer involvement. *'Not only may farmers be viewed as more trustworthy than the multinationals, farmer ownership of parts of the food system can create incentives for the better use of the knowledge that farmers possess regarding product quality and safety'* (Holmlund and Fulton, 1999).

CASE STUDY: IMPLEMENTING A VIRTUAL TRADING COMMUNITY IN THE AUSTRALIAN DAIRY EXPORT SECTOR

The dairy industry is Australia's largest exporter of processed food with export sales of \$3.04 billion in 2000/2001. Australia is the third largest dairy product exporter in the world, after the European Union and New Zealand. Cheese and whole milk powder are the two key products behind the growth of over 12% a year in the value of dairy product exports in the 1990's (Australian Food Statistics, 2000).

Australia's share of international trade in dairy products has risen to around 15% (ABARE, 2001). Major dairy export markets for

Australia include Japan, the Philippines, Malaysia, Saudi Arabia and Singapore with growing customer interest in Indonesia and China (PRC).

In the 1990's industry exports doubled and the dairy industry increased its share of Australian processed food exports from 15% to 22%. Export of annual milk production increased from around 35% in 1988-89 to 50% by 1996-97. In the same period the Asian and Middle Eastern market share grew from 60% to 80% of Australian dairy exports.

The role of government health regulation in the dairy sector

EXDOC was introduced to support the preparation of export documentation for primary produce as prescribed under the Export Control Act 1982 and associated legislation. The system operated by the Australian Quarantine Inspection Service [AQIS], has been in place since August 1992. EXDOC provides greater certainty in certification through the standardisation of documentation and the enhanced integrity of Australia's certification systems. Originally designed for meat exports, the system has been redeveloped for use by non-meat commodities and is now available for dairy, fish, grain and horticulture exports. It forms an integral part of overall AQIS procedures, which ensure products meets Australian legislative and importing country standards and requirements.

The EXDOC system requires data flows from the exporter to AQIS and via separate screens in the exporter system to Customs and the Australian Bureau of Statistics [ABS] and the Australian Dairy Corporation [ADC]. An export can often involve a number of parties such as a processing establishment, a packing establishment, the exporter or agent acting on behalf of any or all of these. Typically each party has partial input to a Request for Permit [RFP] and will wish to pass the RFP on to the next party in the export cycle when their input is finalised.

EXDOC interacts with different types of users classified as internal to AQIS, operating within the private sector, or members of other government agencies. Users include exporters and their agents, authorised AQIS inspection and documentation staff, Australian Customs Service and Australian Dairy Corporation staff.

The system accepts details of proposed exports from exporters, links these with the results of inspection of product and, where product is eligible, issues export permits, health certificates, certificates as to condition and Phytosanitary certificates to enable export. The central documents involved are the Request for Permit (RFP) provided by the exporter, and the Export Permit Number (EPN) and export documentation, both provided by AQIS.

Government regulations in the dairy sector require each establishment to fulfil particular health certificate requirements for product identification. For example, these requirements for frozen products may relate to the date of freezing and the temperature. In effect, the issue of a health certificate makes certain statements about the efficacy of a product. Any product identification code used had to link back precisely to the AQIS classifications. Establishments could then know that this number meant that they had to meet certain requirements or that a certain manufacturer was licensed to actually produce that kind of product.

Dairy did not move onto EXDOC for some considerable time after the initial implementation in the meat sector. The delay is accounted for by a number of factors:

- Industry resistance to change
The government agency sponsoring this virtual community saw the problem as due to stalling by industry. The original intention had been *'to start [the EXDOC implementation] in 1992, develop it in 1994 with other industries to move on straight after meat. But it wasn't until dairy decided they had to do something about it that there was anything but resistance'* (N Scott, AQIS, 22 July, 2002 personal communication). Industry sources have confirmed that *'a lack of will by other exporters to get involved slowed it down'*. In some cases, companies struggled with the technical requirements.

- Product description complexities for electronic transmission requirements
The ability of EXDOC to provide adequate product description for the dairy sector's needs remained unresolved until the late 1990's (ADPF, 2002).
- Implementation costs
Initially costed at \$220,000, the EXDOC project budget blew out to \$1m before costs were capped by AQIS (Minter Ellison Report, 2002)
- System availability disputed
At the time the implementation start date was first given for dairy to go online, the Australian Dairy Producers Federation (ADPF), the peak representative body for the industry, considered EXDOC to be only at a rudimentary level of development. *'It took a long time for the system to really be available for trialling – it was not even ready for testing...'**The three software providers did not have a product ready at a time when companies were ready to use it'* (ADPF, Feb 2, 2001).
- System feasibility questioned
In 1997, the ADPF commissioned a consultant on behalf of the dairy industry in order to report independently on the feasibility of introducing the EXDOC system in dairy and to establish whether it would accord with industry needs.

Despite these initial 'teething' problems, in 2001 very rapid uptake of EXDOC took place in the dairy sector. Whereas at the beginning of the year, no dairy company was fully utilising EXDOC for their export documentation, by April, 2001 Murray Goulburn P/L - the company responsible for the majority of the sector's exports from Australia - had 50 per cent of its export documentation being electronically processed.

Reasons for successful take up of EXDOC in the Dairy Sector:

- Industry Report concludes in favour of adoption
Although the industry was committed to EXDOC before engaging the consultant, the recommendations of the ADPF report effectively locked in all the key industry stakeholders represented on the project steering committee, ensuring implementation of EXDOC in their establishments with no further delays.
- Industry conditions for usage accepted by the sponsor of the VTC (AQIS)
The industry peak body, the ADPF, expected AQIS to address its requirements as high priorities before implementing EXDOC and used delaying tactics as a successful bargaining tool for the industry. As an experienced negotiator with government on conditions for industry deregulation, the ADPF gained concessions for the sector, which included:
 - Authorisation for dairy to use third party auditors to inspect registered establishments.
 - The introduction of electronic signatures.
 - The right to employ remote printing facilities.
 Dairy also asked for free text needed to add documentary evidence on AQIS certification. This was an enhancement not available in the EXDOC format for meat in the initial iteration of the system. Generic information passed by the exporter to government and to the commercial sector for each individual shipment is estimated as having at least 75 to 85% data commonality (G. Grant, APEC, 2001). However over time, different descriptions for different products had become standard practice in dairy and several other sectors. These descriptions were accepted and even expected by customers in dairy (Minter Ellison Report, 2002). Agreement was reached before the system was sent out to tender but the issue represented a stumbling block for some time.

- Agreement reached with industry bodies
By the beginning of 2000, time-lines had been established for the EXDOC implementation and the push [to go online] had been agreed to by the dairy industry.
- Support by Senior Management
The move online diffused rapidly through the sector. The attitude of industry leaders proved to be an important impetus for sector adoption. *'Once you convinced big companies, they really jumped in ... [it] takes time to convince them. Once the General Manager makes the decision then it happens. At Murray Goulburn they decided ... 'let's try' and went on'* (AQIS EXDOC development manager, 2002).
- Alignment between the VTC offering and key performance indicators for individual firms
Leading firms in the industry appreciated that uptake of EXDOC would assist them with respect to:
- Fulfilment of rising customer expectations for volume, accuracy and consistency of information and service.
- Improved documentation performance
Despite the long delay between the initial implementation in the meat sector and that in the Dairy sector, the EXDOC system has now gained the full and active support of the industry. Public acknowledgement of the benefits of uptake – particularly faster turn-around, better customer service capabilities and fewer barriers to supply chain integration – has come from industry leaders as well as firms across the sector (Wilkins, 2002).
- Increased cooperation between sector members
Implementation of EXDOC has encouraged cooperation between sector members. *'We've had competitors in showing them our systems, working side by side with Murray Goulburn, sharing our experiences- good for them, good for the industry'* (IT manager of Bonlac).
- Increased standardisation of platforms
The EXDOC implementation is appreciated by the industry as being generally good for international trade. *'It's a thing to build on...It will link people with more common documentation platforms'* (finance manager, Murray Goulburn).
Reducing turn around time and eliminating the paper trail was a primary motivation for the implementation of EXDOC. The opportunity to offer better service to customers was also an important gain. The implementation outcome is viewed as a success with the system becoming more generic as more sectors take it up. The EXDOC implementation process has resulted in increased cooperation between firms in the dairy sector – a major gain for industry competitiveness in itself.

CONCLUSION

Unlike the fragmentation evident in other commodity sectors that eventually became part of this virtual trading community (Wilkins, Swatman and Castleman, 2003), firms in the Australian dairy sector have an established tradition of working together for the good of the industry. It is notable in this context that senior management of the leading firm and major exporter in the sector, Murray Goulburn, assessed the EXDOC implementation as a success specifically because it had met both company and sectoral objectives.

The cooperatives that dominate the dairy sector have a cultural history of serving their members – a feature that aligns particularly well with the requirements for building on line communities – such as finding opportunities for collaborative information sharing and dissemination.

A feature of VTCs that was overlooked in the earlier waves of innovation was the fact that buy-in requires significant levels of trust and long-term commitment between all parties (Hansen, Mathews,

Mosconi and Sankaran, 2001). The role industry culture played in this case study of a successfully established VTC clearly supports this finding.

Perceptions about the role of virtual organisations and what they have to offer participants are changing. As this study indicates, understanding of the value-creating potential of VTCs has shifted to a more flexible, user-oriented approach. Such an approach offers opportunities to foster information sharing and cooperation and to improve sector business planning and projections. (Devine, Dugan, Semaca and Speicher, 2001).

Agrawal and Pak (2001) suggest that the commercial future for virtual organisations lies in taking on the role of information hub for distinct segments of the supply chain. An information hub model offers members the advantages of instantaneous data exchange as well as the sharing of logistics support features. These 'third wave' models represent a considerable shift from the role originally envisioned for these technologically enhanced markets.

Export logistics support was the underlying motivation for implementing this example of an online community in the dairy sector. However there have been a number of other benefits for the industry. EXDOC has stimulated the development of a coordinated management strategy of information flows for *all* dairy exporters. Whilst the implementation demonstrates that there will always be tensions between user needs and the requirements for a workable standard, the sustainable nature of this VTC demonstrates the possibilities for building such communities and offers the promise of more creative and opportunistic exchanges of information with trading partners.

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