Factors influencing e-marketplace adoption in agricultural micro-enterprises

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Abstract: E-marketplaces present a business-to-business (B2B) trading environment in which firms can benefit from increased choice among trading partners, and other efficiencies gained through electronic trading. B2B e-marketplaces have only recently emerged in New Zealand; however, there is already doubt whether predicted benefits are being realized. This study draws on the Tornatzky and Fleischer (1990) adoption model to explore the motivations and barriers to e-marketplace adoption that agricultural micro-enterprises experience. Key perceived barriers of e-marketplace adoption include conflict with pre-existing relationships, risk perceptions, ease of use and infrastructure problems. Dominant motivations include the ability to exclude the agent middleman, a reduction in transaction costs, and market reach. E-marketplace owners can use these preliminary findings to reduce perceived barriers and encourage increased participation. They also extend our understanding and assist theory development of the factors influencing micro enterprise adoption and participation in e-marketplaces, and within the agricultural sector.

Keywords: e-commerce, electronic channels, e-marketplaces, B2B, micro-enterprises, agricultural firms.
1 Introduction

The rapid rise in the use of internet technologies in B2B exchange is well documented in academic and business discourse over the last decade (e.g. Bakos, 1991, 1998; Kaplan and Sawhney, 2000). XML (Extensible Mark-up Language) makes possible the exchange of a wide variety of data over the internet and is accelerating emergence of what are termed ‘electronic marketplaces’. An electronic marketplace (or e-marketplace) is an inter-organizational information system allowing multiple buyers and sellers, and other stakeholders, to interact, communicate and transact with one another (Stockdale and Standing, 2004). E-marketplaces involving multiple participants now are driving growth in B2B e-commerce. The current generation of Transaction Delivery Networks, which substantially lowers the cost of participation in electronic transactions, also allows a large number of small and medium sized firms to start enjoying the benefits of electronic trading. ¹

E-commerce is often one of the least common uses of the internet by small businesses. Additionally, little is known about why firms choose to participate or not in e-marketplaces. The focus of B2B e-commerce studies is generally on other areas of e-business such as the internet and website adoption, EDI and CRM. In a recent meta-analysis of SME e-business journal publications (Parker and Castleman, 2006), only two of the 100 studies of e-business technologies and applications analyzed specifically investigated e-marketplaces. Notably, Stockdale and Standing (2004) argue that it may be premature to discuss e-marketplace adoption by small and medium sized enterprises (SMEs) as many SMEs are still not yet secure with other applications of e-commerce. Nevertheless, an increasing number of small businesses are participating in e-marketplaces, although the rate of adoption generally remains lower than expected. A greater understanding of the barriers and benefits from small firm participation in an e-marketplace is needed.

The current study investigates the motivations and barriers New Zealand agricultural micro-enterprises experience when buying and selling on an e-marketplace. Choudhury, Hartzel and Konsynski (1998) began the process of exploring e-marketplace participation from the buyers’ perspective, yet little empirical research explores e-marketplace adoption from the suppliers’ perspective.² This is despite a number of calls for research in this area (Choudhury, Hartzel and Konsynski, 1998; Stockdale and Standing, 2002) and evidence that significant differences could exist in the adoption behavior of buyers and sellers (Rask and Kragh, 2004; Stockdale and Standing, 2002). The study contributes to the growing need to develop knowledge of the e-marketplace adoption behavior of small and medium sized enterprises (Stockdale and Standing, 2004). While there is some study of SME e-marketplace adoption (Kendall et al. 2001; Scupola, 2003; Yu, 2006), to the best of the authors’ knowledge there is yet no investigation of micro-enterprise e-marketplace adoption. There is growing evidence that micro-enterprises and larger ‘small’ firms may differ significantly in their e-commerce behavior (e.g. Mirchandani and Motwani, 2001; Riemenscheider and McKinney, 2002). The findings of this study provide some preliminary insights that can be used to develop a more general theory of e-marketplace adoption, and improve understanding of issues specific to micro-enterprises involved in, or contemplating, e-business activity. Research in this area also will give agricultural market makers a better understanding of the barriers and motivations for adoption, and direction in how to create e-marketplaces that can be of additional value to participants.

The use of e-marketplaces for B2B interaction and exchange has grown in New Zealand over recent years. In the primary sector in New Zealand, the context for this study, there are a large number and range of e-commerce sites. Examples include Stocknet (www.Stocknet.co.nz), New Zealand’s first online information and listing service for the livestock industry; Lignus (www.Lignus.com), an electronic trading exchange for the wood industry; Woolnet (www.Woolnet.co.nz), an internet based trading system for New Zealand wool traders; and Fonterra’s Fencepost website (www.fencepost.com), that enables livestock trading (Live.ex) and the ability to tender to a number of selected meat processors (Prime.ex).³ E-commerce is

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predicted to have a major impact on how goods are bought and sold in agricultural markets. The New Zealand Institute of Economic Research highlight the potential of e-commerce to provide significant benefits to agricultural producers in terms of lower transaction costs, improved price signaling and increased geographic reach (NZIER, 2000). However, tangible evidence of realized benefits is less apparent (e.g. Clarke and Jenkins, 1993; Yu, 2006). New Zealand primary sector e-commerce sites are known to be underperforming against expectations.

Stocknet has undergone some major changes. Fencepost.com recently has undertaken a major internal strategic review. The New Zealand Wool Board’s ‘Woolnet’ e-marketplace has been shut down, primarily due to poor participation rates, as has the fishing industry trading site SouthFresh. Such observations also provide an important motivation for research into e-marketplace adoption in the agricultural industry.

2 Research design and methods

An exploratory study is conducted which investigates the motivators and barriers to participation in the Live.ex e-marketplace. Live.ex began in 2001 as an independently owned e-marketplace. By the time of the study Live.ex was incorporated into Fonterra’s Fencepost website (www.fencepost.com). Fonterra’s Fencepost site adopts the community site model, providing a wide range of facilities primarily to the co-operative’s dairy farmer shareholders. These facilities include bulletin boards, job vacancies, weather information, industry specific news and the Live.ex e-marketplace. The Live.ex e-marketplace functions as a ‘sell-side asset exchange’ (Wise and Morrison, 2000). Therefore this e-marketplace offers the advantage of providing a context where the issues of both buyer and seller adoption can be studied. Farm owners use Live.ex to exchange (either buy or sell) livestock directly with other farm owners. Rather than using typical classified listings, Live.ex uses an algorithm to best match buyers and sellers on a number of criteria.

The limited number of previous studies into small firm e-marketplace adoption favors a multi-site case study approach (Eisenhardt, 1989). Ash and Burn (2006), Hsiao (2007) and Scupola (2006) in recent study of the barriers and benefits of e-marketplace adoption successfully use the case study approach. This study focuses on collecting data that could generalize back to theory and be understood in terms of a new context, agricultural micro-enterprise e-marketplace adoption. The study provides a number of interesting contrasts to previous investigations; namely, the wide and often remote geographic spread of primary sector farms, the prevalence of micro-firms, generally well developed channel relationships and farmers’ significant industry experience.

2.1 Description of study participants and selection process

In order to investigate the motivations and barriers to participation in the Live.ex e-marketplace, eleven agricultural enterprises were selected and interviewed. Following the call by Rask and Kragh (2004) for future research to examine motives at early and more mature stages of e-marketplace participation, theoretical sampling is used to select case informants at various stages of the adoption process. Initially, the researchers’ personal contacts and a snowball sampling approach were used. This led to five qualified respondents being selected and interviewed (F1-5). Subsequently, the e-marketplace manager provided the researchers with contact details for recent users of the e-marketplace and those that had achieved a successful transaction(s) on the Live.ex site. A random sample from this list was then contacted. Case data was collected until data saturation was reached. This process resulted in identification and qualification of cases F6-11. To improve comprehension of the study findings, case number designation is aligned with the respondents’ stage of adoption of the e-marketplace. For example, F1 is at a very early stage of the adoption process, having awareness of the site, but not yet listed. F11 is at a relatively mature stage having achieved multiple successful transactions.
In order to qualify for the study the following criteria were applied: the firms had to be a micro-enterprise; they at least had to be aware of Live.ex (an issue in the first data collection phase only) and overall satisfy the requirement to be at various stages of the adoption process; and located in geographic proximity to the Waikato district of the North Island, the major dairy industry region in New Zealand. Identified agricultural enterprises were contacted initially by telephone to ascertain their willingness to participate in the study, and assess whether they met the qualifying criteria.

Table 1 provides a description of the agricultural micro-enterprise participants. The selected case sites are North Island (New Zealand) farms, nine of which are dairy farms (Fonterra shareholders), one a dairy support cattle farm (Farmer 7), and one a mixed sheep and cattle farm (Farmer 1). Farm owners are the key informants, as they are the key decision makers and primary users of the Fencepost website. With the exception of Farmer 6 (F6), and F10 in which the interview involved the farming couple, all the respondents are male. The farmers have a high level of farming experience, with the average being 27 years. F1 has the lowest level of farming experience at 6 years, F11 the highest at 50 years. The farmers are generally in their forties. The average size of the farmer’s herd is 449. Farms range in size from 50 to 500 hectares and have no more than four employees. While financial data was not provided in all cases, an average Fonterra supplier received a milk payout of approximately $NZ900,000 in the last financial year, with this milk payout generally accounting for at least 90% of a dairy farm’s gross income. Consequently, according to the European Union definition, all study subjects are classed as micro-enterprises. In terms of stage of adoption of the e-marketplace, F1 and F2 indicate awareness of the e-marketplace but have not listed; F3 indicates awareness and attempted use; F4, F5, and F6 indicate they have listed on the site but have not been able to enact a transaction; and F7, F8, F9, F10 and F11 have experienced at least one successful trade as a result of listing on Live.ex.

Semi-structured in-depth interviews (approximately 60 minutes) were completed on-site at the participants’ location. The interviews, conducted by the second author, were audio-taped and transcribed. Field notes and transcripts were made within 24 hours of each interview. Transcripts then were content analyzed, interpreted and coded into emerging themes by the second author. Initial coding then was checked and confirmed by the first author. Development of themes follows an interpretive and inductive approach in accord with the relativist view that is adopted for the purposes of the study (Anderson, 1983). These themes are labeled and direct quotations are used in this paper to convey the meaning of themes (Coviello and Munro, 1997).

Along with the depth interviews other sources of evidence are used to inform the study. The Fencepost discussion forum provides responses that farmers make regarding their trades on Live.ex or Prime.ex under a topic heading ‘who’s used the Live.ex livestock exchange? What about prime.ex’. Recent studies into online behavior (Bagozzi and Dholakia, 2002; Kozinets, 2002) use this method of research. Additionally, findings are further informed through an interview with Dave McPherson, Fonterra Portal Services Manager.

2.2 The Tornatzky and Fleischer (1990) model

Previous studies use various frameworks to investigate the factors influencing e-marketplace adoption. Prominent among them is the theory of planned behavior (Riemenschneider and McKinney, 2002), Rogers’ model of innovation diffusion (Kendall et al. 2001), Davis’s technology acceptance model (Grandon and Pearson, 2004), market process re-engineering (Lee and Clark, 1997) and Tornatzky and Fleischer’s (1990) model of innovation adoption (Anand and Kulshreshtha, 2007; Scupola, 2006). This study draws on the Tornatzky and Fleischer
(1990) model as their framework is considered to fit well with the context of SME e-commerce adoption (e.g. Kurnia and Johnston, 2000).

The Tornatzky and Fleischer (1990) Technology-Organization-Environment (TOE) model considers three contexts that are relevant for explaining technology adoption. These three contexts are: the technological context; the organizational context and the external environmental context (see Figure 1). Tornatzky and Fleischer (1990) define the organizational context in terms of several descriptive measures including firm size, quality and availability of internal resources, internal and external communications, management style and decision making. The technological context describes the internal and external technologies relevant to the firm. This includes current practices and equipment available to the firm as well as the external pool of technologies accessible by the firm. The decision to adopt a technology depends not only on what is available on the market, but also on how such technologies fit with the technologies the firm already possesses (Chau and Tam, 1997; Tornatzky and Fleischer, 1990). Following Tornatzky and Fleischer (1990), we consider the technological context separately from the rest of the environment. This is in order to be able to focus attention on how features of the technology can influence the adoption process and implementation. The external environment context considers issues involving the focal firm’s industry context, competitors, relationships and access to resources supplied by external parties, and interactions with the government. A firm’s relationship with its external environment can both constrain and provide opportunities for technological innovation.

This paper continues by presenting findings on the key barriers and motivations to e-marketplace adoption utilizing the TOE framework to organize the discussion. Following examination of the organizational, external environment and technological contexts, a summary of key findings, conclusions and directions for future research are provided.

3 Organizational context

Perceived barriers to adoption can exist especially for SMEs who lack a readiness to participate in e-marketplaces (Stockdale and Standing, 2004). SMEs can be restricted by the technical and financial resources needed to participate (Mehrtens, Cragg and Mills, 2001). This is especially significant for micro-enterprises. SME managers also may not have the necessary skill level needed to participate, and might lack an understanding of the realizable benefits of e-marketplace adoption (Stockdale and Standing, 2004). Alverez and Nuthall (2001) found Uruguayan dairy farmers’ unwillingness to use computerized systems could be explained by their feelings of alienation towards computer technology, incompatible information management skills and poor economic benefit perceptions. The key factors in the organizational context influencing adoption of the Live.ex e-marketplace include farmer computer skills, trust and control issues, inefficient use of the e-marketplace, and small size issues.

3.1 Farmers’ computer skills

Findings from the United States Department of Agriculture (NASS, 2007) indicate that while 55 per cent of American farms have access to the internet, only 35 per cent use the computer for farm business. These findings are mirrored by an earlier study by the Department of Environment, Food and Rural Affairs of UK farm businesses (DEFRA, 2002). They found a farm business internet access rate of 60 per cent, while usage of the internet for business purposes was only 26 per cent. A key issue relating to these findings is likely to be farmers’ limited IT and computer skills. For example, Mirchandani and Motwani (2001) found limited
Information Systems knowledge is an important barrier to e-commerce adoption in small businesses. Limited computer skills also are highlighted as a key barrier to internet adoption, particularly by older interviewees, in a study of the drivers and impediments to internet use by agricultural businesses (Warren, 2004). Similarly, in a study of B2C adoption in retail firms in India Anand and Kulshreshtha (2007), using the Tornatzky and Fleischer (1990) TOE model, found IT experience was one of the two most important factors in the technological context of the firm. The evidence from this study indicates farm owners are, in many cases, not proficient computer users. Live.ex is generally their first exposure to a B2B or B2C e-marketplace. The following quote illustrates this well and provides support for previous studies indicating limited computer skills are a key barrier to adoption of new internet enabled applications.

“We’ve got a computer but I couldn’t do a hell of a lot of work with it” (F9).

3.2 Trust and control issues

Trust has a central role in relationship development and management (Morgan and Hunt, 1994). In a meta-analysis of the role of trust in marketing channels, Geyskens, Steenkamp and Kumar (1998, p. 242) conclude that “relationships are not prisoners of the environment and power structure, but whether trust develops depends on how parties feel and behave and on the outcomes developed.” Reliance on trust by organizations can be expected to emerge only when they have completed successful transactions in the past (Doney and Cannon, 1997). The importance of an ownership structure and governance that engenders trust is a key factor affecting the success of an e-marketplace (e.g. Gengatharen and Standing, 2005).

There also is evidence that the fear of losing decision making control over commercial transactions in business relationships is a significant issue for small firms especially. For example, in a study by the Australian Bureau of Industry Economics, the fear of losing decision control is found to be the main reason for small firms not entering into closer channel relationships, and business cooperation failure (BIE, 1995). A number of farmers express concerns about the lack of control they have in both traditional and online livestock transactions. These farmers also are concerned about trust. Adopters and non-adopters of the e-marketplace have quite diverse perspectives on the issue of control in livestock trading. For example, F2 who has not used the e-marketplace, has a very good working relationship with his agent, a strong preference for the agent payment protection and the value of the services provided by his agent, expresses strong reservations about participating on Live.ex.

“I can’t see myself rushing out to join something that is anonymous and I had really no control over” (F2).

However, the perspective of two farmers that have transacted over the e-marketplace show a clear preference for the e-marketplace in terms of giving them direct control over the process and related conditions of the transaction.

“Some of these open-ended clauses that stock companies have looking after their purchasers, looking after their clients, the client has all the say, the vendor has no say kind of thing. So any opportunity like this [Live.ex] can be quite a good one, where you pre-agree on conditions.” (F9).

“You feel more in control I think, when you’re making the listings and you’re taking the phone calls and you’re showing the animals [as opposed to an agent performing these tasks] “ (F10).

Trust related issues are found here to be significant in farmer attitudes and behavior towards the Live.ex e-marketplace. The absence of an agent-mediated trade and associated payment protection, the non-physical nature of the online relationship, the perception of an industry propensity for untrustworthiness and issues with trusting other farmers, dominate discussion on this topic. These findings provide support for Gengatharen and Standing (2005) who show trust is a key factor in the success or failure of SME e-marketplaces.
"The ones that are trucked off down south are right out of control and who knows that the animal they claim is empty [not in-calf] is actually your animal. So you're very vulnerable …" (F9).

"There’s probably more risk because you’re not dealing with someone, and you’re dealing electronically" (F4).

"Farmers are rather untrustworthy, they don’t trust. I mean they’ll trust their next door neighbors, they’ll trust the vet and they’ll trust the local supply store, but someone out there I think it’s just a little hard for them to physically trust” (F10).

3.3 Inefficient use of the e-marketplace

Farmers are inefficient when using the e-marketplace. This may well relate to subjects’ limited experience with e-marketplaces, and often inadequate computing skills (see section 3.1). The majority of farmers in the study that have listed livestock for purchase and/or sale are relatively passive in their post-listing behavior. Once listed, most farmers in the study would wait for contact or focus solely on the matches provided by the e-marketplace. Typically they would not utilize the search facilities on the e-marketplace to look for other potential matches. The inefficiency of this approach also may have been magnified given issues with the effectiveness of the matching algorithm used by the site (see section 5.3). A more proactive approach may well lead to greater success as indicated.

"... It wasn’t just all one-way; it wasn’t just people approaching me. I was actually approaching other people because I could see who was in the marketplace wanting a particular herd of a particular type and if it suited what we had then I’d contact them” (F11).

The efficacy of a more proactive approach supports findings from the channels literature indicating a positive association between more active relationships (in terms of greater levels of information sharing, flexibility, and joint planning and decision making) and business performance (e.g. Noordewier, John and Nevin, 1990). Ash and Burn (2006) also found the more active the e-marketplace buyer-seller trading relationships, the greater the level of benefits realized.

3.4 Small size issues

Small firm practices have historically been assessed in the context of existing business models based on large firm practices. However, there is sufficient evidence that small firms’ marketing practices (e.g. Coviello, Brodie and Munro, 2000), strategy (e.g. Macrae, 1992), risk behavior (Cooper, Woo and Dunkelberg, 1988), management and relationship practices (e.g. BIE, 1995) and technology and innovation behavior (e.g. Phillips, 1997) differ significantly from that of larger firms. The literature on electronic marketplaces does not generally differentiate between size of firm, taking instead a ‘one size fits all’ approach to benefits (Fariselli et al. 1999). However, the size of the micro-enterprises and their limited stock trading has direct implications for the benefits gained from trading on the e-marketplace. Suppliers are price makers in on-line trading systems and these systems help determine quantities traded at relatively fixed prices (Lee and Clark, 1997). Micro-enterprises generally are price takers in the traditional livestock trading market and often receive limited service from livestock agents, in particular the larger stock firms, not interested in small lots. The following statements illustrate these issues.

"Because we are only a small farm we supply such a small amount of milk and small amount of cows to the market, or calves, or whatever, you pretty much are a price taker rather than a price dictator, so it’s really quite hard and Live.ex is possibly an opportunity to pre-sell animals and get into the market where prices and value for stock are better” (F9).
“We listed them [stock] with numerous livestock agents and nothing was happening ... the agent was honestly not working for us” (F10).

“Sometimes the stock agents don’t always do the best job in getting people there [to view their stock for sale]” (F11).

These statements mirror findings from the channels literature indicating cooperation and coordination is harder to achieve in relationships exhibiting asymmetric levels of dependence (e.g. Buchanan, 1986).

4 External environment

Tornatzky and Fleischer (1990) argue that much of the research on innovation activity indicates a key role for the external environment. Two key determinants of innovative activity are the competitive characteristics of the industry (including competitive intensity, supplier and channel relationships and market uncertainty) and the existence of a relevant technology support infrastructure (access to suppliers of technology related products and services). In addition to these primary elements of the external environment, Tornatzky and Fleischer (1990) consider also the role of government regulation in stimulating or retarding the application of new technology. The key issues in the external environment in this study relate to traditional channel relationships, opportunistic use of the e-marketplace by stock suppliers, and inefficiencies of traditional trading mechanisms. Significant discussion also highlights problems with, and costs of, ensuring effective internet access. Tornatzky and Fleischer (1990) consider this issue as arising from the technological context. An examination of how a firm’s existing technological base (i.e. current internet access) constrains its new technology choices is provided in section 5.1. There was an absence of discussion of government related issues.

4.1 Farmer-channel relationships

Marketing channels literature is replete with studies indicating the value of quality buyer-supplier and intermediary relationships to ongoing business and commitment (e.g. Morgan and Hunt, 1994; Thomas, 1992). The development and maintenance of close cooperative stock agent relationships may represent a particularly important competitive strategy for micro-farm enterprises. While larger farm enterprises also may reap the benefits of cooperative relationships, these relationships are likely to be of relatively greater importance to smaller firms with market, financial and cognitive limitations, and fewer strategic options (e.g. Gales and Blackburn, 1990).

Tumolo (2001) and White and Daniel (2004) caution buyers and suppliers to consider the likely implications their use of an e-marketplace will have on their current buyer-supplier relationships. Farmers often are found to have well-established relationships with their stock agents. These relationships appear to be the major barrier for non-adopters to participate in the e-marketplace. Stock agents offer additional value such as payment protection, advice on favorable times to trade, experience and expertise, knowledge of the farmer’s situation, viewing stock to assess quality before purchase, preferential access to meat processors and reliable demand that helps stabilize highly volatile prices. Stock agents commonly are seen by the farm owners to be an important part of their business. Having a trusting personal relationship with a stock agent ensures farm owners do not have to spend time with the buying and selling activities required of their business, which for dairy farmers, as opposed to sheep and cattle farmers, is not normally a significant part of their business. The value that these relationships offer exceeds the perceived value of e-marketplace participation. Choudhury, Hartzel and Konsynski (1998) and Narayandas, Caravella and Deighton (2002) found similar results in the aerospace and electronic parts industry respectively. When asked about the value his stock agent gives him in terms of trading, F1 (sheep and cattle farmer) replied…
“Basically his experience and expertise really. I think he’s become quite involved in the place, he knows what I’m trying to do throughout the year and when I’m either going to be selling stock or needing stock and that sort of thing. I think he’s a vital part of the business and I see him as very vital. I mean you leave all your animal health up to a vet, finances up to an accountant and that sort of thing. I look to him to take care of all my buying and selling of stock and yeah he always does a good job, he knows what I like and always does his best to get the best stock for the best money or to get me the best money for my stock and so on. Yeah, so he’s a vital part of the business really.”

The reality for those farmers using the e-marketplace is somewhat different, as their agent relationships often are viewed negatively. Livestock agents are considered to put pressure on farmers to continue with a transaction, at times impose difficult trading conditions, and provide limited service. Iacovou, Benbasat and Dexter (1995) and Mirchandani and Motwani (2001) found an important factor in small business e-commerce adoption is the perception of its relative advantage over other channels. Creating new business opportunities is an important perceived benefit for SMEs participating in internet commerce (Poon and Strom, 1997). Rask and Kragh (2004) similarly found that buyers use e-marketplaces to find new or alternative suppliers, and suppliers also use these marketplaces to search for new customers. Improvement of customer service is also a significant factor in small business e-commerce adoption (Scupola, 2006). The following quotes illustrate these issues.

“I think with an agent as well there’s more pressure to keep on with the deal rather than if you are feeling uncomfortable you can walk away. When you’re on a personal level between the buyer and the seller, you know either party can just walk away without the added pressure of an agent saying no we’ve got to keep working this” (F10).

“They are pretty keen to conduct everything they do from home so they don’t have to drive and visit you or look at the animals. I think it has sharpened their act up a little bit and it will sharpen it more if I did use Live.ex more often” (F9).

Increased efficiencies deriving from e-marketplace participation, including reduced search and transaction costs, are mentioned frequently in the literature (e.g. Bakos, 1997; Rask and Kragh, 2004). A key motivation for those farmers using Live.ex is the elimination, or significant reduction, of the fees associated with an agent-mediated transaction. The costs of obtaining relevant information are reduced dramatically through creation of an organized market, such as the Live.ex e-marketplace. Agent transaction fees, traditionally calculated on a per-head basis, are significant, especially for large lot sales.

“I think their commissions are high … we actually ended up having a gripe [complaint] over that because we had originally agreed to a price with the agent and his boss came along and he wanted a cheaper price” (F10).

“I think it’s best actually dealing with a customer and cutting out the middleman … if you’re in the place to make money then you don’t want middlemen taking their cut” (F6).

“That’s why you do it [use Live.ex] cause 6-7 percent commission that’s charged by the big stock firms, it’s huge, and you know it’s $60 per dairy cow and like $30-40 per 15-month bull … and I’m buying 400-500 cattle a year and that ends up a lot of money, so that’s the big reason why you would use Fencepost” (F8).

These findings support those of Turner, Epperson and Fletcher (1983). In their study of factors influencing attitudes towards electronic marketing, farmers dissatisfied with their farm produce prices are more willing to accept an alternative to their usual marketing routine.

Johnston and Lawrence (1988) point out that firms using electronic commerce often produce value-adding partnerships. Similarly, Ash and Burn (2006) found that the more active the buyer-seller trading relationships become, the greater the level of benefits realized. One farmer comments on the use of Live.ex to potentially improve their livestock breed. Transactions using a livestock agent as a middleman result generally in an anonymous sale, whereas the e-
marketplace can provide contact details allowing development of an ongoing relationship that involves feedback on product quality.

“If we sell through an agent we don’t get feedback … if you can sell to people who have a name and address and if you want to find out if they’re [beef breed’s] any good or bad then you’ve got that connection” (F6).

However, the existence of payment guarantees, available in agent mediated transactions, is a significant barrier to adoption. Adoption barriers are identified by analyzing transaction risks and resistance (Lee and Clark, 1997). Interviewed farmers that are non-adopters, and discussion forum comments, indicate that Live.ex is perceived as a more risky method of selling stock. Farm owners consider the ‘payment guarantee’ offered by reputable stock agents to be a key advantage of selling stock via their agent and a major barrier to using Live.ex. The need to use an agent with the associated commission cost (approximately 4-7% of the transaction) appears to depend on the buyer’s level of risk averseness. Similar payment protection concerns are considered a barrier to adoption of Woolnet by wool farmers (Verry, 2002). Choudhury, Hartzel and Konsynski (1998) also found analogous behavior amongst small buyers in the aerospace industry. The following quote displays the apprehension Farmer 2 (F2) has with using Live.ex for selling purposes...

“...when I’m selling stock I’m going to get paid within 10 days. If the buyer goes broke I’m still going to get paid by the agent. So I have no hesitation in paying the commission. I’ve never been in the situation where I’ve never been paid put it that way. That’s the risk you take using that [Live.ex] system and if you go with unscrupulous people.”

4.2 Opportunistic use of the e-marketplace

That firms can be opportunistic in their channel relationships is well known (e.g. Brown, Grzeskowiak and Dev, 2009; John, 1984). Opportunism is also the key construct in Williamson’s (1975) transaction cost theory; the underpinnings of which drive much of the marketing channels literature. There is evidence in this study of cases of opportunistic use. For example, some farmers are attempting to appropriate the full cost benefits of the e-marketplace for themselves.

“I found that the vendors with their cattle listed on Live.ex expected all the benefits for themselves as far as margins go. They seemed to want the same money as you could purchase through an agent, so they wanted to retain the value of the commission themselves, so rather than a win-win for both people I got the impression that people selling through Live.ex wanted to retain all the benefit themselves.” (F8)

Interestingly, in a study of farm equipment dealers and their primary supplier organization, opportunistic behavior is related positively to the need for supplier control over dealer decisions (Provan and Skinner, 1989). Evidence of the existence of opportunistic behavior in this study may well be an important antecedent of the repeatedly observed farmer desire for control over the livestock transaction (see section 3.2).

4.3 Transportation risks and costs

A final issue arising from the external environment relates to stock transportation. In electronic markets the transportation logistics from suppliers to markets and final buyers usually are significantly reduced (Lee and Clark, 1997). The traditional system for livestock trading is to transport animals often to quite distant regional sales, where they are inspected by potential buyers and sold at auction. This approach has many disadvantages including the costs of transportation and potential damage to animals (through livestock stress and meat bruising) in transit – without the guarantee of a sale. Direct transportation from buyer to seller reduces the risks of livestock damage and costs associated with the traditional system. In some cases the number of buyers for any single lot also can be relatively small. Sellers frequently feel forced to
accept the available price, as the cost of returning animals to the paddock is sufficiently high (Clarke and Jenkins, 1993). Similar observations and issues are found in the Dutch flower auction markets (Kambil and van Heck, 1998). The following remarks illustrate the inefficiencies of this sales approach. An e-marketplace which allows the buyer and seller to pre-negotiate terms and enact a guaranteed sale offers significant added value to the traditional approach.

“You wouldn’t just send them [a specialized line of heifers] off to the sale yards because they were too good to do that. I mean when you send them to the sale yards anything can happen and you might have to get them back home again” (F11).

“I took some [red Devon bulls] this time to the sale yards and tried to sell them and you know there was only one bid and it wasn’t high enough so I brought them home” (F6).

“If we can list them on something like Live.ex they [Bulls] can just stay roaming around until we get maybe $800 then they can go” (F9).

5 Technological context

Tornatzky and Fleischer (1990) consider the technological context in which a firm operates plays an important, although sometimes overlooked, role in determining adoption activity. This context represents the pool of technologies available for adoption by the organization. The Live.ex e-marketplace is the focal technology in this study. The technological context distinguishes between available technologies for adoption by the firm (Live.ex) and the firm’s current equipment (internet access) (Scupola, 2003). First, this section discusses how a firm’s existing technological base constrains its new technology choices. The section continues by providing a discussion of the characteristics of the available innovation – the Live.ex e-marketplace – and how this influences the agricultural firm’s adoption behavior. The key issues identified in the technological context in this study include farmer internet access, product quality assessment, quality of information provision, market reach, critical mass and ease of use.

5.1 Internet access

Ash and Burn (2006) argue that the success of a company’s e-business initiatives comes from the readiness of buyers and suppliers to engage in electronic interactions. Thong (1999) also found that companies are more likely to adopt new information technology and systems when they are compatible with existing company systems. A key issue here is the availability and cost of the internet technology required to support access and adoption of the e-marketplace platform. Distribution of telecommunications through the New Zealand agricultural industry is uneven and undeveloped. The key barrier to e-marketplace adoption for some farm owners is their remoteness to an efficient internet connection. Having a slow connection deters farm owners from using the internet at all. Differences in bandwidth and access inequalities are considered elsewhere as barriers to internet use by some small businesses (Levenburg, Dandridge and Hong, 2001; Scupola, 2006).

“Straight physical access [to the internet] is awkward in terms of slow dial-up ... never quite being sure when you go on-line whether you are going to get on or not ... I have to sit there for 10 minutes while it dials up and once you do get on it's slow to access everything I just won’t bother.” (F1)

“Our downloading speed is just frustrating, it’s slow.” (F3)

Farmer remoteness from telephone wires and a wireless connection carrying broadband typically requires that a satellite needs to be installed at a considerable cost (approximately NZ$2,000) to the farm owner. Riemenschneider and McKinney (2002) in a study of small
business adoption of web-based e-commerce found high costs to set up and maintain these systems was a significant factor in e-commerce adoption decisions.

5.2  Product quality assessment

The ability to observe and trial new products is argued to be a key factor in product adoption models (e.g. Rogers, 1995). E-marketplaces have long been criticized for their inability to allow the buyer to adequately assess product quality – the ‘lemons problem’ (Akerlof, 1970; Turban, 1997). Lee and Clark (1997) argue that the adoption of electronic markets is likely to increase transaction risks or uncertainties. This risk may be amplified in the study context as standardization of agricultural product is inhibited by the natural environment. Hsiao (2007) also notes that the specification of many agricultural products contains tacit knowledge and may not be articulated clearly in specific terms. The existence of significant variances in product quality, limited standardization and tacit product knowledge are factors that Hsiao (2007) argues are unfavorable for e-marketplace success. Choudhury, Hartzel and Konsynski (1998) similarly argue that a high complexity of product description may make it difficult to implement an electronic market.

Using the Live.ex e-marketplace, in some cases, does not enable the buyer to make an informed selection decision. Farmers may want to view the animals to assess their health and general condition before purchase. Without physically inspecting the products, they face the risk of incomplete and distorted information. There are mixed findings regarding whether livestock sold over Live.ex would meet farm owners’ expectations of quality and that information provided could be trusted. While some cases contained favorable trades, others were unfavorable. Some farm owners indicate that their stock agent could fulfill this function effectively. Their agent would view livestock before purchase and their opinion on the quality of the cattle could be trusted. However, some farmers view at least some of their stock as commodities for which a standard description was sufficient to facilitate a transaction.

“If you were trading something like bulls, which are pretty much a commodity, you can do that by description, by weight and description of breed and so on. And also same with dairy cows, you can just deal over the phone with the vendor or he can deal with me as the seller quite effectively ... because you’ve got breeding values, and production figures, etc” (F8).

Nonetheless, the following statements indicate the majority opinion of the farmers surveyed and the importance of prior inspection before purchase. Interestingly, all transactions that have taken place as a result of a listing on Live.ex by the farmers interviewed have involved inspection of the livestock before purchase.

“I think that anybody who is purchasing a herd would certainly want to go and look at it and would want to make sure that you are happy with the way the animals looked before you went any further” (F11).

“I prefer to see them [cattle] or go through a dealer ... there’s nothing quite like someone going and looking at them” (F2).

These findings align with those of Kambil and van Heck (1998). They found a major reason for buyer non-adoption and subsequent failure of the Flower Auction Holland (BVH) Vidifleur initiative, which involved remote video auctioning, related to issues with product quality and informational deficiencies. Clarke and Jenkins (1993), in their case study of an on-line national livestock trading system, provide a similar conclusion. Significantly, while the early literature on the informational capabilities of IT indicates technology applications enable the provision of more relevant information to decision makers (e.g. Bakos, 1991), this study, in collaboration with the findings of Clarke and Jenkins (1993) and Kambil and van Heck (1998), illustrate that IT can actually reduce the relevant information to decision makers.
5.3 Quality of information provision

While Stockdale and Standing (2004) amongst others indicate that an advantage of e-marketplaces is their ability to provide users with updated information, discussion in the previous section indicates an e-marketplace can restrict significantly the flow of critical information required for decision making. Live.ex is considered to further undermine the provision of critical transaction information by not having an adequate system of updating listings. Farmers who have paid to gain access to these listings are wasting a lot of time (and money) contacting other farmers only to find that the livestock has already been bought or sold. This seriously affects some participant’s evaluation of the e-marketplace. For example, F5 indicates…

“It [Live.ex] came up with a number of lines of stock that matched what you put in and every one that I rang up had either been sold or a couple of them said they’d get back and never did.”

The fact that agents are listing livestock through Live.ex is another significant issue. Users felt ‘disgruntled’ with agents using Live.ex because it is often seen as defeating the purpose of the e-marketplace – to facilitate exchanges between private buyers and sellers. Further, farmers are paying for listings that, in many cases, also have been given to them at no cost by agents. This situation is typified by the following comment by F5…

“Agents started to use it a lot and rather than dealing one-to-one with a farmer which I think was the idea of it, you were ending up getting agents anyway…What I found was that when I did print out all the stuff off Live.ex a lot of it had already been given to me by agents, people were doubling up putting it on Live.ex plus giving it to agents, yeah it wasn’t exclusive to Live.ex.”

An inadequate system for routinely updating listings and duplication through agent participation increases transaction costs, decreases system efficiency and impacts negatively on the relative advantage of the e-marketplace over competing channels. The efficiency motive for reducing transaction costs, and relative advantage, are key motivations for using electronic markets (Grewal, Comer and Mehta, 2001; Iacovou, Benbasat and Dexter, 1995; Mirchandani and Motwani, 2001).

There also was comment on the quality of the e-marketplace search engine. The Live.ex e-marketplace utilizes a proprietary algorithm to match potential buyers and suppliers based on a number of transaction related criteria. While this mechanism should in theory provide search efficiencies, there appears to be issues with the precision of the system. The first remark below alludes to this issue, and along with the following two statements attests to the likely value that may be obtained from a more flexible and open site model. At its inception, farmers were only able to view listings if they were on the system, and then there were limits to implementing a wider search beyond the listings provided by the system.

“We’ve actually listed three times … this year we had some success with it, in a roundabout twisted way. We listed Friesians and we sold Jerseys cause it [Live.ex] connected with someone wanting Jerseys” (F10).

“It [Live.ex] doesn’t give you flexibility … if you had other options [of what you wanted to buy or sell] … you could sort of say we’ve got 100 animals for sale here’s some people that want some of this lot and some other people who might want a small group of another lot, you can turn around and start ringing these people up … but unfortunately with the Live.ex system it doesn’t give you these other groups, it only gives you … listings against your more specific listing” (F10).

“I would actually be happy to see it as an open site and I can’t see any disadvantages of that. You’d certainly get a better overview of the market rather than just listings with a specific class of animal you wanted … the market changes day by day and week by week and it would be a real good way to stay in touch with what’s happening” (F8).
Bakos (1991) identifies a key potential benefit of e-marketplaces is reduced costs in search activities. However, the e-marketplace technology again reveals limitations directly impacting on participants’ ability to achieve enhanced efficiency and effectiveness. Similar issues have been mentioned elsewhere. In Kanter’s (2001) study of global digital trends, one of the most frequently identified barriers to adoption of e-business internet technologies is that the technology and tools are inadequate, unavailable or unreliable. Issues with the functionality of an e-marketplace also negatively affect the trust of participants in the technology, and its subsequent success (Gengatharen and Standing, 2005).

Markets also depend heavily on pre-trading and post-trading information services, particularly where some participants are physically remote (Clarke and Jenkins, 1993). Choudhury, Hartzel and Konsynski (1998) found that e-marketplaces can contribute to the enhancement of trust by offering verification services and screening of potential trading partners. Appropriate feedback mechanisms built into an e-marketplace, which allow participants to publicize their trading experiences, also can improve levels of trust between buyers and sellers (Ba and Pavlou, 2002). In addition, evidence from experimental work indicates greater levels of cooperation occur when reputations are shared (Rapoport, Diekmann and Franzen, 1995). The provision of trading histories is common in some form or another on many e-marketplaces. Also, some online markets provide blacklists (although weaknesses of this approach, such as wrongful accusations, and ease of assuming a new identity, are apparent) or have automatically barred participants from trading when a sufficiently high number of negative trading feedback reports are received (e.g. eBay). Neither a positive or negative reputation system is utilized on Live.ex. There was support in the study for the introduction of trading histories on Live.ex.

“Live.ex should be more open and have some tools such as trading histories ...” (F7).

“If there’s positive selling between farmers and positive feedback put through you should be able to see that you can comfortably deal with whoever you’re dealing with knowing they’ve had good trades in the past” (F10).

5.4 Market reach

There is a strong regional bias in traditional livestock trading. The Live.ex e-marketplace enables buyers and sellers to operate beyond their local region by eliminating the geographical constraints of traditional trading. Electronic markets reduce the cost of searching for new suppliers (Bakos, 1998). This can broaden the range of choices for buyers and sellers, lead to more efficient search strategies and an increased chance of finding preferable trading parties (Lee and Clark, 1997; Rask and Kragh, 2004). The regional and inter-island prices of similar stock also will frequently vary by significantly large amounts that the costs of transporting them long distances are relatively small. Improved market reach through the Live.ex e-marketplace is often provided as a key motivation for its trial and use.

“Live.ex was used really just to try and get another avenue of getting an advertisement out there to a wider viewing, getting more chances of a hit really” (F6).

“I thought it was reasonable to look into that [Live.ex] as an additional means of marketing it [dairy herd]” (F11).

“When we wanted to sell the animals or arrange a contact to sell them the market started to fade a little bit and the stock agent never came up with any buyers so that’s why we used Live.ex as well” (F11).

“The main drivers [of using Live.ex] are, going to test the market, seeing what’s out there, if they can match you up” (F4).

These findings provide observed support for the general consensus that a key benefit of e-marketplace participation is access to a wider range of markets for both suppliers and buyers (Fariselli et al. 1999; Porter, 2001; Tumolo, 2001).
5.5 Critical mass

With market reach as a key motivating factor for using the e-marketplace, achieving critical mass becomes very important. Critical mass refers to the observation that the e-marketplace model only generates benefits when the number of participants exceeds a critical threshold. The importance of achieving critical mass is repeatedly mentioned as a key factor in the success of an e-marketplace (e.g., Clemons and Weber, 1991; Gengatharen and Standing, 2005; Stockdale and Standing, 2002). Stockdale and Standing (2002, p.232) underline that “Critical mass is not only essential to the survival of the e-marketplace, but also provides the attraction of a large base of suppliers to a prospective buyer.” An e-marketplace requires liquidity to function effectively and attract more participants. If the e-marketplace fails to provide a critical mass large enough to induce traders to switch to the new market form, traders will not join the system (Clemons and Weber, 1991).

The transaction fees charged for e-marketplace participation have a key role in the development of critical mass. E-marketplace transaction fees usually apply to sellers. Early participants on Live.ex disliked the fact that buyers had to pay in order to gain access to seller listings. A number of discussion forum postings suggested that Live.ex operate in a similar way to classified newspaper listings where buyers can view the seller’s listings for free. Having the buyer listing fee discourages buyers from using the e-marketplace, leading to sellers having a smaller market to which their livestock could be sold. This is a major issue as eventually it is likely that sellers will become less inclined to use Live.ex and overall participation would decline. This situation demonstrates how the e-marketplace structure (in this case the transaction mechanism and income model) can have an impact on participants’ evaluation and adoption of the e-marketplace. The Live.ex manager acknowledged at the time of this issue (July 2002) there was a buyer-to-seller ratio of 1-to-5 leading to a removal of the buyer’s fee for Fonterra suppliers.

Both F4 and F5 indicate that they probably would not use Live.ex again until they have more site-specific knowledge, knowing that there are more users actively participating and how trades are arranged via the e-marketplace. These findings align with those of Gengatharen and Standing (2005) and Wymer and Regan (2005) that critical mass is a significant issue in e-marketplace adoption decision making. Also, these farm owners indicate that they might decide to use Live.ex again if they hear positive stories about it from other farmers. Similarly, Wymer and Regan (2005) found knowledge of successful use of e-marketplaces to be an important factor in the adoption of e-commerce. This illustrates the importance of positive word-of-mouth on e-marketplace trial and adoption. The following comments indicate there are clear concerns about the size of the e-marketplace.

“I spoke to a few people and they said it’s a waste of bloody time and that influenced me a bit so it reinforced what I was thinking. I wouldn’t go back unless my awareness changed and I started hearing that it was a good site, with good stock on it, good prices…that would be the main one if there was a lot of people using it and I was aware of that and it was working successfully I would jump back into it, yeah. That would be enough for me to have another go at it” (F5).

“With limited purchasers coming on Live.ex sellers were at a disadvantage having a marginalized potential market on Live.ex” (F7).

“It just needs to get bigger that’s all it is, as far as Live.ex goes” (F10).

5.6 Ease of use

Perceived ease of use is a critical factor in technology adoption influencing IT systems usage (Davis, 1989), SME e-commerce adoption (Grandon and Pearson, 2004), the success or failure of e-marketplaces (Gengatharen and Standing, 2005) and satisfaction with self-service
technologies in general (Meuter et al. 2000). The ability to trial the system also is an important factor influencing willingness to adopt electronic commerce (Kendall et al. 2001). Farmers in many cases indicate to improve ease of use they want a greater degree of control when making the listings on the e-marketplace.

“You go on the webpage and press contact, but you sent them an email and they sent back a phone number and then you ring them ... you should be able to just go onto the site and login what you wanted and log-off and not have to go through a phone connection to someone” (F6).

“They need to pass the control of it [Live.ex] over to the farmers, and I think that’s what scares a lot of farmers, they can’t be bothered ringing up and they don’t know enough about it and they can’t actually physically see the thing there on the screen before they put their animals on. I mean you’re not allowed to get on Live.ex until you’ve got a listing on there” (F10).

“The site needs to be more user friendly ... so that you have the ability to put your own information there and the ability to put a picture ... of the animals, because I’m sure that helps” (F6).

“The livestock thing [Live.ex] seemed fairly secure because it was so controlled, and in fact it’s too controlled in our opinion because there’s really very little we can do online to facilitate the sale of the animals” (F10).

Although there may be efficiencies in this approach, Lee and Clark (1997) caution that if market-making firms are not equipped to protect buyers from misinformation, buyers will resist the e-marketplace system. Goodwin (1987) points out also that flexibility can actually impair ease of use, particularly for novice users. There is, however, a minority opposing opinion that there is value in maintaining the option to list on Live.ex via a phone or facsimile communication. Issues revolve around internet reliability, farmers’ technological skills and concerns as to what may eventuate if you are required and/or able to enter your own sale or purchase information.

“It was just a matter of phoning them up ... and that’s fine probably to keep the site tidy ... if everyone entered their own details I’d say it would turn into a shambles” (F8).

6 Conclusions

An electronic marketplace acts on the same economic principles as any other marketplace; added value needs to be created for consumers over competitive offerings to ensure business success. Although these findings are preliminary, case studies of this nature are required in order to improve our understanding of e-marketplace adoption and to develop theory in this area. This study employs the Tornatzky and Fleischer (1990) adoption model to investigate the key issues in the organizational, external environment and technological contexts influencing adoption of the Live.ex livestock trading e-marketplace.

Table 2 provides a summary of the barriers and motivations for e-marketplace participation. These are distinguished for non-adopters and adopters (farmers with at least one successful transaction on the e-marketplace) in this study. In line with previous e-commerce studies (Mirchandani and Motwani, 2001; Riemenschneider and McKinney, 2002; Wymer and Regan, 2005), adopters consider a greater number of factors as motivators, while non-adopters view more factors as barriers. There is both heterogeneity and homogeneity in the barriers and motivations across both groups. In some cases a common factor is seen as a motivation for e-marketplace participation by adopters, yet a barrier for non-adopters. This is most apparent in their relationships with stock agents, and typically in their perceptions of ease of use. There is also evidence of some homogeneity across the groups. Issues relating to limited computer skills, problems with ease of use and limited participation of suppliers and buyers on the e-marketplace are common barriers to further participation. Avoidance of agent commissions, and perceptions of improved market reach, are common motivations for both trial and adoption.
The key barriers discouraging participation are the significant added-value that agent relationships often have over the e-marketplace offer; the risks of e-marketplace use from a supplier and buyer perspective; and infrastructure problems including financial barriers to efficient internet access and a low level of user proficiency with internet technology. The perceived ‘payment protection’ available to farmers through their stock agents is a major barrier to Live.ex participation. Fencepost.com has investigated offering a payment guarantee to Live.ex suppliers; however, the costs of such protection (2-3% of the transaction) are considered prohibitive in terms of reducing margins over other trading mechanisms. Fonterra (the market maker) has significant market power in the dairy industry. Could this position and influence somehow be utilized to guarantee payment compliance by dairy farmers without the need for formal contractual protection? To reduce user risk, mechanisms to allow for the dissemination of user feedback and the establishment of user transaction ratings could be created, as is the case on eBay. The study participants emphasize the value of having trading histories on the e-marketplace. Such histories allow potential participants to better manage the risks of online trading, and are a relatively cost-effective mechanism when there are no other third-party enforcement mechanisms. Kollock (1999) provides an excellent review of feedback mechanisms and reputation systems for online markets.

Findings suggest that a number of listings are not being up-dated and this can negatively impact the farmer’s evaluation. Fonterra may need to become more active in the trades that they facilitate via the site. Then they can monitor the listings where transactions have been completed and eliminate them. It is important also that agricultural market-makers realize the remoteness and skill level of potential users. A number of users may be incapable of using the new internet technologies that facilitate electronic trading. This is a key issue for micro-enterprises that will not have technical support staff. E-marketplaces having a significant SME presence need especially to be easy to use and navigate for participants. Fonterra and Telecom (a New Zealand telecommunications provider) also are addressing internet access costs for remote users and considerable joint investment has been made in remote telecommunications infrastructure development.

The key motivators for using the e-marketplace are avoidance of the agent middleman and consequent transaction fees, a reduced dependence on traditional trading systems, and increased market reach and control over the transaction. The agent middleman often is seen as not working hard to ensure a suitable livestock transaction for the small farmer. This inefficient level of service also is compounded by a significant transaction fee charged on a per-head basis. Avoidance of the agent commission fees for facilitating a transaction was a key motivation for Live.ex trial. Developing a closer personal relationship between vendors and buyers as the result of Live.ex facilitated contact also has potential advantages. The agent generally acts independently to secure a transaction match and provides no or only limited feedback on the transaction. A direct buyer-seller relationship is considered to offer important feedback channels that can influence ongoing product development. An e-marketplace also has a distinct value proposition over the alternative of transporting stock to often distant sale yards without the guarantee of a sale. Improved market reach, regionally and nationally, is another benefit of the e-marketplace. Traditional livestock trading generally is conducted at a regional level. However, significant variations in livestock prices occur across regions. The e-marketplace theoretically allows access to a wider geographical area where stock price differentials can greatly exceed transportation costs.

The market maker (Fonterra) has begun to address the aforementioned challenges and must continue these efforts in order to maintain the viability of their e-marketplace. In many cases significant improvements have been made to the site since its inception (e.g. reduced transaction
costs; easier access, navigation and search; and increased information provision). Improved communications and education are key challenges. A good marketing or awareness-building plan is a critical factor in the successful implementation of e-marketplaces for SMEs (Gengatharen and Standing, 2005). Significantly, Live.ex users are found to be not realizing the full potential of the site through inefficient use (McPherson, 2005). There is also evidence of a lack of marketing effort to increase awareness of the Live.ex e-marketplace.

“There’s not a huge drive for Live.ex to get out there and encourage farmers to use it ... it’s a little tiny link on your Fencepost page and that’s about it” (F10).

The benefits of a continued agent presence on the Live.ex site also need to be communicated. In some cases, these agents have considerable buying portfolios which significantly increase the market size and supplier selling opportunities. Favorable economic and market conditions for primary produce at the time of the study also was believed to act against greater Live.ex participation (McPherson, 2005). Healthy margins are considered to reduce the motivation for farmers to search for new and more efficient channels. Additionally, the micro-enterprises in this study generally agree that the benefits they gained from the e-marketplace are significantly lower than expected. This conclusion aligns with the observations of Yu (2006).

The findings of this study highlight many similarities with previous study of SME e-commerce adoption. There are, however, some key differences in the identified barriers and motivations. The role of government and governmental support for IT infrastructure is not mentioned. The farmers are the key decision makers and their level of awareness and technical skills are critical issues in their effective use of the e-marketplace. Whereas larger small businesses may have technical support personnel; this was not the case in this study of very small firms. Personal relationships are important. The quality or otherwise of the relationship with their stock agent was a key factor influencing participation. The micro-enterprise as a price-taker in the off-line market, and often being heavily dependent on the agent middleman, are issues that are prominent in many small firms.

A number of future research opportunities arise from this study. While the case study approach offers advantages in terms of the depth and richness of the data, future work could take a quantitative approach to investigate the generalizability of these findings to other contexts and populations. Examining the effects of different membership and transaction fee mechanisms on SME e-marketplace participation would be a worthy topic of investigation. How to cost effectively facilitate the development of online trust among participating SMEs and provide adequate product quality assessment are also key issues that demand attention in further study.

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References


Endnotes

1. Transaction Delivery Networks are a class of B2B internet service providers who provide guaranteed delivery of secure binding transactions over the internet.
2. Rask and Kragh (2004) is a notable exception although their focus was solely on motivations for e-marketplace participation.
3. After a recent extensive internal review of the Livestock trading system on Fonterra’s Fencepost website, Live.ex has now become part of RD1 Livestock (www.rdl.com) and Prime.ex has now been discontinued. RD1 is a wholly owned subsidiary of Fonterra and is New Zealand’s largest retailer of agricultural services to dairy farmers.
4. Fonterra is a dairy farming cooperative and New Zealand’s largest organization and exporter. Fonterra is one of the top six dairy companies in the world by turnover, accounts for over a third of international dairy trade, and has over 13,000 dairy farmer shareholders producing more than 95% of New Zealand’s milk production. Over three-quarters of Fonterra’s farms are registered to use the Fencepost site.
5. The market information on Live.ex includes whether the listing is for a sale or purchase, the volume of cattle being sold or required, age of cattle, cattle type and breed, price, and delivery and expiry dates.
6. Interestingly this ‘payment protection’ rested solely on the power and influence of the stock agent to effect payment from the buyer. The guarantee was not supported by a formal legal contract.
8. Liveexmanager - 02:21pm Jul 24, 2002
9. About 75% of Fonterra suppliers can access broadband (McPherson, 2005). Few wool traders had adequate access to the internet, which was one of the contributing factors to the failure of Woolnet (Verry, 2002).
Figure 1 The Tornatzky and Fleischer (1990) model of technological innovation
### Table 1 Case study characteristics

<table>
<thead>
<tr>
<th>Case ID</th>
<th>Respondent profile</th>
<th>Farming experience</th>
<th>Respondent education</th>
<th>Farm type and size</th>
<th>Farmer adoption stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>Male, European, 32 years</td>
<td>6 years</td>
<td>Tertiary degree</td>
<td>Sheep and beef farm, 500 hectares, herd size = 1390, 2 employees</td>
<td>Awareness of e-marketplace, not listed</td>
</tr>
<tr>
<td>F2</td>
<td>Male, European, 47 years</td>
<td>25 years</td>
<td>Agricultural tertiary degree</td>
<td>Dairy farm, 80 hectares, herd size = 240, 1 employee</td>
<td>Awareness of e-marketplace, not listed</td>
</tr>
<tr>
<td>F3</td>
<td>Male, European, 56 years</td>
<td>36 years</td>
<td>Completed secondary school, Diploma</td>
<td>Dairy farm, 180 hectares, herd size = 400, 2 employees</td>
<td>Awareness of e-marketplace, attempted use</td>
</tr>
<tr>
<td>F4</td>
<td>Male, European, 40 years</td>
<td>18 years</td>
<td>Agricultural tertiary degree</td>
<td>Dairy farm, 200 hectares, herd size = 500, 2 employees</td>
<td>Listed on e-marketplace, no transactions</td>
</tr>
<tr>
<td>F5</td>
<td>Male, European, 41 years</td>
<td>18 years</td>
<td>Tertiary education</td>
<td>Dairy farm, 350 hectares, herd size = 800, 4 employees</td>
<td>Listed on e-marketplace, no transactions</td>
</tr>
<tr>
<td>F6</td>
<td>Female, European, 40 years</td>
<td>23 years</td>
<td>Tertiary degree</td>
<td>Mixed dairy (Friesian and Jersey) and Red Devon bulls, 50 hectares, herd size = 156, 1 employee</td>
<td>Listed on e-marketplace, no transactions</td>
</tr>
<tr>
<td>F7</td>
<td>Male, European, 51 years</td>
<td>33 years</td>
<td>Completed secondary school, some tertiary papers</td>
<td>Dairy support farm (breeding services, etc), 340 hectares, herd size=375, 2 employees</td>
<td>Successful transaction as a result of listing on e-marketplace</td>
</tr>
<tr>
<td>F8</td>
<td>Male, European, 50 years</td>
<td>35 years</td>
<td>Diploma in Agriculture</td>
<td>Dairy and Bulls, 500 hectares, herd size = 250, 1 employee</td>
<td>Successful transaction on e-marketplace</td>
</tr>
<tr>
<td>F9</td>
<td>Male, European, 54 years</td>
<td>30 years</td>
<td>Diploma in Administration (partial completion)</td>
<td>Dairy farm, 65 hectares, herd size= 180, 0 employees</td>
<td>Successful transaction on e-marketplace</td>
</tr>
<tr>
<td>F10</td>
<td>Male and Female Couple, European, 35 years</td>
<td>20 years</td>
<td>Trade certificate</td>
<td>Mixed dairy (Friesian and Jersey), 250 hectares, herd size = 300, 0 employees</td>
<td>Successful transaction on e-marketplace</td>
</tr>
<tr>
<td>F11</td>
<td>Male, European, 67 years</td>
<td>50 years</td>
<td>Diploma in Agriculture</td>
<td>Dairy (Friesian), 240 hectares, herd size = 350, 2 employees</td>
<td>Successful transactions on e-marketplace</td>
</tr>
</tbody>
</table>
Table 2 Summary of barriers and motivations influencing non-adopters and adopters of the e-marketplace

<table>
<thead>
<tr>
<th>Non-Adopters</th>
<th>Barriers</th>
<th>Motivations</th>
<th>Organizational Context</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organizational Context</strong></td>
<td>Trading stock is not a core business activity (F3,F4)</td>
<td>Exploration of new channels (F1,F4,F5,F6)</td>
<td>Positive experience on other e-marketplaces (F1)</td>
</tr>
<tr>
<td></td>
<td>Limited computer skills (F3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Limited trust in anonymous participants in e-marketplace (F2,F4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>External Environment Context</strong></td>
<td>Good working relationship with stock agent and/or meat processors (F1,F2,F5)</td>
<td>Need for positive word-of-mouth on successful transactions (F1,F4,F5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Personal relationships with other stock trading farmers (F3)</td>
<td>Limited transaction feedback from agent (F6)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Agent payment protection (F2,F4,F5)</td>
<td>Avoidance of agent commissions (F4,F5,F6)</td>
<td></td>
</tr>
<tr>
<td><strong>Technological Context</strong></td>
<td>Problems with ease of use (F3,F6)</td>
<td>Perception of increased market reach (F4,F6)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Internet access issues (F1,F2,F3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Limited knowledge of e-marketplace (F1,F4)</td>
<td></td>
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<tr>
<td></td>
<td>Non-exclusivity of listings (F5)</td>
<td></td>
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<tr>
<td></td>
<td>Listings not updated sufficiently (F5)</td>
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<tr>
<td></td>
<td>Lack of control over e-marketplace transaction process (F2)</td>
<td></td>
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<tr>
<td></td>
<td>Inability to physically assess stock quality (F2)</td>
<td></td>
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<tr>
<td></td>
<td>Limited participation of suppliers and buyers (F4,F5,F6)</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Initial expectations of e-marketplace not met (F5,F6)</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Adopters</th>
<th>Barriers</th>
<th>Motivations</th>
<th>Organizational Context</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organizational Context</strong></td>
<td>Limited computer skills (F9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Limited trust in anonymous participants in e-marketplace (F8,F9,F10)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>External Environment Context</strong></td>
<td>Good working relationship with stock agent (F8)</td>
<td>Unsatisfactory stock agent relationship (F9,F10,F11)</td>
<td></td>
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<tr>
<td></td>
<td>Opportunistic use of e-marketplace by suppliers (F8)</td>
<td>Reduced transportation costs and risks (F9,F11)</td>
<td></td>
</tr>
<tr>
<td><strong>Technological Context</strong></td>
<td>Problems with ease of use (F10)</td>
<td>Avoidance of agent commissions (F8,F10,F11)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Limited flexibility of system (F8,F9,F10)</td>
<td>Unfavorable market conditions (F7,F9,F11)</td>
<td></td>
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<tr>
<td></td>
<td>No provision of trading histories (F7,F10)</td>
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<td></td>
<td>Limited participation of suppliers and buyers (F7,F10)</td>
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<td>Need for greater agent transparency on system (F10)</td>
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<td>Direct control over transaction process (F9,F10)</td>
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<td></td>
<td></td>
<td>Absence of e-marketplace supplier transaction fee (F8,F10,F11)</td>
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</tbody>
</table>