



# Factors Influencing B2C E-Commerce Adoption: A Study of On-line Share Trading Technology Adoption Among Stock Brokerage Firms

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## ABSTRACT

This study examines seven small share brokerage firms at various stages in their adoption of on-line share trading technology, to determine the factors influencing the adoption decision. The case evidence suggests four key variables influencing the adoption, namely, business strategy, perceived benefits, organisational readiness, and external pressure from competitors and clients. The case evidence further suggests that business strategy moderates the impact of the other variables on the adoption decision.

## INTRODUCTION

Firms adopt e-commerce technology for many reasons. These include simplifying and streamlining business processes, enabling and facilitating electronic markets, enhancing company image, improving information exchange with customers, providing faster responses to customers, providing access to new customers, and creating new business opportunities (Applegate et al., 1996; Bowden et al., 2001). As firms look to e-commerce and ways in which e-commerce can support competitive positioning in the marketplace, it is important to understand the factors that enable successful adoption. This research therefore seeks to identify significant factors that influence e-commerce adoption to yield a typology that can enable firms to better assess their position vis-à-vis e-commerce readiness.

## LITERATURE REVIEW

Preece (1989) described adoption as the pre-introduction stage of technology involving initiation, progression, investment decision, planning, and system design. Iacovou et al. (1995) defined EDI adoption as "the process during which a firm becomes capable of transacting via EDI". In this study, e-commerce adoption involves the stages of decision-making, planning and system design, by which a firm becomes e-commerce capable.

Firms consider several factors in determining whether to adopt (or not adopt) a technology. These include perceived advantages, technology compatibility and complexity, external pressure, strategic alliance and perceived ability of achieving strategies, being pro-active towards technology, organizational support, and internal and external IS support (Bowersox & Daugherty, 1995; Duxbury & Corbett 1996; Kathuria et al., 1999; King & Teo, 1996; Lederer et al., 1997; Rai & Bajwa, 1997; Raymond & Bergeron, 1996; Salehi, 1997). Small firm adoption studies have specifically identified *perceived benefits, organisational readiness* (including financial readiness, technological readiness and IT knowledge of non-IS professionals) and *external pressure* as variables influencing the adoption (Iacovou et al., 1995; Mehrtens et al (2001). On the other hand, employees' lack of confidence in computer use, incompatibilities with other systems, lack of infrastructure to support the IT innovation, lack of IT drivers, and lack of economies of scale inhibit or slow adoption (Duxbury & Corbett 1996; King & Teo, 1996).

## METHODOLOGY

This research aimed to identify factors that influence a firm's decision to adopt (or not adopt) e-commerce technology – the focus

of this study is on business-to-consumer (B2C) e-commerce. As a relatively new technology in New Zealand, on-line share trading provided a contemporary context in which to examine B2C e-commerce adoption as it evolves.

Case evidence was collected from seven New Zealand brokerage firms (See Table 1). The sample focused on firms that had adopted or were considering adopting order-executing-only on-line share trading technology (OEOOLST). Firms that had decided not to adopt the technology in the short-medium term (ie. non-adopters) were included to provide insight into factors inhibiting technology adoption. The data was gathered using semi-structured interviews with top management who were directly involved in the adoption decision. Top management rather than IT management were interviewed, since the focus was on organizational (decision-making) rather than technical issues. Where possible, internal documents, website information, and other publicly available documents were also reviewed.

Table 1: Profile of cases

Case	A1	A2	A3	U1	U2	N1	N2
Type of firm	Discount <sup>i</sup>	Full service	Discount	Full service	Full service	Full service <sup>ii</sup>	Full service
Market focus	Retail	Institutional & retail	Retail	Retail	Retail	Retail	Institutional <sup>iii</sup>
NZSE Member	No	Yes	Yes	Yes	Yes	Yes	Yes
Number of Staff	< 20	40 – 60	20 – 40	20 – 40	> 80	> 80	< 20
Assets (NZ\$)	< \$200000	\$5–7m	\$10–20 m	> \$2m	\$400–600000	\$5–7m	\$5–7m
Type of adopter	Enthusiastic	Ready	Ready	Unmotivated	Unmotivated	Non-adopter	Non-adopter
Adoption stage	Adopted	Adopted	Adopted	Evaluation	Trial	Evaluation	Evaluation

**Types of Adopters.** The sample yielded four types of adopters: enthusiastic adopters, ready adopters, unmotivated adopters and non-adopters (Iacovou et al, 1995):

- *Enthusiastic adopter* (A1). This firm believed the technology supported firm business strategy - management had a clear vision for future use and expected to gain benefits from OEOOLST. The firm had the financial and technological resources and the support of management and staff for adoption, but did not face significant external pressures to adopt. Hence, the main drivers to adopt were internal. Enthusiastic adopters are normally proactive rather than reactive to market changes (Iacovou et al, 1995), and the adoption process is expected to be rapid.
- *Ready adopters* (A2, A3) faced external pressure to adopt. These firms had sufficient IT knowledge, internal and external support, and financial resources to develop OEOOLST. They recognized the potential benefits of OEOOLST and believed it provides strong sup-

port for firm business strategy. The adoption process is expected to be rapid.

- *Unmotivated adopters* (U1, U2) faced some external pressure to adopt OEOOLST, but believed the technology provided only partial support for firm business strategy. These firms recognized benefits as well as disadvantages. While these firms had the financial and technological resources and top management support to adopt the technology, they were not motivated to do so. The adoption process is likely to be gradual.
- *Non-adopters* (N1, N2). These firms did not recognize any benefits of adoption or support for business strategy from OEOOLST, nor did they face external pressure to adopt. Although such firms may have the financial and technological resources, adoption is not likely in the short-medium term.

## FINDINGS AND DISCUSSION

The case study evidence was used to identify significant factors influencing the adoption. Analysis of the findings suggests four key variables impacting the adoption decision, namely, business strategy, perceived benefits, organizational readiness and external pressure.

**Business Strategy.** The findings showed adopters (A1, A2, A3) believed OEOOLST provided strong support for firm business strategy – A1 and A2 in particular believed an on-line presence enabled them to compete more effectively in the retail market. However, unmotivated adopters (U1, U2) believed OEOOLST provided only partial support for firm business strategy. Both firms focused on building client relationships and believed personalised service and quality provided competitive advantage. They believed OEOOLST was inappropriate for addressing customer needs, and believed a technology that supported a wider range of financial services would better align with business strategy.

Non-adopters (N1, N2) believed their business strategy was not aligned with an e-commerce strategy that emphasised OEOOLST. Like U1 and U2, they believed OEOOLST did not support the focus on customer relationships and service quality. They also did not believe their clients were interested in doing their own transactions - firm N2 believed their institutional clients preferred a service that provides good financial information and transacts large orders quickly and at a reasonable price, while N1 believed their wealthier clientele preferred the *personal touch*. Hence firms that believe the technology is aligned with business strategy are more likely to adopt; however, if the technology falls short of meeting business needs, then uptake is inhibited. These findings are consistent with prior research that emphasises the importance of aligning business strategy and IT strategy (Kathuria et al., 1999; King & Teo, 1996; Lederer et al., 1997). For example, Raghunathan and Madey (1999) argue that without a corporate E-commerce strategy for guidance, the firm is likely to adopt non-integrated information systems with conflicting goals.

**Perceived Benefits.** Perceived benefits describe an awareness of direct and indirect benefits (Iacovou et al., 1995) that e-commerce can provide. The case findings suggest a positive relationship between perceived benefits and E-commerce adoption. Adopters (A1, A2, A3) expected to realise benefits such as financial profitability and market reach from adopting OEOOLST. Unmotivated adopters (U1, U2) recognized both benefits and drawbacks of adopting the technology, while non-adopters believed the drawbacks outweighed the benefits.

Financial impact was a key concern in adopting the technology. Non-adopters (N1, N2) and unmotivated adopters (U1, U2) both identified weak profitability as an adoption inhibitor. All of the firms believed OEOOLST attracts the small retail client, and for those targeting this market segment, (A1, A2, A3, U1, U2) OEOOLST was beneficial - not so for firms not targeting the small retail client (ie. N1, N2).

Determining an appropriate charging system for on-line investors accessing the firms research that also safeguards firm research from users who then trade elsewhere, was a key inhibitor of technology adoption for full-service firms (N1, U1, U2), who believe their

research enables competitive advantage – firm A1 had resolved this dilemma. Although U1 and U2 were IT sophisticated and had access to external resources to assist the uptake of OEOOLST, they lacked the resources to address the challenges of a more complex B2C environment. Clearly for adoption to be successful, firms must have access to sufficient internal and external resources to address the factors inhibiting successful uptake.

**Organizational Readiness.** Adopters (A1, A2, A3) and unmotivated adopters (U1, U2) possessed the necessary financial and technological resources, as well as management support to adopt the technology. Although non-adopter firm N1 possessed the financial and technological resources necessary for adoption, top management did not support the adoption.

**Financial readiness.** The results showed all firms were financially self-capable of adopting e-commerce, but not all had decided to adopt the technology. These findings therefore did not provide support for the role of financial readiness in determining technology adoption. This outcome is reasonable in the context of OEOOLST adoption, since the technology was not considered expensive. This finding is consistent also with prior research on Internet adoption that did not find strong support for including financial readiness (Mehrtens et al., 2001). However, it is reasonable to expect that where significant investments are required, only those firms with access to sufficient financial resources would consider adoption (Iacovou et al., 1995; Thong & Yap, 1995).

**Management/Staff readiness.** The findings showed that adopters (A1, A2, A3, U1, U2) had top management support for adopting OEOOLST, while non-adopters (N1, N2) did not have the support of top management. This is consistent with prior research that found that top management support could lead to adoption or early adoption of the innovation (eg. King & Teo, 1996; Rai & Bajwa, 1997). These findings are consistent with the case evidence regarding strategic alignment, where the adopting firms believed OEOOLST believed the technology supported firm business strategy.

Although the interviewees discussed the readiness of non-management staff for e-commerce, the case evidence did not provide strong support for the role of staff support in the adoption decision. Of the five adopting cases only two (A1, U1) had the support of staff, while A3 had the support of the younger staff only. Firms A2 and U2 did not believe the support of staff was relevant to the adoption decision. It is possible that these firms did not perceive OEOOLST as replacing or improving existing business processes; staff support may therefore have been regarded as not relevant to their decision, since OEOOLST would have little impact on the way in which staff carry out their work. Although the case evidence suggests staff support neither inhibited nor motivated the adoption decision, successful integration is more likely to require the support of staff (Headrick & Morgan, 1999; Sheng et al, 1998); hence staff support should not be overlooked.

**Technological readiness** considers internal IT sophistication (ie. IT usage, IT management and IT skills), access to external IT support, and beliefs about the complexity of the technology and its compatibility with other systems. All the adopting firms (A1, A2, A3, U1, U2) were found to be internally IT sophisticated, and had access to external support for e-commerce adoption – these firms also did not believe the technology was overly complex. These results are consistent with prior research, which suggests that sophisticated firms are less likely to feel intimidated by the technology (eg. Pare & Raymond, 1991). They may also be more willing to explore complex technology (Rai & Bajwa, 1997). Strong support from external technical sources may also lead to or accelerate technology adoption (Attewell, 1992; Raymond & Bergeron, 1996; Salehi, 1997).

Although non-adopter firm N1 was not internally IT sophisticated they had access to sufficient external support for e-commerce adoption. Although such external assistance may reduce the technological knowledge barrier (Attewell, 1992) and enable firms (like N1) to successfully adopt a new technology, the evidence suggests external

IT support did not exert a strong influence on the adoption decision; its impact may have been moderated by other considerations.

Adopting firms (A1, A3) believed OEOOLST was compatible with their existing system, but firms A2 and U2 identified some compatibility problems with back-end systems. However, technology incompatibility did not appear to be a barrier to adoption. The evidence further suggested that internal IT sophistication and access to external support enables firms (such as A2 and U2) to be confident in their ability to address compatibility issues. These findings are supported by prior research suggesting that external IT support and internal IT knowledge influences technology diffusion (Attewell, 1992).

In this study, while all the firms were financially and technologically capable of adopting, only the adopting firms were found to have the clear and strong support of top management for the adoption (ie. management readiness). This suggests that while organizational factors such as technological readiness are important factors to consider for e-commerce adoption, their influence is likely to be moderated by other factors, such as, management support.

**External Pressure** to adopt the technology was defined as the influence that the external environment exerts on a firm to embrace a technology (Iacovou et al., 1995). In this study, external pressure to adopt e-commerce came from the firm's industry, its competitors, and its clients.

Firms A2, A3, and U2 identified competitive pressure (exerted by other firms operating in the small retail client sector) as a key factor influencing their decision to adopt OEOOLST. These firms as well as A1 and U1, also identified client demand for an on-line trading service as a key influence. Although U1 and U2 faced some external pressure to provide an OEOOLST service, the case evidence suggested uptake of the technology was slowed by other considerations, such as strategic alignment and perceptions of the benefits of the technology. Non-adopters (N1, N2) faced no external pressure to adopt, neither from competitors nor clients – they believed their clients had little or no interest in the technology but preferred the *personal touch* and were willing to pay for a personal financial service.

The case evidence suggests that competitors and clients exerted significant pressure on adopting firms to embrace OEOOLST. These findings are consistent with prior research, for example, Iacovou et al. (1995) found that competitive pressure and imposition by trading partners was positively related to EDI adoption, while Chircu and Kauffman (2000) suggested that other e-commerce-able firms might influence the e-commerce adoption decision of traditional firms. Although the research findings did not yield insight into the influence of other trading partners (eg. stock exchanges), future research should consider the role of suppliers and government on e-commerce adoption.

#### The E-Commerce Adoption Model

This research identified four key variables influencing firm adoption of e-commerce technology: business strategy, perceived benefits, organizational readiness (ie. technological and management readiness), and external pressure (from competitors and clients). These findings are consistent with previous research – for example, Iacovou et al (1995) identified perceived benefits, organizational readiness (technological and financial) and external pressure (from competitors and trading partners) as factors influencing EDI adoption. Mehrtens et al's (2001) study of Internet adoption among SMEs also identified perceived benefits, organizational readiness (ie. technology readiness and IT knowledge of non-IT professionals) and external pressure as significant determinants. Like Mehrtens et al., (2001) this study did not find strong support for including financial readiness as a significant adoption factor, although this outcome may be explained by the relative affordability of OEOOLST. Although some of the adoption variables identified in this study (specifically, perceived benefits, organisational readiness and external pressure) are similar to the findings of Mehrtens et al (2001) and Iacovou et al (1995), neither of these studies identified business strategy nor management readiness as factors influencing adoption, as is emphasised by the current research.

The most significant finding in this research concerns the role of business strategy. The case evidence suggested that firm business strategy was an overarching consideration in the adoption decision and that this variable is likely to influence the impact of perceived benefits and organizational readiness on the adoption decision. For example, although non-adopter N1 was financially and technologically capable of adopting e-commerce, they did not believe OEOOLST supported firm business strategy. Unmotivated adopters (U1, U2) were also found to have the necessary resources to adopt, but believed the technology provided only partial support for firm business strategy. These results confirm prior findings regarding the importance of aligning business strategy with e-commerce strategy in the adoption process (Bowersox & Daugherty, 1995; Lederer et al., 1997).

## CONCLUSION

The results suggest business strategy, perceived benefits, organisational readiness (ie. technological and management readiness) and external pressure influence e-commerce adoption. The findings also suggest the impact of perceived benefits and organisational readiness may be moderated by business strategy; firms that do not believe the technology supports business strategy is not likely to adopt the technology.

These findings as well as the limitations of this study provide opportunities for future research. For example, the retrospective nature of the interviews and limited access to documentary evidence made it difficult to validate and triangulate the findings, which may be influenced by poor recall or stakeholder interpretations. Future research should also consider the views of unsuccessful adopters and other e-commerce environments to enlarge current understanding of e-commerce adoption.

## ENDNOTES

1 Discount firms receive and process share transactions but do not normally offer advisory services.

2 Full service firms offer a range of financial services eg. share-broking, financial planning, managed funds, portfolio management, research, investment service management, and investment advice.

3 Institutional firms focus on institutional investors (eg. fund managers, mutual fund companies) providing financial advisory, research, capital raising, and securities broking services to corporations and institutions.

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