

PERCEPTIONS OF BARRIERS TO E-COMMERCE

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Abstract

An exploratory survey of supply personnel from the mining industry in Australia indicated that the main barrier to the implementation of e-Commerce systems for online purchasing was the reluctance of current suppliers to implement systems within their own organisations. Overall, there was a positive perception towards the implementation of e-Commerce for the use of electronic purchasing.

Introduction

The Internet and electronic commerce has revolutionised how business processes between organisations have been evolving. One area in particular where the revolution is expected to have a large influence is supply chain management (Hardaker & Graham 2000; Lancioni, Smith & Oliva 2000). Supply chain management will benefit from e-Commerce in the following 7 areas: sharing of customer information (usage & demand); instantaneous notification of changes; efficiently delivering tender information; increase the speed to process transactions; reduction in business processing costs; reduction in human error; and sharing product information (Alexander 2001; Olson 2001; Schneider & Perry 2001). For those organisations situated in isolated and remote locations the benefits of increased speed and efficiencies may be even more pronounced.

The Australian mining industry is an important industry within the Australian economy, exporting \$54 914 million during the 2000 calendar year (ABARE 2001). Many of these mines are located in remote and isolated areas in Australia where there is limited access to traditional services. Therefore, it could be expected that the installation of e-Commerce systems at such mine sites would increase the productivity within their supply chains as it would overcome some of the current problems they face due to geographical distances. But the mining and construction industries in Australia have been one of the slowest industries to install e-Commerce systems (Love *et al.* 2001). Therefore, this research was conducted to investigate the barriers to the implementation of e-Commerce within the mining industry in Australia.

It is also important for marketing personnel to understand the behaviours and expectations of supply / purchasing personnel in order to meet their future demand for value added goods. If supply personnel require the utilisation e-Commerce platforms in the future, then, marketing personnel need to ensure that their organisations implement their own technology systems to complement those of their customers. This research is aimed at understanding the current behaviours of purchasing officers towards the utilisation of online purchasing systems.

The Procurement function

One of the main business functions to benefit from the implementation of e-Commerce systems is expected to be the procurement function (Alexander 2001; Olson 2001). Benefits of online purchasing include reduced paper work, faster product finds, reduced cycle times, lower inventory, increased product choices, reduced time spent on minor purchases and lower costs in order processing (Alexander 2001; Olson 2001). Each of the benefits will change the procurement function within organisations, allowing purchasing officers or supply personnel to concentrate on important activities. Important activities include developing relationships with major suppliers, searching for possible new vendors with innovative products, managing inventory levels on major expenditure items to reducing stock-outs and implementing JIT systems to name a few. Searching for new vendors has been shown to be the most popular use of the Internet with a recent survey showing that 81% of organisations use the Internet to identify suppliers (Purchasing 2001b). The benefits mentioned are known to purchasing officers but the uptake in online purchasing has still been slow (Alexander 2001). The next section will investigate some of the barriers to the uptake of online technologies currently available in the literature.

Barriers to e-Commerce implementation

With slow uptake of online purchasing it is necessary to discuss the barriers to e-Commerce implementation. Love *et al.* (2001) categorised e-Commerce barriers within the construction industry into the following 4 areas: technical; financial; organisational and behavioural. Barriers to e-Commerce found in the literature have been categorised according to the same criteria as Love *et al.* (2001) and as shown in table 1. Table 1 does not rank any of the barriers listed, it is assumed that they are of equal value.

Table 1
Barriers to e-Commerce

| Technical | Financial | Organisational | Behavioural |
|---|---|--|---|
| Security & encryption (Commercenet 2000; Love et al. 2001; Chong & Pervan 2001) | Inability to develop return on investment (Love et al. 2001) | Lack of Business models (Commercnct 2000) | Trust & Risk (Commercenet 2000) |
| Lack of qualified personnel (Commercnct 2000; Love et al. 2001; Chong & Pervan 2001) | Investment risk (Love et al. 2001) | Culture (Commercenet 2000) | Fraud (Commercenet 2000) |
| User authentication & lack of public key infrastructure (Commercnct 2000; Love et al. 2001) | Cost of training and education (Love et al. 2001) | Organisation & planning (Commercenet 2000; Love et al. 2001; Chong & Pervan 2001) | Resistance to change existing business processes (Love et al. 2001) |
| Internet/ Web is too slow and not dependable (Commercenet 2000; Chong & Pervan 2001) | Loss of productivity and market uncertainty (Love et al. 2001) | Lack of employee knowledge (Love et al. 2001; Chong & Pervan 2001) | Fear of jobs loss (Love et al. 2001) |
| Interoperability (Love et al. 2001) | Available credit (Love et al. 2001) | Lack of infrastructure (Love et al. 2001) | Need to undertake training (Love et al. 2001) |
| | Initial set up costs (Chong & Pervan 2001) | Reluctance to link to other parties (Love et al. 2001) | Uncertainty and lack of overall stability (Love et al. 2001) |
| | On-going maintenance costs (Chong & Pervan 2001) | Time taken for implementation (Purchasing 2001) | |
| | Costs of switching from current EDI to online systems (Deeter-Schmelz <i>et al.</i> 2001) | Lack of supplier interest (Alexander 2001; Deeter-Schelz et al. 2001; Chong & Pervan 2001) | |
| | | Lack of perceived need (Chong & Pervan 2001) | |

Technical

From table 1, compatibility / interoperability was perceived to be a barrier in the previous research undertaken. In a recent survey, 45% of companies perceived that extensible markup language (XML) would help overcome the enablement and interoperability problems that have existed in the past (Purchasing 2001a). Therefore, the interoperability barrier may not be perceived as a barrier in the future.

Financial

Financial barriers looked at the cost required for investment, maintenance and risk of an e-Commerce system. Financial barriers and an acceptable return on investment are highlighted as an important barrier to e-Commerce and were found to be important in the Australian construction industry (Love *et al.* 2001).

Organisational

Organisational barriers were categorised as those barriers that originated from the organisations attitude towards the implementation of e-Commerce systems. Size of the organisation has been found to be critical in the implementation of e-Commerce although not a barrier in itself (Boyle & Alwitt 1999; Chong & Pervan 2001). Size also is critical for the size of the advantages obtained through the use of e-Commerce systems (Lancioni, Smith & Oliva 2000).

Supplier / vendor ability to operate in an e-Commerce environment has also been found to be influential on the attitude of the buyer towards the adoption of online purchasing (Chong & Pervan 2001; Deeter-Schmelz *et al.* 2001). Finding suppliers that are able to transact online is seen as critical if organisations are to compete against companies that are already receiving the benefits of online purchasing (Hoffman, Timson & O'Shea 2001). But, a recent survey of purchasing agents also found that they expected to move online when their current suppliers made the transition and then educated them on how to use their e-Commerce systems (Alexander 2001).

Behavioural

Behavioural barriers involved the issues relating to people and their resistance to change (Love *et al.* 2001).

Working from the categories of barriers outlined by Love *et al.* (2001) and given the lack of research into the barriers to the adoption of e-Commerce in the supply chain within the mining industry in Australia the following research question was developed.

What do the purchasing/supply officers on remote mine sites in Australia perceive as the barriers to the implementation of online purchasing and e-Commerce systems?

The research question relates directly to online purchasing and its connection into the overall information system currently in place and would include examples such as Enterprise Resource Planning Systems (ERP).

Research Method

Supply personnel from 11 mines were interviewed for the research. All mines, except 2, were over 100 kilometers from their major sources of procured goods, thus ensuring that isolated locations were included in the study. Such isolated sites were included as it was expected that they had more to gain through the implementation of electronic communication and online purchasing than their counterparts in more developed areas of Australia. In all cases, goods arrived by truck after shipment from major suppliers. Each mine site had a central supply function and a department on site where major purchases were conducted.

Data was collected through telephone interviews with supply/procurement personnel who operate from the mine site. Telephone interviews were chosen as face to face interviews were unrealistic and it was considered that a researcher should be present to explain any information technology jargon that may not have been known by the interviewees. A standard interview protocol was developed and covered all 4 categories of technical, financial, organisational and behavioural barriers as outlined in the literature review. Interviews were conducted during April 2001.

Data Analysis

All interviewees were aware of e-Commerce, could grasp some of the areas where it would change their current work processes, and realised that the procurement function will be one of the initial business processes targeted for e-Commerce implementation. Characteristics of the interviewees are outlined in table 2.

Table 2
Characteristics of the Companies Interviewed

| Company | Procurement Budget (\$M) | Commodity Type | Distance from suppliers (km) | E-Commerce timeframe | IT Usage | Internet Usage |
|---------|--------------------------|----------------|------------------------------|----------------------|----------|----------------|
| A | 9 | Metal | 100 | >6 Months | V High | Low |
| B | 28 | Metal | 1200 | 6 Months | Medium | Low |
| C | 11 | Metal | 500 | >1 Year | High | Low |
| D | 4 | Services | 10 | Not soon | Medium | Low |
| E | 9 | Metal | 900 | 6 Months | High | Browsing |
| F | 36 | Metals | 1100 | >2 years | V High | High |
| G | 10 | Metal | 1000 | 6 Months | High | Low |
| H | 5 | Ceramic | 10 | Not soon | High | Low |
| I | 12 | Metal | 1000 | 6 Months | V High | Browsing |
| J | 3.5 | Chemical | 2000 | Not soon | Medium | Low |

A majority of interviewees indicated that they perceived e-Commerce would make their present tasks easier. No interviewee had an operating e-Commerce platform operating although companies B, E, G & I indicated that they would be installing a system within the next 6 months. Of all companies that were installing an e-Commerce platform every one had an ERP system (SAP in every case) already operating.

Perspectives on Financial Issues

Not one interviewee believed that there were enough savings to be gained that would pay for the e-Commerce system outright. Therefore, the return on investment would be low when justifying the system. Financial benefits were seen as having the ability to focus on more critical supplies and negotiating better deals with their suppliers. Such intangible benefits were perceived as more difficult to justify through quantitative data.

Perspectives on Technical Issues

Interviewees indicated that they did not foresee any technical problems with the implementation of an e-Commerce system for online purchasing. It was not expected that the interviewees would have a detailed knowledge concerning the technical aspects of implementing e-Commerce systems given their functional positions within the organisation.

Perspectives on Behavioural Issues

Companies B, E, G & I were positive about the implementation of their e-Commerce systems and looked forward to its progress, with only some minor reservations. Barriers relating to resistance to change were only present in 2 other companies, both of which indicated that they were uncomfortable with the use of technology in general.

Perspectives on Organisational Issues

All interviewees indicated that e-Commerce would offer the supply function greater capability to respond to the organisations needs in a more flexible manner, thus, improving the standard of service they are able to offer other departments within their organisations.

All sites had thousands of suppliers most of those being small one or two item specialty suppliers with less than 50 suppliers at each site being the source for more than 10 items. Such a fragmented supplier base makes the purchasing function very complex. One of the organisational benefits perceived is that the number of suppliers will diminish with the advent of an e-Commerce platform.

One question asked relating to suppliers was, “if they were being drawn into e-Commerce by suppliers?” (interview data). No interviewee felt that e-Commerce was being forced upon them by their suppliers, quite the opposite was perceived. Most suppliers are SME’s and do not have any intention of implementing an e-Commerce platform. Interviewees mentioned that in discussions held with specialist suppliers an attitude of “you want my product. I am the only supplier of it, why should I have to put in an expensive system just to keep doing business” (interview data)

was very common. Such comments indicate that the power within the buyer-supplier relationships for those items is currently with the supplier.

Conclusion

The barriers mentioned in the Commercenet Survey (2000) were not found in this group of interviewees. All respondents found that the technological barriers were no longer significant which is consistent with the results indicated by Purchasing (2001a). The main barrier given by all interviewees is that of suppliers not implementing e-Commerce systems within their own organisations. As most suppliers are small specialist organisations with some ability to influence the relationship, it is difficult for the mine site to implement an e-Commerce system without the cooperation of these suppliers. Supplier cooperation was found to be a significant issue by Deeter-Schmelz *et al.* (2001) and is consistent with the findings of this research. Overall, the perception of the use of e-Commerce for electronic purchasing from onsite procurement personnel was positive. The implications of these results for companies marketing to mine sites is that they should seriously consider how they could work with the mining companies in reducing this negative perception the mining companies have towards their suppliers when it comes to developing electronic relationships.

The major limitation of this research is that this was only a very small sample of purchasing/supply officers working within this industry. It is difficult to generalise to the industry in general and further research needs to be conducted to indicate if these findings are consistent across the industry.

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