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FACULTY OF BUSINESS AND ECONOMICS

THE RELATIONSHIP BETWEEN INTERNET USE AND COOPERATIVE PARTNERSHIPS IN B2B E-COMMERCE

Damien Power

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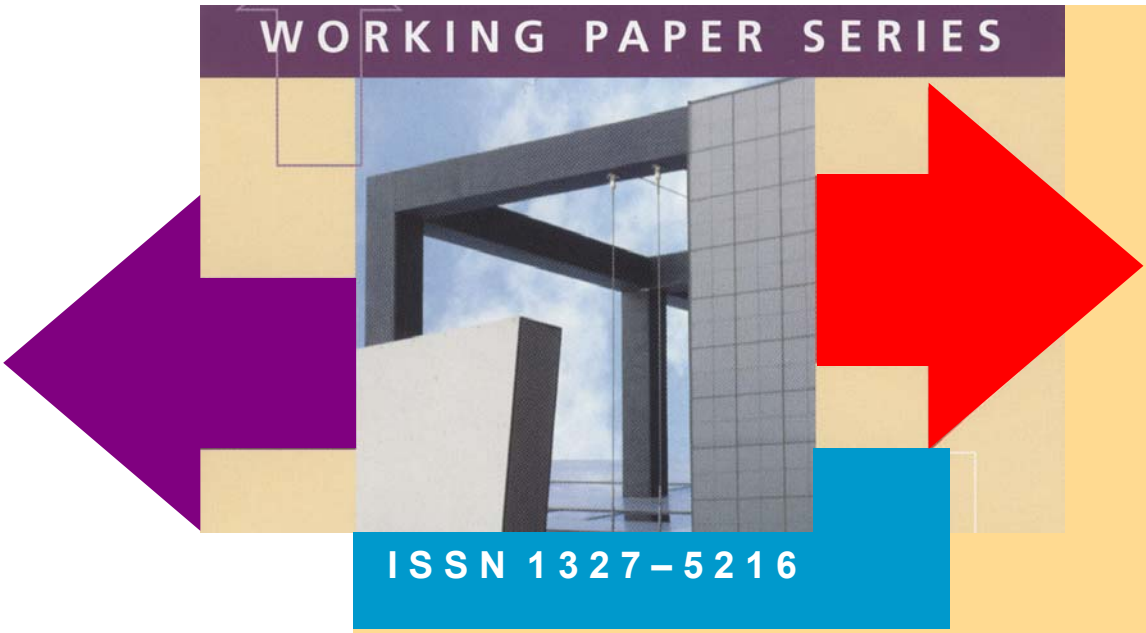

Abstract

A survey has been conducted within Australian organisations using business to business (B2B) e-commerce enabling technologies. The results indicate that there is a strong relationship between the contribution to business performance of cooperative arrangements with both suppliers and customers, and that derived from use of the Internet. At the same time, although extent of involvement in partnerships with both customers and suppliers appear to be complementary, it is less apparent that extent of use of the Internet supports the same relationship. The results also show that the use of multiple stakeholders for the development of Internet strategy is the dominant driver of both implementation and performance. The findings therefore indicate that focus on involvement of multiple stakeholders in formulation of strategies will be more likely to yield better outcomes, rather than a focus on the technologies per se. Technical capacity will determine the ability to extend implementation of Internet based applications across the supply chain, but a broad and coordinated approach to the development of strategy will more likely determine performance outcomes.

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DEPARTMENT OF MANAGEMENT

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LITERATURE BACKGROUND

The importance of relationships for the integration of supply chains is highlighted by the following anecdote:

> "Consultant John Champion, vice president of Kurt Salmon Associates, relates the story of a vendor who spent a great deal of time and money to design special product packaging. When the vendor visited the retailer's distribution centre, it was stunned to discover that the customer was simply throwing the boxes away. The moral, according to Champion: 'Get together and talk'. " (Bowman, 1997, p.29)

Handfield and Nichols also emphasise the fundamental nature of relationships for the effective management of supply chains. They make the point that the basic technological and physical transfer elements are relatively well understood. They see the issue of relationships as more difficult, less well understood and more fundamentally important:

> "……without a foundation of effective supply chain organisational relationships, any efforts to manage the flow of information or materials across the supply chain are likely to be unsuccessful". (Handfield and Nichols, 1999, pp.9-10)

Tait asserts that:

> "Companies that make supplier relationships a priority are rewarded with better financial performance and greater customer satisfaction". (Tait, 1998, p.21)

Despite this, the A. T. Kearney report (A. T. Kearney (1997) cited in Tait, 1998) found that few firms really leverage their supplier relationships, with less than 20% of North American and Canadian companies actively involving their suppliers in key business processes. The major issue acknowledged is the need to identify and include key strategic suppliers as early as possible in order to set joint objectives and align business goals. Traditional supplier relationships have been characterised by what Dyer et al (1998) describe as the "arm's length" model, incorporating multiple suppliers, avoidance of long term (or in some cases any) commitment, and regular price reviews. The rationale for this strategy has been to counteract what Porter has described as sources of bargaining power of suppliers (Porter, 1980; Porter and Millar, 1985). The partner model, on the other hand, features the sharing of information (and in some cases assets) between organisations, recognising areas of common interest and combined competitive advantage. In the context of the rapidly changing supply chain management environment, the partner model has assumed a pivotal position in implementing optimisation strategies. The need for open communication, trust and recognition of the interdependence of "individual" elements of the supply chain as technology implementations span traditional company boundaries has highlighted further the importance of cooperative strategies (Anonymous, 1998; Barratt, 1999; Bensaou, 1999; Dyer et al., 1998; Ghobadian et al., 2000; Kaufman et al., 2000; Kulwiec, 2000; Landry, 1998a; Landry, 1998b; Lumsden, 1999; Rishel et al., 1999; Schonsleben, 2000; Stuart and McCutcheon, 1996; Stuart, 1997; Tait, 1998; Vokurka, 2000).

The key driver of this need to recognise the "common interest" has been a fundamental shift in power toward the customer (Handfield and Nichols, 1999). As the customer begins to dictate terms in the marketplace, issues of interdependency between members of a supply chain become more critical. Winning the custom and loyalty of end users becomes more difficult as the competitive environment becomes more volatile. In this type of environment inefficient and ineffective supply chains characterised by traditional "arms-length" relationships, and "silo" type structures can threaten the survival of the entire chain (Barratt, 1999; Ghobadian et al., 2000; Landry, 1998b; Landry, 1998a; Tolhurst, 2001). Dyer et al (1998) have found that this does not necessarily mean that all relationships with all supply chain members need to be "one size fits all". As a result of comparing supply policies and relationships in the US, Korea and Japan, they have concluded that:

> "To optimise purchasing effectiveness executives should strategically segment their suppliers into strategic partners and durable arms-length suppliers in order to allocate different levels of resources to each group". (Dyer et al., 1998, p.73)

The difference between the two types of relationships is defined by the nature of the inputs they provide (e.g. those of "arms-length" suppliers would be typically standardised items not adding to the differential advantage of the end product). This view has support from Lambert and Cooper (2000) who define these different relationships as managed process links, monitored process links, not managed process links and non-member process links. Their rationale for this model is stated thus:

> "……integrating and managing all process links throughout the entire supply chain is likely not appropriate. Since the drivers for integration are different from process link to process link, the levels of integration should vary from link to link, and over time". (Lambert and Cooper, 2000, p.74)

For Lambert and Cooper, the key to these relationships is the level of management and integration required, with highly strategic inputs requiring the highest levels of management and integration by the focal company. They also make a valid point about the importance of monitoring the relationships suppliers and customers have with competitors ("non-member process links"). This model begs the question of who manages whom, who coordinates what, and how is coordination and integration maintained? The emphasis appears to be very much on managing and controlling partners, perhaps at the expense of setting up mutually beneficial partnerships.

Much of the literature emphasises the importance of managing relationships, but empirical research examining critical success factors is not over abundant. Content analysis of 46 articles relating to research on business to business e-commerce and supply chain management (conducted as part of the literature review) revealed that 9 (20%) covered the issue of cooperation. Given that cooperative arrangements between trading partners are fundamental to the effective management of the supply chain, the relatively small number of articles addressing this issue indicates a significant opportunity for further research. This has led Monczka et al to observe:

> "Recent studies on inter-organisational cooperation have noted the need for research that describes how parties are brought together in cooperative alliances, the dynamics of inter-organisational cooperation, and the performance implications of strategic alliance development". (Monczka et al., 1998, p.554)

At the same time, the rapid development of communications infrastructure and technological change is rated by many authors as having the potential to move supply chain management into its next phase of integration. Projections of the potential impact of technology include: B2B e-commerce transaction value worth $4.8 Trillion by 2004 (Anonymous, 2000); moves toward "channel assembly" of many products (Campbell, 1997); the development of "directory enabled networks" that will enable smarter, more interactive search and relationship management capabilities (Cohen and Jordan, 2000); rapid development of e-market based transaction models promoting the automation of "non-strategic" purchasing (e.g. MRO supplies), and driving a move to more cooperative alliances (Anonymous, 2000); extensive use of extranets, sub contracting and networked enterprises to promote "mass customisation" (Fox, 2000; Magretta and Dell, 1998; Magretta and Fung, 1998); more rapid and extensive adoption of EDI technologies through the use of the Internet and the development of XML/EDI standards (Puttre, 1997; Johnston and Mak, 2000); moves toward collaborative design platforms as product life cycles shorten and customer intelligence becomes more accessible (Say, 2000); reengineering of cross organisational processes into task specific work flows (Seybold, 1999); and a fundamental shift in power to the consumer changing the nature of relationships with customers, and the way companies compete (Slywotzky et al., 2000).

Porter (2001) takes the view that the Internet will in fact have many negative effects on the nature of the competitive environment, and in particular on the ability of organisations to develop and maintain a sustainable competitive advantage. He believes this is due to the open nature of the Internet, its accessibility, and the low cost of implementation and use. This view, to some extent, negates some of the benefits promoted as accruing from the use of technology to integrate the supply chain. In Porter's view, the benefits

will be real, but will not provide a sustainable source of differentiation over time. Whatever the final outcome, emerging technologies are going to have some effect on the nature and application of supply chain management practices. If organisations can be identified as being "Strategic" or "Tactical" or "Reactive" in the extent of adoption of the existing technologies (e.g. barcoding, EDI, product numbering etc.), will they maintain this approach with the availability of the emerging technologies? If barriers to integration of supply chains exist that result from the established technologies, will these same barriers apply to the adoption of emerging technologies? Will the emerging technologies in fact enable more extensive and comprehensive application of integrated supply chain management practices? Will the profile for success that applies to high levels of adoption of the existing technologies apply for the new technologies? Will the emerging technologies open up new opportunities for companies that previously saw the application of supply chain management techniques as simply an additional business cost?

It is against this background of emerging technologies providing significant opportunities for improved management of supply chains, and the recognised need for collaborative arrangements between trading partners to underpin effective management of supply chains, that this paper finds its context. The focus of this paper is on examining how cooperative arrangements with suppliers and customers are related to adoption and use of Internet based technologies, and how they are related to performance.

METHODOLOGY

Introduction

A survey instrument was designed and administered to a sample of the membership of EAN Australia. EAN Australia is the organisation that administers, validates and issues EAN (European Article Numbering) standard barcodes to Australian companies. As well as promoting the use of these barcodes, EAN promote a system for the adoption and implementation of electronic commerce and supply chain management. This uses a combination of EAN numbering, barcoding and EDI type technologies to link the flow of physical goods with the flow of information through a supply chain. As part of the promotion of the use of the EAN system, EAN Australia also actively develop and encourage the use of Internet based technologies and methods for the development of improved supply chain management practices. These organisations (as a result of their membership of EAN Australia) are to some extent practising, involved in or aware of established and emerging technological options for management of supply chains. It was therefore felt appropriate that they be the focus for the research.

Survey Design

The survey was made up of 9 sections covering the following categories:

PROFILE OF USAGE OF THE INTERNET FOR BUSINESS TO BUSINESS E-COMMERCE: This section contained questions relating to whether the organisation had a website, and if so what it was being used for; frequency of use of the internet by the respondent for business related transactions and activities; general questions relating to the focus and expectations of Internet usage; and an assessment of the relative costs and benefits of Internet usage.

ORGANISATIONAL PROFILE: General demographic background information about the organisation.

USE / IMPACT OF THE INTERNET FOR BUSINESS TO BUSINESS E-COMMERCE: Questions relating to technical capability; use of various technologies (e.g. XML etc.); impact of legacy systems; strategic focus and involvement of stakeholders in e-commerce strategy development; process reengineering and change management related issues; extent of use of the Internet with both suppliers and customers.

COLLABORATIVE PARTNERSHIPS – SUPPLIERS: A range of questions relating to the degree to which the organisation is involved with collaborative partnerships with suppliers.

COLLABORATIVE PARTNERSHIPS – CUSTOMERS: A range of questions relating to the degree to which the organisation is involved with collaborative partnerships with customers.

BUSINESS OUTCOMES FROM INTERNET TECHNOLOGIES FOR B2B E-COMMERCE: Questions asking respondents to rate the contribution of Internet technologies to a range of business outcomes.

BUSINESS OUTCOMES FROM COLLABORATIVE PARTNERSHIPS WITH SUPPLIERS: Questions asking respondents to rate the contribution of collaborative partnerships with suppliers to a range of business outcomes.

BUSINESS OUTCOMES FROM COLLABORATIVE PARTNERSHIPS WITH CUSTOMERS: Questions asking respondents to rate the contribution of collaborative partnerships with customers to a range of business outcomes.

FACTORS INFLUENCING IMPLEMENTATION OF B2B E-COMMERCE TECHNOLOGIES AND METHODS: A range of questions relating to factors affecting the capability of organisations to implement B2B e-commerce technologies (e.g. computer literacy, rate of technological change etc.).

Most questions (other than those relating to functions of websites and organisational demographics) used 5 point Likert scales with the range being either from "Not at All" to "To a Very Large Extent", or "Not Important" to "Extremely Important", depending on the nature of the question.

Survey Administration

2500 surveys were sent out to EAN Australia members randomly selected from their database. 130 surveys were returned as having incorrect address etc., and a total of 281 usable responses were collected. This represented a response rate of 12%. Confidence in the generalisability of the results was provided through comparison with demographic profiles (based on primary business activity). Data from a previous survey run within the membership of EAN (including a non-respondent survey) indicated that there were no significant differences between the three groups.

DATA ANALYSIS

Introduction

For much of the analysis contained in this paper a process of data reduction was employed as a precursor to further analysis. This involved the use of Factor Analysis (Principal Components) to develop and verify the integrity of constructs, and also to reduce the data to a manageable size.

Levels of Internet Adoption for B2B e-Commerce

The survey data indicates that adoption and use of the Internet for business to business transactions with trading partners is still limited. Only 13% of respondents could be classified as using the Internet for B2B transaction to a high degree, and only a further 20% to a moderate degree. The balance of 67% recorded a low use of the Internet. One interesting aspect of this finding is that these results are almost identical to those recorded for a similar sample of the EAN membership in 2000. In this case, however, levels of use of established technologies (such as EDI) were being measured. In this case, the results indicate that the level of use of the Internet for enabling B2B transactions with supply chain trading partners is not significantly different from that of traditionally costly and difficult to implement established alternatives.

Comparative Levels of Involvement in Collaborative Partnerships with Suppliers and Customers

The correlation between extent of use of the Internet for B2B transactions, and involvement in collaborative partnerships with suppliers was weak but significant (.132 at $p<.05$) for the full data set. It could therefore be expected that higher users of the Internet would also be more likely to be involved in collaborative

arrangements with suppliers. The relationship with involvement in customer partnerships, on the other hand, was weak and not significant. This was interesting to note, as it indicates a mindset of looking backward along the chain of supply, rather than forward toward the customer, when using the internet for enabling B2B transactions.

Correlations Between Levels of Involvement in Collaborative Partnerships with Suppliers and Customers

collaborative arrangements, indicating that organisations are likely to be involved in both rather than just one type of partnership.

Comparative Contribution to Performance Outcomes of Collaborative Partnerships and Use of Internet Technologies

There were very strong and highly significant correlations recorded between contribution to performance of use of the Internet, use of collaborative partnerships with suppliers, and use of collaborative partnerships with customers. Table 1 below contains these results:

Table 1

PEARSON CORRELATION	Contribution of Collaborative Partnerships with Suppliers to Performance	Contribution of Collaborative Partnerships with Customers to Performance	Contribution of Use of the Internet to Performance
Contribution of Collaborative Partnerships with Suppliers to Performance	1.00	.841**	.751**
Contribution of Collaborative Partnerships with Customers to Performance	.841**	1.00	.758**
Contribution of Use of the Internet to Performance	.751**	.758**	1.00

***Note:** denotes significance at p<.01*

The strength and significance of these results indicate an interdependency between the three that points to the possibility of a synergistic relationship. Table 2 below compares the correlations between extent of use of the Internet and partnerships with suppliers / customers, with contribution to performance outcomes of each of these factors.

Table 2

PEARSON CORRELATION	Extent of Use of Collaborative Partnerships - Suppliers	Extent of Use of Collaborative Partnerships - Customers	Extent of Use of the Internet
Contribution of Collaborative Partnerships with Suppliers to Performance	.305**	.322**	.198**
Contribution of Collaborative Partnerships with Customers to Performance	.416**	.328**	.178**
Contribution of Use of the Internet to Performance	.286**	.261**	.283**

***Note:** denotes significance at p<.01*

In this case, the strength of the correlation between the contribution of the Internet to performance, and extent of use of the three factors are very similar. On the other hand, the correlation recorded for extent of use of the Internet with contribution to performance of collaborative arrangements with suppliers and

customers (although significant) is noticeably weaker than that of the other two factors. The implication here is that the presence of partnerships with suppliers and customers could enhance (or perhaps complement) outcomes attributed to use of the Internet more strongly than use of the internet influencing collaboration outcomes.

Other Influencing Factors

Three factors were also tested for their degree of influence on both extent of use and contribution to performance outcomes of use of the Internet, and both types of collaborative partnership. These three factors were in turn:

INTERNET STRATEGY DEVELOPMENT PROCESS (coopstra): This was comprised of 6 survey items relating to the use of multiple stakeholders in the development of Internet strategy.

TECHNICAL CAPACITY (techcap): This was comprised of 3 survey items relating to the technical capacity of the firm, suppliers and customers to derive benefits from Internet technologies.

ENTERPRISE APPLICATION INTEGRATION TECHNIQUES (eaitech): This was comprised of four survey variables relating to the use of common EAI technologies such as XML, XML/EDI, Extranets and Data Warehousing.

In order to assess the relative importance of each of these factors Multiple Regression analysis was used. The results of this analysis is contained in Table 3 below:

Table 3

Dependent Variable	Adjusted R^2	Dominant Independent Variable
Extent of Use of Collaborative Partnerships	.123**	coopstra
Extent of Use of Collaborative Partnerships	.138**	coopstra
Extent of Use of the Internet	.177**	techcap
Contribution of Collaborative Partnerships v	.128**	coopstra
Contribution of Collaborative Partnerships v	.126**	coopstra
Contribution of Use of the Internet to Perfor	.195**	coopstra

***Note:** denotes significance at p<.01*

The analysis indicates that in each case the three variables in combination have a moderately strong but highly significant affect on each of the dependent variables. Further analysis using stepwise regression indicated that the dominant variable in all bar one case was the Internet Strategy Development Process construct. The one dependent variable for which this was not the case was Extent of Use of the Internet, where Technical Capacity was the dominant construct.

CONCLUSION

The results indicate that there is a strong relationship between the contribution to business performance of cooperative arrangements with both suppliers and customers, and that derived from use of the Internet. At the same time, although extent of involvement in partnerships with both customers and suppliers appear to be complementary, it is less apparent that extent of use of the Internet supports the same relationship. This begs the question as to what are the drivers of use and performance outcomes for Internet use and cooperative arrangements. The regression analysis indicates that of the three factors tested, the use of multiple stakeholders for the development of Internet strategy is the dominant driver of both implementation and performance. The only instance where this was not the case was for extent of use of the internet, where

technical capacity was the main variable. The findings therefore indicate that focus on involvement of multiple stakeholders in formulation of strategies will be more likely to yield better outcomes, rather than a focus on the technologies per se. Technical capacity will determine the ability to extend implementation of Internet based applications across the supply chain, but a broad and coordinated approach to the development of strategy will more likely determine performance outcomes.

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