

Performance Evaluation of e-Business in Australia

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The Internet and related technologies have made a substantial impact on the way organisations conduct business in Australia and around the world. Australian organisations like their international counterparts have invested heavily to leverage the Internet and transform their traditional businesses into e-businesses in the last seven years. E-business investments are claiming a sizeable share of overall IT budgets in most organisations whether they are small, medium or large. However, managers are under constant pressure to justify e-business costs and to ensure that these investments keep paying off. Earlier research on e-business in Australia addressed issues of the rate of e-business uptake and the application of the Internet to certain business processes. Research discussed in this paper is one of the first attempts to evaluate the value of e-business. It is based on data collected, collated and analysed from the responses received from IT and e-business managers throughout Australia.

Research presented in this paper is based on a model developed in the USA (Barua et al, 2001) to identify the impact of e-business drivers on operational excellence of firms which influence financial improvements. It was initiated to quantify the success of e-business in Australia after huge losses from e-business projects were reported by a few large organisations. The paper includes a review of literature on e-business evaluation, research methodology, analysis techniques, a discussion of e-business performance in Australia and presents the impact of e-business on operational excellence and financial performance of the organisation.

Keywords: e-business evaluation, B2B e-business, B2C e-business, e-business drivers, e-business operational improvements, e-business financial success

1. Introduction

Australian organizations have invested heavily to leverage the Internet and transform their traditional businesses into e-businesses in the last seven years. E-businesses are defined as the use of internet based information and communication technologies (ICT) by organisations to conduct business transactions, share information and maintain relationships (Poon and Swatman, 1999). Two main trading models in e-business are B2C (business to consumer) and B2B (business to business). In Australia B2B e-business was worth 1.1% of the gross domestic product in 2001, and B2C e-business was worth 0.17% (NOIE, 2002). Business organisations doing business on the Internet with digitised business processes are expected to achieve business improvements from reduced operation costs, labour, time and paper. E-business investments are claiming a substantial share of overall IT budgets in most organisations based on anecdotal evidence that organisations achieve unprecedented benefits by leveraging the Internet as a medium of business. According to Kearney research report (2003) e-business budgets in Australia are about 27% of overall IT budgets. However, senior managers are increasingly under pressure to justify e-business costs. They are asked how these costs pay off and how can a company make sure they keep

paying off? Managers in e-business organisations are striving to articulate where such benefits come from, and how to turn things around and cash in on e-business initiatives.

E-business research data in Australia to date is mostly on the number of business organizations trading electronically, type of e-business applications, potential benefits of e-business and the application of the Internet to certain business processes (NOIE, 2001 and 2002, Kearney, 2003). These reports indicate a substantial increase in the uptake of e-business and Internet applications by Australian organizations. Earlier research in Australia (Singh, 2000) highlighted the need for e-business metrics to evaluate benefits. In the year 2001 a media publication (The Age, 2001) reported huge losses incurred by large Australian organizations such as Fosters and the National Australia Bank from their e-business projects.

This research was initiated to evaluate the financial and operational performance of e-business and to quantify the success of e-business in Australia. It was accomplished via online and postal questionnaire surveys, and data was statistically analysed. This paper includes a review of literature on e-business evaluation, research methodology, analysis techniques, a discussion of e-business

performance in Australia and presents the impact of e-business on operational improvements and on the financial performance of the organisation.

2. Literature review

New technologies such as the Internet and the World Wide Web have made a profound impact on all businesses in Australia and around the world. E-business enables organisations to reduce costs, increase demand and create new business models. It has the potential to benefit all consumers through reduced prices and improved products and information flows (Dunt and Harper, 2002). Small and large firms alike can access the Internet and exploit near-zero marginal costs of distribution for their products (Dunt and Harper). Although e-business has been proved to be popular with large business enterprises, small and medium companies also create value by marketing and selling goods and services electronically (Dubish, 2000). Each company is constrained by the amount of graphics and design capability that the Internet can deliver, so everyone starts from the same position with their Web sites.

Australian organisations like their international counterparts have increasingly resorted to e-business to capitalise on the opportunities of business efficiencies. These organisations adopted the B2C e-business model to increase market share, offer better customer service and to reach out to customers at greater geographic distances (Singh, 2000). Developments in B2B e-business in Australia has seen businesses and the government, both at the State and Federal levels adopting Web-based e-procurement to achieve volume purchase, dealing with a wider choice of buyers and suppliers, lower costs, better quality, improved delivery, and reduced paperwork and administrative costs (Singh and Thomson, 2002).

Benefits of e-business as outlined by Chaffey (2004), Singh (2002,a) and Turban et al (2004) are increased revenue from enhanced sales; reduced marketing costs with online advertising, reduced time in customer service and online sales; supply chain cost reductions from reduced inventory levels, increased competition from suppliers and shorter cycle time in ordering; and reduced administrative costs from automated routine business processes, order confirmation, accuracy of data and an improved competitive position. Other non quantifiable improvements achieved from e-business include a better corporate

image, improved communication with customers and business partners via electronic channels, a faster product development lifecycle enabling quick response to market needs, improved customer service, better information and knowledge management, ability to incorporate positive feedback from customers to enhance sales, applications of intelligent software for data mining and forecasting trends and demands (Singh, 2000, Chaffey, 2004 and Turban et al, 2002 and Turban et al, 2004).

Amit and Zott (2001) advocate that business conducted over the Internet in the 21st century with its dynamic, rapidly growing and highly competitive characteristics promises new avenues for the creation of wealth. E-business models, methods and the volume of digitisation vary from industry to industry and from organisation to organisation depending on their size, nature of business, technology capability and in-house technical expertise. Although the value of adopting e-business has been recognised, actual achievements from it are not known. Most e-business reports (NOIE, 2003; ABS, 2003; Kearney, 2002) provide an understanding of the level of e-business adoption. Returns from e-business implementations have not been formally evaluated. Grey et al (2003) are of the opinion that much of the value associated with e-business comes not only from improvements in the technological infrastructure but from business and organisational transformations. They explain that a critical part of creating business value is identifying the processes to transform and selecting the right initiatives to enable the transformation. The IT infrastructure capability including speed, flexibility, capacity, efficiency, resilience, and security determine the type of applications that can be run and their performance. These applications affect the accuracy, speed and productivity of business processes in various functional areas of the organisation which have an impact on the overall business performance of the enterprise.

E-business payoffs are generally assessed as IT payoffs under the themes of metrics, environment, technology and processes (Kohli, Sherer and Baron, 2003). As suggested by Shi and Daniels (2003) success in e-business includes functionality, integration and scalability, and an evaluation of e-business applications is necessary for further improvements, management strategies and the deployment of technological developments. Devaraj and Kohli (2002) emphasise that it is

necessary to determine the strategic role of IT in the organisation as compared to other projects to get an overall economic picture. They also emphasise that IT projects have less apparent and longer payoff duration and IT metrics according to Devaraj and Kohli include profitability, productivity and customer value while e-commerce payoff measures address efficiency, effectiveness and innovation strategy measured along five dimensions of time, distance or geography, relationships, interactions, and product or service. IT evaluation is similar to benefits realisation as suggested by Ashburton and Doherty (2003) and it should be explicitly concerned with the on-going management and direction of the project, managing benefits as they are collected. They also emphasise that evaluation should be concerned with assessing the process of systems development as well as its product so that the systems development process can be improved over time, and that evaluation should be performed as an on-going process. Cronholm and Goldkuhl (2003) describe the strategies for Information Systems evaluation to be goal-based evaluation, goal-free evaluation and criteria-based evaluation. Goal based evaluation measure the IT system based on explicit goals from the organisational context. Goal free evaluation is an inductive and situational driven strategy, while criteria based evaluation means that some explicit general criteria are used as an evaluation yardstick. Barnes and Hinton (2004) emphasise that e-business performance measurement systems should include metrics on the performance of the website, business processes, customers and the link between e-business performance and business strategy.

Although all of the above it and e-business evaluation criteria discussed above address important issues, they are ideas or suggestions for evaluation. The only research that evaluated e-business performance exclusively at the time this project was undertaken was by Barua et al (2001) on which research discussed in this paper is based. They developed a conceptual model to evaluate e-business suggesting that e-business drivers contribute to operational improvements and operational excellence improves financial performance as shown in figure 1.

In the model e-business drivers come from the areas of IT applications, processes and readiness. As explained by Barua et al (2004), IT resources, processes and readiness are needed to create organisational information capability which is a resource essential for the

exchange of strategic and tactical information with all stakeholders in an e-business. These drivers are actionable part of business value which have a direct impact on operational excellence and higher order impacts on financial performance of firms (Barua et al (2001). The operational excellence measures in this model are e-business specific as well as traditional. E-business specific measures are total business transacted online, existing customers conducting business online, new customers acquired online, MRO items and production goods procured online, and customer service provided online. Improvements in traditional measures refer to improvements in order delivery times, order fulfilment accuracy and better inventory management. Financial performance of an e-business firm in this model is similar to traditional financial measures of revenue per employee, gross profit margin and return on assets.

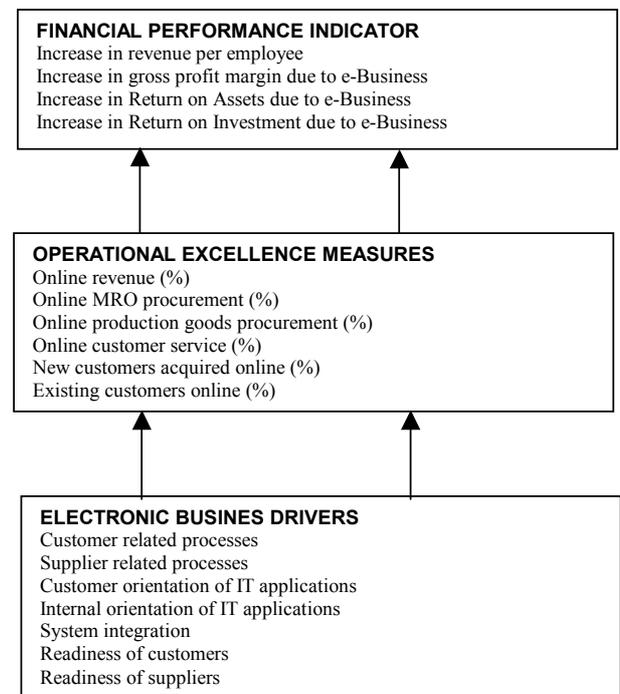


Figure 1: Conceptual e-business value model
In this paper we sought to test this model in the Australian context.

3. Research methodology

This research was accomplished by surveying e-business organisations using online and postal questionnaire surveys. Online surveys, were considered to be the apt method of investigating e-business organizations since it is technology based, quick, convenient, enables unlimited reach, seeks a response to all questions, responses are downloadable into a database and transportable to statistical

packages for analysis. However, due to a disappointing response to online surveys, we resorted to a mail survey to complete the research project.

A set of questions to evaluate the performance of e-business in Australia was initially developed in MSWord. Some of these were adopted from the USA study (Barua et al, 2001). The questionnaire was divided into sections and included questions presented on Likert Scales, as 'yes' and 'no' answers and some fill in the blanks. Respondents were expected to provide answers with radio buttons, choosing an option from the drop down menus or filling in a word, phrase or numerical value in the space provided. The whole questionnaire was presented in six HTML pages for the online survey. At the end of page one a respondent was asked to select the 'submit' button and proceed to the next page. The questionnaire was designed so that a respondent could not proceed to the next page unless an answer to all questions on the current page was provided. On submission of first page, HTML codes were included to generate a tracking number enabling the respondent to complete the rest of the questionnaire at a later time or date if he or she wished to.

The questionnaire was sent to a random sample of 725 companies obtained from a database Business Who's Who <http://bww.dnb.com.au/default.asp>. The database was sorted using different criteria to ensure that they were e-business organizations and included the top 500 companies. The questionnaire was disseminated via emails the addresses for which were obtained from the above database. It was addressed to the e-business manager based on the assumption that these organisations will have such a position, if not will be passed on to the person in charge. A short explanation of the objectives of the research and the URL for the survey was included in the email.

3.1 Response

At the end of one week 32 valid responses were received. The responses to the questionnaire were transferred to a database created in MySQL. Each page in the questionnaire was represented as a table in the database, and each response to a question was recorded as an element in the table. The database was designed to store both numeric and alphanumeric data.

To elicit more responses, a hard copy of the questionnaire was sent by post to the same organisations. The package included a hard copy of the question and a covering letter explaining the purpose of the project and the URL for the online questionnaire. In the month following the mail out of the survey, online responses increased to 91, and valid hard copy responses received were 78. This research analysis is therefore based on a response rate of 23.3 %.

4. Findings and discussion

Findings of this research discussed in this paper reflect the development, application and achievements of e-businesses in Australia. Responses to part 1 of the questionnaire reflect e-business adoption and development in Australia. From this research it is apparent that in Australia e-business is adopted by organisations of all sizes small (32%), medium (34%) and large (34%). Titles of individuals who responded to the surveys were IT managers (22%), e-business managers (14%), managing directors (11%), marketing managers (8%) and other middle managers (45%). It is important to note that many of the respondents held postgraduate (30.8%) and graduate (37.2%) level qualifications. All categories of Australian industries have some form of e-business in their organisations although it is most widely adopted by the manufacturing (24%) and the service industry (22%) sectors. Others were grouped as transport/utility (18%), retail/wholesale (15%) and other (21%). The most popular e-business model adopted was business to business (47%), followed by business to consumer (18.2%). Some adopted more than two types of online trading models. Most e-business development in Australia took place in the year 2000 (22.4%). Other development percentages indicate an increase up to the year 2000 (1998 (16.4%) and 1999 (18.4%)), and a decline in 2001 (11.2%) and 2002 (6.6%). The downward trend in e-business adoption since 2000 is commensurate with the concept that the dot.com crash slowed or discouraged e-business development. E-business like most new initiatives requires substantial resources in terms of technology, finance, people and time. Most Australian organisations made sizeable investment in e-business resources. Findings indicate that 71% assigned all development planning duties to a dedicated group in the organisation, 65% indicated that they allocated large financial resources to e-business projects and 68% had allocated dedicated personnel to manage and implement e-business projects.

4.1 e-Business drivers and operational success

e-business drivers included in this research were system integration, customer orientation of IT, supplier orientation of IT, informational (quality, supply continuity, and relationship management) and transactional; internal operation of IT, customer related processes, supplier related processes, customer e-business readiness and supplier e-business readiness. These are key factors that e-business organisations invest in and commit resources to in order to achieve improved operational performance. Development of e-business drivers in the organisations surveyed are discussed in a separate paper (Singh and Byrne, 2004), highlighting a moderate development in all organisations.

In the following section we discuss the impact of e-business drivers on operational improvements and financial success. In order to determine the impact of e-business drivers on operational excellence measures, we calculated the correlation coefficient between each driver and each operational excellence measure. We display our results in Table 1. Next to the value of the correlation coefficient, we indicate whether the relationship is significant, using three asterisks (***) when the correlation is significant at the 0.01 level, two asterisks (**) when the correlation is significant at the 0.05 level and one asterisk (*) when the relationship is significant at the 0.10 level.

Table 1: Correlation coefficients between e-business drivers and operational excellence measures (***) = p<.01, ** = p<.05, * = p<.1).

E-Bus Drivers	Online Revenue	MRO Procurement	Prod Goods Procurement	Customer Service	New Customers	Existing Customers
Customer Processes	.064	.154	.294 **	-.076	.198	.117
Supplier Processes	.007	.137	.247 **	.002	.147	.139
Customer IT application	.227 *	.110	.205 *	.085	.331 ***	.045
Internal IT application	.383 ***	.146	.255 **	.107	.309 **	.046
System Integration	.424 ***	.197	.263 **	.118	.307 **	.064
Customer readiness	.193	.262 **	.324 ***	.095	.250 **	.232 *
Supplier readiness	.205 *	.300 **	.330 ***	.077	.366 ***	.211 *

From Table 1 it is apparent that in Australia customer and supplier readiness had a significant impact on the procurement of production goods and some impact on the procurement of MRO goods. Buyer (customer) and supplier interaction in an e-marketplace is based on how ready they are to trade online either through net markets (intermediaries) or by net exchanges in-house. E-procurement is a major application of B2B e-business in Australia (Singh, 2004), and this finding highlights the importance of customer and supplier e-readiness to engage in e-procurement. Supplier readiness, however, also had a positive impact on acquisition of new customers, a small increase in online revenue and managed to get some existing customers to trade online. Higher levels of electronic business readiness of customers and suppliers are positively associated with customer and supplier side informational

capabilities reducing uncertainty through better information sharing and coordination and managing demand, inventory and capacity information (Barua et al, 2004).

System integration with automated processes for quick retrieval and processing of information, one set of data or integrated databases, easy access of information and in some cases a single contact point for customers, suppliers and employees are key attributes of e-business that are achieved from integrated systems (Farhoomand and Lovelock, 2001). From Table 1 it is seen that from system integration a small increase in online revenue was achieved, and it positively contributed to e-procurement and acquisition of some new customers. Higher levels of system integration within a firm are positively associated with customer and supplier online

information capabilities (Barua, et al, 2004) supporting e-business transactions.

Internal applications of IT prepare employees to be responsive to customer needs and readily access internal information through easy-to-use interfaces. Data analysis presented in Table 1 indicates that Australian organisations with internal e-business initiatives achieved an increase in online revenue, supported e-procurement and acquired some new customers. The impacts of intranets and internal communication, project management, internal process improvements and internal orientation of electronic business processes are pivotal for e-business success (Singh and Byrne, 2004).

Customer orientation of IT applications helps customers access product related information, use FAQ's for quick answers, find post product information, customise orders and receive online customer service (Barua, et al, 2001). From Table 1 it is seen that customer orientation of e-business led to the acquisition of new customers by firms, and had a small impact on e-procurement of production goods and on online revenue. Supplier related processes are important to reduce approval steps in online purchases, paper work and exception handling. However, from Table 1 it is clear that in Australia this only slightly impacted e-procurement as did customer related processes of improved online services.

4.2 Explanation of results

In Table 2 we summarise the results of the impact of e-business drivers on operational improvements. For each of the e-business drivers, we identify those that were reported to have a significant relationship with the identified operational improvement measures. For example, the e-business driver customer related process has a significant impact on e-procurement only.

Table 2: Significant relationships between e-business drivers and operational measures.

E-business driver	Relationship with operational measures
Customer related processes	None except Online goods procurement

E-business driver	Relationship with operational measures
Supplier related processes	None except Online goods procurement
Customer orientation of IT applications	All except MRO procurement, Online customer service and Existing customers online
Internal orientation of IT applications	All except MRO procurement, Online customer service and Existing customers online
System integration	All except MRO procurement, Online customer service and Existing customers online
Readiness of customers	All except Online revenue and Online customer service
Readiness of suppliers	All except Online customer service

From Table 2 it is apparent that in Australia the impact of e-business drivers on operational improvements is small. This leads to the conclusion that a lot more effort in developing e-business drivers is essential for achieving operational improvements from e-business.

4.3 e-Business operational excellence and financial performance

Financial performance indicators used in this research were also adopted from Barua et al, (2001), and these included percentage increases in revenue per employee, gross profit margin, return on assets and return on invested capital attained from e-business initiatives. In considering the relationship between operational improvements from e-business and their impact on financial performance indicators, we divided responses into whether there was an increase in the financial performance indicator or not. We then calculated the change in the operational excellence measure for those firms showing an increase in the financial performance indicator and the change in the operational excellence measure for those firms not showing an increase in the financial performance indicator. Thus those reporting an increase in revenue (the financial performance indicator) collected on average 11.3% of their revenue online (operational excellence measure). Whereas those who did not report an increase in revenue collected on average only 5.0% of their revenue online. The results are shown in Table 3.

Table 3: Impact of operational improvements on financial performance

Operational Improvement Factors	Increase in Revenue		Increase in profit margin		Increase in ROA		Increase in ROI	
	No	Yes	No	Yes	No	Yes	No	Yes
Online revenue	5.0%	11.3%	5.4%	9.1%	5.7%	8.9%	5.1%	9.3%
MRO procurement	5.0%	3.0%	5.0%	3.0%	4.0%	4.0%	5.0%	3.0%

Operational Improvement Factors	Increase in Revenue		Increase in profit margin		Increase in ROA		Increase in ROI	
	No	Yes	No	Yes	No	Yes	No	Yes
Production Goods procurement	6.0%	10.0%	5.0%	11.0%	8.0%	8.0%	5.0%	11.0%
New customers	24.7%	23.9%	24.1%	24.7%	24.8%	23.9%	24.1%	24.7%
Existing customers	16.0%	12.0%	13.0%	16.0%	16.0%	12.0%	13.0%	16.0%

From the data presented in Table 3 it is clear that although insignificant, Australian organisations managed to achieve some financial improvements from e-business in the short time they adopted and implemented online trading at firm level. E-business is thus a useful venture for Australian businesses.

When we consider the relationship between operational excellence measure and financial performance indicator, there does not seem to be any significant differences in operational excellence measure between those firms reporting increases in financial performance indicators and those firms reporting no increase in financial performance indicators. This Australian result, however, is very different from the result reported by Barua et al (2001). They reported a significantly higher value of the operational excellence measure for those firms reporting an increase in the financial performance indicator in every case. A possible explanation for this phenomenon may be the much higher rate of online revenue collected by the US firms compared to Australian firms. For example, for those firms reporting an increase in revenue per employee, the US firms reported that they collected on average 40.4% of their revenue online, whereas the Australian firms collected 11.3% of their revenue online. In Table 4, we summarise the percentage of revenue collected online by the US and Australian firms for those reporting an increase in each of the financial performance indicators.

Table 4: Revenue collected online by US and Australian firms reporting an increase in the financial performance indicator

Financial Performance Measure	US firms	Australian firms
Revenue per employee	40.4%	11.3%
Gross profit margin	42.2%	9.1%
Return on assets	44.8%	8.9%
Return on Investment	45.0%	9.3%

Although business value of e-business in the USA is not a benchmark for Australian organisations, the figures in Table 4 are included in this paper to suggest the importance of further research needed to address the impact of the political and legal environment, the economic and social

environment, and the technological environment in the two countries as well as other parts of the world as determinants of e-business success. However, from the findings presented in Table 4 it can be said that in Australia a greater emphasis on e-business strategies, initiatives and support is required for organisational information capability development in order to achieve business value from net enabled business transformation.

5. Conclusion

The findings presented in this paper clearly indicate that e-business is the new way of doing business and adopted widely by Australian organisations irrespective of their size. From this it is inferred that the Internet is increasingly transforming traditional businesses to e-businesses. Although most industry sectors have embraced e-business, manufacturing and service industries are capitalising on the opportunities more than others. Although it is not new that larger organisations are in a better position to allocate specific resources for new projects, e-business implementation in Australia shows that the medium and small organisations have also invested substantially in e-business. This indicates that the value of e-business has been realised by all Australian organisations although real benefits of e-business have not been achieved.

Testing the conceptual model developed in the USA for e-business evaluation in Australia reveals that substantial resources have been allocated to implement and maintain e-business drivers. These include customer and supplier related processes, buyer and supplier acceptance and readiness of e-business, internal orientation of e-business and integrated systems. Analysis of data indicates a need for a greater emphasis on the development of e-business drivers in order to achieve operational improvements and financial success.

This research is one of the first in Australia that has attempted to evaluate the performance of

e-business. Although e-business benefits are similar to IT benefits which are long term and some are non quantifiable, slow achievement of improvements from e-business can also be attributed to the fact that it was new, Australia had a lack of expertise for implementation and management, and a cultural change in shopping, negotiating and dealing with customers needs customer acceptance of the new medium.

From the findings discussed in this paper it can thus be concluded that in Australia e-business requires more attention in terms of technology applications, business and management strategies and user acceptance.

References

- ABS (2003) Australian Bureau of Statistics Report on Household Use of Information Technology 8146.0
- Amit, R., and Zott, C. (2001), 'Value creation in e-business', *Strategic Management Journal*, 22, 493-520.
- Ashburton, C. and Doherty, N. F., 2003, 'Towards the Formulation of a "Best Practice" Framework for Benefits Realisation in IT Projects', *Electronic Journal of Information Systems Evaluation*, Volume 6, Issue 2, pp 1 – 10.
- Barnes, D. and Hinton, M., 2004, 'Performance Measurement in E-Business', Proceedings of the 11th European Conference on Information Technology Evaluation, pp 43 – 50.
- Barua, A., Konana, P., Whinston, A. B., and Yin, F. (2001), 'Driving e-business excellence', *MIT Sloan Management Review*, fall, 36-44.
- Barua, A., Konana, P., Whinston, A. B., and Yin, F. (2004), 'An Empirical Investigation of Net-Enabled Business Value', *MIS Quarterly*, Vol 28 No 4, pp 585 – 620.
- Chaffey, D., 2004, *E-Business and E-Commerce Management*, Second Edition, London, Prentice Hall.
- Cronholm, S. and Goldkuhl, G., (2003), 'Strategies for Information Systems Evaluation – Six Generic Types', *Electronic Journal of Information Systems Evaluation*, Volume 6, Issue 2, pp 65 – 74.
- Devaraj, S. and Kohli, R. (2003). Measuring information technology payoff: a meta-analysis of structural variables in firm-level empirical research. *Information Systems Research*, 14 (2), 127-145.
- Dublish, S., (2000), *Retailing and the Internet*, proceedings of the First World Congress on the Management of Electronic Commerce, McMaster University, Hamilton, Canada (CD ROM).
- Dunt, E. S. and Harper, I. R. (2002), "E-Commerce and the Australian Economy", *The Economic Record*, Vol. 78 No. 242, pp. 327-342.
- Farhoomand, A. and Lovelock, P., 2001, *Global e-Commerce*, Prentice Hall, Singapore.
- Grey, W., Katircioglu, K., Bagchi, S., Shi, D., Gallego, G., Seybold, D., and Stefanis, S., (2003). An analytic approach for quantifying the value of e-business initiatives. *IBM Systems Journal*, 42 (3), 484-497.
- Kearney, A T, 2002, 'E-Business Outlook: 2003 A T Kearney an EDS Company', August.
- Kohli, R., Sherer, S.A and Baron, A.(a) (2003), Editorial – IT investment payoff in e-business environments: research issues. *Information Systems Frontiers*, 5 (3), 239-247.
- Kohli, R., Sherer, S.A and Baron, A. (b) (2003), Complementary investment in change management and IT investment payoff. *Information Systems Frontiers*, 5 (3), 321-333.
- NOIE, 2001, NOIE Report (2001, 'B2B E-Commerce: Capturing Value Online', Commonwealth of Australia <http://www.noie.gov.au/publications/NOIE/B2B/start.htm> March 2003
- NOIE, 2002, 'The Current State of Play, Australia's Scorecard', www.noie.gov.au
- NOIE Report (2003), *The Benefits of Doing Business Electronically - eBusiness*.
- Poon, S. and Swatman, P, 1999, 'An exploratory study of small business Internet commerce issues', *Information and Management*, Vol. 35, pp 9 – 18.
- Shi, D., and Daniels, L. (2003). A survey of manufacturing flexibility: implications for e-business flexibility. *IBM Systems Journal*, 42 (3), 414-427.
- Singh, M. (2000), 'Electronic Commerce in Australia: Opportunities and Factors Critical for Success', proceedings of the 1st World Congress on the Management of Electronic Commerce (CD ROM), January 19 – 21, Hamilton, Ontario, Canada.
- Singh, M., 2002 (b), 'E-Services and their role in B2C E-commerce', *Journal of*

- Management Service Quality*, vol. 12, no. 6, November, pp 434 - 446.
- Singh, M., 2002 (a), 'Electronic Commerce Opportunities, Challenges and Organisational Issues for Australian SME's', Managing Information Technology in Small Businesses: Challenges and Solutions edited by Burgess, S., IDEA GROUP PUBLISHING, Hershey, USA, pp 322 – 339.
- Singh, M. and Thomson, D., (2002), 'An E-Procurement Model For B2B Exchanges: An Australian Example', 15th Bled Conference on eReality: Constructing the eEconomy, June 17 – 19, Slovenia, CD ROM.
- Singh, M., 2004, 'Net Market Makers in the Australian B2B E-Space', *Digital Communities in a Networked Society*, edited by Medes, M, Suomi, R. and Passos, C., Kluwer Academic Publishers, pp 39 – 50.
- Singh, M and Byrne, J., 2004, 'E-Business Evaluation in Australia: A Discussion of Some Preliminary Findings', *Proceedings of the Fourth International Conference on Electronic Business*, International Academic Publishers, World Publishing Corporation, pp 1282 – 1288.
- The Age, March, 2001
- Turban, E., Lee, J., King, D. and Chung, H. M., (2002), *Electronic Commerce A Managerial Perspective*, Prentice Hall International Inc., New Jersey.
- Turban, E., King, D., Lee, J. and Viehland, D., 2004, *Electronic Commerce A managerial Perspective*, Prentice Hall, New Jersey.

