

E-Business Evaluation in Australia: A Discussion Of Some Preliminary Findings

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ABSTRACT

This paper reports on research carried out into e-business evaluation in an Australian context. The main research instrument was a questionnaire based on a similar study in the United States, which was adapted to give an Australian dimension. The survey was sent to e-business managers in a random sample of Australian companies. The paper reports some preliminary results from the analysis of the survey data. The results identify the more important e-business drivers, transaction capabilities, impacts on financial performance and improvement; and problems experienced during implementation.

Keywords: E-business evaluation, B2B e-business, B2C e-business, e-business improvements, e-business drivers

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 generally divided into the two main models of B2C and B2B e-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% [15]. 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 based errors. 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 [12] e-business budgets in Australia are about 27% of overall IT budgets. However, senior managers are increasingly under pressure to justify e-business costs. Do these investments pay off? And if so, how can a company make sure they keep paying off? Managers in successful companies struggle to articulate where such benefits come from, and those without success strive to find a way to turn things around and cash in on e-business initiatives. Key value drivers for e-business in the USA have been identified by Barua et. al., [4] to be 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. However, it is difficult to predict that the same set of factors is applicable to organisations in Australia and other parts of the world.

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 [15, 12]. These reports indicate a substantial increase in the uptake of e-business and Internet applications by Australian organizations. Earlier research in Australia [19] highlighted the need for e-business metrics to evaluate benefits. In the year 2001 a media publication [23] reported huge losses incurred by large Australian organizations such as Fosters and the National Australia Bank from their e-business projects. This research was therefore 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 an online survey and data was statistically analysed. This paper includes a brief review of literature on e-business evaluation, research methodology, analysis techniques, a discussion of e-business performance in Australia and presents some preliminary results from the survey.

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 [10]. Small and large firms alike can access the Internet and exploit near-zero marginal costs of distribution for their products [10]. 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 [9]. 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 adopted the B2C e-business model to increase market share, offer better customer service and to reach out to customers at greater geographic distances [19]. 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 [22]. E-business investments are claiming a substantial share of overall IT budgets in most organisations to capitalise on the benefits of e-business [12]. Benefits of e-business as outlined by [6, 21, 24] 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 and customers via electronic templates, a faster product development lifecycle enabling faster response to market needs, improved customer service, better information and knowledge management, ability to incorporate positive feedback from customers to enhance sales and ability to incorporate intelligent applications of software for data mining and for forecasting trends and demands [19, 6, 24]. Amit and Zott [2] 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 [15, 1, 12] provide an understanding of the level of e-business adoption. Returns from e-business implementations have not been formally evaluated. Grey et al [11] 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 these 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 [13]. As suggested by Shi and Daniels [18] 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 [18] emphasise that it is necessary to determine the strategic role of IT in the organisation as compared to other projects and 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 [3] and that IT evaluation should be explicitly concerned with the on-going management and direction of the project, suggesting that benefits have to be managed if they are to be 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 [7] 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.

Although all of the above IT evaluation issues discussed similar implications for e-business, the only research that evaluated e-business performance exclusively at the time this project was undertaken was by Barua et al [4], on which research discussed in this paper is based.

3. RESEARCH METHODOLOGY

This research was accomplished via mixed mode ie online survey method and a mail survey. 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, a mail survey was implemented 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 the USA[4]. 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 or phrase in the space provided. The whole questionnaire was presented in six HTML pages. 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 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. 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. 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. The questionnaire was disseminated via emails addressed to the e-business manager. A short explanation of the objectives of the research and the URL for the survey was included in the package.

Response Rate

At the end of one week 32 valid responses were received. Therefore a hardcopy of the questionnaire was sent by mail to elicit responses from the same organisations. 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 %.

Data Analysis

To complete the analysis, we grouped participants who responded with 5, 6 or 7 on Likert Scales as agreeing to the proposition proposed in the statement and calculated the overall percentage of participants agreeing to each proposition and the percentage agreeing in Small, Medium and Large enterprises. In order to assess whether there were significant differences between the level of response to a proposition from the Small Medium and Large enterprises and the overall responses, we carried out a statistical test. In the test we assumed that the number of participants, X , followed a Binomial (n, p) distribution, where n is the number of respondents and p is the proportion of respondents agreeing to the proposition. In this paper, we use Binomial Confidence interval developed by Byrne and Kabaila [5]. This interval has the proven properties of increasing endpoints, is exact and cannot be shortened without violating the minimum coverage requirement.

4. FINDINGS

Findings of this research are presented in this paper reflecting 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%). Project leaders responsible for the implementation and development of e-business are largely IT managers (22%). Other project leader positions were e-business managers (14%), managing directors (11%), marketing managers (8%) and other middle managers (45%). It is important to note that most e-business project leaders in these organisations generally held postgraduate (30.8%) and graduate (37.2%) level qualifications. All 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 B2B (47%), followed by B2C (18.2%). Some adopted more than two types of trading models. Most e-business development in Australia took place in the year 2000 (22.4%), 2001 (11.2%), 2002 (6.6%), 1998 (16.4%) and 1999 (18.4%). The adoption percentages indicate a downward trend since 2000, which 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 substantial investment in e-business resources as findings indicate that 71% assigned all development planning duties to a dedicated group, 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.

E-Business Drivers

E-business drivers according to Barua et al [4] are factors that impact e-business operational and financial performance. In Table 1, we consider the customer orientation of e-business propositions. Thus in the case of the first proposition in Table 1 (customers can contact representatives), there were 62 participants agreeing to the proposition out of a total of 114 responding to this proposition. Here $n = 114$ and $p = 62/114$ or 54.4%. The 95% confidence interval will have a lower endpoint of 45.2% and an upper endpoint of 63.6%. Thus when we consider the responses of small (51.3%), medium (58.5%) and large (55.6%) organisations to this proposition, we see that in each case the response rate is within the confidence interval. Thus we conclude that there is no statistically significant difference between the response levels of each of these groups and the overall response level. In the following tables we mark occasions where the response is below the confidence

interval with a single asterisk (*) indicating that this response rate is significantly below the overall rate and those occasions where the response is above the confidence interval with a double asterisk (**) indicating that this response rate is significantly above the overall rate. The discussion of findings in this paper is concentrated on issues where the difference in values is statistically significant.

Customer orientation data is presented in Table 1.

For customers to interact with business online it is imperative that customers are well oriented with all aspects of e-business. From the findings presented in Table 1, it is apparent that to reach out to customers the large organisations successfully promoted their e-business by listing their URL's on search engines, e-business promotion by medium sized e-businesses is seen to be fairly poor, and small e-businesses did not provide product related information satisfactorily on their web sites. Personalised web pages enable customers to create their own Web pages, and use it to record purchases and preferences, as well as capture information such as product details, and disseminate information on add-on purchases and warranty. This obviously is an advanced technology based feature which is better offered by large organisations only. Although the web technology is useful for establishing online communities with email, bulletin boards, online forums and chat facilities, this feature is seen to be least popular. However, medium enterprises utilised this feature better than others.

In Table 2, we consider the Supplier related processes analysed in the same way as the data in Table 1. For buyers and suppliers to interact in the B2B e-space it is imperative for the suppliers to be well oriented with electronic ordering, accessing and sharing information online with all business partners, participating in online auctions, and supporting the electronic supply chain for the replacement of inventory with information. For supplier interaction, medium sized enterprises were more successful in online business communication and providing information as FAQs as compared to large and small ones.

In Table 3, we consider the E-Business Processes

Findings indicate that medium sized organisations developed their processes to serve customers better than large and small organisations

In Table 4, we consider the Readiness propositions. From the findings presented in Table 4 it is apparent that security of data interchange in small organisations is far less developed. It is also clear that this feature is well established in large organisations. The other finding worth noting is that only customers of large organisations are able to interact online with e-businesses.

In Table 5, we consider the System Integration propositions. Systems integration initiatives network the stakeholders (customers, suppliers and internal) systems in an e-business environment. 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 system. Automated and integrated business processes form the back end e-business systems. This feature of e-business is significantly well developed in large organisations as evident from the data in Table 5.

In Table 6, we consider the Internal Orientation of IT application. 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. From Table 6 it is clear that this feature of e-business was only moderately achieved by all organisations investigated. As stated by Barua et al (2001), it is important for firms to ensure that employees can manage online customers and suppliers with easy to use internal information systems.

In Table 7 we consider the improvement in Financial Performance. The percentage of overall respondents who indicated an above average financial improvement is shown. For example, 32.5% of respondents overall indicated an above average improvement in return on investment, 28.9% on return on assets, 28.1% on gross profit margin and 20.4% on revenue per employee. In Table 8 we consider the improvements achieved from the implementation of e-business. The percentage of overall respondents who indicated an above average improvement in each measure is shown. For example, 55.3% of respondents overall indicated achieving an above average improvement in providing increased information to their customers via e-business. From the data presented in Table 8 the figures portray what e-business organisations have achieved from e-business. Availability of information which usually is a first step in e-business development has been achieved while other aspects of e-business are far from developed.

5. DISCUSSION AND CONCLUSION

Although all of the findings have not been explicated in detail in this paper the findings 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. It is clear that IT managers popularly undertake e-business leadership indicating that IT knowledge is essential for e-business project leaders. 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 realised. While e-business has obtained some negative publicity in the recent past due to dot.com crash, it is apparent from this research that the Internet is increasingly transforming traditional businesses into e-businesses. This research is one of the first in Australia that has attempted to evaluate the performance of e-business. From the findings presented in this paper, it is apparent that e-business in Australia is not too different from the findings of the US study discussed earlier. We will discuss the value of e-business as it compares to the value in the USA in another forthcoming paper. From the findings discussed in this paper it can thus be concluded that in Australia e-business is very much alive and applied although its implementation is slow and improvised.

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Table 1: Customer Orientation of E-business

	Overall	Small	Medium	Large
Customers can conveniently contact service representatives or seek service on-line.	54.4%	51.3%	58.5%	55.6%
A comprehensive Frequently Asked Questions (FAQ) section on our company, our products/services, contact information etc is available online.	53.4%	59.0%	51.2%	59.3%
The URL for the company's website is listed on numerous search engines to ensure that customers are able to find the site quickly and easily.	53.2%	52.6%	41.5% *	76.9% **
All product-related information available online (eg price, product description, catalogue, etc).	52.6%	41.0% *	58.1%	46.2%
Customers can customise their orders on-line without phone/fax or face-to-face interactions.	40.2%	32.4%	47.6%	46.2%
Customers can see personalised content (eg products, prices, order history, order status etc) when they log onto the website.	38.6%	31.6%	42.9%	48.1% **
Customers can interact with others using online forums and/or communities (eg bulletin boards, chat rooms, etc).	10.6%	10.3%	24.4% **	3.8%

Table 2: Percentage Agreeing With The Supplier Issues

	Overall	Small	Medium	Large
Changes to order product design are communicated to relevant trading partners electronically in real-time	29.0%	29.4%	41.0% **	14.3% *
Customer feedback and field incidence reports are shared with suppliers/vendors in real-time.	26.5%	25.0%	30.8%	28.6%
Continuously updated inventory information is shared with trading partners online.	25.8%	29.4%	34.3%	19.0%
Continuously updated product demand information (actual and forecasted) is shared online with suppliers	24.5%	25.0%	33.3%	14.3%
Quality information (eg yields) is shared electronically with relevant trading partners in real-time.	22.8%	25.0%	29.4%	15.0%
A comprehensive Frequently Asked Questions (FAQ) section is available online to trading partners.	22.1%	17.6%	32.5% **	17.4%
Frequently updated supplier/vendor evaluation reports are available online.	19.4%	34.4%	26.8%	17.4%
Continuously updated production schedules and capacity information are shared with trading partners online.	16.5%	13.3%	23.7%	13.6%
Online communication (eg discussion forums, online chat) is provided to suppliers.	7.0%	12.1%	10.3%	4.5%

Table 3: Percentage Agreeing with E-Business Processes

	Overall	Small	Medium	Large
Customers generally have one contact point for all service needs.	51.0%	48.6%	67.6% **	40.0% *
There are only a few steps in resolving customer complaints.	48.6%	48.6%	59.5% **	42.3%
Supplier quality monitoring processes are well defined.	46.5%	42.4%	50.0%	56.0%
Standard operating procedures cover all procurement scenarios (eg well defined rules for large versus small procurement).	35.1%	29.4%	42.4%	42.9%
Supplier selection criteria are well documented.	30.8%	25.8%	33.3%	40.0%
Supplier evaluation metrics are well documented.	29.2%	34.4%	35.5%	40.0% **
Information exchange policies with our suppliers (eg frequency, precision, real-time or delayed, format, channel) are well defined.	22.9%	24.2%	23.5%	22.7%
The method for sharing product roadmap and demand forecast with our suppliers is well defined.	22.3%	15.2%	29.4%	30.0%

Table 4: Percentage Agreeing With The Readiness Propositions.

	Overall	Small	Medium	Large
Our suppliers consider it important to improve online coordination and collaboration with us.	46.4%	53.1%	44.1%	40.0%
Customers feel comfortable regarding security and privacy in electronic commerce with our company.	46.0%	35.3% *	45.5%	61.5% **
Our customers consider it important to engage in electronic commerce.	43.6%	41.2%	41.2%	53.8% **
Our suppliers are willing to share information electronically with us.	34.3%	33.3%	36.8%	30.4%
Our suppliers consider it important to engage in e-business.	33.0%	27.5%	25.7%	34.8%
Our suppliers feel comfortable (regarding security, privacy etc) engaging in e-business.	28.4%	21.9%	31.4%	33.3%
Our suppliers have Internet-based systems to engage in e- business.	26.5%	32.3%	26.3%	22.7%

Table 5: Percentage Agreeing With The System Integration

	Overall	Small	Medium	Large
Data can be shared easily among various internal systems in our organisation.	54.5%	50.0%	58.5%	57.7%
Order changes automatically get reflected in downstream processes or systems.	44.3%	40.5%	51.4%	43.5%
Our systems easily transmit, integrate and process data from suppliers/vendors and customers through the Internet.	29.7%	30.3%	27.0%	29.2%
Our systems allow continuous monitoring of order status at various stages in the process (eg manufacturing, shipping).	36.9%	34.3%	36.8%	39.1%
Employees can easily retrieve information from various databases for decision support (eg cost information, reporting tools).	49.5%	42.1%	50.0%	61.5% **

Table 6: Percentage Agreeing With The Internal Orientation Of IT Applications

	Overall	Small	Medium	Large
Employees can retrieve required information through the corporate intranet.	51.4%	52.8%	50.0%	53.8%
Employees manage administrative processes (scheduling meetings, travel, training etc) online.	39.6%	36.1%	41.0%	41.7%
Best practice/project management information is available through the corporate intranet.	33.6%	28.6%	32.5%	36.0%

Table 7: Percentage Indicating A Higher Impact Of E-Business On Financial Performance

Return on investment	32.5%
Return on assets	28.9%
Gross profit margin	28.1%
Revenue per employee	20.4%

Table 8: Percentage Indicating Higher Level of Improvement by Implementing E-Business

Increased information available to customers	55.3%
Increased information available to the company	50.4%
Increased information available to employees	49.6%
Improved customer service	44.3%
Reduction in total costs	29.6%
Retention of online customers	28.9%
Increased information available to suppliers	23.7%
Increase in revenue	22.6%
Reduction in labour	21.1%
Increase in the number of new customers	19.3%
New markets	18.6%
Increase in the number of customers overseas	18.4%
Reduction in inventory	16.7%