December 2003

A Study of the Progression of E-Business Maturity in Australian SMEs: Some Evidence of the Applicability of the Stages of Growth for E-Business Model

Adi Prananto
Monash University

Judith McKay
Monash University

Peter Marshall
Queensland University

A study of the progression of e-business maturity in Australian SMEs: Some evidence of the applicability of the stages of growth for e-business model

Adi Prananto[a], Judy McKay[b] and Peter Marshall[c]

[a] School of Information Management and Systems, Monash University
Caulfield Campus, Level 7, 26 Sir John Monash Drive
Caulfield East, Victoria 3145, Australia
adi.prananto@sims.monash.edu.au

[b] School of Information Management and Systems, Monash University
Caulfield Campus, Level 7, 26 Sir John Monash Drive
Caulfield East, Victoria 3145, Australia
judy.mckay@sims.monash.edu.au

[c] Mt Eliza Business School, University of Queensland
380 St Kilda Road, Melbourne, Victoria 3004, Australia
pmarshal@mteliza.com.au

Abstract

This paper reports on the results of an empirical study investigating the progression of e-business maturity in Australian SMEs and the applicability of the stages concept in explaining that progression. Using multiple case studies within medium-sized manufacturing organisations, the authors explore the   issues and challenges experienced by organisations when moving forward with their e-business initiatives. The paper is particularly interested in establishing the applicability of the stages of growth for e-business model for mapping the e-business progression faced by these organisations. The cases presented in this paper suggest that the stages of growth model provides a valuable perspective in examining the progression of the organisation's e-business.

Keywords

Stages of growth, e-business progression, interpretivist research, multiple case studies

Introduction

Even after the bubble burst in the late 90s, the notion e-commerce/e-business is still pervasive. Businesses, including SMEs, are still looking for opportunities presented by doing business, wholly or partially, through the Internet, albeit more cautiously. In order to create an effective e-business strategy, an organisation needs to take account of their past, current and potential involvement in e-business. Arguably, a framework outlining the possible stages of progression when conducting e-business will be a useful tool for SMEs to analyse their current state of e-business initiatives as well as to help them formulate appropriate actions

and strategies in designing their upcoming e-business initiatives. In this regard, a stage of growth model, amongst other things, is quite an attractive proposition and can be particularly useful in assisting and providing a roadmap towards increasingly mature and sophisticated e-business initiatives. Although various stages of growth concepts and models have been proposed both by consulting firm and the academic community, little research has focussed on the pragmatic value of the stages of growth concepts in the progression of e-business within an organisation. Hence, by analysing the cases in this paper, we seek to provide further insights into the pragmatic value of the stages of growth model in explaining the evolution of e-business.

The stages concept of maturity in e-business

Nolan's stage hypothesis first appeared in the 70's, bringing with it a series of debates and arguments on the validity and viability of the stages concept in Information Systems. Although regarded as an attractive model to explain the progression of IT in organisations, Nolan's stage hypothesis raised great concerns as it lacked of empirical validation (King & Kraemer, 1984, 1987). In addition, the various stages proposed by Nolan lacked detail and explanation (see Nolan, 1973; Gibson & Nolan, 1974). Further research based on Nolan's stage hypothesis has resulted in inconsistent and conflicting findings in attempting to validate Nolan's hypothesis (Benbasat et al., 1980). Furthermore, this research concluded that it is probably the lack of information and details in Nolan's stages of growth model that prevented the conduct and pursuit of more comprehensive and rigorous research in stages of growth concepts (Goldstein & McCririck, 1981; Drury, 1983; King & Kraemer, 1984). More importantly, none of the findings utterly rejected the possibility of a stage-like progression in the maturity of IS/IT within an organisation (see Lucas & Sutton, 1977; Benbasat et al., 1980; Goldstein & McCririck, 1981; Drury, 1983; Kazanjian, 1988), and indeed, some researchers indicated that the stage of growth model is useful and widely adopted by academics and practitioners alike (Goldstein & McCririck, 1981; King & Kraemer, 1984) to describe the typical development patterns of organisational information systems (Benbasat et al., 1980; Saaksjarvi, 1985; King & Teo, 1997). This claim can be seen by the emergence of several stages of growth model such as those of Earl (1983), Bhabuta (1988), Hirschheim et al. (1988), and Galliers & Sutherland (1994).

More recently, with the emergence of the Internet and e-commerce, several stages of growth models were formulated to describe the various phases involved in moving towards greater sophistication with respect to the use and management of IS/IT in the new e-commerce environment. Amongst these are the E-Commerce Maturity Model (KPMG, 1997), the Commitment-Implementation Matrix Model (Stroud, 1998), the E-Commerce Levels (O'Connor & Galvin, 1998), the E-Business Lifecycle Model (Berryman, 1999), Intranet Maturity Model (Damsgaard & Scheepers, 1999), and E-Commerce Adoption Model (Daniel et al., 2002) and the Stages of Growth for e-Business (SOGe) model (McKay et al., 2000; Prananto et al., 2002).

Our recent research on the applicability of the SOGe model suggests that the model is useful as a framework to help practitioners understand and describe the current state and position of an organization with respect to e-business (McKay et al., 2000; Prananto et al., 2002 & 2003). Arguably, a clear understanding of the organisation's current e-business situation,

supported by the prescriptive value the model provides, may assist the organisation in formulating its strategy with respect to e-business initiative. The authors would like to emphasise that, as a result of some outstanding situation such as the emergence of an e-business champion or extreme pressure of business partners, an organisation may "jump" over levels (Galliers & Sutherland, 1999). On the other hand, extreme circumstances and failures may cause an organisation to regress to a less mature stage.

Research Aims

The cases presented in this paper are part of the result of a broad research project investigating the pragmatic value of stages of growth concept in explaining the progression of e-business. More importantly, with regards to the stages approach, the research seeks to understand how organisations plan for their e-business initiatives by learning from their past experiences and assessing their current involvement and ability to implement e-business. Hence, the aims of the case studies can be summarised below:

1. To understand how management conceptualise their experience in e-business and whether that conceptualisation can be realised in a stages-like progression

2. To assess the applicability of such conceptualisation in determining future e-business initiatives

3. To determine the accuracy of the description of the stages and the stage-variables proposed in the research

Research Approach and Design

The Overall Research

In order to achieve a deeper understanding of the variations in the applicability of the SOGe model, we decided to conduct an interpretive case study (Cavaye, 1996). Qualitative case studies approach was deemed necessary and viewed as an important part of the research given the limited number of (published) qualitative research in the applicability of stages of growth concept, as most empirical research validating the stages concept was done using quantitative approaches (refer to Lucas & Sutton, 1977; Drury, 1983; King & Teo, 1997; Teo & King, 1997).

Selection of Cases

Selection of the companies for the case studies are based on two criteria, accessibility and representativeness (Glaser & Strauss, 1967; and Eisenhardt, 1989 refer the latter as theoretical sampling) of various stages in the SOGe model. Case studies of eight companies were conducted to see how the companies treat their e-business initiatives at different stages of maturity. The detail of the companies involved in the case study research is shown in table 1. The eight cases are needed to explore the applicability of the SOGe model in various settings. Although the sample size seems relatively small to generalise the findings, it is within the recommended sample size of 4-10 cases for in-depth qualitative case studies

(Eisenhardt, 1989). However, due to the space limitation, we are only able to present two of these cases without severely reducing the context and the content of each case. The two cases presented in this paper are HealthCo and ChemCo. These two cases were selected as they present an interesting view on the rate of e-business progression. Although they are comparatively similar in terms of industry type, line of products, and their level of maturity at the SOGe model, they have been progressing at a very different rate with regards to their e-business initiative. As seen in table 1, ChemCo is currently progressing at a much faster rate than HealthCo. Using the two cases, we hope to gain some insight on how the two companies may use the SOGe model to describe their e-business progress.

	Rubber Co	Freight Co	Compute Co	CaliCo	RetailCo	HealthCo	ChemCo	FoodCo
Industry	Manufg & distribution	Freight forwarding	Retail	Engineering & calibration	Retail	Manufacturing	Manufacturing	Manufacturing
Established	1970	1987	1989	1973	1992	1978	1955	1960
Participant & years of service in current post	IT Manager (5 yrs)	Finance Director (6 yrs)	Business Director (14 yrs)	IT Mgr (10 yrs) CEO (25 yrs)	Business Director (11 yrs)	IT Manager (4 yrs)	IT Manager (20 yrs)	IT Manager (5 yrs)
Size	<100	<15	<30	<40	<20	<200	<150	~200
Q1 2002 stage	Stage 4	Stage 2	Stage 3	Stage 5-6	Stage 3 – mid 1990s Stage 1 - current	Stage 2	Stage 3	Stage 6 (IT) Stage 4 (Int. based e-business)
Planned stage	Stage 6, Q2 2003	Stage 5, >2005	Stage 5, Q4 2003	Stage 6, Q3 2002	-	Stage 6, >2005	Stage 5, Q2 2003 Stage 6, Q1 2004	Stage 6 (Int. based e-business), Q4 2003
e-business progress	Fast	Slow	Medium	Fast	Stagnant	Slow	Fast	Fast

Table 1. Company details

Data Collection

The interviews for the case studies were arranged after the key participant had been identified. The key participants are the highest-ranking personnel in the organisation directly involved in the forming of e-business initiatives within the organisation. The interviews were carried out during the period of May to October 2002.

Using a series of semi-structured interviews (Darke et al., 1998) with open-ended questions, the participants were asked to describe the progress of their e-business initiatives over the years, as well as their future initiatives, focussing on their planning activities, staff and management involvement, and impact of the initiatives to the organisation. At the same time, great care was taken not to reveal the concept of "stages" or "progressing in stages", thus avoiding or at least limiting the possibility of "framing" the participant's mindset and/or even "leading" the participants into thinking in terms of stages-like development when describing their e-business progression and future initiatives.

The second part of the interview involved the validation of the SOGe model. Participants were asked to examine the stages model depicting the description of the stages (refer to

appendix A and B) and to discuss the relevancy of the model with their e-business experience. Finally, the participants were asked if they are able to chart their future e-business using the stages model. It is important to emphasise that the participants were encouraged to express any disagreement, even partial agreement and/or disagreement with certain elements of the stages description, or any concern over description of the stages and its characteristics.

Description of Cases

Case 1: HealthCo

Case 1 involves a medium-sized manufacturer of household and bodycare products. Established in 1970, HealthCo's products are mainly designated for the Australian domestic market with Woolworth and Coles supermarket as some of its major trading partner. Its line of products ranged from household-grade cleaning solution to anti-bacterial soap.

History and Current Status of IS/IT/e-Business

The last significant IS/IT project, involving the establishment of the organisation's core business systems, was conducted in the mid 1980s. Since then, following a change of top management and their perspective of IS/IT, the role and status of the IS/IT department was reduced to IT support services instead of a strategic part of the organisation. This was then followed by a reduced budget allocation for IS/IT development within the company. As a result of the limited funding, the IT infrastructure began its slow disintegration over the years, creating instability of the IS/IT functions within the organisation, which ultimately lead to the increasingly hostile perception towards IS/IT. The absence of the IT manager, who resigned in 1997, worsen the situation as there was no IT representative at the middle management level to advocate the need of having strategic IS/IT within the company.

In the midst of e-commerce hype in the late 90s, the management was excited by the prospect of having a more efficient and profitable transaction by adopting e-business. In 2000, an IT manager was invited to fill in the vacant position and was asked to explore the possibility of conducting e-business. A careful evaluation and systems audit was then conducted with the help of a systems consultant. This resulted in a recommendation to overhaul the entire systems and IT infrastructure to a more up-to-date and more adaptable systems. However, realising the resources and investment needed to fulfil the recommendation, the board of executive decided to suspend the e-business project. Although the initiative had been deferred, the IT manager proposed a 5 years plan to get the organisation's internal IS/IT "up to scratch" and be ready for a full-blown e-business implementation.

A stage-by-stage IS/IT plan was then formulated, aimed at slowly rebuilding the infrastructure and confidence towards IS/IT, increasing exposure of IT in the business, building a bridge between business and IS/IT, and finally building strategic business applications. The illustration of the plan, dubbed the "IS/IT directive", can be seen in figure 1 below.
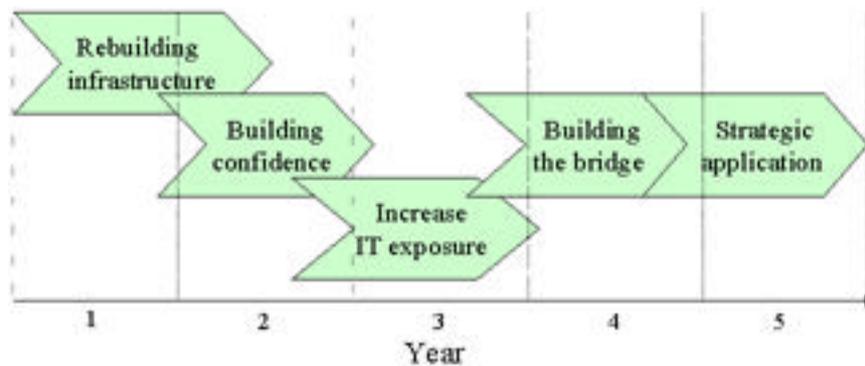
Figure 1. *HealthCo IS/IT Directive*

After the second year of the implementation of the directive, some confidence in IS/IT has been restored, the top management has began to put some interest, albeit slowly, in the development of IS/IT. Further, there has been some discussion on how IS/IT may provide a more strategic support to the organisation's various business units. Although admitting that there is still "a long way to go" the IT manager is confident that with the next few stages of the IS/IT directive, the IS/IT would gain more exposure to the rest of the business and would finally be accepted as a strategic partner by the entire organisation. Having a close link between business and IS/IT was seen as the first step towards having a complete e-business capability such as an integrated trading facility with the organisation's business partners.

Reflections on the SOGe Model

After a careful deliberation, the IS/IT manager concluded that HealthCo is presently at stage 2 of the SOGe model. The IS/IT manager went further to compare the IS/IT directive with the SOGe model, commenting:

> "This is really similar with our IS/IT directive, although this model has four different dimensions attached to it while ours only contains one… according to this we are at level two at almost every dimension, except for our strategy, which resembles more of a stage 3 strategy"

The manager's comment illustrates the movement of the organisation with regards to its e-business. A more mature state in the "strategy" component of the SOGe might indicate that the company might be progressing towards a stage three of the SOGe model in all dimensions. Interestingly, this resembles the conception of the company's progression in its IS/IT directive as they are moving from their second stage, the "building confidence", to their third stage of development, the "increase IT exposure". Expressing interest of the SOGe model and a stages progression, the manager made an interesting remark about progressing in clearly defined stages:

> "… I found it helpful to progress in such (stages like) a manner, it allows me to concentrate and focus on a specific task at one time. It is also easier to deal with the management as I can go to them at the end of each phase and tell them what I've done … do some sort of evaluation, let them see and feel the benefits … hopefully make them to be more involved and interested in the next phase... When you are dealing with somebody who is uncertain about the role of IT but hold the key to the vault, it is easier to go step by step to convince them."

The prescriptive value of the SOGe model was further confirmed when the manager used the model to chart HealthCo's potential and future e-business initiative. Using the model, the manager established the connection between the company's ultimate strategic IS/IT goal with the steps and resources needed to achieve such goal, hence, outlining the value of the SOGe model to incite strategic discussion in determining the future of the organisation's e-business.

> "going to stage 6 will be our main goal, strategic and long term… it will be beneficial for us, but we have to go a long way before implementing such system, as rightly shown in the diagram… to do it properly we have to consolidate all our systems, manufacturing systems etc, other processes before we can connect to our suppliers/customers.. It is a major initiative that requires massive investment at every stage, in terms of staffs, money, time, as well as the interest and the attention from the top executive."

Case 2: ChemCo

ChemCo was founded in 1955 as a contract-manufacturing chemist. Its line of business includes the manufacturing and packaging of various household, automotive and industrial products, ranging from toothpaste to heavy duty cleaner, based on specifications given by the brand owners. As a custom manufacturer, the company needs to be agile in its manufacturing processes. The production line needs to be able to anticipate last minute changes by its client. A client, for example, might want to change the composition of the triclosan component of a specific toothpaste from 0.2% to 0.3%. Such a change will have repercussions on the entire product line, the stock levels of the component need to be checked in the warehouse, procurement of more triclosan component if needed, the chemical mixer vessel needs to be readjusted, the information printed on the package need to be changed, etc. Great care is needed to anticipate such changes. Above all, accuracy and timely information are needed throughout the company as well as between the client, the company and its suppliers.

History and Current Status of IS/IT/e-Business

In the past, ChemCo relied on an off-the-shelf manufacturing processing computer systems to manage its entire ordering and manufacturing processes. However, the 20 year old computer system is becoming increasingly inefficient in handling large volume of processes and fast changing requirements. In early 2001, under the leadership of the new CEO and the stewardship of the IT manager, a series of intensive meetings of all heads of department was held to determine the future of the company's IS/IT. The ultimate decision was to replace the current computer systems with a more efficient and more adaptive systems, at the same time carefully and cautiously exploring the possibility of conducting transactions with its clients and suppliers through a more cost effective channel such as the Internet.

> "as far as we are concerned we have no choice to move on to the new systems. We've had to replace our current systems. It is not a matter of whether we want to or not, but we must… the systems is no longer able to cater for the fast-changing needs of the company. It's old, it's outdated… and with the increasing pressure of our clients to streamline our end to their systems, we have to move on…. "

Due the sheer size of the project, the IT manager, backed by the company's board of executive, decided that the best course of action is to take onboard a systems consultant/ developer to develop an ERP systems suitable for ChemCo. After several careful

considerations, several developers were short-listed and were asked to submit a proposal to the company. Consultations between the IT manager and the selected developer produced a roadmap, broadly outlining three steps action plan in order to reach the ultimate goal of having seamless trading environment between ChemCo and its business partners. To complete and deploy the ERP systems, it needs to be integrated throughout the organisation, hoping the new systems will significantly simplify ChemCo's business processes internally. This integration is needed before ChemCo may go to the next step, which is to streamline its business-to-business interactions with its suppliers and customers. Currently, the ERP system is in the last phase of development and is expected to go live at the end of the 2003 financial year.

Reflections on the SOGe Model

After a brief contemplation on the SOGe model, the IT manager concluded that the current situation at ChemCo has compelling similarity articulated in the description of stage 4.

> "we've been at (stage) 3 and 4, more on 4 as far as I can remember… and I have been here for a very long time. When we developed our current system we took great care to accommodate every aspect of our business, from accounting to the warehouse, especially our manufacturing processes…"

Highlighting the accurate description of the model to explain the situation faced by the company, the IT manager went further to explain that they might not be progressing along the 4 characteristics in the model at the same time. This supports the arguments of the stages model as a "central tendency" (Drury, 1983; Benbasat et al., 1984; and Prananto, 2002), in which companies tends to progress along the characteristic of the stage model albeit at a different pace.

> "this diagram is quite accurate, absolutely, as far as I can see… yeah.. I can see what we are doing. Although probably we are not moving all together in these strategy, staff, etc, but we will reach the end state… in our case we will have the state of our system to this (stage 5 of the systems characteristic) first, then probably our state of business processes will shift"

Special interest was given by the IT manager to the potential application of the model in visualising the goal and to generate discussion over actions needed to achieve the goal of the e-business initiatives, practically providing a roadmap for the future of the company's e-business initiatives.

> "This diagram, shows what we are doing, we want to be here (stage 6), streamlining our business with our partners business. We know it's not easy, we need to streamline our internal (processes) before trying to connect to our clients."

> "…usable, possibly as a point of discussion… guidelines or some sort. Quite simple to understand, you can easily pinpoint the state of the company, the goal, and trace the next thing to do. Sort of like our action plan. Pretty neat."

Discussion

The cases presented two different companies with different stages of maturity with regards to their e-business initiatives. The issues and factors influencing the progression of e-business

illustrated in these two cases are indicative of the cases in our sample. Although not identical, patterns of similarity can be identified between the lessons learned from each case.

A common concern in the cases presented is the cost associated with e-business. In most of our cases, which involve SMEs at a lower IS/IT maturity, cost, whether it was cause by the financial inability of the organisation or the lack of commitment of the management to invest, is the main impediment of e-business progress. This is understandable, as a low maturity of IS/IT can be correlated with low IS/IT infrastructure capability. A huge investment is needed to build this capability before the company can move on to more sophisticated e-business initiatives. It is also understandable that there is reluctance among the management to invest in e-business initiatives without any guarantee that they will get a return on their e-business investment.

The cases also revealed that in order to progress with an e-business initiative, stewardship of e-business is needed. Prevalent in the description of the cases is the different stance on the CEO of the two companies with regards to their e-business. Strong support and commitment from the CEO of ChemCo allowed the e-business initiatives to progress at a relatively fast pace. On the extreme, a history of scepticism and a negative view of IS/IT from the management of HealthCo has resulted in the slow progression of e-business at HealthCo.

An organisation clearly has an advantage when dealing with e-business if it already has a long history of mature and sophisticated IS/IT department and staffs. Arguably, accumulated organisational knowledge of the organisation's IS/IT is a great asset when dealing or implementing a new technology. However, an organisation without prior involvement in IS/IT may also gain similar advantage by having a good and reliable consultant or outsourcing company, as this external entity provides knowledge and experience in e-business implementation.

Finally, the case studies revealed that the stage model and its characteristics provide an accurate description of development and progression path of organisations' e-business initiatives. More importantly, the participants of the case studies, seemed to be able to conceptualise their organisation's e-business progression in a stage-like development. Further, the respondents regarded the stages approach as useful in explaining their past, current, and future involvement in e-business, suggesting that the stages model has a pragmatic value in assisting the management of an organisation in assessing and evaluating their current position with regards to their e-business initiatives, as well as helping them to plan their future involvement in e-business. Arguably, this may indicate that the SOGe model can be used as one of many tools in the formulation of e-business strategy.

Conclusion

The paper, and the research in general, has attempted to bring the stages of growth model beyond the academic scope into a more pragmatic application by having our industry-representative participants to use the model in assessing their e-business progression and to use the model in anticipating their long-term e-business initiatives. Our   research   has indicated that the SOG-e model proposed provides a reasonably accurate description of the different levels of maturity of an organisation's e-business. By providing an accurate description of the stages of maturity, arguably, the model has some merit in assisting an organisation in identifying its future e-business initiatives, thus underlining the prescriptive

nature of the model, as opposed to merely being a descriptive model. Further, the response from the participants involved in the case studies strongly suggest that the SOG-e model does have a useful and pragmatic value in helping them focussing their objectives and generate discussion on "what is needed" and "what needs to be done" in order to achieve their objectives.

References

Benbasat, I., Dexter, A. S., & Mantha, R. W. (1980). Impact of organizational maturity on information system skill needs. MIS Quarterly, 4(1), pp. 21-34.

Berryman, E. (1999). Getting on with the business of e-business. PriceWaterhouseCoopers.

Bhabuta, L. (1988). Sustaining productivity and competitiveness by marshalling IT. Paper presented at the Information Technology Management for Productivity and Strategic Advantage, Proceedings of the IFIP TC8 Open Conference, Singapore.

Cavaye, A. L. M. (1996). Case study research: A multi-faceted research approach for IS. Information Systems Journal, 6, pp. 227-242.

Damsgaard, J., & Scheepers, R. (1999). A stage model of intranet technology implementation and management. Paper presented at the Proceedings of the 7th conference on Information Systems, Copenhagen Business School, Copenhagen, Denmark, 23-25 June 1999.

Daniel, E., Wilson, H., & Myers, A. (2002). Adoption of e-commerce by SMEs in the UK: Towards a stage model. International Small Business Journal, 20(3), 253-270.

Darke, P., Shanks, G., & Broadbent, M. (1998). Successfully completing case study research: Combining rigour, relevance and pragmatism. Information Systems Journal, 8, pp. 2273-2289.

Drury, D. H. (1983). An empirical assessment of the stages of DP growth. MIS Quarterly, 7(2), pp. 59-70.

Earl, M. J. (1983). Emerging trends in managing new information technologies. In N. Peircy (Ed.), The Management Implications of New Information Technology. Oxford Centre for Management Studies London.

Eisenhardt, K. M. (1989). Building theories from case study research. Academy of Management Review, 14(4), pp. 532-550.

Galliers, R. D., & Sutherland, A. R. (1994). Information systems management and strategy formulation: Applying and extending the 'stages of growth' concept. In R. D. Galliers & B. S. H. Baker (Eds.), Strategic Information Management: Challenges and Strategies in Managing Information Systems, pp. 91-117. Butterworth-Heinemann Ltd Oxford.

Galliers, R. D., & Sutherland, A. R. (1999). The evolving information systems strategy: Information systems management and strategy formulation: applying and extending the 'stages of growth' concept. In R. D. Galliers, D. E. Leidner & B. S. H. Baker (Eds.), Strategic Information Management: Challenges and Strategies in Managing Information Systems (2nd Ed.) (pp. 31-60). Oxford: Butterworth Heinemann.

Gibson, C. F., & Nolan, R. L. (1974). Managing the four stages of EDP growth. Harvard Business Review, 52(1), pp. 76-88.

Glaser, B., & Strauss, A. (1967). The discovery of grounded theory: Strategies of qualitative research. Wiedenfeld and Nicholson London.

Goldstein, R. C., & McCririck, I. (1981). The stage hypothesis and data administration: Some contradictory evidence. Paper presented at the Proceedings of the 2nd International Conference on Information Systems, Boston, Massachussetts.

Hirschheim, R., Earl, M., Feeny, D., & Lockett, M. (1988). An exploration into the management of the information systems function: Key issues and an evolutionary model. Paper presented at the Information Technology Management for Productivity and Strategic Advantage, Proceedings of the IFIP TC8 Open Conference, Singapore.

Kazanjian, R. K. (1988). Relation to dominant problems to stages of growth in technology-based new ventures. Academy of Management Journal, 31(2), pp. 257-279.

King, J. L., & Kraemer, K. L. (1984). Evolution and organizational information systems: An assessment of Nolan's stage model. Communications of the ACM, 27(5), pp. 466-485.

King, J. L., & Kraemer, K. L. (1987). Evolution and organizational information systems: An assessment of Nolan's stage model. In E. K. Somogyi & R. D. Galliers (Eds.), Towards strategic information systems, pp. 127-144. Abacus Press Cambridge, USA.

King, W. R., & Teo, T. S. H. (1997). Integration between business planning and information systems planning: Validating a stage hypothesis. Decision Sciences, 28(2).

KPMG. (1997). Electronic commerce research report 1997. KPMG Management Consulting London, UK.

Lucas, H. C., & Sutton, J. A. (1977). The stage hypothesis and the s-curve: Some contradictory evidence. Communications of the ACM, 20(4), pp. 254-260.

McKay, J., Prananto, A., & Marshall, P. (2000). E-business maturity: The SOG-e model. Paper presented at the Proceedings of the 11th Australasian Conference on Information Systems (ACIS), 6-8 Dec, Queensland University of Technology, Brisbane, Australia.

Nolan, R. L. (1973). Managing the computer resource: A stage hypothesis. Communications of the ACM, 16(7), pp. 399-550.

O'Connor, J., & Galvin, E. (1998). Creating Value through E-commerce. Financial Times, Pitman Publishing London.

Prananto, A., Marshall, P., & McKay, J. (2002). Stages of growth of e-business: An analysis of the perceived usability of the stages of growth model in e-business progression. Paper presented at the 4th International Conference on Electronic Commerce (ICEC), 23-25 Oct, City University of Hong Kong, Hong Kong SAR, China.

Prananto, A., McKay, J., & Marshall, P. (2003). The spectrum of e-business maturity in Australian SMEs: A multiple case study approach to the applicability of the stages of growth for e-business model. Paper presented at the 11th European Conference on Information Systems (ECIS) 2003, Universita di Napoli Frederico Il, Napoli, Italy.

Saaksjarvi, M. (1985). End-user participation and the evolution of organizational information systems: An empirical assessment of nolan's stage model. Communications of the ACM, pp. 181-189.

Stroud, D. (1998). Internet strategies: A corporate guide to exploiting the internet. Macmillan Press Ltd. London.

Teo, T. S. H., & King, W. R. (1997). Integration between business planning and information systems planning: An evolutionary-contingency perspective. Journal of Management Information Systems, 14(1), pp. 185-214.

Appendix A. Description of the Stages in the SOG-e Model.

	Description
Stage 1	There is no clear direction for the organisation's e-business initiatives.
Stage 2	E-business initiatives are increasingly considered to be an important component of the organisation's business. However, there is no proper planning and a lack of direction for IS/IT development and implementation.
Stage 3	E-business initiatives are considered an important component of the organisation's business. There is a clear direction for the development of e-business initiatives within the organisation. However, e-business development is still focused much on technology-centric perspective and not influenced by business needs.
Stage 4	E-business adoption and development is becoming more business-focussed. There is a move towards integration and greater coordination between the components of e-business (eg. IS/IT and Internet) and the organisation's business processes.
Stage 5	Integration between traditional business processes and activities and e-business processes and activities, creates seamless communication and flow of processes within the organisation. E-business initiatives aim to provide strategic benefits by building strategic systems.
Stage 6	E-business is deeply embedded throughout every aspect of the organisation. There is a strong integration between the components of e-business and business processes within the organisation as well as with those of its suppliers and business partners. E-business initiatives are aimed to create and maintain our organisation's strategic advantage.

Appendix B. Description of the Characteristics of the SOG-e Model

Stage / Char	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6
Strategy	No strategy and planning for e-business development and implementation	Ad hoc strategy. No formal strategy, but there is some sense of direction for e-business initiatives	There is a formal strategy for e-business initiatives with a technology-centric tendency which has little or no consideration for business strategy	E-business initiatives and activities support the achievement of business goals. There are attempts to integrate and coordinate e-business initiatives with business strategy	Strategy is regularly reviewed and updated. Strategy review sessions involve participation and input from IS/IT and business people, e-business initiatives are influenced by business needs. Strategy for e-business may aim to seek and evaluate new opportunities to provide strategic value for the business	Constant and dynamic strategy and planning sessions that includes both IS/IT and business people. On-going strategic conversation within the organisation and externally with suppliers and business partners to use e-business initiatives as a source of competitive advantage
Systems	Uncoordinated and unconnected systems with limited applications	Increasing use of IS/IT in many aspects of the business, but little input from business strategy in making IS/IT investments	Greater infusion and diffusion of IS/IT with some input from business strategy	Greater inputs from business strategy, but still some IT-driven investments	Systems are focused on internal organisational activities to provide added value to business activities. IS/IT systems are highly integrated with various parts of the organisation which results in a seamless information exchange within the organisation	Systems are focused on seamless interorganisational activities. Corporate systems are highly integrated internally as well as externally, reaching out to business partners' corporate systems
Staffs/ Skills	No formally appointed staff to handle e-business initiatives	Designated staff with expanded responsibility to develop and maintain e-business initiatives	Dedicated staff with technical expertise but without sufficient business knowledge	Dedicated staff with technical expertise with the help of, or together with, business-oriented staff	A team of staff from different departments of the organisation manage the e-business initiatives. A steering committee may be formed to oversee the development of e-business initiatives	Management is committed to an e-business vision and involved in its implementation. The organisation has access to all requisite skills and knowledge for the e-business initiatives
Bus Proc	E-business initiatives are seen as having no impact on existing business processes. Traditional business processes are unaffected by e-business initiatives	E-business initiatives are seen as having little impact on existing business processes	E-business initiatives are seen as having considerable impact on existing business processes and may require process changes	E-business initiatives are seen as a driver of business process reengineering. Reengineering of business processes to accommodate the integration of between IS/IT, Internet based systems, and various parts of the organisation	E-business initiatives play a vital role in streamlining the organisation's internal operations and reorganising of business functions to shorten process cycle time and deliver value to customers	E-business initiatives play a vital role in restructuring the processes linking external business network members to accommodate interorganisational systems. Intergration of the e-business initiative and business processes between the organisation's and its business partners