

E-Business Maturity: the SOG-e Model

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Abstract

The focus of this paper is to describe a stage of growth framework that can be applied to organisations who are involved in Electronic Business. The framework is intended to assist organisations to identify their relative maturity with regards to their approach to Electronic Business and to suggest directions and strategies in which they may wish to move with regards to their involvement in Electronic Business. The model was derived from the understanding that there is no existing model that is capable of showing the linkage between Internet-based Electronic Commerce and an organisation's internal IT. The literature indicates that the sophistication of IT and E-Commerce is always treated as a separate entity to other organisational IT investments. Therefore, the Stages of Growth for E-Business model (the SOG-e model) is developed to accommodate the two components of E-Business, namely the front and back-office. Hence, the model generated in this study will be of importance in contributing to the organisations' strategic planning and strategic IT planning activities.

Keywords

Internet commerce, electronic commerce, electronic business, stages of growth model, IS/IT maturity

INTRODUCTION

Electronic Business is becoming a reality in many industries, and with the increasing use of the Internet, organisations need to rethink their approach by doing some of, or even a majority of their business over the Internet. As an organisation enters the world of Electronic Business there are many issues to think through as well as many challenges and opportunities as information technology (IT) provides a new channel to reach consumers. For example, existing electronic data interchange (EDI) links to suppliers may need to be integrated with both existing internal information systems (IS) and IT, and also with the new environment created by the Internet and associated technologies. However, there are only a few well-defined and accepted strategies and models for management to adopt and follow in order to understand and evaluate the organisation's current position and to plan its future Electronic Business position and progress. Such strategies and models would help both those with some experience in Electronic Business as well as those who are yet to commence Electronic Business to have a guiding path of increasing maturity and sophistication which would include considerations of both traditional information systems (IS) and IT as well as the Internet and Electronic Commerce based systems. Developing such a model of maturity and sophistication for an organisation's entire Electronic Business infrastructure, skills, strategies, and management will form the basis of this paper. However, before proceeding to a consideration of the nature and purpose of models of sophistication with respect to IS/IT, it is

considered important to define terms to ensure that there is no confusion over the arguments presented in this paper.

DEFINITION OF TERMS

There are three terms prevalent in the literature: Internet Commerce (IC), Electronic Business (EB), and perhaps the most common, Electronic Commerce (EC). Of concern for the discipline is that no clear, consistent, and universally-accepted definitions have emerged for each of these terms. OECD (1999), for example, notes that there is an absence of an accepted definition of EC, while others note that as a term, EC has been much abused and misused (Mougayar, 1998). For the purposes of this paper and the research project it has grown out of, the following definitions have been adopted. EB is considered the broadest of the three terms, and may be defined as “the process of using electronic methods and procedures to conduct all forms of business activity to achieve organisational objectives” (DFAT, 1997). Of importance to note is that EB includes both front and back office applications (Kalakota and Robinson, 1999; and Oracle, 1999) and embraces only business activity that is supported or performed electronically. IC is the narrowest of the terms, and refers to commercial activity that is transacted and supported using Internet technologies and applications (Poon, 1999; and UNCTAD, 1998). EC is thus defined as “buying and selling over digital media” (Kalakota and Robinson, 1999), and would include all that is deemed to fall within IC, and in addition, dedicated interorganisational systems (IOS) using electronic data interchange (EDI) technologies (Henry, et. al., 1999). Thus, given the different outlook of these three terms, a picture, as shown in Fig. 1, emerges.

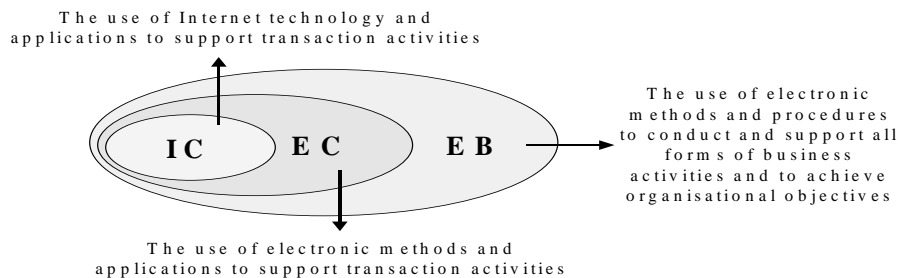


Figure 1: The distinction between IC, EC, and EB

The distinction between IC, EC and EB becomes particularly relevant when various stages of growth models are considered. Since the early 1970s, there have been a number of models of maturity or sophistication posited with respect to an organisation’s adoption and use of IS/IT. By and large, these models describe the state of what might be called “traditional” IS/IT, or largely “back office” systems and technologies, although one of the more recent and sophisticated of these models by (Galliers and Sutherland, 1994) did take into account EDI applications and IOS. These stages of growth models thus deal primarily with the development of traditional IS/IT support for business, and so fall mainly into the domain of EB, but include part of EC. By contrast, in recent times, there has been the emergence of a number of models of EC maturity, which largely describe an organisation’s “front office” systems and technology, particularly the use of Internet applications and technology. These maturity models account for Internet-centric activity in the main. However, as organisations increasingly move towards greater integration of their total IS/IT activity and a much more seamless connection between the “old” IS/IT which merely supports business transactions and “new” IS/IT which support and conduct business transactions, maintaining a difference between IS/IT stages of growth models and EC stages of growth seems a false distinction. This paper calls for much greater integration between the two, and puts forward an integrated

model of organisational sophistication with respect to the use and exploitation of IS/IT throughout its entire business operations. Indeed, it is argued that such an integration between traditional IS/IT and IC/EC is one of the true hallmarks of EB maturity. Fig. 2 depicts this argument.

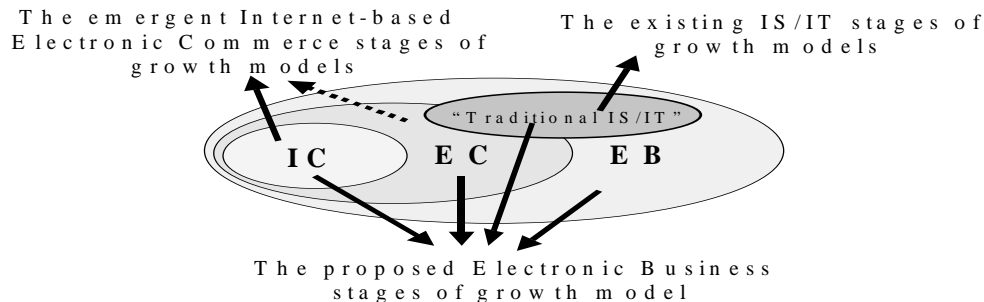


Figure 2: The need for an integrated model of EB maturity

MODELS OF IS/IT MATURITY AND SOPHISTICATION

Since the introduction of computer technology into organisations in the 1960s, there have been numerous attempts to develop models of IS/IT maturity. Amongst the earliest of these was that of Nolan (1973), subsequently refined and extended (Nolan, 1979), and it remains perhaps the most widely cited and known (Galliers and Sutherland, 1994). Others models of interest and note however, are those of Galliers and Sutherland (1994), Earl (1983), Bhabuta (1988), Hirschheim, et. al. (1988). Among these models, Galliers and Sutherland model appears the most sophisticated of these offerings, and will form the basis of much of the subsequent discussion in this paper.

All of these models are premised on the idea that organisations pass through notional 'stages' of maturity or sophistication with respect to the way they use and manage IS/IT to support and facilitate business activities, processes and operations. Such models of maturity may be used for descriptive or prescriptive purposes. The stages of growth models may be helpful to describe and evaluate an organisation's maturity and sophistication in its use and management of the IT resource, for the purposes of enhanced and shared understanding. It is also conceivable that they are used somewhat prescriptively in a planning sense, both outlining a possible direction for migrating towards greater sophistication in deployment of IS/IT throughout the enterprise and also helping to strengthen the link between IS/IT investments and initiatives and business objectives. An important function of some stages of growth models, or models of maturity, is also to consider issues concerning the management and organisation of the IT function as the organisation progresses to greater sophistication in its use of IT. Many of the earlier stages of growth models were criticised for being somewhat IT-centric, suffering generally from a lack of attention to the interrelationship between IT and the rest of the business. The Galliers and Sutherland model is a notable exception in this regard.

Galliers and Sutherland (1994) identified six stages of increasing maturity of IT use in organisations. Stage 1 essentially describes an ad hoc, somewhat chaotic adoption of IT that typifies the early use of IT in organisations. Subsequent stages articulate increasing maturity, through to stage 6, by which stage an organisation has successfully incorporated IT right into the very heart of its operations, with IT valued as an important contributor to strategic initiatives and competitive positioning. IT is also seen as starting to redefine the

organisation's value chain through electronically supported linkages to suppliers and business customers. Table 1 briefly describes each stage.

Stage	Description
1 - Adhocracy	Uncontrolled, ad hoc approach to the use of IT
2 - Starting the foundations	Beginning of the ascendancy of IT 'priesthood' in organisations
3 - Centralised dictatorship	Attempts to right the imbalances caused by the ad hoc nature of stage 1 and the 'blind rush' of stage 2
4 - Democratic dialectic and co-operation	Move towards integration and co-ordination
5 - Entrepreneurial opportunity	IT begins to provide strategic benefit by building strategic systems
6 - Integrated harmonious relationships	IT is deeply embedded throughout aspect of the organisation and embarks on implementing IOS

Table 1: Galliers and Sutherlands six stages of maturity

A particular strength of the Galliers and Sutherland model lies in its definition of seven elements (Strategy, Structure, Systems, Staff Style, Skills, and Superordinate goals) for each stage, thus offering and enabling a more complete understanding and evaluation of the relevant organisational and managerial actions, attributes and structures that characterise each stage. Thus the Galliers and Sutherland model enables organisations to recognise their current level of maturity along seven dimensions, each of which characterizes a different aspect of the total IT function in an organisation. Table 2 depicts the case of an imaginary organisation, Sipco.

Element	Stage					
	1	2	3	4	5	6
Strategy						
Structure						
Systems						
Staff						
Style						
Skills						
Superordinate goals						

Table 2: The case of Sipco

Overall, it could be concluded that Sipco is at Stage 3, although it is not necessarily at Stage 3 on all seven dimensions. Indeed, one of the benefits of the Galliers and Sutherland model is its ability to graphically display organisational strengths and weaknesses which may help management to identify areas needing particular attention, and providing insights into how the organisation may advance the maturity of its own use of IT into the future. Developing a shared understanding and learning from the past in order to move forwards are thus benefits of the use of this model.

Generally speaking, the Galliers and Sutherland model (and indeed, most of the stages of growth models) assume a linear progression from less to more sophistication of IT adoption and use over a period of time. The Galliers and Sutherland model helps to define strategies to assist in that movement. Some unusual circumstances (for example, importing packages and/or skilled personnel) may enable an organisation to "jump" over a stage, although

accumulating the knowledge and learning of the “missed” stage is assumed (Galliers and Sutherland, 1994). Similarly, untoward occurrences (hostile takeover, loss of key personnel, for example) may also result in a backwards movement from more to less mature stages.

One major weakness of the Galliers and Sutherland model stems from its age: it was developed before the burgeoning of the Internet, of telecommunications technologies, and of the emergence of IC, EC, and an increasingly interconnected world of Electronic Business. Thus, it seems inevitable that stages of growth models be developed to account for the Internet-based IT activity in organisations.

EMERGING MODELS OF EC MATURITY

Not unnaturally, the emergence, rapid growth and interest in IC and EC has seen the parallel development of a number of stages of growth models trying to capture and describe the various phases involved in moving towards greater sophistication with respect to the use and management of IT in the new Electronic Business environment. Amongst these are the E-Commerce Maturity Model (KPMG, 1997), the Commitment-Implementation Matrix Model (Stroud, 1998), the E-Commerce Levels (O’Connor and Galvin, 1998), the E-Business Lifecycle Model (Berryman, 1999), and the Internet Commerce Maturity Model (Poon, 1999b). These models mirror the traditional stages of growth models discussed in the previous section in that they basically assume that organisations pass through increasingly mature stages with respect to the way they use and manage IT to involve themselves in a variety of EC activities. Thus, most of the models cited above recognise 3-4 distinct stages, with organisations moving from no presence on the Web, through a static, informational presence ultimately to full-blown electronic business-to-business and business-to consumer trading wither over the Internet and/or using dedicated IOSs. The E-Commerce Maturity Model (KPMG, 1997) in Fig. 3 is quite typical of the EC stages of growth models thus far developed.

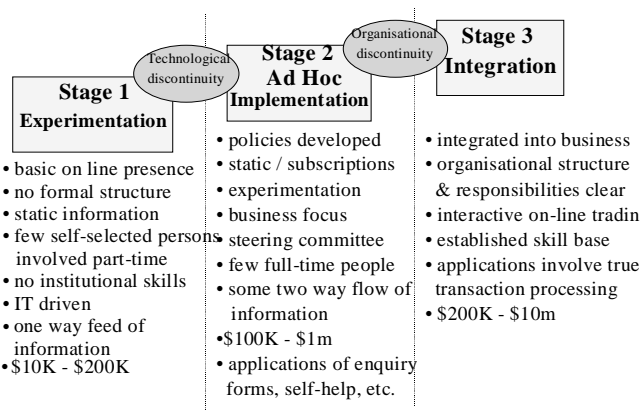


Figure 3: The E-Commerce maturity model (KPMG, 1997)

While this model (and indeed the other models of EC sophistication mentioned above), like their traditional counterparts, facilitate diagnosis, evaluation and description of an organisation’s current level of maturity, it also suffers from a number of important deficiencies. Firstly, it behaves as though IC and EC activities and investments in IT are “standalone” and separate, and somewhat independent of the use of IS/IT throughout the rest of the organisation in supporting and facilitating traditional business activities. This seems an untenable position to adopt, and almost by definition, would seem to preclude organisations from ever achieving the highly sophisticated levels in which integration of IT across the entire

business spectrum becomes paramount. Secondly, the stages are somewhat discontinuous, with large “jumps” involved in the progression from one stage to another. The Electronic Commerce Maturity Model, for example, involves movement from an experimental, ad hoc, minimal presence on the web, to a business-driven and focused, interactive web site, to a fully integrated, total EB solution. Perhaps indicative of the magnitude of this progression is recognition of technical and organisational discontinuities existing in the transition between stages (KPMG, 1997). Given recognition in the literature of the need for models of EC maturity that show gradual progress through the movement towards sophisticated levels of IC/EC (Dominique, 1997; and AeB.N, 1998), this seems a significant limitation of the Electronic Commerce Maturity Model in particular, but also of all the models of EC maturity listed previously.

Other limitations of existing models concern the extent to which the models provide any description or support for the transformation required to existing business processes, given the new business environment, and advice on a range of organisational and managerial issues associated with progression through to more mature stages of IC/EC. Generally speaking, existing models appear simply to describe a number of discrete stages, but are inadequate in prescribing (or at least suggesting) strategies and actions needed to migrate to more mature stages. They are likewise generally deficient in discussing issues such as business process reengineering that may be required to support the IC/EC initiative.

The final limitation to be considered here concerns the extent to which models, as the level of EC maturity and sophistication increases, take into account the increasing interconnectivity of the business environment, and hence address issue such as the degree of integration and relationships formed with suppliers, business partners, customers, and the like. Despite the very nature of IC/EC involving the organisation in a variety of attachments to entities in its business environment (and hence, it is argued, being affected to a greater or lesser degree by the behaviors of those entities), the models typically focus on IC/EC activities within an organisation, and ignore the inevitability of connectivity outside the traditional organisational boundary. There appears to be an “organisation as an island” mentality reflected in many of the stages of growth models for IC/EC, which goes counter to the very nature of IC and EC.

These criticisms are damaging in that they reflect serious limitations of existing models of IC/EC maturity. For this reason, a new model is presented below in Fig. 4, with the express aim of trying to overcome the concerns voiced about existing models. This new model articulates six stages of maturity (and therefore offers a much more gradual transition than models comprised of 3-4 stages), and also describes a relevant organisational approach for each stage.

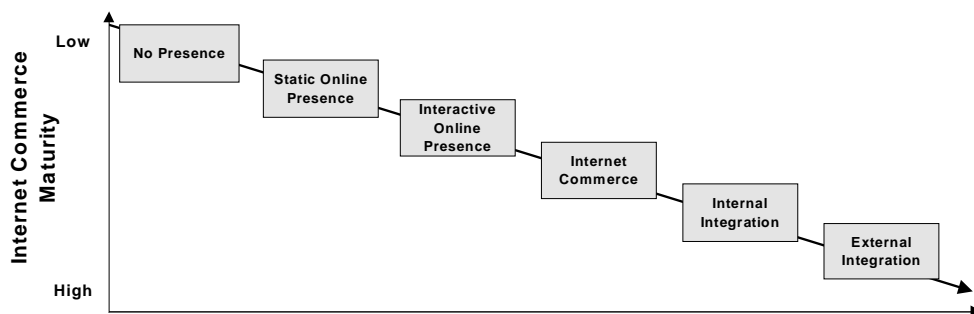


Figure 4: The IC maturity model

It seems appropriate at this stage to briefly describe the six stages in the Internet Commerce Maturity Model, and to discuss some of the salient features of the model.

Stage 1: No Presence

Organisations at this stage may be characterized as adopting a “wait and see” approach. Despite reports of rapid growth in IC, and the concomitant expectation of substantial returns on investment, the strategy adopted here is to wait for competitors or business associates to go on-line, assess their results, and then act when business benefits and/or profitability accrue from the IC investment. The “no presence” approach may stem from ignorance of the Internet, but preliminary research results (Marshall, Sor, and McKay, 1999) suggest it is more typically associated with uncertainty about the costs and benefits of IC (in contradistinction to the costs and benefits of *not* establishing a web presence), issues of risk and security associated with IC, and uncertainty as to whether an organisation’s goods or services are suited to advertising and sale over the Internet. As it has been suggested that early adoption of on-line IC strategies is essential (AOT and OIC, 1998), perhaps gathering relevant information and knowledge is an important activity at this stage.

Stage 2: Static On-line Presence

At this stage, the organisation establishes an initial presence on the Internet, but this is limited to a static, information provision role only where information dissemination and communication is essentially uni-directional from the organisation out to interested parties. Information published on-line at this stage may take the form of corporate brochures or brochureware (Berryman, 1999), product/service information and catalogues, information for shareholders, job opportunities with the organisation, and the like. (O’Connor and Galvin, 1998) suggest that of those organisations with a web presence, this is the most common stage of maturity, despite its limitations in terms of accruing the full benefits associated with on-line trading and the IC revolution. This is an essential stage nevertheless, for experimenting, learning, and building organisational commitment.

Stage 3: Interactive On-line Presence

This is the first stage at which organisations enter into two-way communication and interaction with customers on the Internet., Internet channels such as email, browsers and web-databases help to provide information as required to customers, and may also serve to gather information and feedback from customers. One of the classic strategies adopted at this stage is to offer “giveaways” such as screensavers and the like, free to customers (freeware) who will provide their profile or other desired information back to the organisation (O’Connor and Galvin, 1998). While products or services may be ordered after browsing the Internet by email, online forms, fax or phone, typically there is no use of the Internet to actually complete the transaction at this stage. Payment is thus made by more conservative and traditional means such as mailed cheques, C.O.D., and so on.

While at this stage, the Internet site is not generating cash directly through on-line transactions, it may be supporting sales completed in traditional ways (i.e. after gathering information from the web, the customer visits a traditional physical store and completes a transaction). Popular sites with a large amount of traffic may also be able to generate revenues from advertising and referrals to other sites (O’Connor and Galvin, 1998).

Stage 4: Internet Commerce

It could be argued that this stage marks a fundamental change in business activity as, at this stage, organisations are able to complete transactions over the Internet. Thus on-line

inquiries, orders, payments and other services are provided interactively using the Internet as a medium for the conduct of the transaction. At this stage it would be expected that IC activity is starting to impact an organisational structures and processes, with changes being necessitated to accommodate the new way of transacting business. Additional skills and technology may be required to deal with round the clock trading and distribution issues.

Stage 5: Internal Integration

At stage 5, obviously progress has been made in integrating the “front office” Internet transaction capabilities and accompanying technologies with “back office” IS/IT business support systems and technologies. There is a consciousness throughout the organisation of the need to align IS/IT investment with business strategies, and that processes and structures may have to be reengineered to accrue the true benefits of modern technologies (Premkumar, 1999). Discontinuities between IC trading activities and traditional trading activities disappear as organisations achieve better levels of integration across all the IS/IT investments. In this regard, IC may act as a catalyst to remove duplicated effort and truly integrate intra-organisational IS/IT initiatives and investments. Cultural changes may be evident as organisations embrace the new on-line IC environment (AOT and OIC, 1998).

Stage 6: External Integration

IT plays a key role in transforming entire business networks at this stage. Thus blurring and extension of traditional organisational boundaries will occur, giving rise to notions such as the extended enterprise (Oracle, 1999; Harrison and Pratt, 1998; and Tapscott, 1996), and the virtual organisation (Marshall, McKay, and Burn, 1999). Evident at this stage is the integration of business processes and technologies of networks of buyers and sellers, resulting in close and mutually beneficial relationships between trading partners. Extranet technologies may be usefully employed at this stage. Business strategies and IS/IT strategies must be closely aligned at this stage, both internally, to provide a seamless process of placing and receiving an order, making appropriate logistical arrangements, and making and receiving payments electronically, and externally, across all players in strategic business networks. The resultant “internetworked enterprise” (Tapscott, 1996) is responsive, flexible, dynamic and opportunistic in its business activities.

This new model of IC maturity draws on the seven dimensions (Strategy, Structure, Systems, Staff Style, Skills, and Superordinate goals) articulated by Galliers and Sutherland (1994) in their stages of growth model. The 7 Ss have been redefined to suit the environment of IC, and as they have been discussed thoroughly elsewhere (Prananto, 1999), detailed description of these dimensions will not be attended in this paper. Suffice to say that the 7 Ss for each stage provide detailed support and insights for management in terms of where their organisation is currently positioned and on how progress might be made to more mature stages.

While this new model of IC maturity could be argued to show a number of improvements over its predecessors, there remains one serious impediment in this model. It is still premised on the notion that IC and EC activities and use of IS/IT, are still quite separate from traditional IS/IT employed throughout the organisation. It thus seems vital to attempt to integrate the two, and thus to recognise and acknowledge that arguably, true EB sophistication will only be apparent when “front office” and “back office” applications and technologies are seamlessly integrated in the pursuit of organisational efficiencies, effectiveness gains, and competitive advantages.

TOWARDS AN INTEGRATED MODEL OF E-BUSINESS

An integrated model of EB maturity can be achieved through mapping the Internet Commerce Maturity Model proposed in the previous section onto the Galliers and Sutherland model discussed earlier in this paper. The result is called the SOG-e Model (Stages of Growth for E-Business) and is illustrated in Fig. 5.

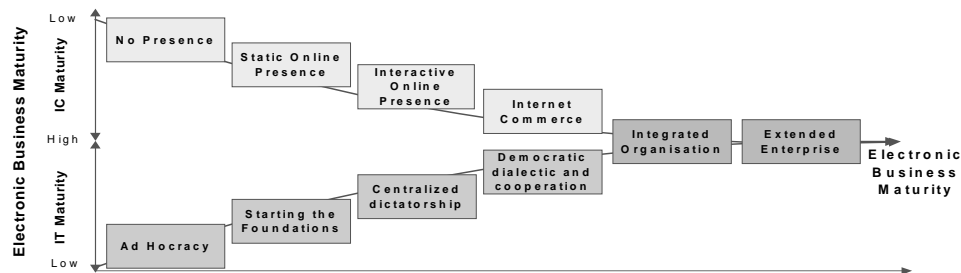


Figure 5: The SOG-e model

The SOG-e model retains the six stages of the Galliers and Sutherland model to describe the maturity of traditional IS/IT within an organisation (illustrated in the bottom half of Fig. 5), but adds the six stage Internet Commerce Maturity Model, which describes maturity in terms of IC (which is captured in the top half of Fig. 5). Attention is drawn to the y-axis in this figure, which charts EB maturity. In the bottom half of the y-axis, representing traditional IS/IT maturity, movement from bottom to top represents increasing maturity, whereas in the top half of the y-axis which represents IC maturity, a movement from top to bottom is required to suggest increasing maturity. The meeting point in the centre of the diagram (achieved in Stage 5 Integrated Enterprise and Stage 6 Extended Enterprise) represents the most mature stage of EB. These final two stages are not dissimilar to the final two stages of organisational transformation described by Venkatraman (1994). According to Venkatraman (1994), Internal integration and business process redesign based on an intranet-driven strategy is more appropriate for increasing internal productivity, while business network redesign and business scope redefinition using an Internet-driven strategy are needed to leverage the external network of business relationships. While it is accepted that at less mature stages, these two components of an organisation's total IT capability may evolve somewhat separately and independently, arguably greater sophistication of IT use (for whatever purpose) must involve full integration, both within the organisation (Stage 5 of the SOG-e model) and ultimately, extended to include an organisation's strategic business network (Stage 6 of the SOG-e model).

As with all other stages of growth models, the SOG-e model assumes that the normal progression is from less mature to increasing sophistication over time. Being at a more mature level assumes an accumulation of the knowledge, experience, skills and expertise of all the previous levels. An important new dimension of the SOG-e model however, is to recognise that within the same organisation, there may exist different levels of maturity for the different components of IT use. Thus it is conceivable that an organisation may be at Stages 3 or 4 with respect to its use of traditional IS/IT, but may still be at Stage 2 (for example) with respect to its maturity in IC. In much the same way, an organisation may have evolved quite quickly to Stage 4 (transacting over the Internet) without having achieved equal maturity with its "back office" IT. To be at Stage 5 or above on the SOG-e model, however, by definition implies at the very least integration of "front" and "back" office applications and technology.

Like the Galliers and Sutherland model, the SOG-e model acknowledges that organisations may “jump” over levels (but assumes that in one way or another, they have acquired the skills of the “missed” level), and also recognizes that extreme circumstances and failure may cause an organisation to regress along one or both of the arms of the model. Being at a reasonably sophisticated level of the Galliers and Sutherland model (say Stage 6) may also support rapid movement through the maturity stages for IC. Thus, if an organisation has experience and success of dedicated IOSs (not Internet-based) that are well integrated with the rest of the IS/IT presence in the organisation, it may be comparatively simple to migrate these systems and/or add Internet-based IOSs and thus quickly achieve Stage 5 or 6 on the SOG-e model without ever having developed a web site, for example. The authors would assert however, that to be able to do this successfully, an organisation would have to possess (or have access to) the requisite skills, knowledge and experience suggesting that it could develop an active on-line presence if it so desired.

USES OF THE SOG-E MODEL

The SOG-e model is useful as a framework to help practitioners understand and describe the current state and position of an organisation with respect to EB, including an assessment of maturity with respect to IC, in addition to an understanding of the maturity of an organisation’s “back office” IS/IT investments. An evaluation of the organisation’s progress with respect to a number of “state variables” (the seven Ss) is enabled and supported by the path of maturity, progress and increasing sophistication with EB that is depicted by the model. The strengths and weaknesses of the current position of all facets of an organisation’s IS/IT can be assessed. Further, a clear understanding of the current position, together with the prescriptive picture that the model provides, can guide future planning and strategy formulation with respect to EB. Thus the model could be viewed as a guide to understanding, diagnosing and evaluating the current position as well as providing insights and guidance on future progression and direction in EB, including the realisation of future business benefits.

CONCLUSION

This paper has described stages of growth model that integrates the concerns and issues of the traditional IS/IT systems or “back office” of organisations with the Internet Commerce systems or “front office”. No stages of growth model to date has attempted such an integration, despite the fact that such an integration is a key aspect of EB maturity.

Preliminary research with this model has resulted in pleasing results that will be reported in a future paper. In general, feedback from industrial and commercial partners in this research has been very encouraging and has suggested that the model is a valuable framework, in particular with respect to their strategic IS/IT planning. However, further and more formal empirical research is needed to validate, refine and enrich the SOG-e model. The authors are currently conducting an in-depth study that examines EB maturity within the context of Australian organisations via the SOG-e model.

REFERENCES

- Australian Electronic Business Network (AeB.N) (1998) *Taking The Plunge: Small Business Attitudes To Electronic Commerce*. Canberra: Department of Communications, Information Technology and the Arts (DOCITA).
- Automated Office Technology (AOT) and Office of Information and Communication (OIC) (1998) *Electronic Commerce: Issues Opportunities Action Plan*. Perth, Western

- Australia: Department of Commerce and Trade Office of Information and Communication (OIC).
- Berryman, E (1999). *Getting on with the Business of E-business*. PriceWaterhouseCoopers.
- Bhabuta, L. (1988) "Sustaining productivity and competitiveness by marshalling IT," in *Information Technology Management for Productivity and Strategic Advantage*, Singapore: Proceedings of the IFIP TC8 Open Conference.
- DFAT (1997) *Putting Australia on the New Silk Road: The Role of Trade Policy in Advancing Electronic Commerce*. Canberra, Australia: Department of Foreign Affairs and Trade (DFAT).
- Dominique, B. (Ed.) (1997) *Electronic Commerce in Support of SMEs: The White Book*. Lyon, France: EITIRT, The European Commission, and The Grand Lyon.
- Earl, M.J. (1983) "Emerging trends in managing new information technologies," in N. Peirce, Ed. *The Management Implications of New Information Technology*. London: Oxford Centre for Management Studies.
- Galliers, R.D. and Sutherland, A.R. (1994) "Information systems management and strategy formulation: Applying and extending the 'stages of growth' concept," in *Strategic Information Management: Challenges and Strategies in Managing Information Systems*, R.D. Galliers and B. S. H. Baker, Eds. Oxford: Butterworth-Heinemann Ltd., pp. 91-117.
- Harrison, D.B. and Pratt, M.D. (1998) "A methodology for reengineering businesses," in *Organisational Transformation through Business Process Reengineering*, V. Sethi and W.R. King, Eds. Upper Saddle River, New Jersey: Prentice Hall.
- Henry, D., Buckley, P., Gurmukh, G., Cooke, S., Dumagan, J., Pastore, D., and Laporte, S. (1999) *The Emerging Digital Economy II: Economics And Statistics Administration*. Washington, USA: U.S. Department of Commerce.
- Hirschheim, R., Earl, M., Feeny, D., and Lockett, M. (1988) "An exploration into the management of the information systems function: Key issues and an evolutionary model," in *Information Technology Management for Productivity and Strategic Advantage*, Singapore: Proceedings of the IFIP TC8 Open Conference.
- Kalakota, R. and Robinson, M. (1999) *E-business: Roadmap for Success*. Massachusetts, USA: Addison-Wesley.
- KPMG (1997) *Electronic Commerce Research Report 1997*. London, UK: KPMG.
- Marshall, P., McKay, J., and Burn, J. (1999) "The three S's of virtual organisations: Structure, strategy and success factors," in *E-Commerce and V-Business*, B. Hunt and S. Downes, Eds. London: Butterworth Heinemann.
- Marshall, P., Sor, R., and McKay, J. (1999) "An industry case study of the impacts of electronic commerce on car dealerships in western australia," in *Proceedings of the Collaborative Electronic Commerce Technology and Research Conference*. New Zealand: University of Wellington.
- Mougayar, W. (1998) *Opening Digital Markets: Battle Plans and Business Strategies for Internet Commerce*. New York: McGraw-Hill.
- Nolan, R.L. (1973) "Managing the computer resource: A stage hypothesis," *Communications of the ACM*, vol. 16 no. 7, pp. 399-406.
- Nolan, R.L. (1979) "Managing the crisis in data processing," *Harvard Business Review*, pp. 115-126, Mar-Apr.
- O'Connor, J. and Galvin, E. (1998) *Creating Value through E-commerce*. London: Financial Times, Pitman Publishing.
- OECD (1999) *The Economic and Social Impact of Electronic Commerce: Preliminary Findings and Research Agenda*. Paris, France: Organisation for Economic Co-operation and Development (OECD).

- Oracle (1999) *Capturing Electronic Commerce Opportunities: An Oracle Business White Paper*. Redwood Shores, California: Oracle Corp.
- Poon, S. (1999a) "Management's role and internet commerce benefit among online small businesses," in *Proceedings of the 7th Conference on Information Systems*, J. Pries-Heje, C. Ciborra, and K. Kautz, Eds. Copenhagen, Denmark: Copenhagen Business School, pp. 559-571.
- Poon, S. (1999b) "Small business and Internet Commerce: What are the lessons learned?" in F. Sudweeks and C. T. Romm, Eds. *Doing Business on the Internet: Opportunities and Pitfalls*. London, UK: Springer, pp. 113-124.
- Prananto, A. (1999) *Electronic Business Stages of Growth: A Definition and Evaluation in an Australian Context*, unpublished doctoral candidacy proposal. Perth, Western Australia: School of Management of Information Systems, Edith Cowan University.
- Premkumar, G. (1999) "Supply chain management and inter-organizational systems: An integrated perspective," in *Proceedings of the Fifth Americas Conference on Information Systems*. Milwaukee, Wisconsin: Association of Information Systems, pp. 621-623, August 13-15.
- Stroud, D. (1998) *Internet Strategies: A Corporate Guide to Exploiting the Internet*. London: Macmillan Press Ltd..
- Tapscott, D. (1996) *The Digital Economy: Promise and Peril in the Age of Networked Intelligence*. New York: McGraw-Hill.
- UNCTAD (1998) *Policy Issues Relating to Access to Participation in Electronic Commerce*. Geneva: United Nations Conference on Trade and Development (UNCTAD).
- Venkatraman, N. (1994) "IT-enabled business transformation: From automation to business scope redefinition," in *Sloan Management Review*, vol. 35, no. 2, pp. 73-87.

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