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# Exploring the Perceptions of Inhibitors and Drivers of eBusiness Progression Among SMEs at Different Stages of eBusiness Maturity

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# EXPLORING THE PERCEPTIONS OF INHIBITORS AND DRIVERS OF E-BUSINESS PROGRESSION AMONG SMES AT DIFFERENT STAGES OF E-BUSINESS MATURITY

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## Abstract

*It is imperative for an organisation to identify potential drivers and inhibitors of e-business in order to minimise the risk and maximise the benefits derived from its e-business initiative. Although the issues of drivers and inhibitors of e-business/e-commerce have been the subject of intensive discussions elsewhere, the literature bears no indication of any attempt to look into the distinction of the drivers and inhibitors of e-business perceived by organisations at different level of e-business maturity. Hence, in this paper, it is our intention to explore this issue further. Using a stage model we developed to distinguish organisational maturity in approaching their e-business initiatives, we found that there are differences in emphasis on how organisations at different level of maturity. Arguably, by realising and understanding which issues need to be prioritised, organisation would be better equipped in anticipating any difficulties in progressing through with their e-business initiatives.*

*Keywords: Stage of Growth, E-business progression, Small and Medium Enterprises (SMEs), inhibitors, drivers.*

## **1 INTRODUCTION**

There are numerous reports and literature highlighting the potential benefits of e-business, especially for organisations classified as Small and Medium Enterprises (SMEs) (EITIRT, 1997; AeBN, 1998; DFAT, 1999; CEC, 2001; EBPG, 2002; Brown, 2002; and Yellow Pages Business Index, 2002 & 2003 to name a few). As an organisation conduct e-business, there are a range of issues to think through as well as the challenges and opportunities presented by e-business. More interestingly is how these challenges and perceived opportunities affect the progress of an organisation's e-business. Admittedly, there have been a number of publications and research regarding the drivers and inhibitors of e-business/e-commerce in SMEs (refer to the work of MacGregor et al., 1996; Cameron & Clarke, 1996; Lowry et al., 1999; Chau, 2001; Mehrtens et al., 2001; EBPG, 2002; Brown, 2002; Levy & Powell, 2002; Stansfield & Grant, 2003). However, none of these publications look into the perception of SMEs at different level of e-business maturity when dealing with these factors. Arguably, SMEs at higher level of e-business maturity would perceive these drivers and inhibitors differently from their counterparts with low e-business maturity.

In our endeavour to understand why SMEs progressed at a different rate when it comes to their e-business initiatives, we found that although these organisations faced similar challenges, they perceive and rate the severity of these challenges differently. In realisation that there are comparatively few publications addressing this issue, we decided to develop a stage model and use it to analyse the factors that act as drivers and inhibitors of e-business. The stage model was developed and used as a framework to chart the trajectory of maturity of e-business initiative within the company. This model was also used to assist in identifying and understanding the issues surrounding the e-business progression within a company. The following sections will discuss the concept of a stage model followed by some explanation of the stage model developed and used in this research.

## **2 STAGES OF GROWTH MODEL TO EXPLAIN E-BUSINESS PROGRESSION**

Since the introduction of computer technology into organizations in the 1960s, there have been numerous attempts to develop models of IS/IT maturity (Nolan, 1973; Nolan, 1979; Earl, 1983; Bhabuta, 1988; Hirschheim et al., 1988; Galliers & Sutherland, 1994). All of these models are premised on the idea that organizations 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 organization'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 organization of the IT function as the organization progresses to greater sophistication in its use of IT. Many of the earlier stages of growth models were criticized 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 (1994) is a notable exception in this regard.

In order to explain the progression of e-business in the context of Australian SMEs, we developed a "Stages of Growth for e-Business" (SOGe) model (see Prananto et al, 2003ab). The original and provisional SOGe model (refer to McKay et al 2000a & 2000b) was based on Galliers and Sutherland's stage model for IS/IT development (Galliers & Sutherland, 1994) combined with the Internet Commerce Maturity model (McKay et al., 2000b). However, after a rigorous testing, the

model evolved to its current form (see Appendix A for the summary of the model). As with all other stages of growth models, the SOGe model assumes that a normal progression is from a less mature to an 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. Based on this model, we developed a questionnaire to explore various issues affecting the progression of e-business within the SME sector and to explore if there are any differences in which organisations at different level of e-business maturity perceived these issues.

### **3 RESEARCH DESIGN**

A systematic sampling method was used in determining the sample of the study. Categorised as a probability sampling technique (Jobber, 1991; Malhotra, 1996; Scheaffer et al., 1996), the sample is chosen by selecting a random starting point and then selecting every  $n^{\text{th}}$  element in succession from the sampling frame (Hansen et al., 1953; Hoinville & Jowell, 1978; Barnett, 1991; Levy & Lemeshow, 1991). It is more or less the same as the random sampling, in which each element in the population has a known and equal chance of being selected (Hansen et al., 1953). The only difference is that “only permissible samples of size  $n$  can be drawn with a known and equal probability of selection, while the remaining sample of size  $n$  has a zero probability of being selected” (Malhotra, 1996, p. 313).

Prior to distribution, a series of pilot tests were conducted with a group of 20 middle managers from a range of businesses and a group of 6 PhD students. The test participants were asked to complete the questionnaire and then evaluate the questionnaire for clarity, bias, ambiguous questions, and relevance of the questions. After the questionnaire had been finalised, the questionnaire was administered to the 500 senior executives in-charge of the e-business initiatives of their respective organisations. The questionnaire was distributed in March 2002.

### **4 SAMPLE PROFILE**

Response from the 500 SMEs surveyed was encouraging. Within the cut-off date, set at 3 weeks after the survey was distributed, there were approximately 109 returned questionnaires and 34 questionnaires being returned to the sender for various reasons (i.e. the company does not exist in the specified address or the addressee was no longer working for the company). Of the 109 companies, 3 respondents indicated in their letter or email that they do not have IS/IT and e-business ability and hence were not able to participate. 2 of the questionnaires were not filled adequately, prompting their removal from the sample as this might increase the error and bias of the survey. Elimination of the respondents from the sample due to such circumstances is common when computing the actual response rate (Chadwick et al., 1984). Effectively, 104 usable responses were included in the sample for further analysis, representing a good response rate at 22.6%. This is well above the normally-low response-rate of 5-10% for a postal survey (Alreck & Settle, 1985; Barnett, 1991). Such a high response rate can be contributed to the follow-up letter, email, and phone call (Sekaran, 1992; Cavana et al., 2000) conducted within the first 2 weeks of the survey distribution.

#### **4.1 Demographics**

The final sample, comprised of 104 organisations from the private sectors, consists of 38 (36.5%) manufacturing firms, 15 (14.4%) firms in the business services sector, 12 (11.5%) retailers, 11 (10.6%) wholesalers, 5 (4.8%) firms in the financial services category, 10 (9.6%) firms in the category of IT communication & services, and 13 (12.5%) organisations from various categories. The organisations involved in the survey were spread almost evenly at the 4 age-of-the-organisation classifications set in the study. While 24% of the participating organisations were relatively young companies (<10 years), most of the respondents (73.1%) indicated that their organisation had been in

business for 10 years or more (22.1% of the organisations had been in business for 10-20 years; 21.2% of the organisations had been in business for 21-30 years; and 29.8% had been in business for over 30 years).

#### 4.2 Key personnel's characteristics

The majority of the organisations' key personnel responding in this survey are the IS/IT managers (32%), followed by business managers and managing directors at 22% and 19% respectively. Other respondents held the position of business director (11%), CEO (8%), finance director (5%), technical director (2%), and a CIO (1%). In terms of involvement in the organisation's e-business initiatives, the majority of the respondents (51%) indicated that their role is mainly to supervise the e-business development and implementation, 32.7% indicated they have had a direct involvement in the e-business initiatives of the company, while 9.6% have informal or ad hoc involvement in e-business initiatives. Overall, there are a significant number (83.7%) of the respondents who have a first hand knowledge of their organisation's e-business initiatives. Arguably, this would significantly increase the reliability of their responses in answering the questionnaire.

## 5 SURVEY FINDINGS & DISCUSSIONS

After presenting the characteristics of the respondents and having established that these respondents have the capacity to give a relevant and knowledgeable response to the survey instrument, the discussion can then be focussed on to the result and the findings of the survey.

### 5.1 Determining the Respondents' E-Business Maturity

In order to determine the respondent's level of maturity with regards to their approach to their e-business initiatives, a self-typing paragraph approach was utilised to gather the necessary data without imposing the concept of stages development to the respondents. Self-typing paragraph refers to the use of short and unlabeled paragraphs that shows a set of descriptions in which the respondents can be asked to identify and indicate which paragraph best describe their opinions/situations (James and Hatten, 1995). With regards to this research, the respondents were asked to read each description of the stages, reminisce on their past and present e-business and compare their approach towards their e-business initiatives with the SOGe's stages description. The respondents were then asked to outline the time period where the particular stage of the SOGe model resembles their organisation's approach towards e-business.

The aim of using this approach was to obtain data regarding the specific time frame of each stage passed by the organisation. (i.e., firm A was at stage 1 from 1995 to 1999, stage 2 from 1999 to 2001, and stage 3 from 2002 onwards). Using the data gathered from this question, we managed to identify the current stage of e-business maturity of the organisation involved in the study (as indicated by the respondents themselves). We then use this data to explore the differences of the perceptions between organisations at different stages of e-business maturity regarding various issues and factors affecting their e-business initiatives.

### 5.2 Drivers of E-Business Progression

The respondents' perceptions of the factors that act as drivers of e-business progression are reported in table 1. Note that the responses in table 4 have been ranked according to their importance as indicated by the means. In this section, key informants were asked to rate the reasons that influence their company's decision to progress through with their e-business initiatives to its level of maturity.

<b>Drivers</b>	<b>Mean</b>	<b>N</b>
Suppliers' or partners' e-business initiatives	4.70	102
Senior management stewardship of e-business	4.55	101
Pressure from customers	4.50	101
New and emerging technology	4.20	101
Competitors' e-business initiatives	4.17	102
Changes in strategic direction	4.11	101
Changes in marketplace	4.01	102
Changes in industry sector	3.80	100
Outsourcing services	2.98	99
External consultants	2.90	101
Government policy/initiatives	2.37	101

Respondents scored each item on a 7-point scale where 1 = not influential 7= very influential

Table 1. Factors influencing the progression of e-business

From table 1 above, it is clear that the company's *suppliers' or partners' e-business initiatives* (4.70) has been the most influential driver for the SMEs to evolve its e-business initiatives to its current level of maturity followed by *stewardships of senior management* (4.55) and the *pressure from their customers* (4.5). Interestingly, the role of *outsourcing services* (2.98), *external consultants* (2.90) and influence of *government initiatives* on e-commerce/e-business (2.37) are considered the least influential in driving the progression of e-business initiatives within these organisations.

Some distinct differences in the degree of emphasis on these factors emerged when the data was separated based on the organisations' level of maturity. As can be seen in table 2 and table 3, the main drivers to engage on e-business initiatives for companies at an earlier stage (i.e. stage 1 and stage 2) came from external pressures such as their *customers' initiatives* (4.11 and 4.76 respectively), their *suppliers' and/or business partners' e-business initiatives* (4.05 and 4.43 respectively), *competitors' e-business initiatives* (3.11 and 3.52 respectively), and the novelty of *internet as an emerging technology* (3.00 and 4.10 respectively), indicating that adoption of e-business initiatives at these stages are more of reactionary responses than a careful consideration and self-realisation of the need to have innovative e-business solutions stemming from the need of the organisations to obtain strategic advantage.

At the other end of the continuum, however, more mature organisations tend to be driven by internal factors, such as *stewardship of e-business by senior management* (6.00 for stage 5, 5.60 for stage 6) coupled with the *changes in the company's strategic direction* (5.50 for stage 5, 6.00 for stage 6). In addition, ranked highly as drivers for companies at stage 5 are external factors such as *emerging technology* (5.33), *suppliers/business partners' initiatives* (5.03), and their *competitors' initiatives* (5.00). Stage 5 companies indicated that additional factors that are highly influential in driving their e-business progression are the *changes in marketplace* (5.20), *pressure from their customers* (5.20), and *changes in their respective industry sector* (5.00). This shows that although there are external pressures to develop their e-business initiatives, the main drivers came from within the organisations. This clearly indicates that the changes and the decision to progress through with their e-business initiatives were determined after careful consideration by the management based on the need of the business and in response to the challenges posed by the organisation's external environments.

<b>Drivers</b>	<b>Stage 1</b>	<b>Stage 2</b>	<b>Stage 3</b>	<b>Stage 4</b>	<b>Stage 5</b>	<b>Stage 6</b>
Government policy/initiatives	1.67	2.33	1.73	2.38	3.67	2.80
Competitors e-business initiatives	3.11	3.52	4.91	4.48	5.00	4.80
Supplier-partners e-business initiatives	4.05	4.43	4.45	5.03	5.50	4.80
Changes in industry sector	2.56	3.24	4.45	3.96	4.67	5.00
Changes in marketplace	2.79	3.19	4.55	4.45	4.83	5.20
Pressure from customers	4.11	4.76	5.09	4.21	4.25	5.20
New and emerging technology	3.00	4.10	4.27	4.52	5.33	4.20
External consultants	2.50	2.81	4.18	2.86	2.67	2.80
Outsourcing services	2.56	2.95	3.60	2.75	3.00	3.80
Changes in strategic direction	2.17	3.29	5.00	4.34	5.50	6.00
Senior mgmt stewardship of e-business	3.06	3.33	5.00	5.24	6.00	5.60

Table 2. *Priority of drivers for e-business initiatives at each stage (note that the darkened cells contain the 5 highest means in each grouping)*

	<b>Rank 1</b>	<b>Rank 2</b>	<b>Rank 3</b>	<b>Rank 4</b>	<b>Rank 5</b>
Stage 1	Pressure from customers	Supp-partners e-business initiatives	Competitors e-business initiatives	Senior mgmt stewardship of e-business	New and emerging technology
Stage 2	Pressure from customers	Supp-partners e-business initiatives	New and emerging technology	Competitors e-business initiatives	Senior mgmt stewardship of e-business
Stage 3	Pressure from customers	Changes in strategic direction	Senior mgmt stewardship of e-business	Competitors e-business initiatives	Changes in marketplace
Stage 4	Senior mgmt stewardship of e-business	Supp-partners e-business initiatives	New and emerging technology	Changes in marketplace	Competitors e-business initiatives
Stage 5	Senior mgmt stewardship of e-business	Supp-partners e-business initiatives	Changes in strategic direction	New and emerging technology	Competitors e-business initiatives
Stage 6	Changes in strategic direction	Senior mgmt stewardship of e-business	Changes in marketplace	Pressure from customers	Changes in industry sector

Table 3. *Rank order of drivers of e-business at different stage of maturity*

### 5.3 Inhibitors of E-Business Progression

Respondents were also asked to rate the concerns/problems acting as inhibitors for the development of their e-business initiatives. The responses were reported in table 4 below.

<b>Inhibitors</b>	<b>Mean</b>	<b>N</b>
Access to technical skills & expertise	5.13	100
Expanding the infrastructure for e-business	4.73	101
Managing e-business project	4.60	99
Cost of e-business	4.24	99
Reengineering business processes	4.21	99
Business-technology alignment	4.19	99
Coord between business-technology people	4.05	100
Lack of senior management support	3.57	101
Conflict between traditional business and e-business initiatives	3.02	99
Conflict with traditional trading partners	2.57	99

*Respondents scored each item on a 7-point scale where 1 = not problematic  
7= very problematic*

*Table 4. Major problems encountered*

Overall, it is reported that access to technical skills and expertise (5.13), expanding the infrastructure (4.73) and managing e-business project (4.60) are the main inhibitors to e-business initiatives. In addition, cost (4.24), business processes reengineering (4.21), alignment between business and technology (4.19), and coordination between business and technology (4.05) were also ranked highly as potential barriers to e-business implementation. On the other hand, lack of senior management support (3.57), conflict between traditional business and e-business initiatives (3.02) and conflict with traditional trading partners (2.57) are perceived to have less importance as barriers to the progression of e-business within the company.

However, when this finding was examined based on the organisations' e-business level of maturity, a clearer picture emerges from the data. As expected, there are actual differences in how organisations at different level of maturity perceived the barriers and/ inhibitors of e-business. Shown in table 5, it is apparent that preparing the infrastructure for e-business and limited access to technical skills and expertise are the major barriers in advancing the organisation's e-business. This is followed by other barriers such as cost of e-business, management of e-business, and support from senior management. Note that the average range of means of these factors reveals no significant differences, which might suggests that they are perceived as being closely related to each other. This makes sense, as organisations at the lower end of maturity would not normally have the required infrastructure to run e-business, hence they would need to put a significant amount of investment to build their e-business infrastructure. Furthermore, as SMEs, it would not be unusual for these organisations not to have adequate access to the required skills and expertise needed to implement their e-business vision. Access to appropriate skills and expertise might also be hampered by the cost factor, as obtaining people with the needed skills might involve a significant investment as well. This would implicate their ability to manage e-business project. It is interesting to note that lack of support from senior management was ranked quite highly as inhibitors of e-business progression, albeit lower than the other four factors mentioned above. This is in contrast with the rank of senior management support presented in table 4. In table 4, influence of senior management support was ranked as "medium". Hence, once again, this highlights the fallacy of analysing such data without considering the differences of perception from organisations at different stages of e-business maturity.

<b>Problems</b>	<b>Stage 1</b>	<b>Stage 2</b>	<b>Stage 3</b>	<b>Stage 4</b>	<b>Stage 5</b>	<b>Stage 6</b>
Cost of e-business	5.06	5.10	4.90	3.52	3.17	3.90
Expanding the infrastructure for e-business	5.33	5.25	6.10	3.83	4.33	4.50
Access to technical skills & expertise	5.33	5.30	6.30	4.66	4.58	5.30
Managing e-business project	5.03	5.10	5.10	4.36	4.17	3.50
Coord between business-tech people	3.33	4.90	4.30	3.86	4.17	3.60
Reengineering business processes	3.50	4.55	4.20	4.31	4.58	3.80
Business-technology alignment	3.14	3.89	4.30	3.72	4.33	3.30
Senior management support	4.27	4.90	3.60	2.93	3.50	1.80
Conflict between traditional business and e-business initiatives	2.62	3.00	3.40	3.14	3.50	2.30
Conflict with traditional trading partners	2.54	2.11	2.60	2.69	3.08	2.50

Table 5 Major problems encountered at each stage of maturity (note that the darkened cells contain the 5 highest means in each grouping)

Organisations at all stages seem to consider having access to appropriate technical skills and expertise as the main difficulty in going forward with their e-business initiatives (refer to table 6). As discussed in the previous sections, this factor can be related to the characteristics of the target population of the survey, which consist of SMEs. In general, the top 5 factors that act as inhibitors to the e-business progression are consistent between organisations at different level of maturity. However, the differences in emphasis between organisations at more mature stages with those of less mature stages are significant. It is pertinent to acknowledge that organisations at the highest level of e-business maturity perceived these factors at somewhat less problematic (indicated by lower average means) than those organisations at the lower level of maturity. This suggests that despite the higher degree of complexity surrounding their e-business initiatives, organisations with a higher level of e-business maturity are more capable of dealing with problems associated with e-business. It is also argued that as an organisation progresses through with its e-business, it also acquired and retained the knowledge and experience that prepares the organisation to deal with more complex and more difficult problems that it would likely to encounter at the next stage of progression.

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Stage 1	Expanding the infrastructure for e-business	Access to technical skills & expertise	Cost of e-business	Managing e-business project	Senior management support
Stage 2	Access to technical skills & expertise	Expanding the infrastructure for e-business	Cost of e-business & Managing e-business project	Coord between business-tech people	Senior management support
Stage 3	Access to technical skills & expertise	Expanding the infrastructure for e-business	Managing e-business project	Cost of e-business	Business-technology alignment
Stage 4	Access to technical skills & expertise	Managing e-business project	Reengineering business processes	Coord between business-tech people	Reengineering business processes
Stage 5	Access to technical skills & expertise	Reengineering business processes	Expanding the infrastructure for e-business	Business-technology alignment	Managing e-business project
Stage 6	Access to technical skills & expertise	Expanding the infrastructure for e-business	Cost of e-business	Reengineering business processes	Coord between business-tech people

Table 6. Rank order of problems encountered at different stage of maturity

## 6 CONCLUSION

The use of the SOGe model has provided some unique perspectives in examining the influence of various organisational issues in affecting the progression of an organisation's e-business. The use of the stages model as a classification criterion in analysing the drivers and barriers/inhibitors of e-business clearly highlight another potential use of the model. The analysis of these factors show a distinction between the degrees of emphasis between organisations at different stage of maturity, in which these factors were considered as influential in affecting the progression of e-business initiatives. Arguably, by realising and understanding which issues need to be prioritised at different levels of maturity, organisation would be better equipped in anticipating any difficulties in progressing through with their e-business initiatives. In addition, as a follow up of this study, we have contacted some of our survey respondents to obtain their agreement to allow us to conduct a more in-depth research in their organisations to explore if there is indeed a change in their perception of these factors overtime.

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Appendix A. Summary of the Revised SOGe Model

Stage Char	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6
<b>Strategy</b>	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
<b>Systems</b>	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
<b>Staffs/ Skills</b>	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
<b>Bus Proc</b>	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. Integration of the e-business initiative and business processes between the organisation's and its business partners