

Association for Information Systems AIS Electronic Library (AISeL)

ECIS 2002 Proceedings

European Conference on Information Systems
(ECIS)

2002

A Framework for Analyzing Factors Influencing Small to Medium Sized Enterprises (SMEs) Ability to Derive Benefit from the Conduct of Web Based Electronic Commerce (EC) - 34 Australian Case Studies

Stephen B. Chau

University of Tasmania, stephen.chau@utas.edu.au

Paul Turner

University of Tasmania, paul.tumer@utas.edu.au

Follow this and additional works at: <http://aisel.aisnet.org/ecis2002>

Recommended Citation

Chau, Stephen B. and Turner, Paul, "A Framework for Analyzing Factors Influencing Small to Medium Sized Enterprises (SMEs) Ability to Derive Benefit from the Conduct of Web Based Electronic Commerce (EC) - 34 Australian Case Studies" (2002). *ECIS 2002 Proceedings*. 110.

<http://aisel.aisnet.org/ecis2002/110>

This material is brought to you by the European Conference on Information Systems (ECIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in ECIS 2002 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

A FRAMEWORK FOR ANALYSING FACTORS INFLUENCING SMALL TO MEDIUM SIZED ENTERPRISES (SMEs) ABILITY TO DERIVE BENEFIT FROM THE CONDUCT OF WEB-BASED ELECTRONIC COMMERCE (EC) – 34 AUSTRALIAN CASE STUDIES

Stephen B. Chau

School of Information Systems, University of Tasmania

G.P.O. Box 252-87 Hobart, Tasmania, Australia

Tel: +61-3-6226 7435, Fax: +61-3-6226 2913

Email: stephen.chau@utas.edu.au

Paul Turner

School of Information Systems, University of Tasmania

G.P.O. Box 252-87 Hobart, Tasmania, Australia

Tel: +61-3-6226 2930, Fax: +61-3-6226 2913

Email: paul.turner@utas.edu.au

ABSTRACT

This paper is based on case study research conducted with thirty-four Australian SMEs. It develops a framework for identifying and analysing the factors influencing SMEs ability to derive benefit from conducting web-based EC. Adapting the work of Venkatraman (1994) the paper begins by presenting a model of E-business transformation exploring the relationship between the degree of SME organisational transformation and the potential benefits to be derived from EC. This four phase model is used as a basis for examining the range of internal and external factors that influence SMEs ability to engage in these types of organisational transformations and to derive benefits from EC. The factors are grouped into two categorises: internal and external. From analysis it emerges that depending on their nature, these factors generate inhibiting or enabling forces on an SME's ability to engage in EC business transformation. More specifically, within any particular phase it is the interaction between these inhibiting/enabling forces that directly influence the ability of an SME to derive benefit from the conduct of web-based EC. Significantly the case study analysis also indicates that where SMEs have already engaged in a high level of EC business transformation (phase 4 Enterprises) their ability to derive further marginal benefit from EC becomes increasingly linked to the nature of factors external to the enterprise.

1. INTRODUCTION

Numerous studies have illustrated the relative disparities that exist between large enterprises and small to medium sized enterprises (SMEs) in the adoption and utilisation of Electronic Commerce (EC) (Lowry et al, 1999; NOIE, 2000a; Poon & Swatman, 1998). While EC offers SMEs a range of potential benefits including global reach (Hughes, Ralf & Michels, 1998), equalising the business environment (Winston, Stahl & Choi, 1997), cost savings and increased productivity (Burgess, 1998)

low relative SME adoption has continued. These studies resonant with the view that small businesses are not the same as large businesses, and that the differences between them go beyond simple distinctions based on size, turnover and resources (Dandridge, 1979; Welsh & White, 1981).

In Australia¹, researchers have previously explored the range of factors inhibiting SME adoption of EC (Cameron & Clarke, 1996, Corbitt et al, 1997; Freel, 2000; Lawrence & Keen, 1997; MacGregor et al, 1996, 1998; Poon et al, 1996). As increasing numbers of SMEs have become web-enabled subsequent research has highlighted that even where SMEs adopt EC technologies this often does not convert into the active utilisation and conduct of EC (Small Business Index, 1999; NOIE, 2000b). Recent Australian surveys have examined inhibitors to this active utilisation and identified a number including: perceptions of the unsuitability of products and services for EC; time and expense; concerns that EC will lead to uncontrolled growth; uncertainty in the quality and availability of products; in delivery and supply arrangements and fear of alienating existing intermediaries (Small Business Index, 2000). More recently research into the drivers that stimulate SMEs to overcome adoption barriers and actively utilise EC has emerged (Wong & Turner, 2001). To date however, there has been limited detailed exploration of the factors that influence the ability of SMEs to derive benefit from engaging in EC utilisation.

Based on case study research conducted with thirty-four Australian SMEs this paper develops a framework for identifying and analysing these factors. Acknowledging the work of Venkatraman (1994) the paper begins by presenting a model of E-business transformation exploring the relationship between the degree of SME organisational transformation and the potential benefits to be derived from EC. This four phase model is used as a basis for examining the range of factors that influence SMEs ability to engage in these types of organisational transformations and to derive benefits from EC. The factors are grouped into two categorises: internal and external. From analysis it emerges that depending on their nature, these factors generate enabling or inhibiting forces on an SME's ability to engage in EC business transformation. More specifically, within any particular phase it is the interaction between these inhibiting/enabling forces that directly influence the ability of an SME to derive benefit from the conduct of web-based EC. Significantly the case study analysis also indicates that where SMEs have already engaged in a high level of EC business transformation (phase 4 enterprises), their ability to derive further marginal benefit from EC becomes more intimately linked to the nature of factors external to the enterprise².

1.1 The 34 Case Studies:

This paper is part of research in progress investigating the adoption and utilisation of EC by Australian SMEs. The aim of the case studies was to investigate the uptake and use of EC amongst SMEs and to construct an EC utilisation framework. The case studies represent a broad range of businesses from a number of different industries including agriculture, retail trade, hospitality, education, communications, and manufacturing. These businesses vary in age from start-ups to those that are well established. The SMEs that participated in this research were drawn from two States in Australia: approximately half the case studies were conducted in Tasmania and the other half in Western Australia over an 18-month period. A basic description of the 34 case studies is presented in the Appendix 1.

¹ In Australia, SMEs are a significant force in the economy making up 95% of all enterprises and accounting for 50% of all private sector employment.

² SMEs generally have a limited ability to exert influence over their business environment – this again emphasizes an important distinction between large and small enterprises that impact on potential to derive EC benefit.

2. METHODOLOGY

An interpretative epistemology combined with a qualitative research design was deployed as the most logical and appropriate approach to capture information about the beliefs, actions, and experiences of SME participants³ in relation to their use of EC. Yin (1984) and Benbasat, Goldstein and Mead (1987) have previously discussed the merits of using multiple case studies to provide replication logic and rich descriptions of emergent research areas. Similarly Zikmund (1997) has justified and validated multiple case study analysis for investigations into the use of inter-organisational information systems.

Following a detailed review of existing research into IT and EC amongst SMEs a semi-structured question frame was developed to explore the EC utilisation process. Background data was collected on each business, its associated internal and external trading systems and core/target markets. Managers/Owners were then asked a series of questions investigating the reasons for adopting EC and the current use of EC within the business. Associated questions addressed problems faced during or subsequent to EC adoption; organisational changes that occurred as a result of EC; benefits received from utilising EC; and, the direct impact of EC on business performance. An appraisal of existing IT/EC skills and resources was also undertaken along with insights into future EC plans. The development process of EC applications and how these systems were supported and maintained was also addressed. Finally interviewees were asked to outline the incorporation of their EC strategies within existing business structures⁴.

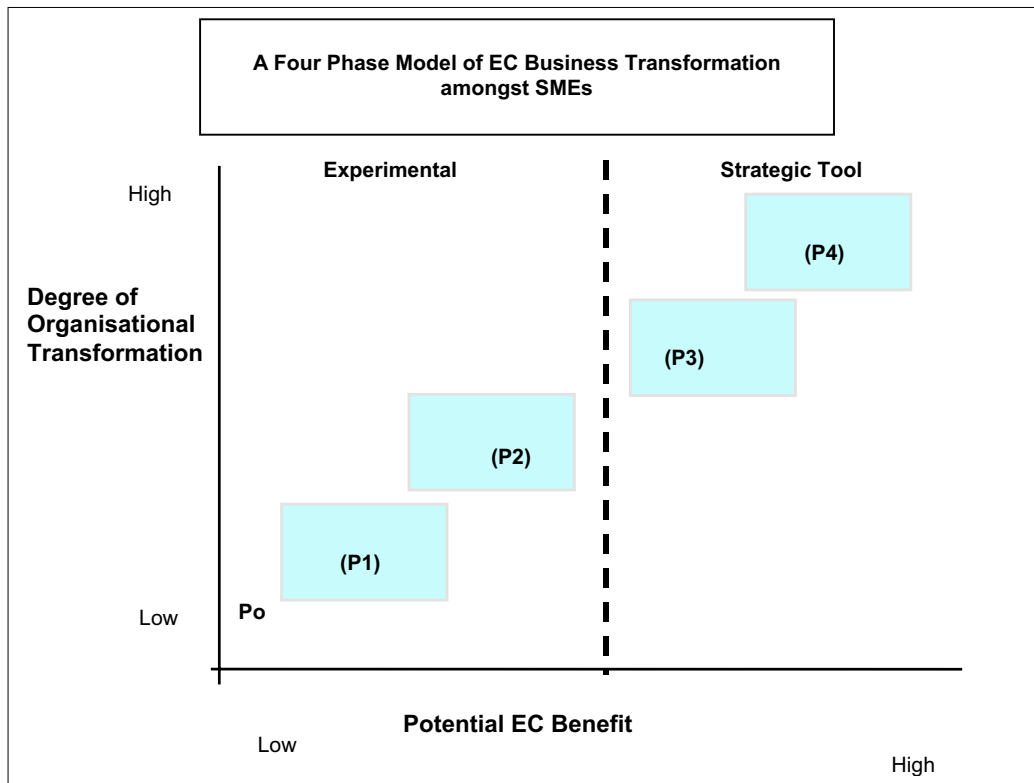
3. A MODEL OF EC BUSINESS TRANSFORMATION

Initial research analysis of these 34 case studies revealed that the SMEs web-based EC activity could meaningfully be categorised into four phases⁵: static web site; adjunct to traditional business; substantial re-engineering of business processes; virtual enterprise (Chau, 2001). Subsequent analysis revealed a link between the degree of SME organisational transformation and the potential to derive benefits from EC activities. This led to the development of an extended four phase model (Chau & Turner, 2001b). This extended model (Diagram 1) acknowledges Venkatraman's (1994) work identifying an association between the range of potential benefits enabled by investment in information technology and levels of organisational transformation.

³ Conventional techniques were deployed in identifying and selecting SMEs using EC. Forty were formally approached and thirty-four agreed to participate in the study.

⁴ Interview transcripts were analysed through three levels of coding based on grounded theory

⁵ The term phase is used to highlight that SMEs can either establish themselves directly at any one of the phases or follow a staged process moving from one phase to another. It also encapsulates the view that the desirability of any phase for an SME relates directly to its business directions and broader strategic goals.

Diagram 1. An Extended Four Phase Model of EC Business Transformation

It also acknowledges the work of Poon and Swatman (1998) on SMEs that identified a relationship between organisational process adjustment and potential benefits from the Internet for internal application systems integration. Based on analysis of the 34 case studies the model depicts:

- Potential benefits to be derived from EC activities increase where enterprises engage in a process of organisational transformation. Where investment in EC technologies increases optimal benefits can only be obtained by suitable changes in organisational structure and processes.
- The phases depicted do not prescribe an evolutionary path for EC utilisation. The position of a particular SME relies on strategic choices. Subject to business directions and strategic goals it is possible through investment for an SME to migrate or establish themselves directly at any one of the four phases.
- There are two distinct perspective's adopted by SMEs in relation to the use of EC. The initial stage comprises a period of experimentation with EC that delivers limited EC benefits and requires limited organisational change. The second stage involves a clear strategic direction requiring greater resources and organisational transformation to acquire increased potential to derive EC benefit.

Position P0: Conventional SME utilising no web based EC.

SMEs in this phase may adopt basic EC banking functions such as electronic funds transfer (EFT), EFT point of sale (EFTPOS), phone banking and electronic bill payment (BPAY). They have not however incorporated any web based EC.

Phase P1: SMEs incorporate a static web presence

SMEs consider EC will have a role in their industry in the future. These enterprises incorporate basic EC initiatives, typically a web site providing information on organisational background, email

contacts, and information on product and services. These web sites tend to be static and require little maintenance (for example, cases B and C- Appendix 1).

Phase P2: SMEs add dynamic and interactive functionality to their use of EC.

SMEs demonstrate an interactive utilisation of EC on their web site. Core internal business processes remain unchanged and EC initiatives are performed in addition to the core business. EC applications are not integrated directly into existing information systems. EC endeavours are largely deemed to be experimental and are not highlighted as strategic. In some cases (for example cases J and I Appendix 1.) benefits from EC activities are not expected in the short term, however these SMEs continue to support their current EC activities in anticipation of future benefits.

Phase P3: SMEs engage in substantial re-engineering of business processes to accommodate EC initiatives.

SMEs engage in an advanced stage of EC utilisation. These SMEs have an in-depth understanding of their business and what benefits EC technologies can provide. They have a clear EC strategy that links directly to their broader business strategy⁶. EC initiatives have required substantial capital/resource expenditure and involved substantial organisational transformation in core business processes. Business service information systems are altered to accommodate the online environment. The degree of organisational transformation is markedly higher than cases found in phase 2.

Phase P4: Virtual business enterprises.

SMEs have either restructured their traditional business to trade completely online or are classified as new Internet start-up businesses focusing their core market at the WWW⁷. The use of EC is fundamental to business operations. These types of virtual businesses may operate from home or other non-commercial settings substantially reducing the overheads incurred in traditional business operations. Virtual organisations readily embrace new technologies for computer-mediated communications as suggested by Barnatt (1997). Case AB (Appendix 1.) demonstrates how a business owner has consolidated his operations to such a degree that he is the only full time employee. The owner contracts extra support when required. He now operates his business in a mobile environment and communicates with customers and business partners via email and the web. SMEs trading in information products are highly suited to this phase.

4. ANALYSING FACTORS IN THE SME EC ENVIRONMENT

This section examines the range of internal and external factors that impact on SMEs ability to engage in EC business transformations. The enabling or inhibiting forces generated by the nature of these factors and their interactions directly influences an SME's ability to derive benefit from the conduct of web-based EC.

4.1. Internal Factors

Venkatraman (1994) has identified two categories of internal factors impacting on the organisational transformation: Technological factors including cost performance trends and connectivity capabilities; and, Organisational factors including managerial assertiveness, motivation and financial constraints. From the analysis of the case studies these two categories of internal factors are supported and

⁶ In some of the SMEs these strategies lacked formal documentation (ie. implicit rather than explicit).

⁷ It should be noted that none of the 34 cases were dot.com start-ups although several ended up being dot.coms through a process of EC business transformation. Dot.com start-ups are phase 4 businesses but do not undergo the organisational transformations being discussed in the context of the case studies.

validated. The analysis also adds a third category of internal factors: EC Related Factors. Table 1 usefully sub-divides these two categories into three groupings based on the existing level of: technological resources; managerial skill; and financial resources and the level of business acumen. The third category of internal factors is grouped under: EC Related. Based on the analysis a discussion of these groupings of internal factors follows:

4.1.1. *Organisational Factors*

Organisational factors are analysed in three parts: the role of management; resources; business direction. (i) Management plays a key role in deciding to utilise EC for business. A common theme across all SMEs studied was management enthusiasm and belief in the view that EC could benefit their business. Phase 1 business managers acknowledge the potential value of EC but use it in a minimal manner. Regardless of SME size Phase 1 enterprises regard EC as contributing a minor but useful role in day-to-day business operations as a support tool. Phase 1 SMEs use their static web-presence to provide a static presence to promote and advertise products and services. In Phases 2,3,4 management identify economic value as justification for using EC. The owner/managers are proactive in their use of IT and EC even though some of the owner/managers consider themselves to be lacking in IT illiteracy.

Table 1: Internal factors influencing SME EC business transformation	
Organisational: <i>Management</i> <ul style="list-style-type: none"> • MIS skills • Leadership Qualities • EC Strategy formulation <i>Internal Resources</i> <ul style="list-style-type: none"> • Capital to invest in technology • Capital to support on-going IT investment <i>Business Direction</i> <ul style="list-style-type: none"> • Experimental use of EC • Strategic use of EC 	Technological: <ul style="list-style-type: none"> • EC Support / Development • IT Experience • IT Infrastructure EC Related: <ul style="list-style-type: none"> • EC Driver • EC Application

(ii) Available resources varied widely across the SMEs studied as did the resources deployed to conduct EC. Limited financial resources have already been identified as a barrier to the uptake of EC. From analysis they also emerge as significant in relation to EC utilisation particularly amongst small and micro businesses, with owner/ operators developing their own EC web-sites to save money. Interestingly, amongst those businesses that developed their own sites one of the biggest perceived advantages of EC was the knowledge gained from the development process. (iii) Business directions vary across the phases. In phases 1 and 2 utilisation of EC is experimental. EC is used as a complementary marketing and sales function, it is applied independently of existing information system processes and no formal integration exists between existing IT applications and EC endeavours. Thus potential benefits of increased efficiencies and cost reductions are absent. In phase 3 EC is valued strategically with utilisation involving direct linkages into existing IS/IT structures and EC strategic use aligned with implicit/explicit business strategies aimed at acquiring efficiencies, cost reductions and improved customer service. EC is used to streamline existing business processes. In phase 4 enterprises rely completely on web-based EC as their business infrastructure. EC is used as a strategic platform central to their business operations without which these enterprises would not exist.

4.1.2. *Technological Factors*

Technological factors are analysed in three parts: EC Support / Development; IT experience; and IT infrastructure. (i) EC support and development occurs in a number of ways across the case studies:

those enterprises that develop, support and implement EC in-house; those enterprises that predominately develop their EC in-house but periodically utilise external assistance; those enterprises that use external developers exclusively to design, implement and host their EC initiatives. In-house development can reduce EC costs and enhance in-house skills that may provide competitive advantage. From the analysis, use of external developers often generates problems particularly where EC specifications have not been formalised or when the reported skills and services of developers and Internet Service Providers (ISPs) have been overstated. Although the medium sized firms studied had in-house IT officers or divisions their capacity to implement EC initiatives did not always result in a comprehensive utilisation of EC. This was partly due to the strategic approach to EC adopted by these medium sized enterprises, particularly in phase 3 where the utilisation of EC was predicated on gaining on-going return on the EC investment. (ii) IT experience amongst the SMEs studied was varied but all had access to the skill sets required by drawing on basic IT skills acquired by necessity in the past, through family and friends or by developing their own skills. (iii) An elaborate IT infrastructure was used by most SMEs studied. A computer with Internet access was common and in 4 cases SMEs used their home computer to develop and maintain their EC utilisation. The ability to host the website or EC applications did not emerge as a major hurdle for the SMEs included in the case studies.

4.1.3. *EC Related Factors*

EC related factors are examined in two parts: Drivers for EC; EC applications. (i) Internal drivers for the utilisation of EC varied across the phases. In all cases the owner/manager was central to EC adoption and continued utilisation. Table 2 summarises analysis of the dominant drivers in each phase.

Table 2: EC Drivers Evident from the Case Study Analysis:	
PHASE 1 <ul style="list-style-type: none"> • Provide information • Marketing • Enhance customer support • Experimental 	PHASE 2 <ul style="list-style-type: none"> • Offer Convenience • Online sales • Global reach • Gain competitive advantage • Cost effective
PHASE 3 <ul style="list-style-type: none"> • Competitive Advantage • Efficient communication • Efficiency • Cost Reduction • Customer service • Quality control 	PHASE 4 <ul style="list-style-type: none"> • Disintermediation • Customer service • Customer loyalty • Online Store • Accessibility • Convenience • Global reach • Cost effective business • Marketing • Communications with customers

(ii) The nature of the web-based EC applications utilised vary widely across the Phases. From analysis EC utilisation appears to fall into two types: experimental and strategic. Phase 1 and Phase 2 enterprises do not significantly alter their core business structure or processes in utilising EC. In cases where online shop fronts existed order information was manually re-entered into the back-office system. In phases 3 and 4 enterprises utilise EC strategically. Phase 3 SMEs explicitly utilise EC in core business processes. EC is integral to business efficiencies and cost reduction. In Phase 4 EC is central to the enterprise's existence, without the Internet and EC, the business would not be able to

operate. The EC strategy is almost completely synonymous with the business strategy. Table 3 summarises the key EC applications utilised by the SMEs in the study

Table 3: Range of EC Applications used by SMEs in the Study	
PHASE 1 <ul style="list-style-type: none"> • Electronic Brochure 	PHASE 2 <ul style="list-style-type: none"> • Online Store • Electronic Brochure • Online Service
PHASE 3 <ul style="list-style-type: none"> • Online service • Customer service centre • National Intranet • Online procurement system • Quotation system 	PHASE 4 <ul style="list-style-type: none"> • Product demonstration • Communication router • Online store

4.2. External Factors

The case studies also revealed a range of external factors impacting on SMEs ability to acquire EC benefits. Although these external factors are less significant in terms of influencing an SME's ability to engage in organisational transformation, as will be explored later in this paper, they emerge as very important in terms of influencing an SME's ability to derive benefit from EC. From the analysis these external factors fall into three categories: nature of the supply chain/business partners; the influence of industry structures; and, the role of government. These are summarised in Table 4.

Table 4: External factors affecting SME ability to acquire EC benefits	
Supply Chain/Business Partners <ul style="list-style-type: none"> • Level of automation in Supply chain • Size and number of participants • Other participants internal factors • Information Service Providers 	Industry Influence <ul style="list-style-type: none"> • Level of industry support for change • Information and Education • Business Champions
Government Support <ul style="list-style-type: none"> • Policy and EC framework • Type of Sector Strategy • Level of Financial Aid 	

These external factors effect the environment within which the SMEs studied operate. The external factors do not directly affect the ability to conduct organisational transformation, although an exception to this exists where government's offer financial assistance or grants for SMEs to engage in EC initiatives, education and training.

4.2.1. Supply chain / business partners

Supply chain/business partners are analysed in four parts. (i) From analysis the level of supply chain automation remained generally low. For most SMEs the primary form of communication with suppliers remained phone, fax and to a lesser extent email. (ii) The issue of critical mass was identified by many of the SMEs i.e. until this occurs across the supply chain potential for EC benefit is reduced. (iii) Distributors and wholesalers included in the study expressed a desire to utilise more EC in business with resellers and other participants but recognised many resellers lacked the capacity to

conduct EC. SMEs dealing direct with consumers conducted more EC transactions. A related issue was the limited ability of SMEs to influence the supply chain environment and their susceptibility to demands for change by large players in the chain (iv) ISPs also emerged as important both in terms of hosting web-sites and in providing input in their development. Problems with experience and level of service from ISPs emerged as one of the largest external problems for SMEs utilising EC, particularly amongst SMEs with limited IT skills and experience. The lack of experience and knowledge of ISP/EC developers was identified as a problem in the case studies. From the case studies, businesses that developed EC applications internally had the least number of problems.

4.2.2. Industry Influence

Industry influence is analysed in three parts. (i) The case studies identified that none of the SMEs received or felt it purposeful to seek help from their industry in developing their EC initiatives and none of the cases mentioned industry support for change as having been significant. (ii) There was also a broad acknowledgement of the general lack of information, education and training provided via industry links on EC and its benefits. (iii) In relation to business champions the only comments made related to the relative lack of power of SMEs over the industry, its policy and approaches.

4.2.3. Government Support

Factors relating to government support are analysed together. Analysis of the case studies indicated that government support provided had been only a minor factor in the development of EC adoption and utilisation amongst the cases studied. A number of government approaches were mentioned including: Education and awareness programs for breaking down the barriers of misinformation and EC adoption fears; direct financial assistance in terms of capital funds to subsidise EC efforts helped a number of the small and micro enterprises. More generally the cases did reveal that other Government policies including tax and other initiatives was identified as potentially significant factors.

5. FACTORS AND FORCES: MODELLING SMEs ABILITY TO DERIVE BENEFIT FROM EC

The combined nature of the factors described above, can have an enabling or inhibiting effect on the ability of an SME to derive benefit from utilising EC. Before presenting a model of these interactions it is important to identify the range of enabling and inhibiting forces that these factors can generate. Ultimately it is the mix of enabling and inhibiting forces generated by the interaction of these factors that determines the extent to which EC benefits can be realised in each phase of EC utilisation.

5.1. Internal forces

Building on Table 1 the EC enabling/inhibiting forces generated by internal factors are summarised in Table 5 below⁸. Where SMEs generate high levels of enabling forces derived from internal factors they exhibit an ability to engage in sophisticated levels of EC business transformation, thereby maximising their potential to derive EC benefits. Where SMEs face strong inhibiting forces derived from internal factors the resultant potential to engage in EC business transformation and potential to derive EC benefit is significantly reduced. From the case studies it emerges that most SMEs exhibit a mix of enabling and inhibiting forces generated by technological and organisational factors. The ability to identify these forces however provides an opportunity to potentially change these internal factors to increase the potential of SMEs to optimise levels of EC business transformation.

⁸ EC related factors are combined with Technology factors and presented in Table 5.

5.2. External forces

Following on from Table 2 the EC enabling/inhibiting forces generated by external factors are summarised in Table 6 below. From the case studies it emerges that factors in the SMEs external business environment can have a major impact on their ability to derive benefits from EC. In particular these forces generated by external factors can compound the influence of the internal factors identified above to either enhance or reduce the potential benefits of EC. SMEs are rarely able to significantly alter these external factors or the impacts of the forces that these factors generate. Consequently, even where SMEs have engaged in high levels of EC business transformation, the extent to which EC benefits can be realised is heavily reliant on the external environment in which they operate.

Table 5. EC Enabling/Inhibiting Forces generated by Internal Factors	
Technology Enablers <ul style="list-style-type: none"> • Sophisticated IT Infrastructure • High level IT implementation and support skills • An EC application with scope to improve business value • A conducive relationship with external service providers 	Technology Inhibitors <ul style="list-style-type: none"> • Lack of sophisticated IT Infrastructure • Lack of IT expertise / skills • An EC application with limited EC benefits • Poor relationships with external service providers
Organisational Enablers <ul style="list-style-type: none"> • Management Motivation • Management Expertise • Abundant resources (financial, personnel) • Management support for EC initiative 	Organisational Inhibitors <ul style="list-style-type: none"> • Lack of EC strategic foresight • Poor Leadership qualities • Limited resources • Half hearted support for EC

Table 6. EC Enabling/Inhibiting Forces generated by External Factors	
Environmental Enablers <ul style="list-style-type: none"> • Supply Chain Mechanisms • Critical Mass of Suppliers • Industry Support • Government Assistance • Supportive ISP 	Environmental Inhibitors <ul style="list-style-type: none"> • Lack of Support from Government and Industry • Archaic Trading Systems • No Interest from Trading Agents • No Champion to Implement Change • Inability to exert automation of supply chain • No incentives to automate the supply chain • Problems with ISPs

5.3. A Four Forces Model:

Returning to the four phase model (Diagram 1) the interaction between enabling and inhibiting forces (Table 5 and 6) can be seen to directly affect the position of an SME within any phase and it's ability to move between phases as illustrated in Diagram 2. The combination of these forces directly impacts

on the potential of an SME to derive benefit from EC in any phase. Forces generated by internal and external factors can effect an SMEs potential EC benefit within a phase. But the potential for an organisation to shift between phases depends primarily on the magnitude of the internal enabling or inhibiting forces as internal factors are the primary drivers for organisational transformation.

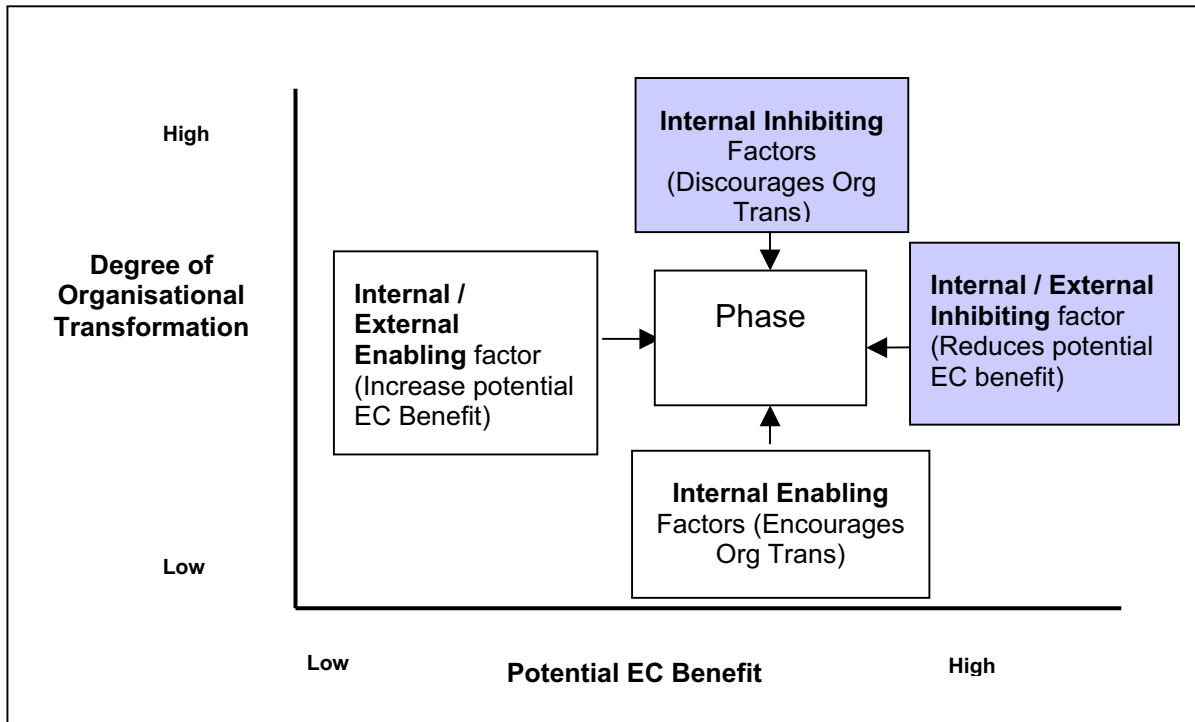


Diagram 2: A four Forces Model: Factors impacting on SME Organisational Transformation and Potential to derive EC Benefits.

KEY: ➔ indicates the direction of the force being exerted.

Diagram 3 combines the extended four phase model of EC business transformation (diagram 1) with the four forces model (diagram 2) to illustrate the inter-relationship between SMEs ability to derive potential EC benefit across the phases. The dotted ovals surrounding each phase provide a more sophisticated illustration of the inter-relationship between organisational transformation and the potential to generate EC benefit. Diagram 3 highlights that there is considerable overlap between the phases in SMEs potential to derive EC benefit. This overlap between the phases is significant and results from the complex interaction between enabling and inhibiting forces generated by internal / external factors.

Significantly in phase 4 the ability to derive further marginal benefits from EC via further organisational transformation is reduced because this phase depicts an optimised state of business transformation. In this phase, increases or decreases in the potential to derive further EC benefit rely primarily on enabling/inhibiting forces generated by factors operating on the enterprise from the external environment. In phases 1,2 and 3 the ability to derive further benefits from EC through further degrees of organisational transformation remain significant. In these phases, forces operating on the enterprise from the external environment can further increase or decrease the potential to derive further EC.

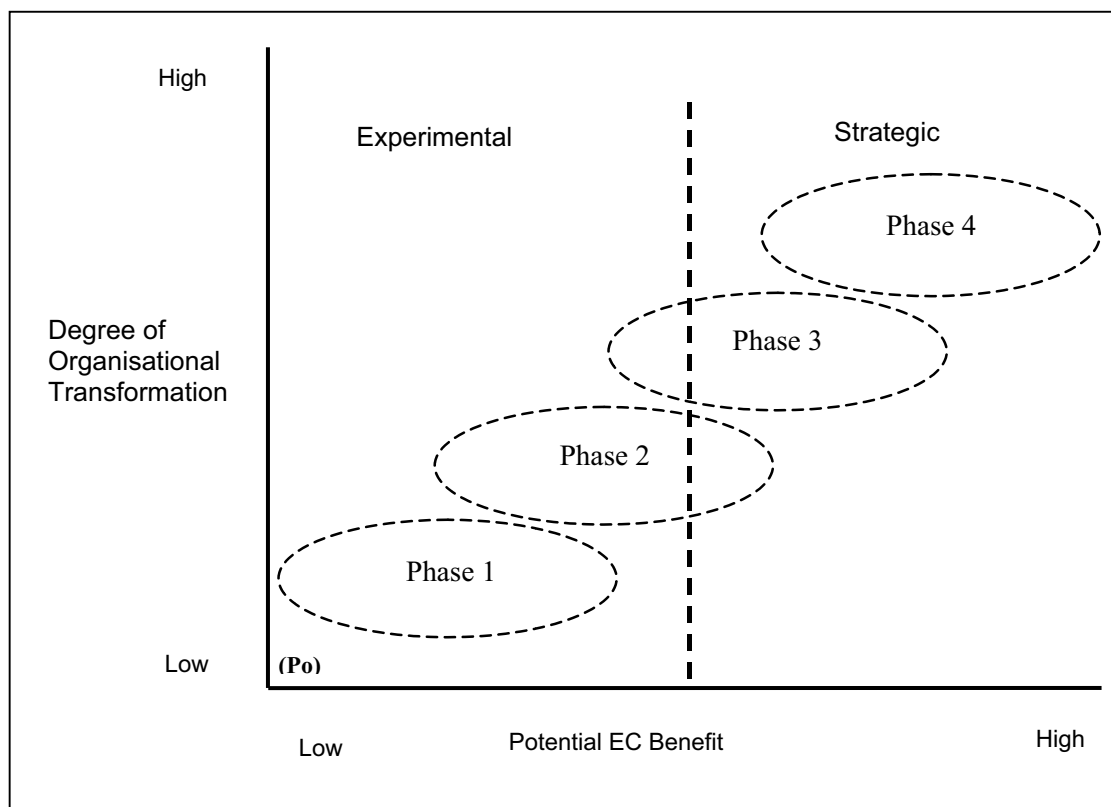


Diagram 3. The Impact of internal and external Forces on the Potential EC benefit across 4 Phases

6. CONCLUSIONS

This paper has developed a framework that identifies and critically analyse the range of factors impacting on SMEs ability to derive benefit from EC. This framework has examined factors both internal and external to the organisation and has identified enabling and inhibiting forces generated by their interaction. Significantly this framework has highlighted that for SMEs the ability to derive benefit from EC relies on internal forces where they have some control and external forces over which they have little control. This exploratory study provides an explanation for why many SMEs who are relatively sophisticated users of EC have often found it difficult to derive significant benefit from EC.

7. FUTURE WORK:

The extent to which particular combinations of internal and external factors influence SMEs within each phase requires future investigation. It appears probable that these factors and the forces they generate impact to different degrees at each phase of EC utilisation. Future work will investigate and compare these differences at each phase and explore the consequences for the conduct of EC.

REFERENCES

- Barnatt, C. (1997) "Virtual organisation in the small business sector: the case of Cavendish Management resources", *International Small Business Journal*, 15(4) pp.36-47.
- Benbasat, I., Goldstein, D.K. and Mead, M. (1987) "The Case Research Strategy in Studies of Information Systems". *MIS Quarterly*, Sep, 369-386
- Burgess, S. (1998) *Information Technology in small business in Australia: A summary of recent studies*. <http://www.sbaer.uca.edu/docs.proceedingsII/98usa283.txt>
- Cameron, J. & Clarke, R. [1996] Towards A Theoretical Framework For Collaborative Electronic Commerce Projects Involving Small and Medium-Sized Enterprises, *Electronic Commerce for Trade Efficiency and Effectiveness*, 9th International Conference on EDI-IOS, Bled, Slovenia.
- Chau, S. B., (2001) "Four Phases of Ecommerce a Small Business Perspective: An Exploratory Study of 23 Australian Small Businesses" *Proceedings of the Information Resource and Management Association Conference*, Toronto, Canada 2001
- Chau S.B. & Turner P. (2001a) "A Conceptual Approach to Virtual-ness in Small Business Electronic Commerce: Four Australian Case Studies" *School of Information Systems Working Paper*, University of Tasmania, March 2001. re-submission to Electronic Journal Organisational Virtualness.
- Chau S.B. & Turner P. (2001b) "A Four Phase Model of EC Business Transformation amongst Small to Medium Sized Enterprises: Preliminary Findings from 34 Australian Case Studies" *Proceedings of the 12th Australasian Conference on Information Systems, Coffs Harbour, Australia 5-7 December*.
- Corbitt, B., Behrendorff, G., Brown-Parker, J., (1997) "SMEs and electronic commerce" *The Australian Institute of Management*", Vol 14., pp204-222
- Dandridge, T.C. (1979) "Children are not little "grown-ups - Small business needs its own organisational theory", *Journal of Small Business Management* 17(2) pp. 53-57.
- Freel, M, "Barriers to Product Innovation in Small Manufacturing Firms" *International Small Business Journal* March 2000 (18:2) p60
- Hughes, J., Ralf, M. & Michels, B. (1998) *Transform Your Supply Chain: Releasing value in Business*, International Thomson Business Press, London.
- Industry Standard (2000) *Behind the Numbers: the Mystery of B-to-B Forecasts Revealed*, February 21 <http://www.thestandard.com/research/metrics/display/0,2799,11300,00.html>
- Lawrence, K. & Keen, C.D. (1997) A survey of factors inhibiting the adoption of electronic commerce by small and medium sized enterprises in Tasmania, *Working paper 97-01*, School of Information Systems, University of Tasmania, Hobart, Tasmania.
- Lowry, G., Singh, M. and Scollary, A. (1999) Electronic commerce initiatives in Australia: Identifying opportunity, meeting challenges and measuring success. *Proceedings of the 10th Australasian Conference on Information System: 532-541. Wellington, New Zealand 1-3 December*.
- MacGregor, R.C., Waugh, P. & Bunker, D. [1996] Attitudes of Small Business to the Implementation and Use of IT: Are we basing EDI Design Initiatives for Small Business on Myths? *Ninth International Conference on EDI-IOS, Bled, Slovenia*.
- National Office for the Information Economy (NOIE) (2000a) *Current State of Play-July 2000: Australia and the Information Economy*. <http://www.noie.gov.au/publications/index.htm>
- National Office for the Information Economy(NOIE) (2000b) *Taking the Plunge - Sink or Swim: Attitudes and Experiences of SMEs to E-commerce*. <http://www.noie.gov.au/publications/index.htm>
- Neuman, , W.L. (1994) *Social Research Methods: Qualitative and Quantitative Approaches* (2nd edition) Allyn and Bacon, USA.
- Poon, S., Swatman, P. & Vitale, M. (1996) Electronic Networking Among Small Business in Australia- An Exploratory Study, *Ninth International Conference on EDI-IOS, Bled Slovenia*.
- Poon, S. & Swatman, P. (1998) Small Business Internet Commerce Experiences: A Longitudinal Study, *Electronic Commerce in the Information Society, 11th International Bled Electronic Commerce Conference Bled*.
- Small Business Index (1999) *Survey of computer technology and E-commerce in Australian Small and Medium Business*, Yellow Pages, Telstra Corporation Limited and National Office for the Information Economy, May.

- Small Business Index (2000) *Survey of computer technology and E-commerce in Australian Small and Medium Business*, Yellow Pages, Telstra Corporation Limited and National Office for the Information Economy, June.
- Venkatraman, N., (1994) "IT-enabled business transformation: from automation to business scope redefinition", *Sloan Management Review*, 35(2) Winter, p73(15)
- Welsh, J.A. and White, J.F. (1981) "A Small Business is not a little big business", *Harvard Business Review*, 59(4) pp. 18-32.
- Winston, A.B., Stahl, D.O. and Choi, S.Y. (1997) *The Economics of Electronic Commerce*, MacMillan Technical Publishing, Indianapolis.
- Wong, M and Turner, P. (2001) An Investigation of Drivers/Activators for the Adoption and utilisation of B2B Electronic Commerce amongst Small to Medium Sized Suppliers to the Tasmanian Pyrethrum Industry, Australia (2001) 3rd *Information Technology in Regional Areas Conference*, Central Queensland University, Rockhampton, Qld. 5-7 September.
- Yin, R. (1994) *Case Study Research. Design and method*. London: Sage
- Zikmund, W.G., (1997). *Business Research Methods* (5th ed.). Sydney: The Dryden Press

APPENDIX 1. Case Study Descriptions: 34 Australian SMEs

Case	Case Code	Phase ID	Industry	Full Time Staff	EC Application	EC Benefit
Restaurant	A	P1	Hospitality	3	Online lunch and catering menu	enhanced customer service
Rural Producer	B	P1	Agriculture	3	Electronic Publishing	Reduced publishing costs
Hotel	C	P1	Hospitality	14	Basic Online bookings	online booking, marketing
Rural Producer	D	P1	Agriculture	8	Accounting Information System	reduced operational costs
Fish Farmer	E	P1	Fishing	65	Online Marketing	reduced marketing and costs
Flower shop	F	P2	Retail Trade	1	Online Sales	extra sales revenue, marketing
Educational Service Provider	G	P2	Education	2	Marketing, Online Sales	global reach, marketing
Agricultural Advice Services	H	P2	Agriculture	21	Information dissemination	cost effective communication
Retail Shop	I	P2	Retail Trade	4	Online Sales	extra sales
Retail Shop	J	P2	Retail Trade	4	Online Sales	global reach, sales
Manufacturer	K	P2	Manufacturing	9	Online Sales, Electronic banking	global reach, sales
Grocery Store	L	P2	Retail Trade	25	Online Sales	extra sales
Craft Shop	M	P2	Manufacturing	1	Online Sales	global reach, sales
Communication products	N	P3	Wholesale Trade	45	Supply chain management system	supply chain efficiencies
Web Developer	O	P3	Communications	4	ISP	production efficiencies
Clothing Distributor	P	P3	Wholesale Trade	23	Customer Information system	Customer service, customer loyalty
Web Developer	Q	P3	Communications	12	ISP	production efficiencies
Manufacturer	R	P3	Mining	27	Global Intranet	Global reach, customer service
Web Developer	S	P3	Communications	8	ISP	production efficiencies
Web Developer	T	P3	Communications	45	ISP	production efficiencies
Web Developer	U	P3	Communications	3	ISP	production efficiencies
Insurance Adjuster	V	P3	Insurance	18	Customer Information System	better communication efficiencies
Software Developer	W	P3	Communications	2	ISP	production efficiencies
Bakery	X	P3	Retail	26	Franchise Information System	administration efficiencies
Financial Service Provider	Y	P3	Business Services	35	Customer Information System	enhanced customer service
Food product Manufacturer	Z	P3	Manufacturing	49	Supply Chain Management System	production efficiencies
ISP	AA	P3	Communications	2	ISP	production efficiencies
Scientific systems provider	AB	P4	Fishing	2	Communications, Product Demos	marketing, mobile working
Software Distributor	AC	P4	Retail Trade	5	Product Demonstration	global reach, efficient info. systems
Online Education Service	AD	P4	Education	2	Online education provider	fully automated business
Online Retail Shop	AE	P4	Retail Trade	2	Online Sales	dis-intermediation
Online Bookshop	AF	P4	Retail Trade	2	Online Sales	dis-intermediation
Fruit tree grower	AG	P4	Agriculture	4	Online Sales	dis-intermediation
Stationery Supplier	AH	P4	Retail Trade	8	Online Sales	National reach