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Exploring The Antecedents Of Successful E-business Implementations Through ERP : A Longitudinal Study of SAP-based Organisations 1999-2003

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**EXPLORING THE ANTECEDENTS OF SUCCESSFUL
E-BUSINESS IMPLEMENTATIONS THROUGH ERP:
A LONGITUDINAL STUDY OF SAP-BASED ORGANISATIONS
1999 - 2003**

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15 Dec 2003

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ABSTRACT

This research was carried out between 1999 and 2003 on the use of e-business applications in ERP-based organisations. A composite research method based on structured case studies was developed for this study. It combined the application of case methods by Carroll et al. (1998), Klein and Myer (1998), and Eisenhardt (1989). This was used to provide a focused, yet flexible structure, as a dynamic approach to case study interpretive research. The research method used three distinct models at three progressive stages of the study, to provide a multi-faceted view of each case. This composite case-based method was developed to maintain the balance between research rigour and relevance.

A pilot case study of nine Australian SAP sites helped ground the theory of the study. This was followed by three stages of study of eleven international cases within a diverse industry context. The method revealed the antecedents of e-business success using the findings from case analyses against three separate research models: B2B interaction, e-business change, and virtual organising.

A final conceptual framework was developed as new theory of e-business transformation. The theory views e-business transformation as realising the benefits from virtual organising within complex B2B interactions by utilising the facilitators of successful e-business change.

The research demonstrates that successful e-business transformation with ERP occurs when value propositions are realised through integration and differentiation of technologies used to support new business models to deliver products and services online. The associated management practice evolves through efficiency from self-service, effectiveness through empowerment towards customer care, and value enhancement from extensive relationship building with multiple alliances.

The new theory of e-business transformation identifies the stages of e-business growth and development as a comprehensive plan that should assist managers of ERP-based organisations in migrating their company towards a successful e-business organisation. The detailed analysis of the findings offers a foundational perspective of strategies, tactics and performance objectives for e-ERP implementations. The strength of the theory lies in the synthesis of multiple case analyses using three different lenses over three separate time periods. The triangulation of the three research frameworks provides a method for study at appropriate levels of complexity. It is evolutionary in nature and is content driven. Other researchers are urged to apply similar multi-viewed analysis.

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ABBREVIATIONS AND DEFINITIONS

The following abbreviations and definitions represent the core terms throughout this thesis work:

- (i) **e-business or “electronic business”** means making the key business processes of an organisation available over the Internet. Also, the employment of Internet-ERP technologies “to improve business performance, speed up business processes, increase sales and decrease costs” (Viehland, 2000, p.913).
- (ii) **ERP or “enterprise resource planning”** systems are configurable information systems packages that integrate information and information-based processes within and across functional areas in an organisation. The current generation of ERP systems also provides business reference models or process templates that claim to embody the current best practices - industry based.
- (iii) **e-ERP or “e-business through ERP” implementations** involves the integration of e-business application with an organisation’s ERP system, for example; SAP B2B e-Procurement. It implies an e-ERP project is a solution or supports an e-business strategy.
- (iv) **eBC or “e-business change”** is an organisational initiative to design an e-ERP project “to achieve significant breakthrough improvements in performance” (Guha et al., 1997, p.121). For example; “cost, quality, responsiveness, flexibility, satisfaction, shareholder value, and other critical” e-business measures.
- (v) **eBT or “e-business transformation”** is a comprehensive business architecture that focuses on three interdependent dimensions of online business; *ICT technologies, Products and Services, Business Models* where dimension is further detailed at three stages of greater e-business activity of integration, differentiation, and the realisation of value propositions.
- (vi) **VOing or “virtual organising”** is a “strategic approach that is singularly focused on creating, nurturing, and deploying key intellectual knowledge assets while sourcing tangible, physical assets in a complex network of relationships” (Venkatraman & Henderson, 1998, p.34).

CHAPTER 1
AN OVERVIEW

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1.0 *As more and more established organisations realise the need to form alliances with their customers, partners and suppliers over the Internet, e-business implementations with ERP systems becomes a critical issue (Markus, 2000; Scheer & Habermann, 2000).*

1.1 INTRODUCTION

As with all Information Systems (IS), Enterprise Resource Planning (ERP) software has been profoundly influenced and transformed by the Internet.

At the beginning of 1998, the ERP paradigm was largely confined within the walls of the traditional business enterprise. The current Internet trends serve to extend the original value proposition of ERP systems by breaking down organisational barriers. "Now these boundaries have become almost obsolete, so that the structure of such organisations, appears more like the web" (Larsen, 2000, p. 1).

The adoption or presence of ERP is thought to position such organisations to be easily able to extend their business processes beyond the boundaries of their enterprises. As organisations commit to e-business with an ERP infrastructure, the issue of benefit maximisation becomes paramount and the organisational focus will be supply chain automation based around business-to-business models.

The study took place between 1999 and 2003, and involved a detailed review of eleven internationally based ERP enabled organisations. The research was founded on an initial pilot study of ten Australian-based organisations that planned to undertake significant e-business initiatives. The intention was to leverage the highly integrated business modules of their SAP systems. Initially these initiatives were concerned with cost savings, but later the trend was towards strategic initiatives for new revenues.

The aim of the study was to provide new theory on e-business implementation for ERP enabled organisations. From the outset, the research was viewed as foundational and based on case organisations that pioneered the use of e-business applications with ongoing ERP systems (e-ERP). The earlier thinking on this topic indicated a significant role for information technology in these initiatives. This study determined to depart from this by investigating the importance of managing change processes within e-business projects (Kalakota & Robinson, 1999). For example, what are the factors for change or the specific facilitators and inhibitors of successful e-business implementations?

Main Stages of the Thesis

The flow chart below visualises the main stages of the thesis and the interrelationships between the chapters given by inputs and outputs:

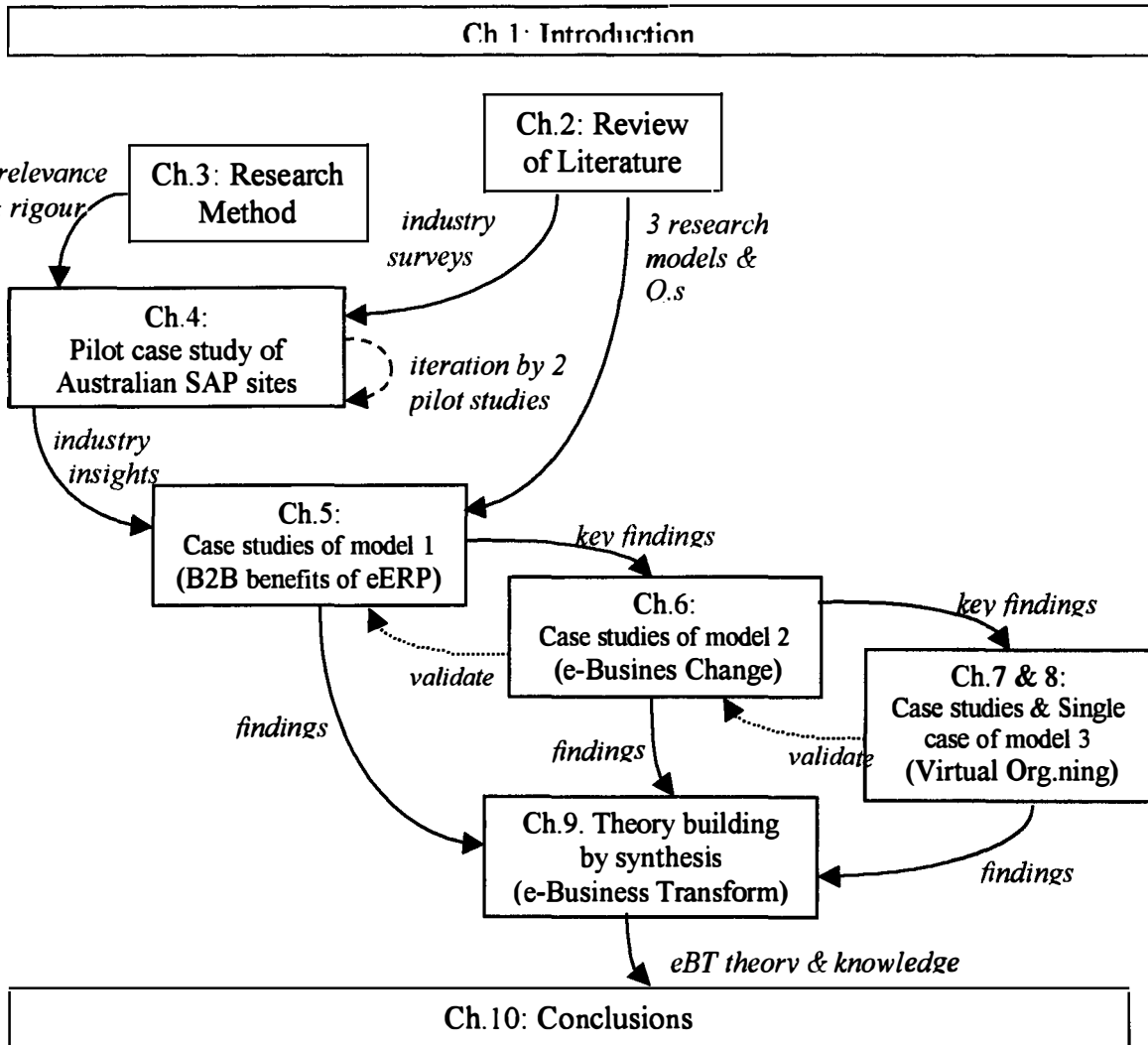


Figure 1.1: Flow chart of Thesis Chapters with Inputs & Outputs Relationships

A longitudinal qualitative study was carried out to examine three models for theory building. These models proposed various antecedents of successful e-business implementations in ERP environments. Multiple case studies with varying dimensions of e-business scope are described in the context of these models. These cases span the 'dot.com' era that inspired great expectations for new wealth from online buying and selling opportunities to a new reality of business-to-business (B2B) interactions using e-business networks for sustained competitive advantage (Tapscott, 1999).

The problem is how to combine existing ERP systems with the latest Web-based technologies to create one all-encompassing e-business architecture? Three fundamental questions for the investigation are :

- (i) How do organisations realise benefits from e-ERP implementations?
- (ii) What factors facilitate and inhibit success of e-ERP implementations?
- (iii) Do effective strategies of e-ERP implementations fit the virtual organising model?

1.2 LITERATURE REVIEW

In Chapter 2 a literature review is presented around three main contributing research areas: convergence of Internet and ERP technologies, change management, and e-business strategy or tactics. The literature on these three areas is explored in detail to elicit fundamental questions of e-business adoption by ERP enabled organizations. Next, the review examines the more interesting complex interrelationships between them, before finally

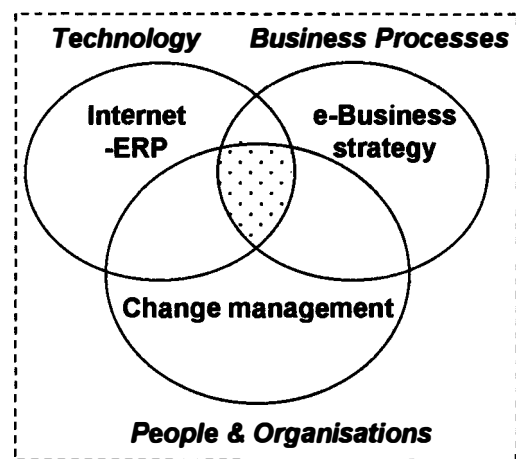


Figure 1.2: Plan of Literature Review

focusing on their intersection (Figure 1.2). This structured approach of the literature review was necessary to accommodate the research methodology. The method is a qualitative iterative theory building method that has at its core, theoretical or conceptual frameworks that are to be studied.

With very little information available on how to successfully manage e-business implementations with ERP (Hesterbrink, 1999; Holland, Light, & Gibson, 1999), the review established three areas of research based on the conceptual foundations of:

- (i) “electronic consultative commerce” as proposed by Carlson (1995),
- (ii) e-business change management adapted from investigations into “business process change” by Guha, Grover, Kettinger, and Teng (1997),
- (iii) “virtual organising” as an e-business strategy developed by Venkatraman and Henderson, (1998),

and collectively fused these into a “stages of growth for e-business” model of organisational transformation as suggested by McKay, Prananto, and Marshall, (2001).

1.3 METHODOLOGY

In Chapter 3, a composite case-based research method is assembled to detail what will be done to research the topic of e-business implementations in ERP enabled organisations. The chapter argues for the adoption of a qualitative case-based research method for theory building as proposed by Carroll, Dawson, and Swatman (1998), Klein and Myer, (1998), and Eisenhardt, (1989). This composite method uses inputs from theoretical foundations, and industry insights to construct various conceptual frameworks as the focus of the three research questions. The theory embedded in the conceptual frameworks is tested and extended through three research cycles to build new theory.

The composite case study method is examined for its suitability for examining this topic. In addition modelling is used to clarify the complexity of relationships between the elements in each conceptual foundation. A Pilot study in Australian SAP enabled firms, was used to help ground the study in the complex phenomena of e-business with ERP. A detailed plan of the method is presented as a set of repetitive inter-related activities, designed to preserve the balance between relevance and rigour.

1.4 PILOT STUDY OF E-BUSINESS IMPLEMENTATIONS THROUGH ERP

Chapter 4 reports on a two-part pilot study carried out during 1998-99 on the expected use of Internet technology within SAP-based organisations. It used semi-structured questions based on a previously used research tool. Two research cycles use content and comparative case analysis to establish initial theory. Industry insights were gathered to help ground the initial research and conceptual framework of e-ERP. This confirmed the first research question, established from the literature review as: How do organisations realise benefits from e-ERP projects?

1.5 E-BUSINESS IMPLEMENTATIONS THROUGH ERP: BENEFITS AND BARRIERS

In Chapter 5, the initial conceptual framework was used to examine the benefits from using e-business applications in SAP-based organisations. The cases of early adopters of e-business show a trend towards cost reductions and administrative efficiencies from procurement and self-service applications used by employees and customers. An interview-based protocol was used to collect data on a variety of established organisations from a diverse range of industries. The findings are analysed according to the level of complexity of B2B interaction models.

Two case studies of early e-business integration involving a global supplier and a corporate customer are analysed for complementary benefits in the context of the model. Collectively, the set of case studies demonstrate increased benefits flow from an increased level of e-business B2B integration by networking of SAP-based organisations. Theory in the form of a candidate model is derived for future research of the complex phenomena of e-business implementations through ERP.

1.6 E-BUSINESS CHANGE MANAGEMENT IN ERP ENVIRONMENTS

In Chapter 6, an established research framework was used for gathering evidence to identify the factors for success of an e-business project. An analysis of unexpected findings in Chapter 5 led to the adoption of a model proposing various antecedents to successful e-business change management in ERP environments. In order to avoid an original IT-centric position, emphasis was on the success of managing the change of e-business projects. Multiple case studies with varying dimensions of e-business scope are described in the context of this model. The results indicate that successful projects were found to have facilitators in all dimensions of the framework, including the change environment, and project management. The least successful project lacked facilitators primarily in the area of cultural readiness and change management.

1.7 E-BUSINESS THROUGH ERP AS A MODEL OF VIRTUAL ORGANISING

In chapter 7, Virtual Organising (VOing) is used as a comprehensive e-business approach applicable to all organisations in the global, digital economy. The model represents a major departure from the earlier approach of incremental e-business development, expressed in the previous chapters. The business logic places powerful ICT systems, such as e-ERP, at the centre of the new business model. VOing has the capability to bring together the distinct business models of chapter 4, into a comprehensive business framework to accommodate emergent strategy. The objective is to test the theoretical constructs and measures within the VOing model for ERP enabled organisations, when contemplating e-business strategies. In addition to verifying the foundations of VOing, the level of development at each stage along virtual dimensions of the model is established.

1.8 STAGED IMPLEMENTATION OF E-BUSINESS NETWORKS THROUGH ERP

In Chapter 8, a case study of Siemens (1998-2001) is portrayed as a staged implementation of e-business networks through ERP. Internet technologies offer an ERP based organisation the opportunity to build interactive relationships with its business partners. The Siemens case of e-business evolution is viewed in terms of

buy-side and sell-side solutions and services that inter-relate. e-Business solutions were seen to evolve in six stages with increasing business value and network complexity; from infrastructure to e-marketplaces. By viewing the Siemens case as a staged implementation, it may easily be evaluated in terms of the attributes of two models: the stage of growth in e-business, and virtual organising. VOing offers a framework for checking e-business opportunities and progress in each dimension and at the different stages of development.

At Siemens e-business is about transition from a fragmented web presence to a company-wide approach. To be successful, Siemens will have evolved in six stages with increasing business value and complexity, from an initial ERP based infrastructure loosely connected, to a strategic set of private e-marketplaces.

1.9 A MODEL OF E-BUSINESS TRANSFORMATION THROUGH ERP

In Chapter 9, a model e-business transformation (eBT) is proposed, applicable to the combined old and new economies. It represents a single overview model of eBT that focuses on realising the benefits of B2B interaction, from virtual organising by utilising the facilitators of successful e-business change management. This model of eBT represents a comprehensive model of e-ERP phenomena formed by the synthesis of the research models, and a staged implementation of e-business. It incorporates the antecedents of e-ERP phenomena, at three levels of development:

Level 1, defines three stages of greater e-business activity as integration, differentiation, and the demonstration of value propositions.

Level 2, distills the case findings from each research model and builds a single comprehensive matrix that describes the elements of eBT.

Level 3, incorporates the antecedents of e-ERP within each research model. In addition, level three includes measures for evaluating success.

The management focus is on employee empowerment and e-business readiness along customer and supply chains.

1.10 CONCLUSIONS

The final chapter of the thesis sets out the conclusions and lists the future research topics that should be of interest to practitioners and researchers. These recommendations of the thesis are framed in a hierarchical structure according to the various levels of abstraction within the final research model of e-Business transformation (eBT). The model represents the research outcome - theory building. The key issue for managers that emerges from the exemplar case studies is that e-business readiness of customers and suppliers is critical for success, and requires

an approach to change management practice through empowerment called 'emergent change management'. The chapter concludes that successful e-business transformation with ERP occurs when the benefits of value propositions are realised through integration and differentiation, of technologies needed to support new e-business models aimed at delivering products and services online. Finally, benefits maximisation is facilitated by a culture of e-business readiness and emergent change management.

CHAPTER 2**LITERATURE REVIEW OF E-BUSINESS IMPLEMENTATIONS THROUGH
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2.0 INTRODUCTION

This chapter is a review of the literature on the topic of *e-business implementations through ERP* (e-ERP). The review incorporates concepts and issues from the IS literature on the coupling of Internet technologies with ERP, e-business strategy, and managing people through organisational change. These areas are explored to elicit fundamental research questions of the e-ERP phenomena.

To guide the review, Figure 2.0 classifies the topic in terms of the generic areas of study: “technology, business processes, people and organisations” (Deise, Nowikow, King, & Wright, 2000; Hesterbrink, 1999).

The review examines the literature in these core topics before focusing on the main area of interest. This relates to the intersection of the three areas and the complex relationships between them.

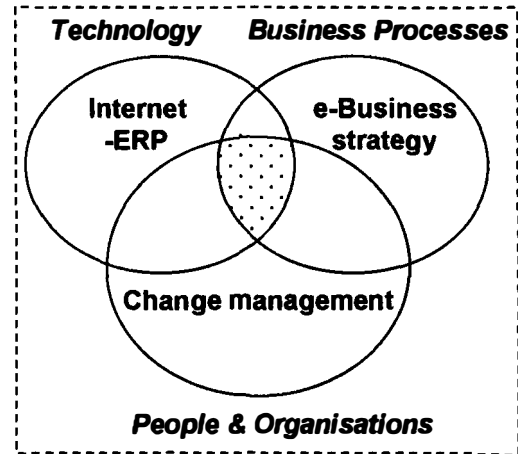


Figure 2.0: Plan of Literature Review

The following simple definition of the e-ERP phenomena incorporates the basic ideas of the topic and their interplay:

Internet enabled ERP, the combining of two *technologies* for doing **e-business**;

↳ making key *business processes* available over the Internet through **change management**;

↳ managing *people* and teams for successful implementations and ultimately transforming the *organisation*.

The definition helps to focus on the intersection of the three areas of IS (Figure 2.0), and highlights critical integration issues that might otherwise be overlooked. It adopts a holistic approach to provide a conceptual foundation for the management of e-business change within ERP environments (Burn & Ash, 2000; Shaw & Ferguson, 1998; Venkatraman & Henderson, 1998).

Norris, et al (2000) capture the essence of this study in declaring - moving from an ERP to an e-business environment involves a major organisational change. “Like ERP major business initiatives, e-business forces change to occur to three corporate domains – technology, processes, and people – at both a strategic and operational (tactical) level” (p. 119).

2.1 LITERATURE REVIEW PLAN

In this literature review five areas of IS are explored to elicit fundamental questions of e-business implementations within ERP environments.

The focus is on three basic areas: Internet enabled ERP, e-business, and change management, where

- i. **Internet-ERP** is the fusing of Internet technologies with ERP systems of organisations,
- ii. **e-business** is viewed as strategies and models for online business-to-business opportunities,
- iii. **change Management** is activities planned to facilitate organisational change and the focus is on the more complex interrelationships between:
- iv. **e-business** and **Internet-ERP** as e-business implementations with ERP systems,
- v. **e-business** and **change management** as management of e-business change,
- vi. **e-business** and **Internet-ERP** and **change management** as a comprehensive e-business strategy, towards an organisational transformation.

Key Texts

A detailed list of texts, papers, and case studies is given in Appendix 2.1 the initial review of key issues. It includes ten key texts that form the base literature, namely:

- a. Curran, T., Keller, G., & Ladd, A. (1998). *Sap R/3 business blueprint: Understanding the business process reference model* (ch. 15).
- b. Deise, M.V., Nowikow, C., King, P., & Wright, A. (2000). *E-business: From tactics to strategy* (ch. 1, 5, 6, 8, 9, 10).
- c. Fellenstein, C., & Wood, R. (2000). *Exploring e-commerce, global e-business, and e-societies* (ch. 3, 8, 11, 15, 19, 20, 21).
- d. Gonzalez, J.S. (1998). *The 21st-Century intranet* (ch. 7, 8).
- e. Kalakota, R., & Robinson, M. (1999). *e-Business: Roadmap for success* (ch. 2, 7, 8, 9, 12).
- f. Kale, V. (2000) *Implementing SAP R/3: The guide for business and technology and managers* (ch. 15, 19, 20, 21).
- g. Norris, G., Hurley, J.M., Hartley, K.M., Dunleavy, J.R., & Balls, J.D. (2000). *E-business and ERP: Transforming the enterprise* (ch. 1 – 8, 11).
- h. Perez, M., Hantusch, T., Matzke, B., (1999). *The Sap R/3 System on the Internet* (ch. 1, 2, 3, 5).
- i. Sculley, A.B., & Woods, W.W.A. (1999). *B2B exchanges: The killer application in the business-to-business Internet revolution*, (ch. 4).

Shields, M.G. (2001). *E-business and ERP: Rapid implementation and project planning* (ch. 1, 2, 5, 6, 7, 9).

Table 2.1: Key Texts that Canvas each Sub-topic

Sub-topic	*Text	a	b	c	d	e	f	g	h	i	j
		1998	2000	2000	1998	1999	2000	2000	1999	1999	2001
(1) Internet enabled ERP	ch.15						ch.19	Intro.	ch.2, 3, 5		ch.1
(2) e-Business	ch.15	ch.1	ch.3, 19	ch.5, 7	ch.2, 3		ch.1, 6, 7	ch.5	ch.4		
(3) e-Business with ERP	ch.15	ch.3	ch.20		ch.7 5-9		Ch.1 to 5				ch.1, 9
(4) e-Business with change Mgt		ch.10	ch.8, 15			ch.20	ch.8				ch.2, 5, 6
(5) e-Business transformation through ERP	ch.15	ch.2 4-6	ch.11 21		ch.12	ch.21 15	ch.9, 10	ch.1			

***Appendix A2.1 has an extended list of Texts**

Table 2.1 is a summary of the key chapter references of these texts that canvas each sub-topic. Collectively four texts (with shaded headings) are considered to offer a general coverage of the research topic; **a.** (Curran et al., 1998), **e.** (Kalakota & Robinson, 1999), **g.** (Norris et al., 2000), and **j.** (Shields, 2001).

However, within Table 2.1 the key text chapters are listed that offer detailed content for each sub-topic. Furthermore, the shaded cells indicate the most appropriate chapter material for review, by sub-topic:

- (1) Internet-ERP - **h.**(Perez et al., 1999) and **a.** (Curran et al., 1998)
- (2) e-business - **c.** (Fellenstein & Wood, 2000) and **d.** (Gonzalez, 1998:)
- (3) e-business with Internet-ERP - **e.** (Kalakota & Robinson 1999) and **g.** (Norris et al., 2000)
- (4) e-business with change management - **b.** (Deise et al., 2000) and **j.** (Shields, 2001)
- (5) e-business, Internet-ERP, and change management - **g.** (Norris et al., 2000), and **b.** (Deise et al., 2000).

For the remainder of the chapter the discussion is framed around the five sub-topics (1 - 5) and based mostly on the literature tabulated in Appendix, A2.1. This material is used to delve the in-depth issues for each sub-topic, for example;

- benefits realisation and outcomes from IT (Thorpe, 1998, ch. 4),
- success factors (Probst et al., 2000, Appendix 1),
- knowledge sharing and management (Hinrichs, 1997, ch.4),
- patterns of e-business change (Kalakota & Robinson, 2001, ch. 3),
- barriers to change (Deise et al., 2000, ch10; Palmer, 1998).

The list of key texts and the extended collection of literature in Appdx: A2.1 evolved through three iterations of research, performed during 1999, 2000, and 2001. This was done to narrow the scope and refine the theoretical foundations of the study.

2.2 INTERNET ENABLED ERP

This section is a review of the literature on the convergence of Internet technologies with ERP systems and the impact on organisations.

In a paper entitled “What is ERP?” Klaus, Rosemann, and Gable (2000) review the IS literature from 1997 to August 2000 in relation to ERP activity and trends, and point to emerging research topics. The authors used historical analysis, meta-analysis of representative IS literature, and a survey of academic experts. They observed some dissent on the definition and nature of ERP and even alternatives to the term ERP, eg “Standard Business Application Software” [Davenport, 1998; Laudon and Laudon, 2000).

To begin the discussion, Klaus et al. (2000, p.234) offer a suitable definition of ERP:

“Enterprise resource planning (ERP) systems are configurable information systems packages that integrate information and information-based processes within and across functional areas in an organisation. The current generation of ERP systems also provides business reference models or process templates that claim to embody the current best practices - industry based.”

For the purpose of this review, the term ‘Internet enabled ERP’ (Internet-ERP) is used to accommodate various technical constructs found in IS literature, namely: (i) Internet integration of ERP (Curran et al., 1998, p. 272), (ii) Internet connected ERP (Perez et al., 1999, p. 5), (iii) Web enabled ERP (Norris et al., 2000, p. 7) (iv) extended ERP (Shields, 2001, p. 11). In this study the following definition of ERP is used.

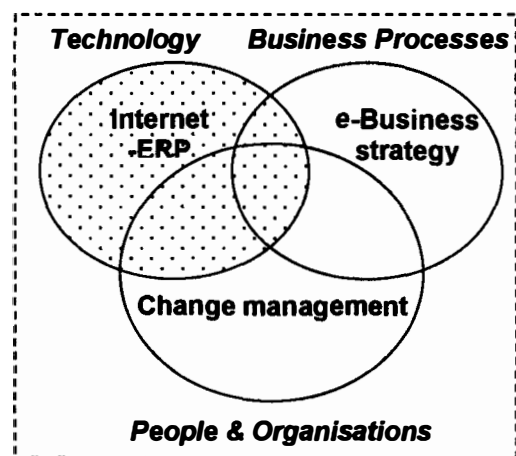


Figure 2.1: Review of ERP Literature

Definition of Internet-ERP:

Internet enabled ERP is the integration of an ERP system with the Internet. Alternatively, the “webifying” of an ERP package, to enable users to interact, via the Web with the ERP data. The word “Internet” includes the most up-to-date Web-based technologies; web, e-mail, intranets and extranets, as well as EDI via the web (Boey et al., 1999, p.2).

The term Internet-ERP is used to focus on the pervasiveness or enabling quality of the Web. Dobis, (1998a) argues this case for sustained competitive advantage from the Internet enabling of ERP. It has a two-way benefit and return on ERP investment. It will provide a catalyst for greater return on ERP investment by promoting the most efficient events through the Internet interface.

"The majority of the benefit will be returned to customers and suppliers connecting through this interface - and will have a propensity to cannibalise revenue from the existing physical channel as suppliers and customers find ways of dealing more efficiently with organisations through the electronic interface" (Dobis, 1998a, p.1).

Whereas the early critics of ERP focused on implementation issues (Bancroft et al., 1998; Cameron, 1996) other authors emphasise the Web enabled flow of information across almost all boundaries of the organisation (Curran et al., 1998; Carlson, 1995). In addition, they foresee a change in the nature of the organisation to an enterprise that begins to appear more like the Web (Larsen, 2000).

A fundamental question is "how to combine existing ERP systems with the latest Web-based technologies to create one all-encompassing e-business architecture?" (Norris et al., 2000, p. 197).

Enterprise Architecture

In Figure 2.2 ERP represents the information and communication technology (ICT) components of an enterprise architecture. Just as Drucker (1988) defines organisation as a structure in which information serves as the axis and the central support, in the 21st century enterprise an Internet enabled ERP is central to the company (Prior, 2000; Archer, 1997; Malhotra, 1996). However, the merging of ERP, e.g. SAP R/3, BAAN, PeopleSoft, Oracle

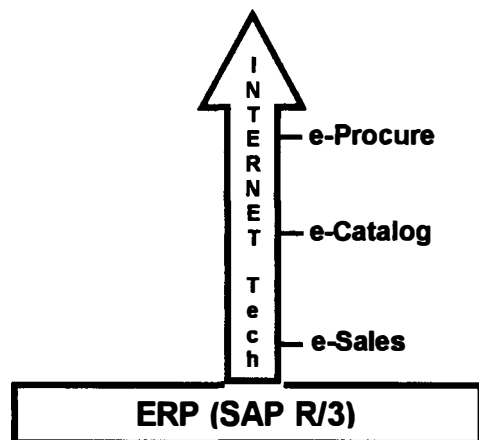


Figure 2.2: ERP as a ICT Model

Financials, with the Internet is not the only approach to developing an e-business infrastructure or an enterprise architecture (EA). An alternative to the ERP approach to EA was taken by Dell Computers (Dell & Fredman, 1999). Fan et al. (2000, p. 25) report Dell adopted a "component-based" set of enterprise applications as an enterprise architecture for the company's e-business activities.

Technology Integration for enabling Communication

Throughout the literature on ERP there is a common axiom. Once Internet technology is effectively integrated into the internal operation, its effective use for external interactions becomes a natural and easy extension. Without the internal infrastructure, external interactions will always be strained and limited (Norris et al., 2000; Perez et al., 1999; Curran et al., 1998; Baker, 1997; Telleen, 1996).

Also, ERPs provide a workflow to business behaviour, but fail to enable a “learning organization” as the ERP business model is static. “We need to add other mechanisms - the Internet as the key enabling technology” (Dobis, 1998a, p.1).

Gonzalez (1998) emphasises that it is not only the technical but also the human and behavioural issues that must be addressed to harness the pervasive *enabling* power of the Intranet. This must be directed towards the development of the learning organisation (Guengerich, 1997), the management of knowledge sharing (Hinrichs, 1997), and the building of relationships in e-communities (Figallo, 1998). The implementation of these technologies is seen as “a shift from the traditional emphasis on transaction processing, integrated logistics and workflows to systems that support competencies for communications building, people networks, and on-the-job learning” (Manville, 1997). This suggests the need for a learning organisation and people becoming knowledge workers.

An initial analysis of the literature revealed three necessary stages of developmental use of the Internet (Gonzalez, 1998; Curran et al., 1998).

- (i) Internet site 'Value triad'
- (ii) Intranet value chain
- (iii) Autonomous software agents

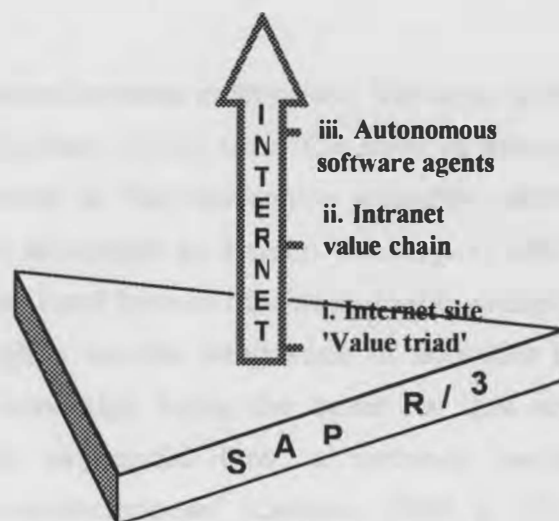


Figure 2.3: ERP model with Internet technologies

Figure 2.3 includes these three stages as the focus of ERP to represent the components of a dynamic developmental model for an enterprise architecture.

(i) Internet Site - 'Value Triad'

Gonzalez, (1998, p. 201) identifies three value factors which work together to create a successful, user friendly internet site that:

- satisfies employee communication and information needs - helps me do my job better,
- possesses outstanding product features - intuitive navigation and visually pleasing,
- exhibits operating excellence - convenient, reliable or trustworthy.

(ii) Intranet Value Chains

For an *intranet value chain*, each activity adds to the end product as well as to the technology infrastructure. Unless specialists come together to perform the activities of the value chain, it becomes impossible for employees to have trust in the intranet. Further, this intranet value chain represents a change in ownership of any of the enterprise's applications (Gonzalez, 1998, 201).

(iii) Autonomous Software Agents

“Instead of user-initiated interaction via commands and/or direct manipulation, the user is engaged in a cooperative process in which human and artificial intelligent software agents initiate communication, monitor events and perform tasks” (Carlson, 1995, p. 14).

Business agents can search product catalogs or "smart catalogs" while learning agents can assist to configure products of all combinations, accessible via an Internet browser (Curran et al., 1998, p. 275). This may be viewed as the delivery of e-commerce solutions.

Value Networks

ERP sets new standards for communication between enterprises, business partners and customers (Perez et al., 1999). Carlson [1995] used the idea of synergy to develop a new model from his experiences in the electronics industry called the “value network”. This concept is further developed by Larsen (2000, p.1) with “the fusion of ERP and the Web”. The premise used here is that sustainable competitive advantage can only be attained through a careful integration of activities in an organisation’s value chain and with knowledge being the basis for this activity integration. Whereas a chain implies sequential flow, a network carries a “connotation of multidimensional inter-connectedness” (Carlson, 1995, p. 11). The model represents the creation of a shared knowledge infrastructure that enables and “harnesses the flow of knowledge within and between communities” (p. 12).

Internet-ERP Developments for Value Networks

SAP expects that “ERP as a distinct entity will eventually give way to a much broader value proposition that effectively fuses different forms of business applications and services ... for value-chain collaboration between business partners” (Larsen, 2000, p. 3), also, (SAP, 1999a).

Table 2.2 is constructed from the literature on the rapid developments of SAP’s R/3 ERP with Internet technologies, with a brief description of the strengths and trends.

Table 2.2: ERP Developments

ICT	i. Examples - SAP R/3 * (References)	ii. Strengths	iii. Trends
ERP	SAP R/3 v3.0 – 1996 (SAP SCM, 1997)	Secure & quality data, integrated key internal business processes	legacy to ERP; intra-organisational integration
Internet-ERP	SAP R/3 v3.1 – 1998 (SAP, 1998a; 1998b)	Access to firm's data by partners; via Internet (communication)	internal integration to inter-organisational integration
e-Bus appln with ERP	SAP B2B Procurement'99 (SAP, 1999b)	Access to suppliers catalogues by employees; anywhere, anytime	broadcasting to B2B interactions
Web-enabled ERP	SAP R/3 v4.6 – Jan 2000 (SAP, 1999a; 1999c)	Web access to firm's business intelligence by employees, 24x7	data to information mgt, push and pull (interface)
eXtended ERP	mySAP.com – Jun 2000 (SAP, 1999e)	Personalised push & pull workplace with portal services applications.	to private e-marketplaces as business networks

* References are in (brackets)

The strengths and trends are referenced from Curran et al., (1998), Kalakota and Robinson, (1999), Norris et al., (2000) and Shields, (2001). The three shaded rows in Table 2.2 classify the focus of this study as 'e-Business implementations with ERP'. The developments with SAP R/3 are seen to represent a staged model as:

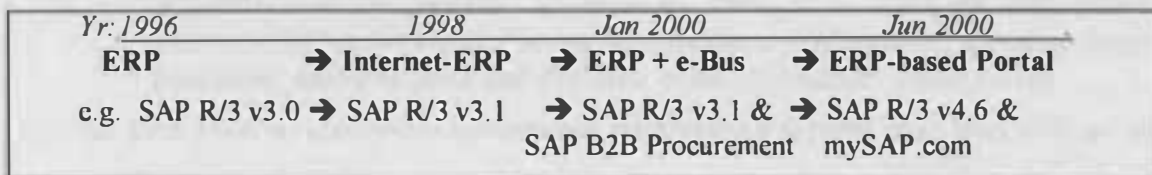


Figure 2.4 illustrates an extra dimension of the staged model of ERP developments from the same literature used in Table 2.2. Progress in the two dimensions in Figure 2.4 represents integration of the enterprise architecture for intra- and inter-organisational systems. These systems are designed to add value in virtual space, improve relationships with partner organisations, and take advantage of new business opportunities (Tapscott, 1999, p. xiii).

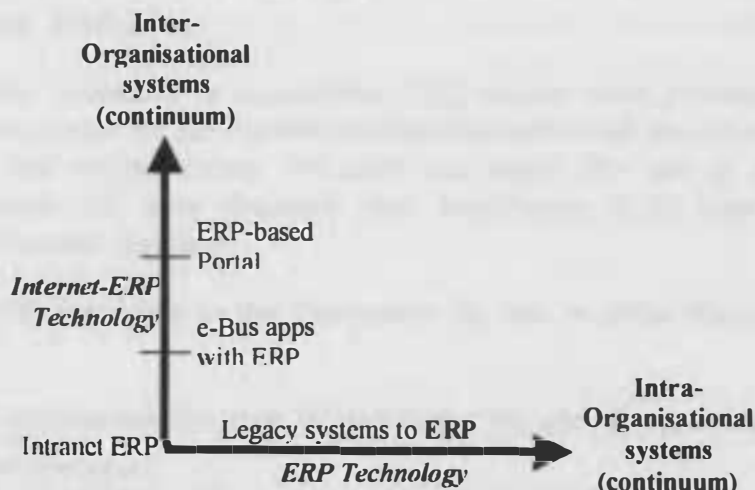


Figure 2.4: ERP Developments with Internet technologies

A major question that arises from this part of the literature review is:

Is ERP adoption staged, with different outcomes at each stage?

2.3 E-BUSINESS

What is e-Business?

IBM define the term e-business as “how network technologies can be used to transform key business processes conducted both within an organization, and externally with its customers, partners, stakeholders and suppliers.” An element of e-business is e-commerce, which IBM defines more narrowly, “as commercial transactions over the Internet only” (Wagstaff, 1997, p.1).

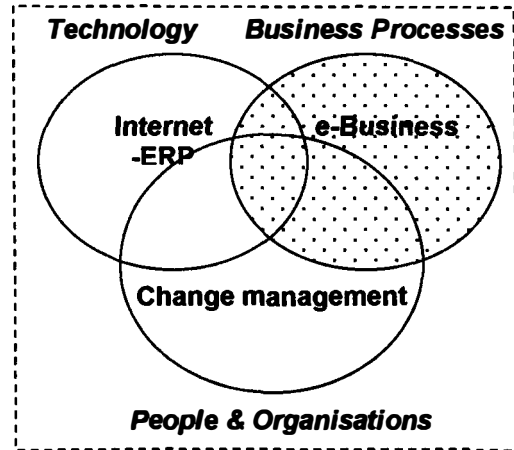


Figure 2.5: Lit. Review of e-Business

The following definition embraces key elements and perceived drivers of e-business.

Definition : *e-Business means “making the key business processes of an organisation available over the Internet” (Boey et al., 1999, p. 1). Also, the employment of Internet-ERP technologies “to improve business performance, speed up business processes, increase sales and decrease costs” (Viehland, 2000, p.913).*

By the mid-1990's, electronic commerce emerged as a term that was EDI as well as open buying and selling on electronic networks. For example, the Computer Desktop Encyclopedia (1995) defined electronic commerce as “doing business on-line”. It includes purchasing products via on-line services and the Internet as well as electronic data interchange (EDI), in which one company's computer queries and transmits purchase orders to another company's computer. Also, a simple definition of e-commerce widely used at this time will be used in chapter 4, as “the buying and selling of information, products and services via computer networks” (Kalakota & Whinston, 1996, p.1).

Definition : *Electronic Commerce or e-commerce (EC) occurs when a consumer orders goods or services on the Internet and has them delivered directly to them. It is buying and selling online. EC does not imply the use of the Internet technologies. EC used electronic data interchange (EDI) long before the Internet became available.*

It is vital to include EC literature in the discussion for two reasons (Saarinen et al., 1999):

- EC is used to emphasise the role of consumer for global organisations with established ERP systems,
- EC is changing the logic of business and the “change processes” in order to be competitive.

In addition to changing processes with existing players, EC can create new opportunities for established organisations in a number of industries (Braa & Sorensen, 1999). These opportunities arise from new services and customised products enabled by the ICT infrastructure, or Internet-ERP in this study.

Importance of Electronic Commerce Models

The growth of EC is driven by the effects of increasing globalisation and the rapid convergence of technologies (Nahar et al., 2000; Whiteley, 1998). EC has been defined by Seddon (1997) as "commerce enabled by the Internet-era technologies". In this initial context, a fundamental focus or question asked by researchers in literature on EC is "how to build robust models and solutions for a variety of circumstances" (Saarinen & Tuunainen, 1999).

Figure 2.6 illustrates an EC model developed by Palmer (1998, p.316) to assist research into key interorganisational boundaries:

- Business-to-Business (B2B)
- Business-to-Customer (B2C)
- "End Run"
- "Marketspace"

The model departs from earlier technology based approaches to modelling EC and emphasises relationships (Benjamin & Wigand, 1995; Kalakota & Whinston, 1996; Zwass, 1997).

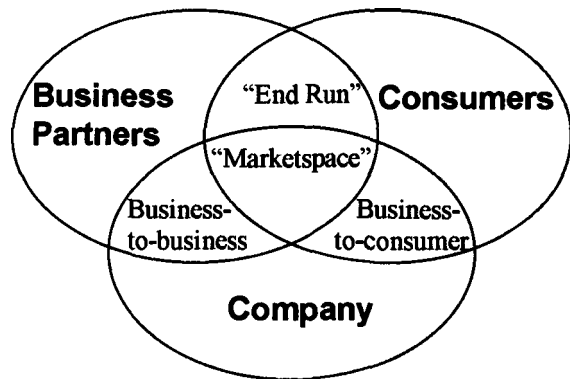


Figure 2.6: EC Model (Palmer, 1998, p.316)

It is useful for examining the "multiplicity" of relationships that can be enabled by the Internet to connect suppliers/partners and customers, to the company. In addition, there is the issue of changes in interorganisational relationships among those sharing information and transactions over the Internet (Clarke and Lee, 1997). More in depth issues include the type of communication, information shared (knowledge), benefits, and costs (Palmer, 1998). These interorganisational relationships are often a result of new or hybrid relationships that could be expected in the new marketspace (Braa, & Sorensen 1999). They involve issues of trust and boundary management (Kim & Prabhakar, 2000; Kleist et al., 2000).

A study of 280 US companies that focused on EC Internet strategies, found that EC has penetrated businesses of all sizes (Porra, 2000). Results of their "EC Internet strategies and Business Models" survey, showed "that while many companies had

participated in EC for years, their business models are still in their infancies” (p. 389). Further, they identified three distinct company types:

- **traditional** - use the Internet as an extension of their current business,
- **transitional** - in a process of transitioning their entire business to the Internet,
- **all-digital** - companies that are totally dependent on the Internet.

Cheng, (2000) and others argue the case for a Web EC model. Instead of the traditional bipartite business supply chains linking suppliers, customers, and intermediaries, e-supply chains connect suppliers, consumers, and intermediaries alike directly to an on-line market place using Internet technology, forming a "star" Web-centric commerce system. This effectively shifts the balance of power from vendors to consumers, making the need for responsive and adaptive just-in-time business models more critical, and creating a need for customer-centric business models (Fall, 2000; Prahalad & Ramaswamy, 2000).

In addition, McKay, Prananto, and Marshall (2000a; 2000b) offer a theory of stages of maturity for e-business based on their “framework for e-business growth strategy”. Their later work (McKay et al., 2001) is chosen as a theoretical framework to examine a ‘stages of growth’ theory of e-business in chapter 8 of this thesis.

On summary, a review of the e-business literature raises the question:

Is e-Business a staged process with different outcomes at each stage?

2.4 E-BUSINESS IMPLEMENTATION WITH ERP (E-ERP)

Numerous papers and reports have been written about e-business and how this concept will change the way companies do business (Viehland, 2000). However, apart from trade reports, sparse information is available on how to successfully integrate e-business projects with ongoing ERP implementations or already productive ERP systems illustrated in Figure 2.7 (Klaus et al., 2000; Scheer and Habermann, 2000).

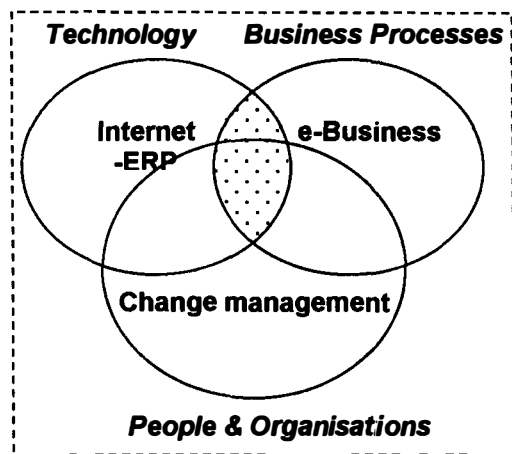


Figure 2.7: Review of e-Bus & ERP

Definition: *An e-ERP implementation involves the integration of e-business application(s) with an organisation's ERP system, for example SAP B2B e-Procurement. It implies an e-ERP project is a solution or supports an e-business strategy.*

e-ERP is used to emphasize the dual nature of this type of e-business application implementation; a specific Internet interface front-end coupled with the ERP back-end or "back office". In contrast, some authors use the initials "ERP" to represent this type of e-business application (Viehland, 2000). Others stress the impact that e-business strategies have on technology, business processes, people, and organisation in an ERP environment (Norris et al., 2000; Hesterbrink, 1999).

Hesterbrink, (1999, p.11) debates the commonalities and differences between e-business and ERP projects and concludes these are complementary for example:

- An e-business implementation is from the onset aimed at integrating business processes with outside business partners and is built on and supported by the ERP foundation. The main focus of the implementation will therefore be the integration of cross-company value chains using e-business tools.
- An ERP Implementation has a defined lifecycle of typically 12-24 months depending on the scope and other parameters. After the initial implementation, upgrade and functional enhancement projects follow at irregular intervals.
- e-Business implementations need to be significantly faster than initial ERP implementations "1-2 months" - Shields, (2001) on *e-Business and ERP: Rapid Implementation*. However it can be expected that these activities will continue on an ongoing basis to accommodate changing relationships with business partners and enhance functional and technical scope of existing relationships.

e-Business Map with ERP

Kalakota and Robinson, (1999, p.4) define “e-business, in addition to encompassing e-commerce, includes both front- and back-office applications that form the engine for modern business.” Also, “e-business is the overall strategy, and e-commerce is an extremely important facet of e-business through B2B interactions.”

Based on Carlson’s model “electronic consultative commerce” Figure 2.8 presents a basic e-business map of e-commerce communication channels as business-to-relationships, connected to the ERP integrated application modules (single lines).

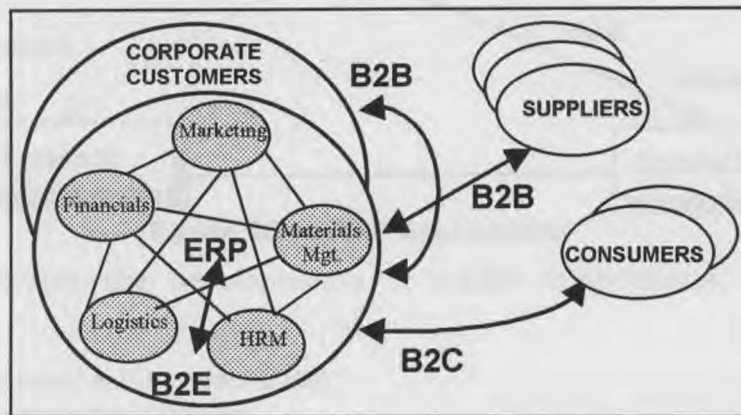


Figure 2.8: E-Business Map for SAP enabled Organisations

(Source: Adapted from Carlson, 1995, p. 4)

The B2- relationships through online channels (shown by arrows) include:

- Business-to-Consumer (B2C) via Internet/Web-sites to support consumer interaction,
- Business-to-Business (B2B) via extranets to support business partners,
- Business-to-Employee (B2E) via Intranets to support information sharing.

The map in Figure 2.8 includes a set of e-business applications that interface the internal ERP modules through Internet channels with corporate customers and suppliers as B2B, consumers as B2C, and employees as B2E interactions. In 1999 SAP customer began using e-business applications such as “SAP B2B Procurement” for B2B, “SAP Online Store” for B2C, and “SAP Employee Self-Service” for B2E (SAP, 1999a). This scopes the generic set e-business applications.

e-Business Integration with ERP

Technically, “integration of ERP and the Internet is no simple matter” (Perez, 1998). You need far more than a Web browser and an Internet connection. You must also have a comprehensive suite of applications that allow end-to-end process integration (Dobis, 1998b). This means not only creating a company's web site, but

also business Internet applications, eg B2B Procurement integrated to meet the new business requirements of an ERP (SAP, 1998a, p. 5).

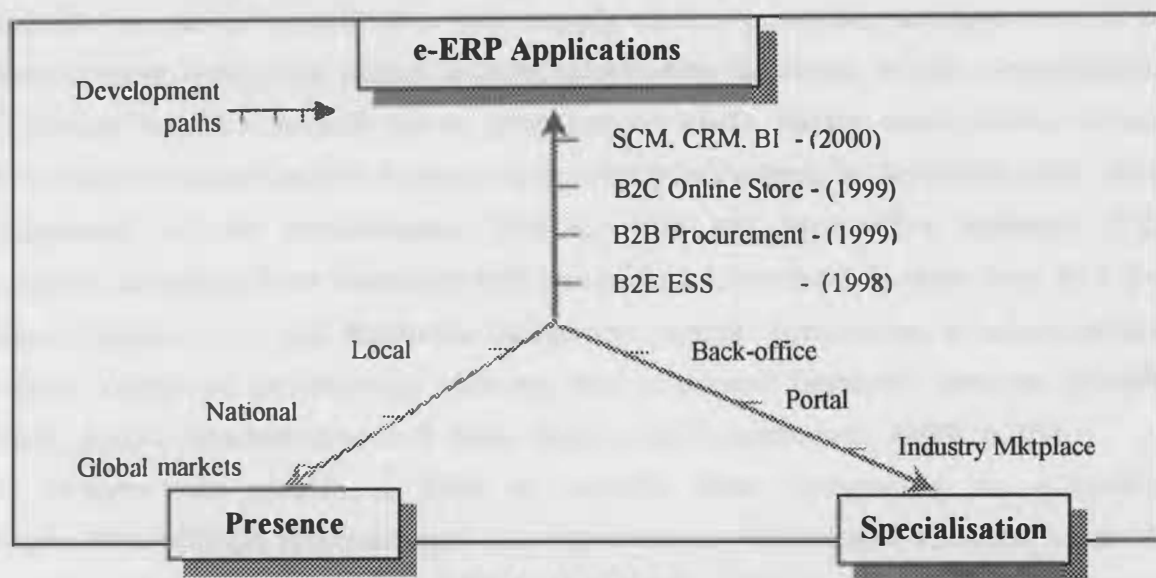


Figure 2.9: e-ERP Applications

Figure 2.9 illustrates the developments of e-ERP applications, purposes, and presence:

B2E - employee self service (ESS)

B2B - e-Procurement where,

- procurement (direct purchasing for product and services)
- maintenance, repair, and operation (MRO) – indirect purchasing for non-production

B2C from “Online Store” for consumers and as B2B for corporate Customers.

These applications support the move into the “virtual marketplace” globalisation as collaboration within Marketplaces, to increased competitiveness, and increased customer loyalty, as well as IT innovation through integration of B2B e-business applications (SAP, 1999a; Palmer, 1998)

Does Internet-ERP help or hinder e-business?

In answering this generic question Rossouw and van Rensberg (2001) argue that there is a more concrete and significant question; “how do organisations realise benefits from e-ERP projects?” In particular, what are the benefits from “SAP B2B Procurement”, “SAP Online Store” “SAP Employee Self-Service” (SAP, 1999a)?

(1) Benefits

With the developments in B2B e-commerce, Australian businesses and the government, both at the State and Federal levels, are increasingly adopting Web-based e-procurement capabilities to achieve volume purchase, a wider choice of buyers and suppliers, lower costs, better quality, improved delivery, and reduced paperwork and administrative costs (Singh & Thomson, 2002).

The benefits of e-procurement” as described by Kalakota and Robinson (2001) fall into two major categories: effectiveness and efficiency. Effectiveness benefits include increased control over the supply chain, proactive management of key procurement data, and higher quality purchasing decisions within organisations. Efficiency benefits include lower procurement costs, faster cycle times, reduced maverick or unauthorised buying, more highly organised information, and tighter integration of the procurement function with key back-office systems. Other benefits identified from literature include: reduced purchasing cycle time and cost, price transparency and improved budgetary control, elimination of administrative errors, improved information sharing and improved payment process (Chaffey, 2002, p.264; Themistocleous & Irani, 2001, p.317; Linthicum, 1999, p.354).

To achieve the maximum level of benefits from integrating an e-business application with an ERP package, it is important to understand from the outset the complementary nature of an e-ERP implementation. Hesterbrink (1999, p.6) raises the importance of ‘alignment’ of those dimensions with respect to ERP and e-Business implementations. The stakeholders of an ERP system are potentially every employee in the company as well as key suppliers and customers. Typically, an ERP system in its final rollout will replace the majority of legacy systems and interface with the remaining systems. To the outside world however, the ERP system will be largely transparent, as it communicates with suppliers and vendors using traditional media or standard EDI transactions.

(ii) Optimising and Business Integration

Getting optimal value from the Internet requires an end-to-end integration: intra-enterprise front-end systems to back-end systems, inter-enterprise between two organisations, and community wide (SAP, 1999a). To achieve optimal efficiencies and to eliminate incremental transaction costs, the following must hold true (p.5):

- *The core business systems within an enterprise must be integrated, front end to back end.*
- *The firms that effect transactions must have the data flow seamlessly from one enterprise to the other.*
- *An industry or community must allow for any participant to use any type of system and to communicate with any other system openly and collaboratively.*

When these conditions are met, the environment incurs no incremental transaction costs. This is called “3-dimensional” business integration (p. 5).

(iii) Benefits Realisation

Interaction is about efficiency through electronic data processing which may have no influence on effectiveness, such as a reduction of incorrect orders. Savings are guaranteed by augmentation, not interaction. (Onarheim & Syvertsen, 1999, p.2). StatOil's data quality programme (BRA) exemplifies the shift from interaction of processes (efficiency alone) to augmentation of improved value added processes (effectiveness) through the use of digital information (Onarheim & Syvertsen, 1999, p. 5) from a common source of quality data.

(iv) Success of e-ERP Implementations

The generic business dimensions of success as recommended by Venkatraman and Henderson (1998, p.34) as **Outcomes & Performance Objectives:**

- Improved operating efficiency (ROI),
- Virtual and economic value added (EVA), and
- Sustained innovation and growth (SIG)

A concluding question that represents the whole of this section is:

How do the stages of ERP and e-Business align?

An associated question selected for an investigation into theory of e-ERP is:

How do organisations realise benefits from e-ERP implementations?

In chapter 4, more detailed questions are developed for an investigation into theory of benefits from e-ERP projects.

2.5 CHANGE MANAGEMENT WITH E-BUSINESS AND ERP

Business Process Change and ERP

Reported organisational experiences relating to ERP implementations have been contradictory (Al-Mashari, 2000). But one fundamental experience appears common to all implementations - a high level of organisational change (Blain, 2000; Bancroft et al., 1998). Such change impacts on business processes, organisational structures and even strategy (Curran et al., 1998, p.279; Davenport, 1996).

In the mid-1990s, the Business Process Reengineering (BPR) debate drew attention to a trend from isolated business activities to entire value chains (Corrigan, 1997). Notably, work on BPR by Grover and Kettinger, (1995) became largely concerned with business process redesign, a subset of BPR. Yet, "entire" process management in most of the cases focused on the information flow within departmental, corporate, or national boundaries (Grover & Kettinger, 1997). Obstacles within these areas appeared difficult enough without looking to interorganisational business processes (Scheer & Hubermann, 2000, p.58).

Organisations seek to use ERP resources to gain a competitive advantage over competitors (Pereira, 1999; Gable et al., 1998, Cameron, 1996). In implementing ERP systems, the business process change focus is on supply chain management (Curran & Ladd, 2000; SAP, 1997), and particularly in the procurement landscape (Kalakota & Robinson, 1999: chap.7-9; SAP, 1999b).

In viewing SAP R/3 as an enabling tool for business process change, theories used by Scott, (1999) and Esteves and Pastor, (2000) fall short of covering the multi-facets of change. Studying such changes entails taking a broader approach towards uncovering the multi-facets of Process Change Management (PCM) in the ERP context. These can be based on Grover's (1999, p.41) PCM framework that embodies five groups of facets, as follows:

- *Change management* – representing various human-related change activities,
- *Project management* – relating to organizing and monitoring project team relations and activities,
- *Continuous process management* – concerning the ongoing business processes' evaluation and improvement,
- *Strategic planning* – referring to the set-up and planning of change goals and directions, and
- *Technology management* – covering the technology selection and development tasks.

Change Management with Internet-ERP - Figure 2.10

Initially, many enterprises have implemented ERP packages but left value on the table by not restructuring the business processes to become more efficient (Dobis 1998a). Generally, organisations added their own business events to the ERP business model (Curran et al., 1998). So, interorganisational communication and B2B cooperation were seldom seriously put on the improvement agenda. Consequently, ERP systems were also restricted to intra-organisational process support (Dobis, 1998a).

By the end of 1999 organisations seemed to opt for an evolutionary or staged approach to ERP implementation, where the ERP connection to the Internet was to be a separate and later stage of implementation (Hesterbrink, 1999, p.1).

A survey of 800 large companies (Wieder et al., 2000) reported that in Australian industry "Internet integration and ERP are still widely independent issues", and at this point in time (December, 2000) "ERP systems do not influence the way companies make use of the Internet" (p.12).

Change Management with e-Business - Figure 2.11

Scheer and Habermann, (2000) argue that after various BPR and ERP lessons learned, companies seem to be better prepared for business scope redefinition. "They understand more and more the limitations of intra-organizational improvement and the urge to play an active role in the global e-business community" (p.60). Further, they welcome analysis of current business processes and the chance of reengineering (change), rather than designing an e-business application that makes only "the best of bad processes."

Kalakota and Robinson, (1999, p. 60) put this into context - "the creation of an e-business design is inextricably linked to the management of change". Change management of new business practices is paramount in organisational transformation that is driven by doing business via the Internet - a topic addressed descriptively by Norris et al., (2000).

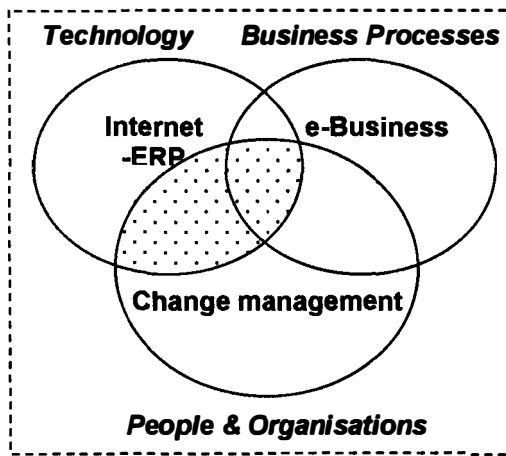


Figure 2.10: Review of ERP & CMgt

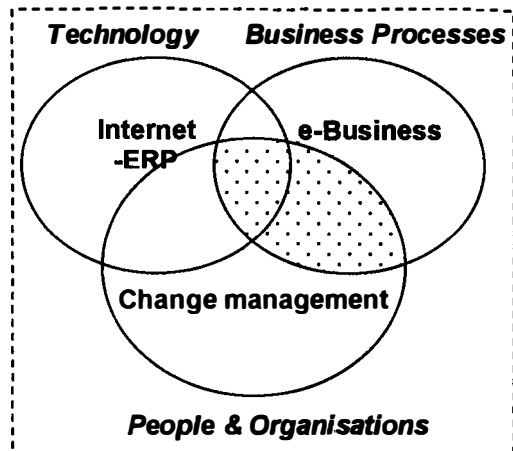


Figure 2.11: Review of e-Bus & CMgt

Definition : e-Business Change (eBC)

e-Business change is an "organisation initiative to design" an e-ERP project "to achieve significant breakthrough improvements in performance through changes in relationships between management, information, technology, organisational structure, and people" (adapted from Guha, et al., 1997, p.121).

For example, "improvements in quality, responsiveness, reduced cost, flexibility, satisfaction, shareholder value" (p.121), and other suitable e-business measures.

In order to avoid an original ICT-centric position, e-business change is the preferred approach for examining the success of e-business projects. This approach was confirmed by a later study by Sarker and Lee (2002). Their study provides "support for the socio-technical theory-in-use" (p.1).

e-Business Change Model

A literature search revealed four candidate models for theory testing of eBC.

i. Planned change management from the traditional school sees change as a sequence of steps: unfreezing, executing change, and refreezing (Mintzberg et al., 1999). This is widely documented and recommended in many texts on implementation of SAP R/3 (Shields, 2001; Blain, 2000; Kale, 2000). This appears to be a possible management approach for eBC with e-ERP projects.

ii. Dawson, (1996) debates the need for emergent change strategy in highly dynamic IT induce change. The emerging contextual movement (Clarke, 1998) have developed a framework for analysing the process of continuous versus disjoint technological change. This appears to be a possible candidate model for eBC.

iii. Dawson (1996) developed "processual" framework of organisational change as:

- Conception of a need to change – which connects with benefits realisation,
- Process of organisational transition,
- Operation of new work practices and procedures.

The advantage of the processual approach is its ability to accommodate conflicting histories of change at different points of time, and at the same point in time for different groups (Dawson, 1996, p.68). This appears to be a more likely candidate model for eBC.

iv. The model in Figure 2.12 guides the researcher in identifying facilitators and inhibitors of successful eBC. The relationships presented in the model are based on relevant work in organisational change, strategic management innovation, and information systems. The general thesis of the framework (embedded measurement criteria) is adapted from Guha's et al., (1997) work on "business process change".

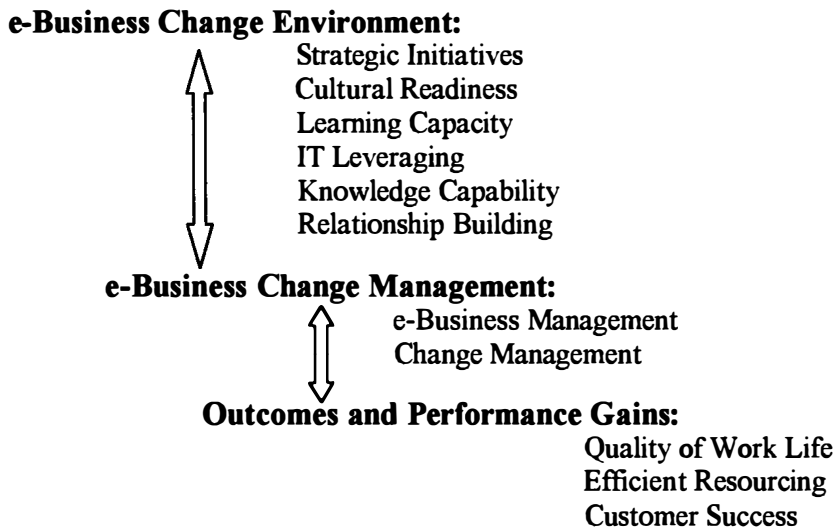


Figure 2.12: Model of e-Business Change

(Source: Adapted from work on BPC by Guha et al., 1997)

Figure 2.12, details the components of a proposed research model of eBC within three major segments, and how these inter-relate (double-ended arrows).

In any examination of eBC outcomes, consideration should be given to the environmental conditions for change, and the ability of the organisation to manage change in those conditions. This is offered as suitable candidate model of eBC because of its foundations on previous research into BPC and IS theory.

Measures of Success: Outcomes and Performance gains

Outcomes of e-business change can be measured at various levels of the broad complex phenomenon of any e-ERP project. More recently, leading firms that have begun to undertake eBC to meet strategic goals recognise that they accomplish their objectives through people, therefore placing importance on improving the quality of work-life issues. If effectively managed, employees should ultimately be more productive in their work tasks and better able to serve customers, suppliers, and business partners. The key constructs that can be probed here are: gaps between effectiveness expectations (goals) and actual performance improvements, such as employee work satisfaction, efficient resourcing, and more customers (Guha et al., 1997). In addition, Kaplan and Norton's (1996; 1992) use with the "balanced scorecard" offers another eBC metric.

The concluding questions that represent the whole of this section is:

- **What facilitates and inhibits the success of e-business implementations through ERP?**
- How are these processes for change managed?
- Is there a pattern of change management?

2.6 E-BUSINESS STRATEGY THROUGH INTERNET-ERP

This section is about e-business strategy using Internet-ERP (Figure 2.13). A meta-analysis by Viehland (2000) of e-business writings by several authors, proposes six critical success factors for developing an e-business strategy (Table 2.3). For this purpose, a critical success factor is defined as, a factor that is considered critical to the success of the e-business strategy. "Successful performance in this area will assure the success of the strategy and the attainment of the organisation's goals" (O'Brien, 1999, p. G4).

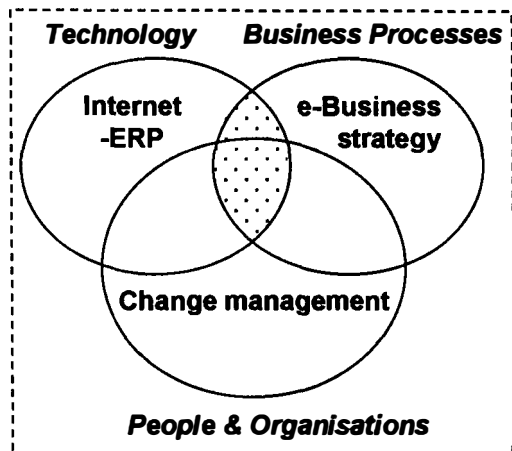


Figure 2.13: Review of e-Bus Strat & ERP

Table 2.3: Six Critical Success Factors for e-Business Strategy

CSF1: Create a consumer/customer-centric strategy
CSF2: Embrace outsourcing to improve business performance
CSF3: Use information management to differentiate your product
CSF4: Be part of an e-business community
CSF5: Act like a new entrant
CSF6: Executive leadership is essential

However, Viehland (2000) fails to mention a further candidate for a CSF in citing the case study - Barnes and Noble versus Amazon.com. Amazon's IT infrastructure lacked an integrated back-office to match its "Web face". Venkatraman and Henderson, (1998, p. 34) suggest, and Kalakota and Robinson, (2000, p.166) argue the case that ERP is a necessary backbone for an organisation's e-business architecture. Guha et al, (1995, 1997) on BPC provide alternate success factors.

Comparison of e-Business Strategy Models

In choosing a candidate research model for theory testing of an e-business strategy three models appear in the literature that demonstrate a common theme. Each of the models shows a progression of e-business growth and there is the implication for organisational transformation. The reader is invited to look at the full details of the models, with further discussion, in Appendix 2.2.

(i) "e-Commerce Maturity" Model (KPMG, 1998)

- Stage 1: there is a basic online presence such as a web site with a one-way flow of information to customers, and with little technology integration across the enterprise.

- Stage 2: some two-way flow of information and cross-functional integration of the application portfolio begins. Organisational discontinuity exists while business units compete for resources and communications between units is hampered by different IT solutions.
- Stage 3: change becomes a managed process and business units have responsibility for their own progress. Integration of technology across the enterprise is extensive. The final stage is key to value of empowerment.

(ii) Customer Focused Model: “Now-Perfect-Free” (Young et al., 1997)

Stages of development along three paths of business activity:

- Products and services at the lowest possible cost with highest quality
- Greatest possible customisation
- Fastest possible delivery time

(iii) Virtual Organising Model (VOing) (Venkatraman & Henderson, 1998)

VOing as a concept focuses on the developments in three business dimensions:

- Asset Configuration – moving towards collaboration/coalitions
- Customer interaction - moving towards the e-Customer communities
- Knowledge Leveraging – harnessing the flow of knowledge

Table 2.4 Comparative Analysis of Three e-Business strategy models

Theoretical Model	CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	Activity Focus	Performance Gains	Business Strategy
“e-Commerce Maturity”	•	•	•	•	•	•	e-Sourcing	Efficiency,	Savings v’s gaining customers
“Customer Focus”	•	•	•	•	•	•	e-Sourcing Customer Interaction	Efficiency, Value added services	Quality products, Customer reach
“Virtual Organising”	•	•	•	•	•	•	e-Sourcing Customer Interaction Leveraging Expertise	Efficiency, Value added services Improved Admin	Quality products, Customer reach Innovation at lowest level

Table 2.4 shows a simple comparative analysis of the three candidate e-business models for theory testing. It is based on the criteria of measurement and value networks. The VOing model is selected for its superior completeness. It embraces all of the elements of the other models and their measures of e-business success.

Case for VOing

A study of “EC strategy and business models” found in favour of an incremental approach to the EC strategy (Porra, 2000). This is in contrast to the study of a large

US electronics company, Marshall Industries, that demonstrates a discrete set of discontinuities in its "IT-induced" strategy (Young et al., 1997).

Further, Venkatraman and Henderson (1998, p. 33) declare, "the current models of strategy and structure are woefully inadequate to meet the imminent challenges" of a knowledge based digital (online) economy.

In Figure 2.14, VOing is characterised by the holistic model or synergistic solution for the delivery of consultative value added products and services supported by an integrated ICT based organisation. Further, VOing is a "strategic approach that is singularly focused on creating, nurturing, and deploying key intellectual knowledge assets while sourcing tangible, physical assets in a complex network of relationships" (p. 34).

In an extended study Tabor (2000, p. 670) found; "an aggressive business strategy is a stronger driver of EC technology adoption than IS strategic orientation."

VOing is a business strategy that focuses on three interdependent strategic business vectors (Venkatraman & Henderson, 1998) or constructs, namely:

- (i) *Customer Interaction* - refers to the extent to which customers virtually interact with the market defined at three levels of greater virtual progression;
- (ii) *Asset Configuration* - refers to asset optimisation by leveraging competencies;
- (iii) *Knowledge Leveraging* - refers to the virtual progression of harnessing knowledge sharing.

The objective is to derive add value, in the context of an integrated ICT infrastructure by the merging of enterprise system and Internet technologies.

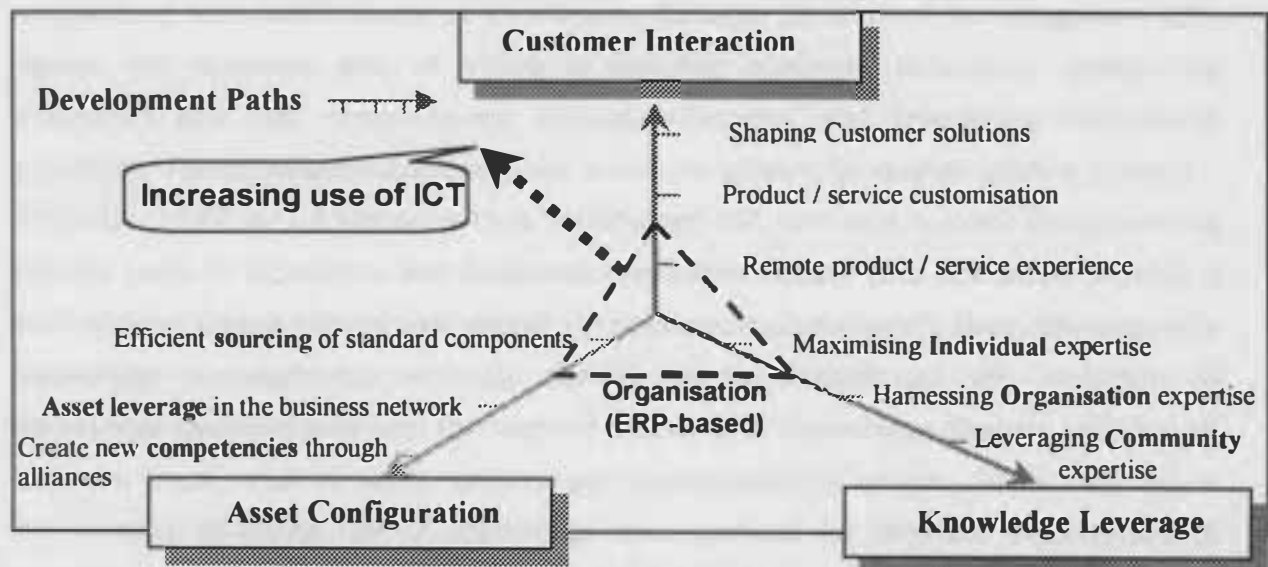


Figure 2.14: Virtual Organising Model of ERP based Organisations

(Source: Adapted from Venkatraman & Henderson, 1998, p.34)

Figure 2.14 illustrates how the vectors of VOing exhibit three developmental levels, rather than continuous progress of change, (adapted from Venkatraman & Henderson, 1996).

These stages reflect development of people associated with an organisation at the individual level, the corporate level, and the community level. McKenna, (1999) suggests four levels: individual, team, organisation, and community. A shift to higher levels in each of the business vectors, is the goal for migrating the organisation towards an “electronic consultative commerce” (Carlson, 1995). There is the potential to take the organisation beyond an electronic consultative enterprise, where collaboration and competition are in tension with each other at all levels. To go beyond return on investment, the virtual ICT-based organisation must establish explicit processes to increase collaboration and to facilitate the flow of knowledge within and beyond the organisation. Management's goal is NOT to save costs but to derive added value in virtual space. Finally, the VOing model represents an inter-organisation network that can create opportunities for collaboration between participating organisations for the knowledge economy (Pouloudi, 1998), where the coopting of customer competence is desirable (Prahalad & Ramaswamy, 2000).

As discussed in section 2.2, Carlson (1995) uses the idea of synergy to develop a model called the “value network”. The model represents the “creation of a shared knowledge infrastructure that enables and harnesses the flow of knowledge within and between communities” (p.12). This is achieved through enabling technologies supporting the collaboration of knowledge, through the use of the integrated ICT. Again, the essential goal of VOing is shaping customer solutions, configuring resources and new competencies through alliances, and leveraging community expertise. The measures of success are based on generic business metrics (Chap.7). Manville (1997, p. 12) observes that “technology will continue to yield disappointing results until IS managers and business executives realise that ICT must provide a way to form communities, not simply provide communications”. Here, the goal of a knowledge management strategy should be to understand the presence of knowledge communities and the various channels of knowledge sharing within and between them, and to apply technology appropriately (Carlson, 1995). Managers are looking to make use of knowledge management for effective exploitation of employee and customer expertise (Prahalad & Ramaswamy, 2000).

A concluding question that represents the whole of this section is:

Do effective strategies of e-ERP implementations fit the VOing model?

In chapter 7, further detailed questions are developed for an investigation into the theory of VOing.

2.7 E-BUSINESS TRANSFORMATION THROUGH ERP

In this section the discussion of e-business strategy turns to the effects of e-ERP implementations on organisations (Figure 2.15) (Deise et al., 2000: ch.6; Norris et al., 2000: ch.8). Collectively Kalakota and Robinson (1999, ch.12) and Norris et al (2000: chap.10) explore the strategy and tactics of an ERP system with e-Business applications, as the enterprise architecture necessary to support organisational migration to an e-business.

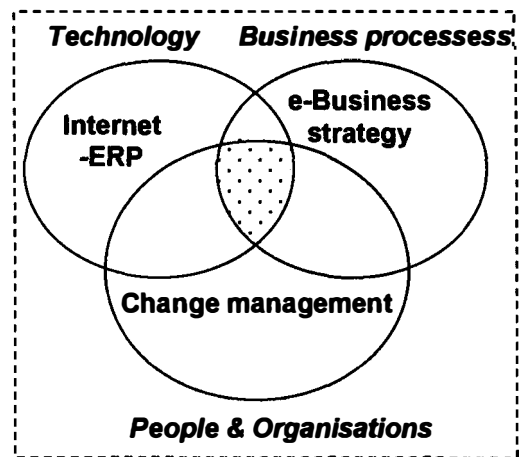


Figure 2.15: Review of e-Bus trans with ERP

Evolution of IT applications use

In Thorpe’s view the evolution of IT applications use is through three stages: interaction of work, information management, and business transformation (Thorpe, 1998, p.14). Sculley and Woods (1999) emphasise that B2B systems involve business applications not IT applications. Therefore, Table 2.5 has been updated to include an *ICT applications attribute.

Table 2.5: Stages of IT Evolution (Theory of Evolution)

Stage	* ICT	Benefits	Examples
Interaction of Work	ERP	Operational efficiency, Data Integration and security	Human Resources; payroll, Financials Logistics
Information Management	Data warehouse, Data mining	Operational and tactical effectiveness	OLAP
Business Transformation	e-Bus apps with ERP	Strategic effectiveness and positioning	e-Business

Increasing order of ICT application and perceived benefits

The key attributes, “Stage” and “ICT” are found in Table 2.2 and Figure 2.4 on page 2.10. These are also found in Venkatraman’s (1991; 1994) views of IT-induced organisational transformation. However, the focus here is on business transformation through e-business and ERP applications.

Stages of Growth

One major weakness of the existing stages of growth models emerges when it is applied to assess an organisation’s e-business activity. The IS/IT stages of growth models concentrate solely on the issue of a “traditional” IS/IT, or the “back-office”,

within an organisation without considering the impact of the Internet technologies in the organisation. On the other hand, the Internet based stages of growth models focus solely on the e-business side of the organisation, or the “front-office”, while paying less or no attention to the more traditional IT (McKay et al., 2001).

“Thus, it seems inevitable that stages of growth models be developed to account for the Internet-based IT activity in organisations, alongside traditional notions of IS/IT usage in organisations” (McKay et al., 2001, p. 1079).

An integrated model of e-business maturity can be achieved through mapping the Internet based stages of growth model onto the IS/IT stages of growth model. The result is called the Stages of Growth for e-Business (SOG-e) model and is illustrated by Figure 2.16.

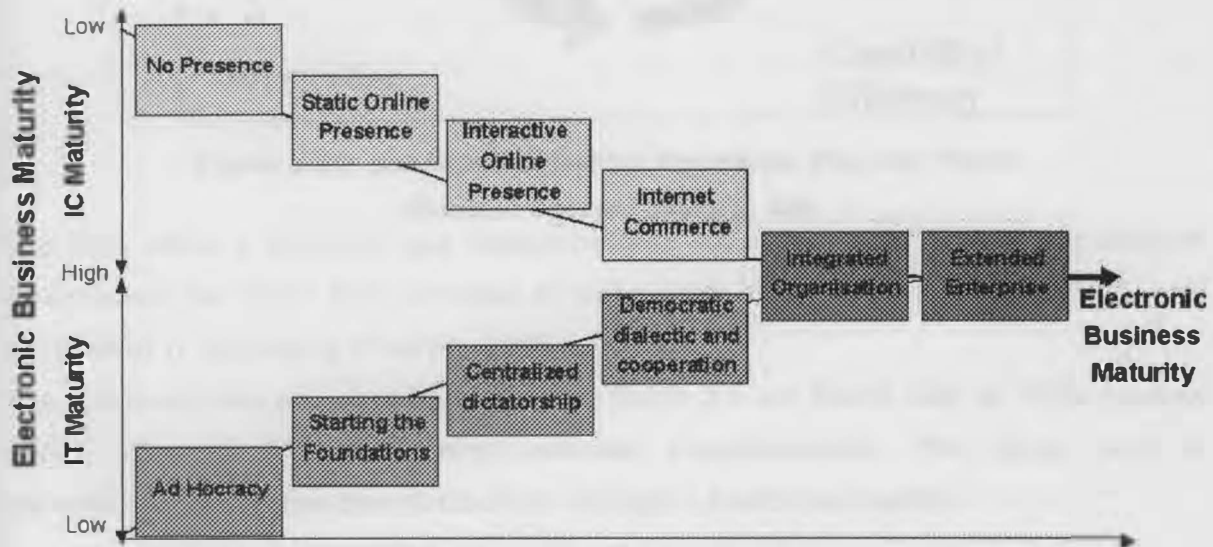


Figure 2.16: The SOG-e model

(Source: McKay et al., 2001, p. 1079)

A more thorough description of SOG-e model can be found in McKay et al. (2000a). The criticism is that 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 stage assumes an accumulation of the knowledge, experience, skills and expertise of all the previous stages. An important new dimension of the SOG-e model, however, is to recognise that within the same organisation there may exist different stages of maturity for the different components of IT use.

A concluding question that represents the whole of this section is:

What are the stages of growth in e-Business through ERP?

In chapter 8, this question is used to extend the third research question about VOing to prompt the investigation of stage of growth for e-ERP implementation.

2.8 BENEFITS REALISATION APPROACH FOR E-ERP

Thorpe (1998) recommends the practice of continuously asking the four “Are”s. Figure 2.17 emphasises this by illustrating the cyclic nature of the Benefits Realisation Approach (BRA).

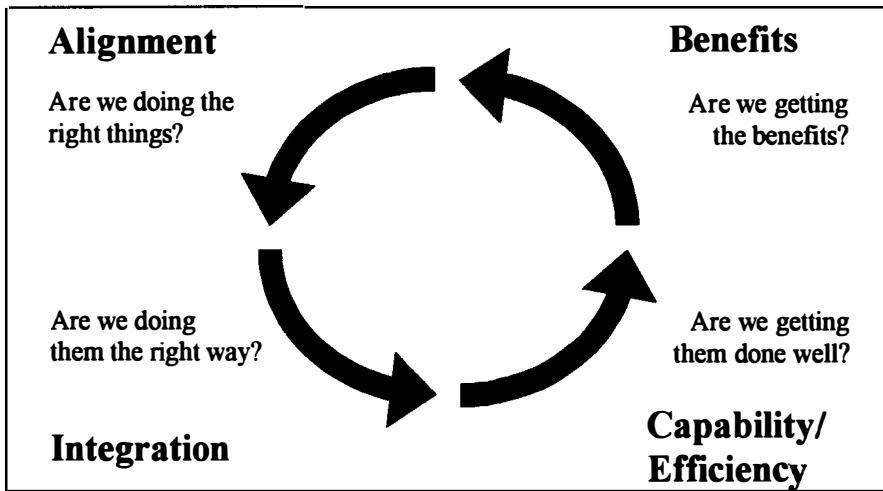


Figure 2.17: Benefits Realisation Approach, The four “Are”s

(Source: Thorpe, 1998, p. 52)

The BRA offers a powerful and comprehensive set of practices that help managers understand the value and potential of technology in business transformation, and successful IT Managing (Thorpe, 1998).

The fundamentals as columns 1 and 2 in Table 2.6 are found also in Venkatraman (1991) view of IT-induced organisational transformation. The focus here is especially on business transformation through e-business models.

Table 2.6: Benefits Realisation Approach for e-ERP

Elements of BRA	“Are” Questions	eERP
Alignment	1. Are we doing the right things?	Business models
Integration	2. Are we doing them the right way?	Synergy of all BTPP elements
Capability / Efficiency	3. Are we getting them done well?	Measures of e-business
Benefits	4. Are we getting the benefits?	B2E, B2B, and B2C

Table 2.6 shows the corresponding approximation of the elements of BRA with respect to the four “are”s, and their relationship to e-ERP activities.

e-Business Readiness

At a practical level, e-business readiness poses questions that companies need to ask to obtain each stakeholder's view. Interviews with industry and government leaders such as VerticalNet, Nuance, Siemens, and Novell illustrate various e-business initiatives Craig and Jutla (2000, ch.9).

A concluding question that represents the whole of this section is:

What is the most effective pattern for benefits realisation?

2.8 SUMMARY

Those companies that have implemented enterprise resource planning (ERP) systems are considered well placed for doing business on the Internet. ERP will position these organisations to easily extend their business processes beyond the boundaries of the enterprise. Since ERP technology represents a sound highly integrated IT platform for internal processes, coupled with the Internet, ERP becomes relevant in the age of e-business.

An e-business implementation is from the onset aimed at integrating business processes with outside business partners and is built on and supported by the ERP foundation. ERP systems are also designed to facilitate business administration workflow. Change management of new business practices is vital for organisational transformation towards doing business via the Internet. The key components of these areas stress the impact that e-business projects have for business processes, people, technology, and strategy.

A fundamental question of this is "How do we combine existing ERP systems with the latest Web-based technologies to create one all-encompassing e-business architecture?"

The concluding ten generic questions derived from all sections of the chapter are re-arranged within three main lines of enquiry for the investigation into theory of e-ERP as:

Q.1 How do organisations realise benefits from e-ERP implementations?

- (i) Is ERP a staged process with different outcomes at each stage?
- (ii) Is e-Business adoption staged, with different outcomes at each stage?
- (iii) How do ERP and e-Business align?

Q.2 What facilitates and inhibits the success of e-business implementations through ERP?

- (i) How are these processes for change managed?
- (ii) Is there a pattern of change management?

Q.3 Do effective strategies for e-ERP implementations fit the VOing model?

- (i) What is the pattern of growth in e-Business through ERP?
- (ii) What is the most effective pattern for benefits realisation?

Collectively the three questions investigate theories of benefits realisation, e-Business change, VOing, and stages of growth for e-ERP.

CHAPTER 3 – METHODOLOGY

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3.0 INTRODUCTION

This chapter is about the what, why, and how of research. It is concerned with the selection and development of a suitable research approach, relative to the research topic. A survey of the relevant literature is used to assemble an appropriate approach to researching an emerging organisation phenomenon, and a pilot study helps ground the research.

The main part of the chapter details the activities designed to explore, describe, and justify theory associated with the research questions identified in chapter 2. These core questions derived from the literature focus the research to build theory around e-business implementations through ERP (e-ERP).

The structure of the chapter is as follows: a review of the relevant methodology literature with approaches to IS research, the design of a composite case-based research method, its implications for the study, and a detailed research plan.

3.1 NATURE OF IS INQUIRY

In thinking about the research methodology and its design, there are questions that need answering in relation to issues of appropriateness to the research topic, and trustworthiness of conducting the method. What is an appropriate method (Galliers, 1994)? Should quantitative or qualitative analysis be used (Gable, 1994)? Is case study method preferable (Yin, 1984)? For whom is this research intended (Moody, 2000)? How is the data collected (Miles & Huberman, 1994)?

The IS research literature can be classified under three themes about the nature of the foundations of inquiry: philosophy, methods, tools and techniques.

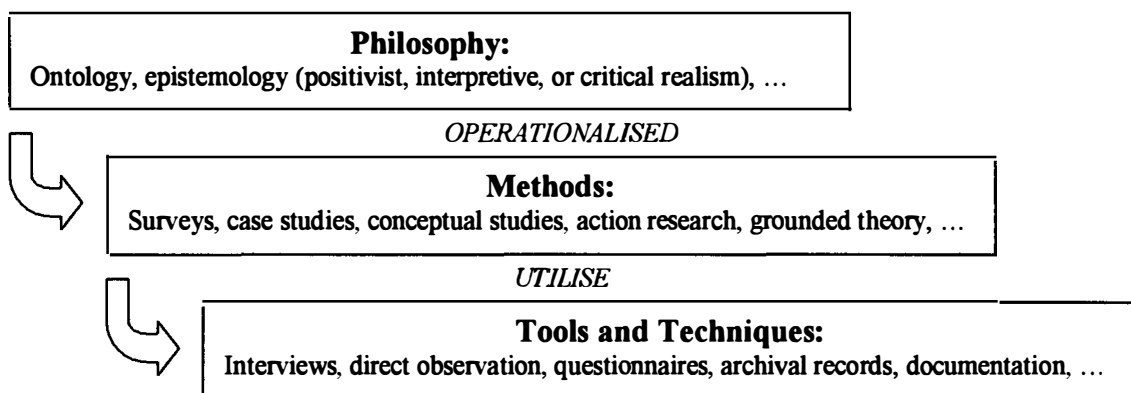


Figure 3.1: Components of IS Enquiry

Figure 3.1 illustrating three themes of the researcher's **philosophy** towards the research topic is *operationalised* by a research **method** that *utilises* various **tools and techniques**:

- (i) The research philosophy is about the researcher's point of view on the topic and influences the choice of a method, for example theory or practice, relevance and rigour, open to thought and unexpected findings.
- (ii) The method frames the research and is chosen from surveys, case studies, field experiments, conceptual studies, action research, or any combination of the above.
- (iii) The use of techniques and tools include interviews, direct observation, questionnaires, archival records, and documentation.

3.2 RESEARCH PHILOSOPHY

In this section the researcher's view of the topic is examined. This thesis is built on the belief that IS research can help practitioners better understand and adapt to emerging situations by providing timely, relevant, and rigorous research (Fernández et al., 2002). Furthermore, it will be argued that synergy between relevance and rigour is possible and that Case Study methods in combination with Grounded Theory (theory building) techniques provides a good composite framework for relevant and rigorous research of emerging phenomena in IS.

To achieve the maximum level of benefits from integrating an e-business application with an ERP package, it is important to understand from the outset the complementary nature of an e-business and ERP implementation. This raises the importance of examining both technological and sociological issues with respect to e-ERP implementations.

In this context, no single research method holds the solution to exploring the range of issues about the complex phenomenon of e-ERP. For this research, the researcher adopted an interpretivist approach with a combination of qualitative methods. The research adopts a multi-view approach for investigation of the research topic.

IS as an Applied Discipline: Theory versus Practice

There has been a great deal of debate about the status of information systems (IS) as an academic discipline, its progress, and continued survival (Galliers, 1994a; 1994b; 1997; Hirschheim, 2001). Much of the debate has been "inward looking, and focused either on research methodology or the need to develop a theoretical foundation" Moody (2000, p.351). A wider objective of IS is or should be to improve the uses of information systems in practice (Keen, 1991). "It seems clear ... there is no reason to see any great dichotomy between theory and practice in IS."

Moody (2000, p.351) argue that “as an applied discipline, IS will not achieve legitimacy by the rigour of its methods or by its theoretical base, but by being practically useful.” This is not a view singular to IS “the balance between pure and applied research is a problem in any discipline” (Larkins and Anderson, 1998: in relation to medicine).

Its success will be measured by its contribution to the IS profession, and ultimately to society. Further, to be effective, research must be both relevant to the needs of practice and disseminated and used by practitioners (Moody, 2000).

Relevance and Rigour

‘Relevance and Rigour’ is an on-going concern in the IS community as discussed, for example by: Benbasat et al. (1986); Keen (1991); Davenport (1995), Robey and Markus (1998); Lee (1999) and more recently, Alter, (2001); Cresswell, (2001); Kock, et al., (2002); Loebbecke, et al., (2003); Palvia, et al., (2003).

Moody (2000) uses medicine, a discipline with a high level of integration between research and practice, as a model for radically changing IS research to become more relevant and to have a genuine impact in practice.

To appreciate the essentials of relevance versus rigour, Hirschheim (2001) presents relevance and rigour as two interdependent dimensions of IS research. Figure 3.2 below is used to illustrate an objective in this study to maximise relevance of a study while maintaining a level of rigour of the research method. This “ideal” goal will be borne in mind when designing the research method.

The other research challenge is that of relevance and rigour in the design of the research method:

- Keen (1991) observed that relevance as a research objective is usual for new and emerging phenomena, lacking in prior research. However, when assembling the research method, Gable (1994) warns about the challenges of relevance, especially problems of access to organisations, people and artifacts.
- James and Smith (1998) explain relevance as a research objective through benefits from academic-industry interaction. This includes: research topics, funding, and access to data (Kohli, 2001), that allows observation of “difficult-to-replicate” environments or systems. Further relevance has much to do with communicating the findings to industry leaders. This implies capture of primary data, and the interview of key staff is most desirable.

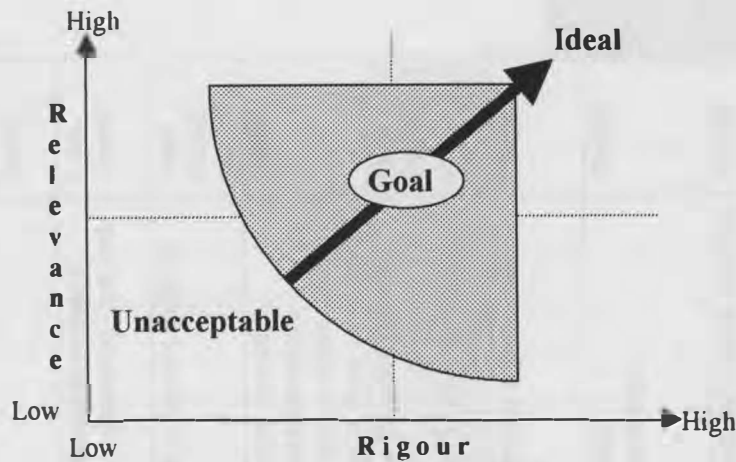


Figure 3.2: Relevance versus Rigour
(Source: Hirschheim, 2001, p.4)

3.3 RESEARCH METHODS

According to Wood-harper (1989, p.2), a “detailed typology of research methods produced by Van Horn (1973) forms the foundation for most classification schemes. Indoor and Sage (1981) produced a similar scheme including field experiments, surveys, case studies, and laboratory experiments; Hamilton et al. (1981) added conceptual study.” Later Galliers (1985) suggested two more research methods: phenomenological studies and action research. Finally ‘grounded theory’ is also considered, first described by Glaser and Strauss (1967).

Comparison of Research Methods

The methods are presented in order cited from Wood-harper (1989, ch.5) as:

- (i) conceptual studies (Neuman, 1991; Jenkins, 1984)
- (ii) mathematical modelling (Churchman, 1971)
- (iii) laboratory experiments (Jenkins, 1984; Dickson, et al., 1977)
- (iv) field experiments (Jenkins, 1984; Dickson, et al., 1977)
- (v) surveys (Jenkins, 1984; Douglas, 1977)
- (vi) case studies (Eisenhardt, 1989; Benbasat, et al., 1987; Yin, 1984)
- (vii) phenomenological studies (Boland, 1985; Galliers, 1985)
- (viii) action research (Susman, 1985; Checkland, 1985, 1981)
- (ix) grounded theory (Glaser, 1998, 1978; Strauss & Corbin, 1994, 1990)

Table 3.1 provides a critique of each method, including defining characteristics, and strengths and weaknesses for selection. From the list, Case Studies appears the most appropriate research method with supporting roles from phenomenological studies, conceptual studies modelling, survey interview techniques, action research iterations, and grounded theory building techniques.

Table 3.1: Comparison of Research Methods (Source: Wood-Harper, 1989, ch.5)

Method	Description	Strengths and Weaknesses	Rating
*Conceptual Study	Requires logical reasoning of causal relations using a standard set of rules. Requires thinking and no active experimentation. Its basis may be of opinion and speculation.	The development of frameworks and representative models. Weak at linking a conceptual with a real environment. This requires the application of another method .	Useful
Mathematical Modelling	An empirical method where the level of control is near absolute. The area of interest is able to be modelled.	Objectivity is high, but reflection of the often unpredictable world is low.	Least Useful
Laboratory Experiment	Types: simulation, small groups, prototype experiments. Choice depends on the area of interest. Researcher exerts a sizeable measure of control.	More closely controlled conditions for statistical measures. Experimental simulation is an artificial environment - not real.	Least Useful
Field Experiment	These include: field studies, field tests, adaptive experiment or group feedback.	These may be a mixture of objective and subjective subjects.	Least Useful
Surveys	Techniques: mail, telephone, or personal interviews Use of questionnaires.	Large sample size, very useful for statistical measures. Lack of control over who completes the questionnaire. Personal interviews are expensive and less available, thus probable reduced sample size, and a bias of those interviewed.	Useful
* Case Studies	Examines a phenomenon in its natural setting, using multiple techniques of data collection. Types: exploratory, descriptive, explanatory. More indepth than surveys, and may use questionnaires to aid structure with interviews.	Ideal where the area of interest cannot be divorced from its natural setting lies in current events. The boundaries are not clearly evident at the outset and no experimental controls.	Most Useful
*Phenomenological Research	How things are as opposed how things work. No objective view really exists, tainted by our perception.	Often used in conjunction with other methods such as, case study and action research.	Useful
*Action Research	Attempts to link theory and practice, thinking and doing, achieving both practical and research objectives. It builds on a learning circle of diagnosis, action planning, action taking, evaluation and specifications.	Sometimes treated as a subset of case study. Allow for iteration of inquiry by the researcher.	Useful
*Grounded Theory Building	Theory based on empirical data, aims at discovery rather than testing. Focus on conceptualisation not description; identifies commonalities in their 'relations' until the categories, relations and concepts are 'theoretically saturated'	Allows for triangulation, can include quantitative data, and can include case studies. Values the experience of the researcher . Widely used to study social interactions, essentially inductive.	Useful

* Case studies appears the most appropriate research method, with help from conceptual study, surveys, action research, and grounded theory building.

Using Case Studies

Yin (1984) argues that case studies are appropriate where the objective is to study contemporary events, and where it is not necessary to control behavioural events or variables. In addition, he recommends a single case study when the objective of the research is to explore a previously un-researched subject, whereas multiple-case designs are desirable when the intent is description, theory building, and theory testing. Miles and Huberman (1994) suggest multiple-case designs allow for cross-case analysis that lends weight to the extension of theory.

Benbasat et al. (1987, p.370) identify the strengths of case study research in IS as:

- (i) The researcher can study IS in a natural setting, learn about state of the art, and generate theories from practice.
- (ii) The method allows the researcher to comprehend the nature and complexity of the process taking place, and
- (iii) Valuable insights of new topics emerging in the rapidly changing IS field are gained.

Review of Case-Study Methods

Edwards (1998, p.37) argues that there is limited value to quantitative models, eg "factor analytic personality models ... compared with the indepth case material that forms the basis of case-based theories."

Josselson and Lieblich (1993, p.37) express it as "listening to people talk in their own terms about what had been significant in their lives seemed to us far more valuable than studying preconceived psychometric scales or contrived experiments"

Weaknesses

The critics of qualitative methods are many, and hail mainly from the physical sciences (Gable, 1994). More objective criticism has come from the social sciences.

Kerlinger (1986, p.348) identifies three major weaknesses of case study research in IS:

- (i) The inability to manipulate independent variables, not relevant in this study.
- (ii) The risk of improper interpretation - most relevant.
- (iii) The lack of power to randomise - relevant but manageable.

Further, Lee (1989) identifies four corresponding problems with case study research as a lack of controllability, deductibility, replication, and generalisability.

The latter two limitations stem largely from the lack of power to randomise. Lee defends the case study method by suggesting these are not insurmountable and can be overcome by quality of design. Inspired by Carroll et al. (1998) a range of

research methods are designed into a composite structured method (case-based) to overcome these limitations.

Building Theory from Cases

The use of case studies appears the most appropriate research method with additional help from conceptual study, action research and grounded theory building techniques.

The implications of choosing case studies can be seen in the steps detailed in Table 3.2. This set of activities form the backbone of the overall research method.

Table 3.2: Eight Basic Steps of Case Research (Eisenhardt, 1989)

Step	Activity	Reason
1. Getting Started	Definition of research question Possibly a priori of constructs Neither theory nor hypotheses	Focuses efforts Provides better grounding of construct measures Retains theoretical flexibility
2. Selecting Cases	Specification of population Theoretical not random sampling	Constrains extraneous variation and sharpens external validity. Focuses efforts on theoretically useful cases, ie those that replicate or extend theory by filling conceptual categories
3. Crafting Instruments and Protocols	Multiple data collection methods Qualitative and quantitative data combined Multiple investigators	Strengthens grounding of theory by triangulation of evidence Synergistic view of evidence Fosters divergent perspectives and strengthens grounding
4. Entering the Field	Overlap data collection and analysis including field notes Flexible and opportunistic data collection methods	Speeds analyses and reveals helpful adjustments to data collection Allows investigators to take advantage of emergent themes and unique case features
5. Analysing Data	Within-case analysis Cross-case pattern search using divergent techniques	Gains familiarity with data and preliminary theory generation Forces investigators to look beyond initial impressions and sees evidence through multiple lenses
6. Shaping Hypothesis or * Refining Research Model	Iterative tabulation of evidence for each construct Replication, not sampling, logic across cases Search evidence for 'why' behind relationships	Sharpens construct definition, validity, measurability Confirms, extends, and sharpens theory Builds internal validity
7. Enfolding literature	Comparison with conflicting literature Comparison with similar literature	Builds internal validity, raises theoretical level, and sharpens construct definitions Sharpens generalisability, improves construct definitions, and raises theoretical level
8. Reaching Closure	Theoretical saturation when possible	Ends process when marginal improvement becomes small

[Source; Adapted from Eisenhardt, (1989, p.533)]

*6. Refining a research model involves investigating the components and relationships within a model

The case-based research method caters for the overlap between theory creation and validation or building and testing (Eisenhardt, 1989). Also, it allows for “unfreeze thinking” on the part of the researcher (p.546). Eisenhardt warns the inexperienced researcher against “slipage of completion” at each step of the method (p.547).

Conceptual Studies

The research attempts to provide knowledge and extend our understanding of e-business solutions by the target organisations - initially in Western Australia. The specific or generic objective is to develop a Conceptual Framework (CF) of e-business adoption by SAP-based organisations. This is described by Neuman (1991, p.30) as “a system of interconnected ideas that condense and organise knowledge.”

The CF is the theoretical construct that bounds the research and determines what is to be examined in the next cycle. At the beginning of each cycle a CF is constructed by considering the following inputs;

- **research themes** – scopes the area in which the research questions are refined,
- **literature review** – visits the literature to confirm/disconfirm the findings,
- **insights** – accesses expert knowledge in ERP from SAP consultants and practitioners, such as SAP/IT consultants as would be mentors,
- **theoretical foundations** – acts as a filter to the vast range of observations.

Modelling the Conceptual Foundations

The conceptual foundations of this research may be better understood and more simply communicated by the use of models. These models, based on actual case studies, will be used to capture multiple views of e-business adoption. Such models could be amalgamated into a holistic model of e-business migration.

In this study, modelling is used systematically to clarify and explicitly state the conceptual foundations at each stage of the study of e-ERP implementations.

“We humans have developed an exceptionally powerful technique for dealing with complexity. We abstract from it. Unable to master the entirety of a complex object, we choose to ignore its inessential details, dealing instead with the generalised, ideal model of the object.” (Shaw, 1981, cited in Steele, 1999, p.864).

The representation of abstractions through models is an over-arching theme in functionalist information systems development (Steele, 1999). A model is an abstraction or simplification of some part of the present proposed information system (Avison & Fitzgerald, 1995).

A good model captures the crucial elements of a problem and the relationships between them (Rumbaugh et al., 1991). In order to express all the subtleties of complex systems it is necessary to use multiple views (models), with each view representing a subset of the aspects of interest (Booch, 1994, p.172), e.g. the complex phenomena of e-ERP.

3.4 A COMPOSITE CASE-BASED RESEARCH METHOD

In this section the research questions identified in chapter 2 are used to develop a composite case-based method. These questions set the main research objectives to test three practitioner “theories-in-use” benefits of e-business implementations derived from virtual organising through e-business change management. They are presented in order of increasing theoretical complexity as:

- Q.1:** How do organisations maximise benefits from e-ERP implementations?
- Q.2:** What factors facilitates and inhibits success of e-ERP implementations?
- Q.3:** Do effective strategies of e-ERP implementations fit the virtual organising model?

Carroll et al. (1998) recommend a structure case method for the inexperienced IS researcher in undertaking case study to build theory. Their methodology has been tested by their doctoral students (Carroll et al., 1998)

Yin (1984) identifies case study types as exploratory, descriptive, and explanatory. Mohr (1985) argues that case studies vary, dependent on the type of research to be performed: theoretical, evaluative, or associational. Edwards (1998) incorporates the three case study types into an overarching framework for theory validation and ultimately creation of new theory.

Edwards (1998) describes a conceptual framework for understanding the phases of case-based research. “Case-based strategies in research are widely used in case study methodology as well as in a number of qualitative methodologies, including grounded theory development, phenomenological research method, and psychotherapy process research” (p.61). This work is based on the supervision of two case-based PhD theses by Knight, (1997) and Oberholzer, (1996) cited in Edwards (1998, p.47).

3 Phases of the Research Method

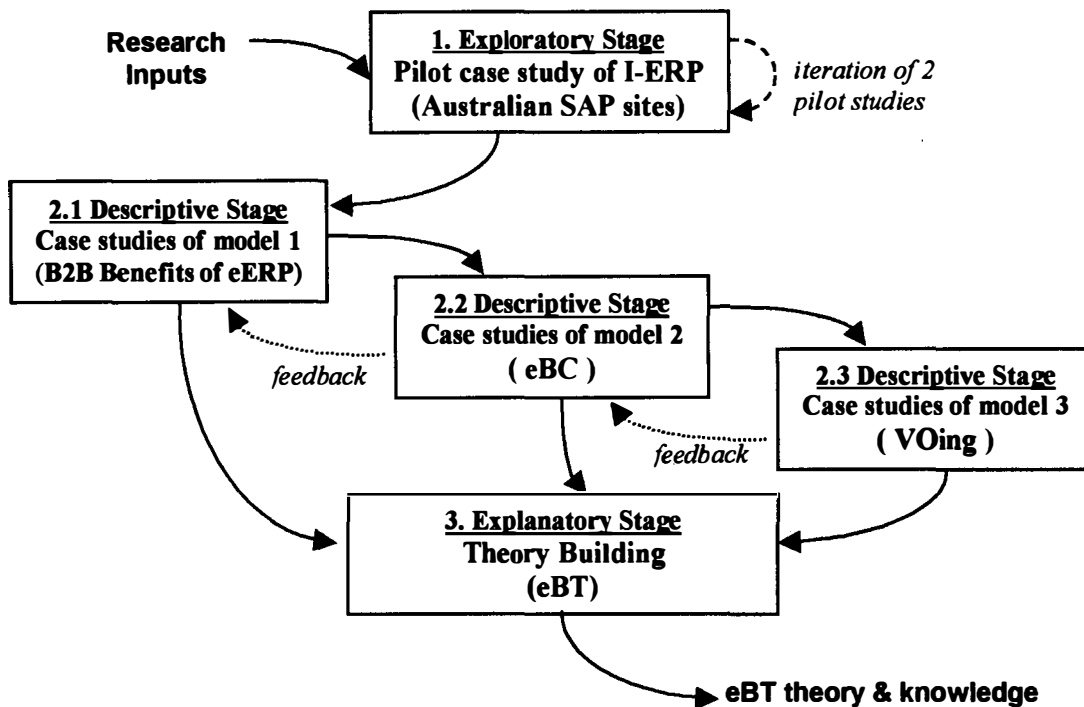


Figure 3.3: Composite Case-based Research Method

Figure 3.3 diagrams the three types of case-based research methods: exploratory, descriptive, and explanatory. Importantly, it shows the interrelationships between them:

Exploratory Phase 1 – pilot study

Carroll et al. (1998) provide “structured-case studies” for use in the pilot study to build initial conceptual foundations, with the focus on rigour and relevance. Figure 3.4 details the structured-case studies method.

Descriptive Phase 2 – main study in 3 parts

Eisenhardt (1989, p.533) provides “case studies basics” for investigating the 3 research models and examining the corresponding questions (Q1, Q2, Q3) using multiple case studies. The three research questions are an aid to help investigate their corresponding research models using the basic research activities as detailed in Table 3.2.

Explanatory Phase 3 – Holistic study

Strauss and Corbin (1990, pp.116-142) provide theory building procedures and analysis techniques for establishing new theory of e-business transformation (eBT). In Table 3.3 “the Hermeneutic circle” is defined as considering the interdependent meaning of the parts to understand the whole they form.

Structured-Case Research Method

Part of the methodology suggested for this research is called 'structured-case' research method (Carroll et al., 1998). It offers a structure that guides the IS researcher in undertaking case study to build theory. Structured-case uses a range of mechanisms from action research and case study method. These were synthesised into a structured yet flexible method for performing rigorous research. Structured-case assists the researcher to undertake case study research through the use of conceptual framework and a research cycle that provides for building knowledge and theory.

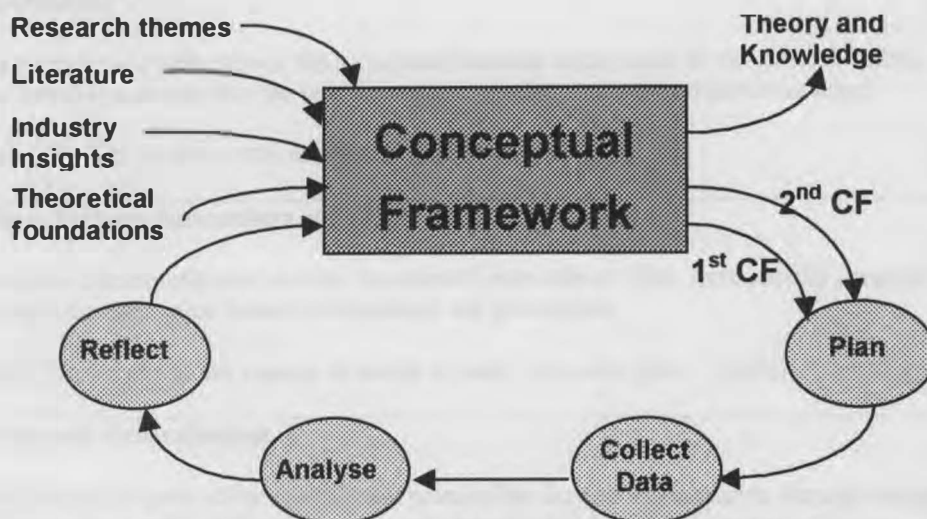


Figure 3.4: Structured-Case Research Method
(Source: Carroll et al., 1998, p.65)

Figure 3.4 illustrates the main activities of the method, and the procedural structure within the research cycle, as well as the inputs and output. In building theory from case studies, the CF is the theoretical construct that gives boundaries to the research and determines what is to be examined in the next cycle. At the beginning of each cycle a CF is constructed by considering the following **inputs**: research themes, literature review, industry insights, and theoretical foundations that acts as a filter to the vast range of observations.

The **research cycle** involves the set of activities used to test and refine the CF. This cycle is adapted by Carroll et al. (1998) from Susman and Evered (1987) who provided an earlier action research model. In practice, at least two research cycles may be performed to achieve the research closure. During each cycle, a set of activities: planning, interviewing, analysing, and reflecting are performed to validate the final CF.

Evaluation of Case-based Research Method

In this study Klein and Myer's (1998) seven principles summarised in Table 3.3, are offered as a high level evaluation criteria of the research method (Figure 3.4).

Table 3.3 Summary of Principles for Interpretive Field Research

<p>1. The Hermeneutic circle</p> <p>This principle suggests that all human understanding is achieved by iterating between considering the interdependent meaning of the parts and the whole that they form. This principle of human understanding is fundamental to all other principles (2-7).</p> <p>* Example: In chapter 9, three research models are combined into one model of e-business transformation.</p>
<p>2. Contextualisation</p> <p>Requires critical reflection of the social and historical background of the research setting, so that the intended audience can see how the current situation under investigation emerged.</p> <p>*Example: Used in the four areas of research chapters 5 - 8.</p>
<p>3. Interactions between Researchers and Subjects</p> <p>Requires critical reflection on how the research materials or 'data' were socially constructed through the interaction between researchers and participants.</p> <p>*Example: Varied due to the amount of access to cases; Novartis (low) - StatOil (Very high)</p>
<p>4. Abstraction and Generalisation</p> <p>Requires relating the idiographic details revealed by the data interpretation through the application of principles 1 and 2 to theoretical, general concepts that describe the nature of human understanding and social action.</p> <p>*Example: Generalisation and abstraction was at times quite difficult, but chapter 9 demonstrates how a general framework evolved which expressed all cases.</p>
<p>5. Dialogical Reasoning</p> <p>Requires sensitivity to possible contradictions between the theoretical preconceptions guiding the research design and actual findings 'the story which the data tell' with subsequent cycles of revision.</p> <p>*Example: Unexpected issues appeared regularly, but the use of three research models and three cycles of research allowed other characteristics to surface.</p>
<p>6. Multiple Interpretations</p> <p>Requires sensitivity to possible differences in interpretations among the participants as are typically expressed in multiple narratives or stories of the same sequence of events under study. Similar to multiple witness accounts even if all tell it as they saw it.</p> <p>* Example: Interviews of staff of <i>Employment National</i> recorded conflicting views of end-useability of the Web interface of the 'Time sheet' and 'Purchasing applications.</p>
<p>7. Suspicion</p> <p>Requires sensitivity to possible 'biases' and systematic 'distortions' in the narratives collected from the participants.</p> <p>* Example: The cultural differences between researcher and interviewees created "noise" with interviews.</p>

* The examples are used to assess Klein and Myer's (1998, p.7) research criteria.

Assessment of Composite Case-based Research Method

The arguments in support of this research method include: ease of use for the inexperienced researcher, multiple interpretations, reflection for validation of analysis, and an improved understanding through iteration and multiple cases (Carroll et al., 1998).

A pilot case study (in two parts) of Australian SAP sites to help ground the theory of the study for Q.1, allows for industry insight into the nature of the final topic and a diverse industry context. Also, this provides a high level of relevance, that is pertinence to the topic in hand, or important current issues.

Eisenhardt (1989) provides case studies basics for overlapping data collection and analysis including field notes flexible and opportunistic data collection methods. Also, multiple-case designs allow for cross-case analysis that lends weight to the extension of theory.

Klein and Myers (1998, p. 7) reinforce and supplement these arguments with their summary of the “principles for interpretative field research.” For example, the seventh principle of “suspicion” requires sensitivity to possible biases and systematic “distortions” in the data collected from participants.

The first principle of the “Hermeneutic circle” fundamental to all the other principles, is the catalyst for the final and explanatory phase of the research.

Finally, the seven principles of interpretive field research are adopted as a high level goal and evaluation scheme for the research method.

3.5 RESEARCH TECHNIQUES AND TOOLS

The research cycle comprises the **techniques** of email, telephone, personal interviews, and **tools** as a set of three semi-structured questionnaires.

Each research cycle will be applied to validate and extend a CF. During each cycle, a set of activities: planning, interviewing, data collection, analysing, and reflecting are performed to validate and refine the proposed CF.

The CF shapes and guides the planning of the cycle, selection and approach to organisations, and the method of data collection. Carroll et al. (1998) stress that this is a tentative design for guidance rather than prescription. This flexibility facilitates participants’ openness, and allows for rigour to be applied to richer data.

Planning

The research is guided by the plan, including an interview tool, to collect and record case data while remaining responsive to unexpected factors (Miles & Huberman, 1994). This is detailed under the following four general activities:

(i) Selecting Target Organisations (SAP Sites)

Selection and contact of target organisations was performed by 'convenience sampling'. This approach was confirmed by the 1st pilot study of five SAP sites. These Australian organisations were very new to the use of the SAP R/3 system. These sites were not expected to initiate e-ERP projects before mid-year 2000. In addition, the lack of recognition of the benefits arising from the integration of the Internet with SAP R/3 by local organisations made them limited as potential target sites. To counter this, the research looked beyond the local organisations to interstate and overseas target organisations (A3.1). SAP R/3 sites were chosen for this study as this offered a single type of ERP environment. This eliminated the complication of different types of ERP systems from this study.

The introduction to SAP-enabled organisations was made through professional contacts made locally, then nationally, and finally overseas. These contacts were sought through ECU's SAP alliance partnership and SAP industry conferences, university-industry partners; AlphaWest's ERP group, Woodside Energy, and WMC SAP projects. This provided three industry-based mentors.

(ii) Selection of Interviewees

Selection of the interviewees was driven by the need to determine project content from three appropriate and most knowledgeable persons within the target organisation. This was to validate the data captured. Respondents with the following profiles were sought out and interviewed: senior management, project champion, and eBC team leader. For example, the interviewees at Siemens were a key e-business project group member, an ERP business systems group member, and the senior e-Commerce group manager.

(iii) Interview Questionnaires

A structured interview approach using open-ended questions was used to capture information of current and future use of Internet technology, business practises and strategies about the concepts, their stages of development, and use of e-ERP.

Patton (1990) recommends open questions as a useful basis for interviews as they enable richer, and more complex answers to be given by participants. e-Business as an imperative dictated the nature of the interview questions asked. The design of the questions must address all research objectives, not just primary, but also secondary. For example, the type of SAP R/3 implementations, industry focus - customers or suppliers, products and services, and e-business applications for doing business and exploiting opportunities.

(iv) Construction of Interview Questionnaires

Pilot (A) interview questionnaire for interviewing the five (5) local SAP sites.

In constructing and generating open-ended interview questions to explore the basic Internet uses with SAP R/3 systems, an open-ended interview questionnaire for the research questions needed to consider the range of potential e-business applications expected by local SAP Sites. The interview questions addressed the perceived and actual benefits of e-ERP.

Pilot (B) interview questionnaire for interviewing the nine (9) Australian SAP sites:

In constructing and generating structured interview questions to explore the basic Internet uses with SAP R/3 systems open-ended interview questionnaire the research questions needed to consider, the range of potential e-business applications expected by local SAP sites. The interview questions address the perceived and actual benefits of e-ERP. In constructing questions, the following resources were utilised: data gathered from pilot (A) interviews of SAP-based organisations.

1st interview questionnaire for interviewing the eleven (11) overseas SAP sites:

In constructing an appropriate semi-structured interview questionnaire the research questions needed to consider the types of e-business applications reported at each SAP sites. The interview questions address the categories of questions as outlined by B2B interactions. In constructing valid questions, the following resources were utilised: data gathered from pilot (A) and (B) interviews of Australian SAP-based organisations, Carlson's model of "electronic consultative commerce" adapted in Figure 2.8, and VOing model illustrated in Figure 2.14.

2nd interview questionnaire for interviewing the eleven (11) overseas SAP sites:

In constructing an appropriate structured interview questionnaire, the research questions needed to map all the elements of the eBC model. In constructing questions, the following resources were utilised: data gathered from Guha et al. (1997) work on BPC projects illustrated in Figure 2.12, and the performance measures from the VOing model.

Data Collection and Analysis

(i) Data Collection Issues

Table 3.5 shows the guiding factors applied to gain real value from the interviews.

Table 3.5: Seven Lesson from Experience (Kean & Parent, 1998, p. 308)

* Lessons	Implications
1. Be prepared and well informed before making the initial approach.	Getting good quality information and intelligence is critical in qualifying potential subjects, designing the selling strategy, and in demonstrating credibility.
2. Ask for a small commitment – just one initial meeting to start.	Small success leads to bigger ones. People will be more willing to participate if they can “try before they buy.”
3. Continually emphasise the benefits of participation at two levels – organisational and personal.	Research subjects that participate see themselves as benefiting, not just aiding research.
4. Look for opportunities where you can “add value” to the research subject.	While collecting data, researchers can also be a source of quality advice, challenging thinking, and objective opinion.
5. The need for speed.	The longer it takes to enlist a research subject, the more likely it is that they will not participate.
6. Set and observe deadlines.	Forces the candidate subjects to make a decision, does not waste the researcher’s time or resources.
7. Minimise risk by having several points of contact within participating organisations.	People come, go get promoted, and are fired within organisations. Recruiting several “sponsors” overcomes the problem of having the success of a research project tied too closely with the fortunes of individuals.

* Lessons 1-7 were applied most to least to improve the quality of data captured.

In all cases the focal point for contact was a senior-project manager in the company who was directly responsible or integrally involved with the project from beginning to end. To eliminate any bias by a single respondent, attempts were made to ensure triangulation of data from multiple sources in the organisation. Most of the interviewees were either sponsors of the e-ERP or major team members who had a good, objective, and knowledgeable view of the project.

The nature and objective of the study was first explained to the respondent(s), who were informed “up front” about expectations of involvement and the duration of the interview, as well as being reassured about issues of confidentiality. This was thought to be important since e-business tends to involve deviations from corporate strategy that firms are reluctant to release, especially to the competition. This provided a means to ensure integrity of the research and allowed the respondent to answer more openly and objectively.

(ii) Analyse

In contrast to quantitative analysis, where data collection precedes analysis, qualitative data collection and analysis may be viewed as one whole activity (Sarker et al., 2001). This allows the researcher to adjust the data collection, by adding new questions, to incorporate new themes that have emerged.

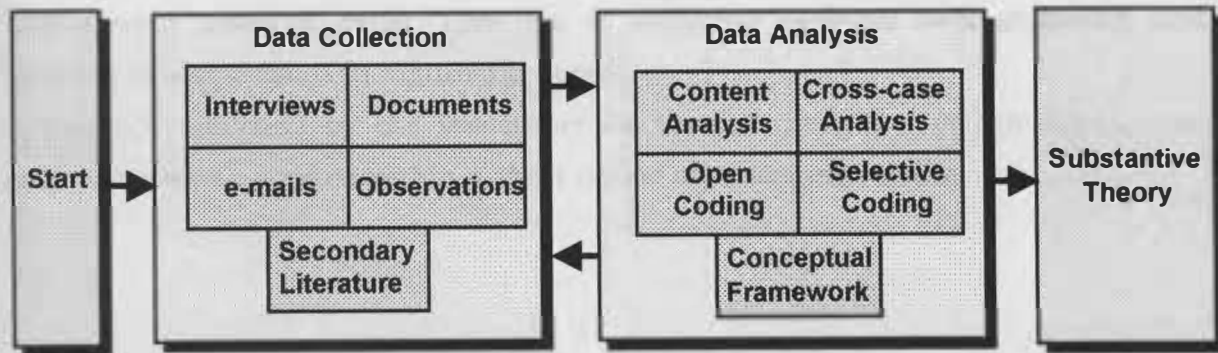


Figure 3.5: Data Collection and Analysis (Source: Fernandez et al., 2002, p.113)

Case studies research method starts with data collection techniques of interviews, secondary documents, emails, and documents (Figure 3.5). This interacts with content analysis and cross-case analysis using coding techniques. A key driver in this iterative process is the discovery of new or extended theory.

Simple content analysis within all B2B interactions was used to examine the data gathered on maximising benefits and minimising barriers. Analysis framework is to be simple and open to permit identification of generic and key issues, factors of success, and potential measures of success.

(iii) Data Collection and Analysis Matrix

Table 3.4 represents the intention of the main elements of the data gathering and analysis in order to answer the research questions. The responses were from pilot interviews conducted during September 1998 and followed up in February 1999.

Table 3.4: Data Collection and Analysis Matrix – Phase 2

Questions #	Data Collection Instrument	Data Analysis
1. How do organisations maximise benefits from e-ERP implementations?	1 st Interview instrument - semi-structured Questionnaire.	Content analysis of interview data within CF ₁ model developed from the Pilot Study.
2. What factors facilitate and/or inhibit the success of e-ERP implementations?	2 nd Interview instrument - semi-structured Questionnaire constructs of components of e-ERP projects.	Cross-case analysis of constructs to determine the components that contribute to success or failure; using exemplar cases.
3. Do e-ERP projects fit the strategy of virtual organising?	1 st and 2 nd Interview instrument - semi-structured Questionnaire and industry presentations.	Map content of all cases to demonstrate the fit to progress in VOing dimensions

Reflection

Structured-case incorporates an explicit time for reflection to review the research process, the interpretations considered, and the broader implications of any findings. Edwards (1998, p.39) argues that deliberate and conscious reflection is necessary for effective action research and learning. In more practical terms, Klein and Myer (1998, p.7) argue the necessity of reflection about the interviewees by the researcher. Further, Carroll et al. (1998) emphasise reflection at each activity

within each research cycle. This use of reflection between data gathering and analysis is also evident in Figure 3.5 above.

Systematic reflection by the researcher on the interpretation of comments from interviewees was applied within a short period after the interviews.

3.6 RESEARCH TIMETABLE: 3-PHASE WORK PLAN

The research programme was organised into a 3-phase work plan for validating and extending the conceptual foundations of the e-ERP phenomena.

Exploratory Phase 1: Pilot Study (a) & (b) to help ground the 1st research (Q.1)

Pilot Study (a) - Perform 1st research cycle to develop an initial CF (CF₁):

1. Use of inputs: research themes, literature, insights, and theoretical foundations to determine the CF₁.
2. Plan - gather resources for generating open-ended interview questions to explore the basic Internet uses with SAP R/3 systems.
3. Choose SAP-based target organisations sites; using convenience sampling.
4. Collect data - using structure interviews of target SAP-based organisations.
5. Analyse - using content and cross-case analysis to code categories of "use."
6. Reflect - to validate the analysis.

Pilot Study (b) - Perform 2nd research cycle to test CF₁ and develop the CF₂, 1999

Generate an e-ERP Benefits Model to initialize the next phase of the research:

7. Use of inputs: research themes, literature, insights, and theoretical foundations to test CF₁ and determine the CF₂.
8. Plan - gather resources for generating structured-interview questions to tests the research objectives; success factors for a range of e-business projects.
9. Revisit SAP sites; using previous contacts and target organisations.
10. Collect data - using structure interviews of target SAP-based organisations.
11. Analyse - using *content analysis*.
12. Reflect - to validate the analysis.

Descriptive Phase 2: Test and Extend 3 models for e-ERP projects

Phase 2.1 - Perform a research cycle to validate and extend 1st model, 1999

e-ERP Benefits Model is used to research the first research question, (Q.1):

13. Use of inputs: research themes, literature, insights, and theoretical foundations to test Q.1.
14. Plan - gather resources for generating structured-interview questions to tests the research objectives; success factors for a range of e-business projects.
15. Introduction to SAP sites; use collaborative initiatives to contact target organisations.
16. Collect data - using structure interviews of target SAP-based organisations.
17. Analyse - using content and cross-case analysis.

18. Reflect - to validate the analysis.

Phase 2.2 - Perform a research cycle to validate and extend 2nd model, 2000

e-Business Change Model is used to research the second research question, (Q.2):

19. Use of inputs: research themes, literature, insights, and theoretical foundations to test Q.2, using a model from business process change (BPC).
20. Plan - gather resources for generating structured-interview questions to tests the research objectives; success factors for a range of e-business projects.
21. Revisit SAP sites; using previous contacts and target organisations.
22. Collect data - using structure interviews of target SAP-based organisations.
23. using content and cross-case analysis.
24. Reflect - to validate the analysis.

Phase 2.3 - Perform a research cycle to validate and extend 3rd model, 2001

Virtual Organising Model is used to research the third research question, (Q.3):

25. Use of inputs: research themes, literature, insights, and theoretical foundations to test Q.3, using the Venkatraman and Henderson (1998) VOing model.
26. Plan - gather resources for generating structured-interview questions to tests the research objectives; multiple dimensions of VOing for a range of e-business projects.
27. Revisit SAP sites; using previous contacts and target organisations.
28. Collect data - using structure interviews of target SAP-based organisations.
29. using content and cross-case analysis.
30. Reflect - to validate the analysis and research method.

Explanation Phase 3: Perform Hermeneutic circle to develop eBT Theory, 2002

All three Models are synthesised as follows:

31. Use of inputs: research findings, literature, insights, and theoretical foundations of the three research models determine CF for eBT
32. Plan - draw together resources - three theories of e-business projects.
33. Analyse - using "grounded theory techniques" to perform content analysis.
34. Reflect - to validate the analysis and research method.
35. Write up the conclusions as eBT new theory.

3.7 SUMMARY

The research objective is to test three theories of e-business implementations derived from virtual organizing and e-business change management literature and grounded by a pilot study. An analysis of research methodology literature revealed several options for case-based methodologies for theory building. The combined application of case methods by Carroll et al. (1998), Klein and Myer (1998), and Eisenhardt (1989) is proposed as an appropriate method for maintaining a balance between research rigour and relevance. This composite case-based method provides a focused yet flexible, structured yet dynamic approach to case study interpretive research. It provides a research method for the exploration and examination of the topic, with the following recommendations (Carroll, et al., 1998);

- focused to maximise the benefits of scarce resources (time, manpower and money),
- flexible to allow theory to emerge from the data collected and integrate unexpected outcomes,
- structured to guide the researcher and assure rigour and relevance,
- dynamic to record the process of knowledge and theory building,
- multiple-case designs are desirable when the intent is description, theory building, and theory testing. Also, multiple-case designs allow for cross-case analysis that lends weight to the extension of theory. (the others all start with adjectives)

In theory the research plan is organised into three distinct phases in the development of the conceptual foundation:

Phase 1: A two-part pilot study is used to help ground this 3-phase plan for developing the initial conceptual framework of the benefits from e-ERP projects.

Phase 2: The theoretical foundations of the three research models are examined and extended through separate research cycles. The three research questions and associated models are based on existing theory of B2B models, virtual organising and business process change management, and output from phase 1.

Phase 3: Theory building procedures and analysis techniques are used for creating a new theory of e-business transformation (eBT). The principle of "the Hermeneutic circle" is used to build a final conceptual framework of eBT by combining the research outputs from theory testing the three models in phase 2.

Finally, a detailed plan is given as a set of iterative procedures for theory building and theory extension.

CHAPTER 4

PILOT STUDY OF E-BUSINESS IMPLEMENTATIONS THROUGH ERP

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4.0 INTRODUCTION

The chapter presents the “exploratory” phase of the research. A preliminary investigation of established Australian organisations was carried out between September 1998 and August 1999. A two-part pilot study was performed to examine the expectations of IT/SAP project managers of using Internet technologies with existing SAP R/3 systems. The pilot study was designed to establish the initial conceptual framework and confirm the first research question needed for the second phase research.

The research used “structured-case” as a structured yet flexible method for performing rigorous and relevant research theory building in Chapter 3.3. Two research cycles guided the researcher in undertaking the pilot study.

In general, the preliminary investigation of established Australian SAP-based sites identified an evolutionary implementation approach that is common in the Australian ‘follower’ type organisations, (KPMG, 1998). The main findings confirmed that expectation of benefits from using Internet technologies with SAP systems (I-SAP) was far greater than previously reported. (or believed to be/expected/reported to be)

4.1 THEORETICAL CONCEPTS

Early Literature

The theoretical foundations of the pilot study are based on the early literature discussed in chapter 2, sections 2.2 and 2.3 that includes the developments in e-ERP technology and improved business-to-business processes for online business:

- (i) “Once Internet technology is efficiently integrated into the internal operation, its effective use for external interactions becomes a natural and easy extension. Without the internal infrastructure, external interactions will always be strained and limited” (Telleen, 1996, p. 2).
- (ii) “Although these technologies have distinctly different functions, integrated they offer a sound infrastructure for doing e-business” (Venkatraman & Henderson, 1998, p. 32).
- (iii) “Internet technologies offer an ERP-based organisation the opportunity to build interactive relationships with its customers and suppliers, improve efficiency and extend its reach, all that at a very low cost” (Hesterbrink, 1999, p. 2).

Industry Insights

Many enterprises have implemented ERP packages but have left value on the table by not restructuring the business processes to become more efficient. Generally, organisations have added their own business events to the SAP business model. "The Internet enabling of ERPs will provide a catalyst for greater ROI by promoting the most efficient events through the Internet interface" (Dobis, 1998a, p.1).

"The majority of the benefit will be returned to customers and suppliers connecting through this interface - and will have a propensity to cannibalise revenue from the existing physical channel as suppliers and customers find ways of dealing more efficiently with organisations through the electronic interface" (Dobis, 1998a, p.2).

Industry surveys

Norton Nolan Institute (NNI) research conducted a survey on Australian industries to determine e-commerce developments (KPMG, 1998). The two largest specific industry categories in the survey were the manufacturing /distribution industry (28%) and the government services industry (13%). Also, 35% of organisations surveyed indicated they had a global market reach of 31%. The key findings of the NNI report (KPMG, 1998, p.2):

- (i) Integration across the entire organisation is the key to large efficiency gains;
- (ii) Transparency of implementation and changing process is important, both in terms of acceptance of the change and achieving the expected efficiency gains;
- (iii) Distinguishing between striving to win new markets or customers to achieve cost reductions;
- (iv) Development of a benefits register to measure achievements against it.

KPMG's 1998 survey, conducted in Australia and New Zealand to determine the view of senior business and IT executives on electronic commerce, revealed that although e-commerce is considered "a must", much of the activity is in the "talking stage" (KPMG, 1998, p.8). In particular expected benefits from adopting e-commerce technologies and the actual benefits achieved have proved "blind faith brings" disappointment. "The largest gaps between expected and actual benefits of e-commerce were related to supply chain, product development and customer service." In regard to the supply chain the complexities due to the number of partners involved (suppliers, distributors, customers) are far more than simply an integrated enterprise solution. With Customer care the need is to develop skills to a "higher skills level," beyond the simple Web site and "considerable integration into the business" (p. 8).

KPMG's 1999 survey conducted in Australia, of the views on e-commerce of company directors showed that there is a perception that e-commerce activity will grow but investment will be slow (KPMG, 1999a). Also companies seemed to be placing emphasis on the role of e-commerce in retaining customers and market shares. Significantly the data show that 42% saw e-commerce being useful in improving efficiency, while only 15% saw it as an opportunity to reach new markets and customers. Additionally, the CEO of the Australian National Office for Information Economy (NIOE) is concerned about the conservative funding approach in Australia. "Failure to accelerate funding of e-commerce infrastructure will expose Australian businesses to new competitive threats," especially from US business (Getter, 1999, p.49).

4.2 METHODOLOGY

Exploratory Phase for Study of e-ERP

Figure 4.1 highlights the first phase of the composite case-based research method, as the exploratory phase. "Structured-case studies" method (Carroll et al, 1998) was chosen for the pilot study to build initial conceptual foundations, with the focus on rigour and relevance. In Chapter 3, Figure 3.3 details the method of structured-case studies as research inputs for conducting a research cycle to plan, collect and analyse data, and reflect on the findings.

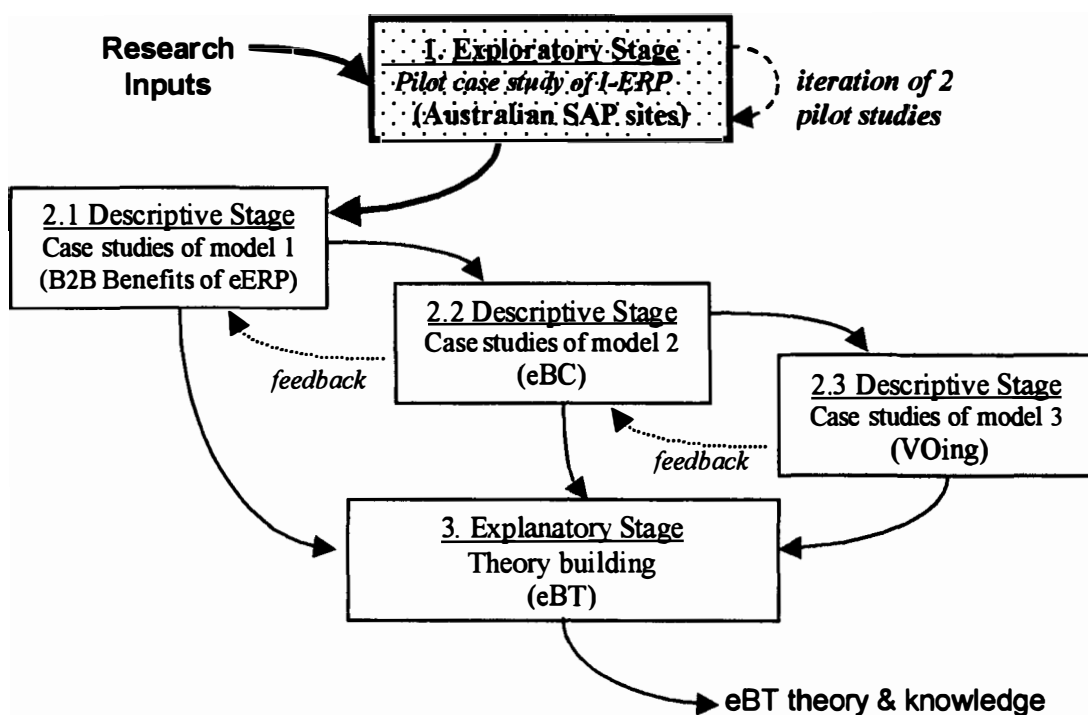


Figure 4.1: Phase 1 of Composite Case-based Research Method

Pilot Study (a): Getting Started

In September 1998 five Australian SAP-enabled enterprises representing different industries were visited. This first part of a pilot study of SAP sites was used to gather industry's views on a possible research topic. The IT/SAP project managers were interviewed to obtain insight into their organisation's status on the use of Internet technology (web, intranets, extranets, and e-mail). Informal interviews were conducted as per the timetable A basic set of questions about the use of SAP R/3 within the organisation was employed (Appendix: A4.1). Specifically, the project managers were questioned about the expected benefits and problems arising from "integrating SAP R/3 with the Internet" (A4.1: Q.5).

A return visit and interview of the five organisations in Table 4.1 was carried out during February 1999 to track further developments. From these interviews invaluable industry insights were gathered for input into the next research cycle.

Pilot Study (b): Development of Initial Conceptual Framework (CF₁)

Having determined the appropriateness of case studies, and relevance of multiple case studies for this research, all possible Western Australian (WA) SAP sites were approached. This was an attempt to minimise the bias (identified in Chapter 3.3) and improved randomness in the choice of SAP sites (A4.2).

In August 1999, nine out of all 11 WA SAP-based organisations agreed to participate in a second Pilot Study (b), listed in A4.2. In each case, a senior IT project manager was contacted for the purpose of conducting interviews.

The growth in the number of organisations implementing SAP R/3, locally and nationally, provided a valuable source of organisations for case study; across industry, SAP R/3 implementation and business scenarios (Table A3.3a). Table 4.2 profiles the nine organisations that participated in the study. In constructing an appropriate open-ended interview questionnaire, the research questions needed to consider the range of potential e-business applications expected by local WA SAP Sites (A3.2). Further, the 'I-SAP benefits' graph includes a useful model or tool for communicating and gathering ideas (Figure 4.2).

Detailed Plan

Pilot Study to establish the CF₁ for e-ERP projects;

(a) SAP sites in Australia, September 1998 and February 1999:

- Conduct 1st interviews of 5 SAP sites to gain insight into research themes.
- Identify the methodology for building theory from case study research.

(b) of SAP sites in Perth, Australia, August 1999:

- Conduct interviews of 9 out all 11 WA based SAP sites, to establish the 1st conceptual framework for exploring expected benefits.
- Use the inputs: research themes, literature, insights, and theoretical foundations to determine the CF₁, based on case data from 2nd interviews.
- Present the first research question as a case-based conceptual model.

4.3 RESEARCH FINDINGS

Interviews from Pilot Study (a) (follow up) - February 1999

In general, the responses from IT or SAP project managers interviewed revealed views and expectations of future e-business developments similar to the key findings of the Norton Nolan Institute (NNI) Australian industry based study (KPMG, 1998).

The preliminary findings match those of the NNI study where the actual benefits achieved from adopting e-business solutions proved very disappointing. 'The largest gaps between expected and actual benefits are related to supply chain, product development and customer service.' It is in these areas of business practice where ERP systems are regarded as being traditionally strong.

A more focused question was asked at follow up interviews during February 1999: "What are the benefits arising from integrating R/3 with the Internet?" The main responses are summarised as (A3.2):

- (i) Perceived that integration with Internet technology can lift "Efficiency curve."
- (ii) In the future, the benefit will occur in "supply chain and customer care."
- (iii) More access to intelligence in supplier catalogues.
- (iv) Value adding comes from increased transparency of information flow and access, eg the invoice cycle can be eliminated in the Internet customer payment system.

Model of Internet Extended SAP Implementations

A return visit and interview with each organisation was carried out during February 1999 - (Table 4.1). From the interview of one company Woodside, an extended IT model was captured. Figure 4.2 presents this as a new IT strategy model. It details the stages of adoption and implementation of SAP for an organisation, followed by Internet technology. It represents a staged or evolutionary implementation approached that is common to Australian "follower" type organisations (NNI Report). This model was used as a question in the August 1999

interviews. It was used to obtain an appreciation of the organisation's IT strategy with SAP and the Internet.

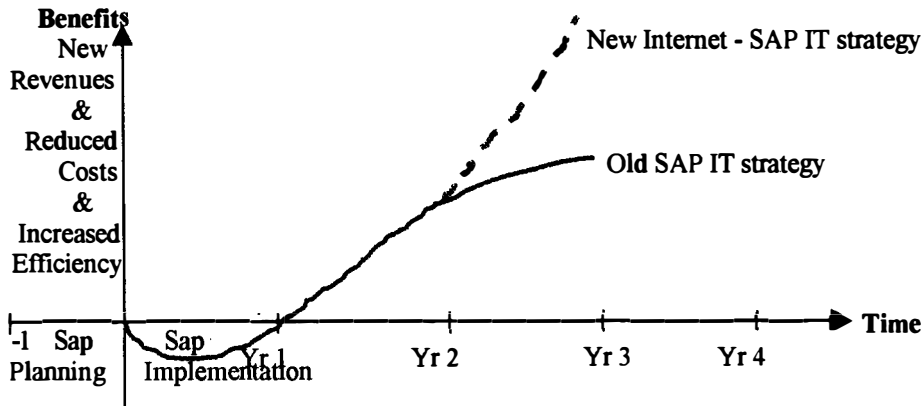


Figure 4.2: Internet extended SAP R/3 for Increased Benefits

This graph/model was included as a question in the August 1999 interviews. It was meant to obtain an appreciation of the organisation's IT developments of SAP R/3 with the Internet. Interview question 5: "How closely does this model fit your organisation?" A(4.2).

Finally, the type of benefits was added as labels of the vertical axis. This list was confirmed by Viehland (2000, p.3); "the employment of ERP with Internet technologies leads to improving business performance; speeding up business processes, increasing sales and decreasing costs."

e-Business and B2- Models

Table 4.1 summarises the range of 'Business-to' models and their industry types discovered from the Pilot study (a).

Table 4.1: Expected Use of Internet with SAP R/3 – Pilot Study (a) of 5 SAP Sites

# Case	Interview date	* Industry	'Business-to' Models - Comments from interviews
1.	Worsley Alumina 13-Feb-99	Mining	B2B – Company uses an Inbound side business-to-suppliers (B2S) but needs the Outbound side for business-to-corporate customers.
2.	Woodside Energy 12-Feb-99	Oil & Gas	B2B – Business-to-business partners or corporate customers Procurement and logistics, access to supplier's catalogues (B2S).
3.	WA Police service 11-Feb-99	State Police Service	B2E – business-to-employee for employee self-service in personnel management from Intranet access to R/3 data any time, anywhere.
4.	Wine Society 24-Sep-98	Retail	B2C – business-to-consumer by the integration of business administrative processes with Internet mailings and Web orders.
5.	WA Water Corp. 12-Feb-99	Gov. Utility	B2B - Business-to-government (B2G) with on-line payments for delivery of contractual arrangements.

* Five industries use SAP's R/3 systems dominates the ERP landscape locally in WA

The variety of "Business-to" models identified in Table 4.1 presents a simple classification scheme for business interactions as: Business-to-Business (B2B), Business-to-Consumer (B2C) and Business-to-Employee (B2E) that focuses on Employee Self-Service (ESS). Significantly, B2B rather than B2C was expected to be the main activity of future e-business – not initially appreciated by the researcher.

Next, Table 4.2 summarises the range of 'Business-to' models and their industry types discovered from the Pilot study (b).

Table 4.2: Expected Use of e-Bus Apps with SAP – Pilot Study (b) of 9 WA Sites

# Organisation	Industry	Bus-to-Emp (B2E)	Bus-to-Bus customer (B2B ^C)	Bus-to-Bus Supplier (B2B ^S)	Bus-to-Consumer (B2C)
1. Worsley Alumina	Mining	x	x	x	na
2. Coop Bulk Handling	Agric Distn	x	x	x	?
3. BHP IT-div	IT	x	x	x	na
4. Western Mining Corp	Mining	x	x	x	na
5. Woodside Energy	Oil & Gas	x	x	x	?
6. Australian Post WA	Postal Service	na	na	na	na
7. WA Police Service	State Police	x	x	x	na
8. Alinta Gas	Gas Utility	x	x	x	x
9. WA Water Corp.	Water Utility	x	x	x	?

Key: x = Expected use of e-Bus Appln, na = Not applicable ? = Unknown

A summary of expectations in Table 4.2 provides a classification scheme that includes B2E, and B2C and commends a further sub-division for B2B as B2B^C and B2B^S for B2B interactions with corporate customers and suppliers. This represents a basic framework for a "B2B Interaction" model for investigating the first generic research question about the complex phenomena of e-ERP.

In chapter 2, an initial research question (Q.1) was elicited from the literature as:

Q.1 How do organisations realise benefits from e-ERP projects?

In light of these findings and observations, two detailed questions are now proposed for examining the theory of benefits from e-ERP implementation:

- What is the nature of B2B interaction models induced by e-ERP?
- Does the increase in B2B interaction deliver increased benefits from e-ERP?

The range of observations of mapped Table 4.2 of the list of all e-business scenarios favours a multiple-case study design across multiple industries, rather than an in depth single case for future studies.

Together, the summarised information in Tables 4.1 and 4.2 of the interviews of all the SAP sites suggest a variety of e-business issues:

- (i) different e-business models,
- (ii) different stages of implementation of e-business maturity, and
- (iii) little stages of causality appeared to exist across different industries

4.4 IMPLICATIONS OF THE FINDINGS

The KPMG surveys above reflect the situation before the e-Commerce bubble burst and stock market crash. These findings remain relevant as shown by the NOIE report (2001). 55% of Australian firms surveyed indicated that they had complemented their traditional business activities with e-commerce, and 62 %

realised some cost savings and greater efficiencies. In addition some B2B e-commerce in Australia developed from B2C applications beginning with sell-side capabilities to order online. Singh & Thompson (2002, p.293) report that Australian businesses and governments, both at the State and Federal levels are increasingly adopting integrated "Web based e-procurement capabilities to achieve volume purchases, a wider choice of buyers and suppliers, lower costs, better quality, improved delivery, and reduced paperwork and admin costs."

e-Business Expectations

The Pilot study (b) confirmed the *expectations of benefits* from using 'Business-to' applications for interactions with other business entities, and so extending the reach of SAP R/3 integrated business modules. Also, both studies confirmed a basic framework or Business-to-Business (B2B) Interaction model for investigating the first generic research question about the complex phenomena of e-ERP.

Research Tools

In constructing an appropriate open-ended interview questionnaire, the issue of benefit maximisation should be paramount, and focused towards supply chain interaction based around various business models or principles (A4.2). The first interview tool is designed to examine the benefits and barriers to e-business activities with SAP R/3. It uses open-ended questions, combined with subjective success ratings of outcomes and performance. This forms the basis of the next interview tool.

Theoretical Considerations

- (i) Figure 4.2 is a model of IT strategy. It represents the stages of adoption and implementation of SAP in an organisation, followed by Internet technology. It represents a staged or modular implementation approach that is common in the Australian "follower" type organisations (NNI Report, 1998). This model was used as a basis for a question in the August 1999 interviews. It offers the capability to gather an appreciation of the organisation's IT strategy for their SAP system with the Internet.
- (ii) The pilot study of SAP sites revealed little of the importance of environmental conditions for e-business change (Burn & Ash, 2000). E.g. the capability to share knowledge, importance of the learning organisation, and the role of IT alignment between the ERP and e-Business implementations. Being relative 'new comers' with ERP, the SAP-enabled organisations were pre-occupied with enhancing or optimising the internal processes with their SAP R/3 system.

(iii) The implementation of these technologies is seen as “a shift from the traditional emphasis on transaction processing, integrated logistics and workflows to systems that support competencies for communications building, people networks, and on-the-job learning” (Manville, 1997, p.12). When implementing Internet technology the explicit strategy for knowledge sharing becomes the basis for continuous learning and leveraging business competencies (Carlson, 1995). There is the promise of “employees adopting the role of knowledge workers and the organisation forming part of an electronic community” (Hinrichs, 1997, p.69).

4.5 SUMMARY

This exploratory research phase used a two-part pilot case study to investigate the used or expected use of I-ERP technology in established SAP Australian sites. The findings reflected a staged or modular implementation approach that is common in the Australian “follower” type organizations and is evidence of a conservative management style to e-business adoption. In general the pilot study confirmed that expectation of benefits from using e-business applications for B2B interactions with other business partners is a key issue.

These observations of B2B diversity, favour a multiple-case study design across multiple industries, for further research involving “pioneers” of e-ERP as target organisations to enable validation of all classes of the B2B interactions.

The Pilot study confirmed the existence of the B2B scenarios. The main findings confirmed that the expected benefits from using e-ERP applications fall naturally into a class of organisation interactions with other business entities. This classification scheme of the B2B interactions, is grounded in Carlson’s model (1995) described in chapter 2.4. This model of B2B scenarios is referred to as an “e-Business map for SAP enabled organisations”, adapted from Carlson (1995) to help clarify the ideas of the complex phenomena of e-ERP. The model is further refined to a greater level of abstraction as a conceptual framework for the first research question. This question was established in chapter 2.4 from the literature as:

Q.1 How do organisations realise benefits from e-ERP projects?

In light of these findings and observations, two detailed questions are now proposed for examining the theory of benefits from e-ERP implementation:

- What is the nature of B2B interaction models induced by e-ERP?
- Does the increase in B2B interaction deliver increased benefits from e-ERP?

These two issues are the subject for further study explained in the next chapter.

CHAPTER 5

E-BUSINESS IMPLEMENTATIONS THROUGH ERP: BENEFITS AND BARRIERS

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5.0 INTRODUCTION

This chapter examines the benefits derived from the use of e-business applications with ERP systems, and associated barriers. Reports on early adopters of e-business applications show an initial trend towards realizing the benefits from procurement and self-service applications. *Statoil* expects savings of 30% from a 2b US\$ annual purchases bill (SAP, 1999i), *UBS Banking* has an intranet for the internal organisation of 40,000 employees globally (SAP, 1999c), *Siemens* expects 50% of global sales from its online stores (Siemens, 2001).

The chapter reports the findings from the first part of the descriptive phase of the longitudinal multiple case study of ERP enabled organisations that pioneered the use of e-business applications. The research was carried out during 1999-2001 on the use of e-business applications in SAP-based organisations. A semi-structured interview questionnaire was used to collect data on a variety of established organisations from a diverse range of industries. The objective was to identify the benefits and problems encountered by the early adopters of e-business applications with ERP according to a set of business interaction models.

The findings are analysed according to the level of complexity of business-to-business (B2B) interaction. The class of B2B interaction models include: business to supplier, business-to-employee, and business-to-corporate customer. The latter is used to extend to business-to-consumer (B2C). A case of B2B e-business integration with a global computer supplier and a corporate customer is used to demonstrate a more complex business interaction model through the networking of ERP systems.

Collectively, the cases show that more benefits can be realised from an increased level of complexity of B2B interaction. The more successful cases demonstrate that complementary benefit for the employee and the organisation is critical in e-business. To distil the findings, an e-business model of complementary benefits for stakeholders is derived. This model is recommended as candidate for future research into the study of private e-marketplaces through ERP.

5.1 THEORETICAL CONCEPTS

In striving to achieve the maximum level of benefits from integrating an e-business application with an ERP package, it is important to understand from the outset the complementary nature of an e-ERP implementation. The stakeholders of an ERP system are potentially every employee in the company as well as key suppliers and customers. Typically, an ERP system in its final rollout will replace the majority of

legacy systems, and interface with the remaining systems. To the outside world however, the ERP system will be largely transparent, as it communicates with suppliers and vendors using Internet technologies or traditional media for standard EDI transactions.

An e-business implementation is aimed at integrating business processes with external business partners and is built on and supported by the ERP foundation. The main focus of the implementation will therefore be the integration across companies as well as cross-company value chains using e-business tools (Kalakota & Robinson, 1999).

The findings of the pilot study in chapter 4: Table 4.2, confirms the existence of B2B as: B2E, B2B^S, B2B^C and B2C. It classifies the list of all e-business scenarios for all SAP-based organisations. This represents a basic framework as a B2B interaction model for investigating the first generic research question (Q.1) regarding the complex phenomena of e-ERP.

Figure 5.0 is used to illustrate how the basic e-business applications relate to the class of business-to-business (B2B) models. These include: business-to-supplier (B2B^S), business-to-employee (B2E), and business-to-corporate customer (B2B^C) that can extend to include business-to-consumer (B2C) for end-consumers.

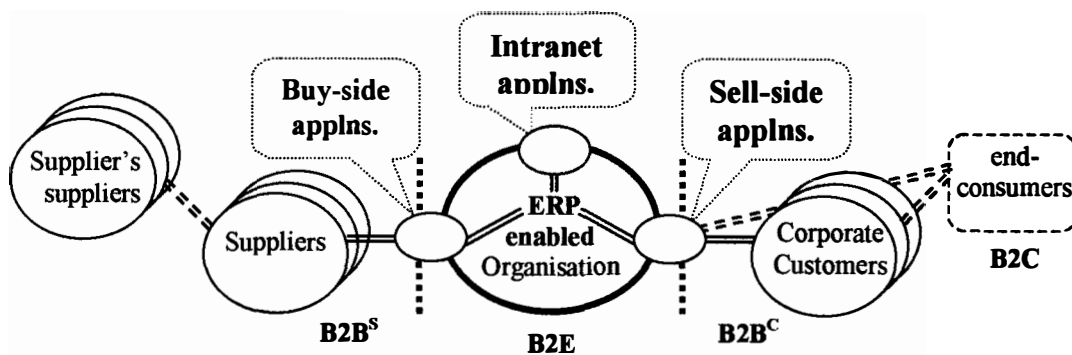


Figure 5.0: B2B Model of a Single ERP enabled Organisation

[Source: Observations from Case Interviews, Nov-Dec. 1999]

The B2B model in Figure 5.0 has its roots in EDI supply chain management systems. As a model of e-business, it describes a 'single' organisation that has key internal processes inter-connected to the internal processes of the network of partner organisations: customers, distributors, and suppliers. This is in keeping with the above definition of e-business where Internet technology in various forms is viewed as the enabler of e-business. An e-business application is therefore a software component that links an organisation's ERP processes with a partner organisation's internal system. For example, "SAP B2B Procurement" and "SAP Online Store" are buy-side and sell-side applications (SAP, 1999b; SAP, 1999d).

B2B Constructs:

B2E is viewed as Intranet access for all employees to their organisation's ERP data, from anywhere, anytime (24x7). It offers transparent Web-based access to important policy, manuals and procedure documents across all departments. An Intranet "also offers collective use of many functions. For example, employees can create individual homepages, collectively offering important information 'into' the organisation" (Perez, Hantusch, & Matzke, 1999, p. 51).

B2B^s refers to a sub-set of B2B where the organisation's employees have Web access to suppliers' internal system; e.g. materials catalogues and prices within the procurement agreements. In Table 5.3, eight organisations were expecting to implement some B2B^s solution.

B2B^c refers to a sub-set of B2B where corporate customers and distributors have access to the organisations order system. B2B^c is differentiated from B2C (business-to-consumer) where the latter infers 'direct' online selling to end-consumers, who have no internal business systems.

Therefore a composite B2B model of B2E, B2B^s, B2B^c that provides access for end-consumers (**B2C**) as Figure 5.0, is proposed as the research conceptual framework for the analysis of benefits from e-ERP. The follow discussion argues this position:

(i) Business-to-Employee and the emergence of Employee Self Service

B2E is viewed as Intranet access for all employees to an organisation's ERP data. From the preliminary findings the use of Intranets and, in particular, the adoption of SAP's Employee Self-Service (ESS) application was seen as "the first Internet experience for the company." Although, no Intranet was currently integrated with R/3, interviewees of the early investigation claimed benefits would be from administrative efficiencies. But an Intranet offers much more than these responses indicated. It offers transparent access to important policy, manuals and procedure documents across all departments. Procurement was recognised as an operational function.

Perez et al. (1999, p. 51) suggest that an Intranet "also offers collective use of many functions." For example employees can create individual homepages, collectively offering important information to the enterprise." Further, KPMG (1999b) views employee self service as the foundation for HR transformation. KPMG (1999b, p.2) defines organisational transformation of human resources in terms increased "value added" over time at three levels: administrative, consultative, and strategic business partner.

(ii) Industry Projections for B2B versus B2C

According to Forrester Research (2000), the industry projections expect the dollar value in online transactions in the B2B and B2C sectors to be billion \$ 6.3 and billion \$ 0.4, by 2004. In addition the ratio of B2B: B2C will have increased to 14:1. This has significant implications for traditional business with respect to future cost reductions and IT investment (ROI) in B2B sectors of the economy.

Table 5.1 shows the worldwide estimates for the dollar value of B2B and B2C transactions (Forrester Research, 2000). Specifically, the last column shows the ratio of B2B:B2C as a coarse measure of their relative value to business. B2B is greater than eleven (11) times the dollar value of B2C transactions for year 2000.

Table 5.1: Comparison of \$Values for B2B and B2C in Year 2000

Yr 2000	million \$	% B2B	million \$	% B2C	B2B : B2C
North America	468.79	77.6%	40.48	75.9%	11.58
Asia & Pacific	49.89	8.3%	3.81	7.1%	13.09
Western Europe	78.82	13.1%	8.54	16.0%	9.23
Latin America	3.32	0.5%	0.25	0.5%	13.09
Africa & Middle East	2.00	0.3%	0.15	0.3%	13.09
Eastern Europe	0.90	0.1%	0.07	0.1%	13.09
Total	603.72	100.0%	53.31	100.0%	11.32

[Source: Forrester 2000; B2B & B2C Projections 2000 ~ ratio 11:1]

These figures indicate that the major beneficiaries of this e-business infrastructure are B2B partners, customers and suppliers, labeled as B2B^C and B2B^S (Figure 5.1). This new B2B model updates the previous model given in chapter 2 (Figure 2.8) by providing more detail in three ways. The new model identifies:

- B2E as the focus and link between supplier and customer chains.
- B2B forms the major part of a larger SCM business model that includes business-to-consumer (B2C) as simplified hybrid of B2B^C.
- Supply chain management (SCM) or extended supply chain is a complex network of B2B models (Curran & Ladd, 2000).

(iii) Business-to-Supplier and the emergence of new Roles for Employees

B2B^S implementations of desktop procurement system designed for the non-professional procurement staff (Segev & Gebauer, 2001). The focus is an indirect procurement function that includes Maintenance, Repair, and Operating (MRO) supplies. It brings into play the issue of employee self service (ESS) that includes retraining for this change in roles. In addition, B2B e-procurement software with links to SAP R/3 is designed to reduce costs and shorten program runs, boosting company earnings and supporting the strategic objectives of supplier management.

5.2 METHODOLOGY

Descriptive Research Phase 2.1

Figure 5.1 highlights the first part of the descriptive phase of the composite case-based research method. This details research activities of case studies (Table 3.3) for describing theory associated with the 1st research question: How do organisations realise benefits from e-ERP projects? This question was the key input from the exploratory stage.

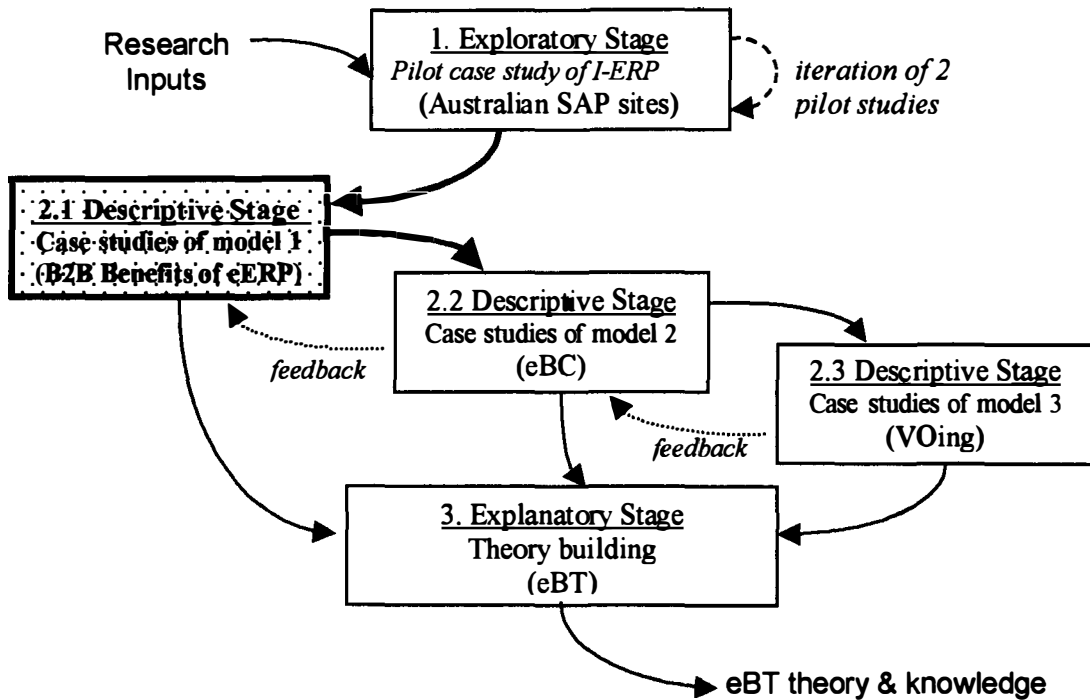


Figure 5.1: Phase 2.1 of Composite Case-based Research Method

The research was carried out between November and December, 1999 on the use of e-business applications in SAP-based organisations. The objective is to identify the benefits and problems encountered by the early adopters of e-business applications with ERP according to the set of e-business models. A semi-structured interview questionnaire was used to collect data on a variety of established organisations from a diverse range of industries. The study explored the nature (what and how) of the benefits realised from the adoption of e-ERP business solutions using the following research framework.

Conceptual Framework

The findings of the “exploratory” phase of established SAP Australian sites were used to establish the classification of the B2B interactive models illustrated by Figure 5.0 using four basic “B2-“ constructs:

- (i) Business-to-employee (B2E) to harness the flow/sharing of corporate information via intranets;

- (ii) Business-to-supplier (B2B^s) to support supply chain management between partner organizations;
- (iii) Business-to-customer (B2B^c) to allow Web access to corporate customers;
- (iv) Business-to-customer (B2C) that extends to an online global consumer base.

Research Scope

Prior to November 1999, a search of ERP literature, web sites, and SAP related industry contacts was performed to identify worldwide a mix of major e-ERP projects. Fifteen SAP-based organisations were contacted. Eleven agreed to be interviewed for gathering information on their developments of Internet integration of their SAP R/3 systems. Within the scope of this study the term e-ERP project is used to represent an e-business project with an ongoing ERP implementation.

1st Research Question

Q1. How do organisations realise benefits from e-ERP projects?

- (i) What is the nature of Business interaction models induced by e-ERP?
- (ii) Does the increase in B2B interaction deliver increased benefits from e-ERP?

Expected Outcomes:

The specific goal is to demonstrate that benefits increase from a higher level B2B interaction of e-business application with SAP R/3 systems. Also, the study is used to emphasize the added benefits from the adoption of an integrated e-business solution of networking ERP-based organisations from utilising self-service.

Table 5.2 Research Data Collection Matrix

Question	Data Collection Instrument	Data Analysis
How do organisations realise the benefits from e-ERP projects?	Semi-structured 1 st interview questionnaire; used Nov-Dec 1999	Match case content of each e-ERP project within B2B interaction types, e.g. B2E, B2B ^s , B2B ^c
a. What is the nature of B2B models induced by e-ERP?	Project correspondence with SAP/IT project managers and consultants 1999-2001	Content analysis of qualitative data. Cross-case analysis of benefits to determine the B2B issues and lessons learnt, e.g. savings, services, staffing
b. Does the increase in B2B interaction deliver increased benefits from e-ERP?	Public and private company documents; June 1999 - June 2000 2 nd interviews July - August 2000	Rank the level of benefits against the increased level of B2B interaction

Construction of 1st Interview Questionnaire

In constructing an appropriate open-ended interview questionnaire, the issue of benefit maximisation was paramount, and the focus of this was towards supply chain interaction based around various business models or principles (A5.2).

The first interview tool was designed with open-ended questions, combined with subjective success ratings of outcomes and performance. It was pre-tested and redesigned at least twice with assistance from local SAP project managers.

Case Selection for e-ERP Projects

The case selection criteria implied that each e-business implementation was to have significant organisational implications, and importantly showed the range of business interaction models. Eleven (11) SAP-based organisations with major e-ERP projects agreed to participate in the study. In each case, a senior IT project manager was contacted for the purpose of conducting initial interviews. Table 5.3 profiles the eleven organisations that participated in the study. In the table the cases are ranked by B2B interactions, and span eleven industry types.

Selection of the target case organisations' collaborative initiatives included: consultations with university-industry partners, conference paper collaboration, attend SAP and ERP industry based SIG workshops and international conferences, and collaborative publications of white papers. Therefore an opportunistic approach across a multitude of industry was adopted.

Analysing the Findings

The findings are analysed according to the level of complexity of B2B interaction defined in Figure 5.0, and grounded in Carlson's model (1995).

Table 5.3: Case Profiles of All 11 SAP-based Organisations Interviewed Nov'99

#	Organisation	Country	Industry	Bus-to-Bus Scenarios			Bus-to-Consumers
				B2E	B2B ^s	B2B ^c	B2C
1	Halliburton	Norway	Engineering	•			
2	UBS	Switzerland	Banking	•			
3	Bertelsmann	Germany	Media	•			
4	British Biotech	UK	Bio-technology		•		
5	Novartis	Switzerland	Pharmaceutical		•		
6	Statoil	Norway	Oil & Gas		•		
7	Employment Nat	Australia	Employment agency		•		
8	UNICEF Aust.	Australia	Charities				•
9	Wine Society	Australia	Wine Retailing				•
10	**Siemens (FSC) Fujitsu-Siemens	UK	Multiple industries Computing			•	
11	*Dell Computers LSI Electronics	USA	Computing, Electronics			•	

All cases were initially interviewed between Nov – Dec 1999

* Dell and LSI (Electronics) are a combined case of supplier-to-customer B2B.

** Siemens is a cross-divisional case; Fujitsu Siemens Computers (FSC) is subsidiary case.

5.3 RESEARCH FINDINGS BY B2B MODELS

The project managers of each SAP-based organisation, were questioned about 'the benefits and barriers arising from extending their R/3 business processes onto the Internet'. The findings of all case studies profiled in Tables 5.4 to 5.7, are presented according to the business interactions model classification. Within each classification the case findings are presented in order of increasing e-business sophistication or complexity.

B2E Cases: Employee self service for access to corporate data

The cases profiled in Table 5.4 demonstrate the use of e-business intranet applications. This category of application links a company's ERP data to the Web to provide access for all employees to corporate data, e.g. SAP Employee Self Service (ESS). It represents the earliest stage of e-ERP implementations.

Table 5.4: Business-to-Employee (B2E) Cases

B2E Interaction	*#. Case	Employees	e-Business Application	No. of Users
Intranet access to ERP	1. Halliburton	Managers & engineers	Mgt reporting and tracking of skilled contractors	~1100 staff
	2. UBS	All employees	Networking of employees across very large bank	~45,000 bank employees
	3. Bertelsmann	All employees	Networking of employees across a global media corp.	~33,000 media employees

* 2 Large companies with increasing level of employee access 24x7 to R/3 personnel data

The B2E model of a Single ERP to Employee Intranet, is illustrated by Figure 5.2.

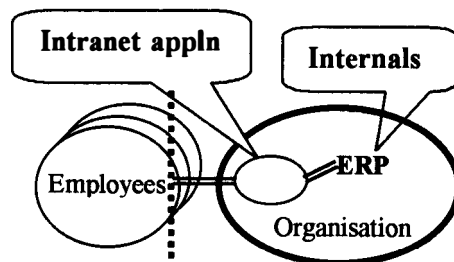


Figure 5.2: B2E Model of an ERP enabled Organisation for Employee Self Service

[Source: Observations from Case Interviews, Nov 1999]

Three large established organisations from distinct industries implemented organisational intranets that allowed Web access to SAP R/3 HR data. These solutions were easy to deploy while offering significant benefits for employee networking and the management of corporate information.

Case 1. *Halliburton* staff developed an in-house Web initiative that allowed access to R/3 personnel data. It is a specific example of a HR Intranet application to improve personnel management in Oil and Gas construction projects. The

application has proven to be a major tool for supporting decision making towards minimising offshore labour costs of skilled agency workers in offshore projects. With the aid of computer graphics this Intranet system provided a simple 'walk-up' user interface for casual users, including project managers who have little or no training on the use of the R/3 HR module. It has been expanded to include a computer hardware tracking system.

Case 2. UBS implemented the SAP Internet solution for internal address management. It covers all organisational information within the company and is the most-used Web application, available for all 45,000 employees, with 300,000 transaction calls per day. It implements its own Intranet integrated with R/3 to facilitate the networking of the staff in preparation for e-commerce. 'This is a generic office management solution, not a Banking industry solution, to save time and paper for the distribution of staff information' (UBS project manager). It offers transparent access to important policy manuals and procedure documents across all departments and collective use of many functions (Perez et al. 1999).

Case 3. Bertelsmann is a leader in media sales and services worldwide. The company implemented SAP Internet solutions to enable it "to further leverage its investment in its SAP system by extending the functionality of the R/3 system to casual users" (SAP, 1998b). This global integration strategy by networking the enterprise is viewed as "e-commerce survival." A change management team was commissioned to achieve this end. The numerous requests from various profit centres within the group for similar solutions showed a high level of acceptance from the other user communities within Bertelsmann.

To maximise the benefits- there needs to be;

- recognition that the inspiration of ESS applications can come from end-users.
- the communication of the corporate vision.
- a commitment to create the Intranet system as a 'learning system' at all levels of use so that all managers and IT staff must learn together to seek and develop new business models.

To minimise the barriers – the design of the Web interface and its functionality:

- Must accommodate the least experienced employee.
- Must enable users to be more efficient than previous paper-based systems including faxes.
- Must provide groupware solutions to enhance communication.

In summary by allowing employees appropriate access to core systems:

- (i) The managers in the Halliburton case were able to **minimize costs**.
- (ii) UBS and Bertelsmann employees were able to provide **efficient service**.
- (iii) In all cases the e-ERP applications offers collective use of many functions or **“shared services”** across certain groups with improved quality of work life.

Finally, to maximise the benefits from **employee self-service** applications, continuous employee involvement is essential. To minimise the barriers, these applications need to deliver efficient and shared services.

B2B^S Cases: Online Procurement for Lower costs and B2E

The cases profiled in Table 5.5 demonstrate the use of e-business ‘buy-side’ applications. This category of application links a company’s ERP purchasing processes to a supplier’s catalogues, e.g. SAP “B2B Procurement.” The B2B procurement software with links to R/3 is designed to reduce costs and shorten program runs, boosting company earnings and supporting the strategic objectives of supplier management. The Internet-enabled process flows provide a flexible, standardized control layer that regulates the forwarding of requisitions and purchase orders to the right person for approval. The motivation for these developments or business driver is cost reductions and efficiency gains.

Table 5.5: Business-to-Supplier B2B^S

B2B Interaction (level)	*#. Case	B2B ^S	e-Business example	No. of Users
ERP to supplier catalogues,	4. Biotech	B2B ^S	B2B procurement of bio-chemicals items as core business.	~240
+ Intranet access to ERP-HR	5. Novartis	B2E, B2B ^S	B2B procurement of chemicals	~2,000
+ Intranet access to ERP-HR	6. Statoil		B2B Procurement, and updated by Intranet access to Personnel data	~18,000?
	7. Employ-Nat	B2B ^S + B2E	B2B Procurement with Intranet access to Personnel data	~14,000

3 Cases representing 3 industries, ordered by increasing level of B2E with B2B^S

The B2B^S model for a single ERP enabled organisation, is illustrated by Figure 5.3.

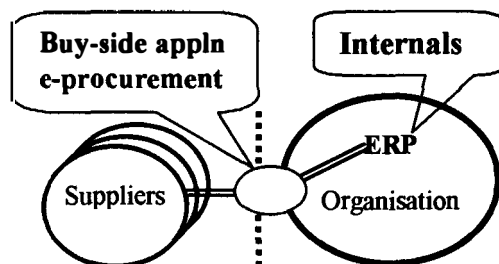


Figure 5.3: B2B^S Model of e-Procurement from Suppliers

[Source: Observations from Case Interviews, Nov 1999]

Case 4. *Biotech* pioneered the SAP B2B Procurement e-business solution. It reported 'lead times to fill an order were down from five to just one day, from the point in time when an employee identifies an order, to actual delivery' (Biotech, 1999). Having achieved shorter lead times, *Biotech* no longer needs to keep large stocks of materials, so expenditures are down and cash flow is healthier. Indeed, the company estimates it will save between ten and 15 percent on the cost of purchasing suppliers.

Another goal of the B2B^s project was to build more long-term links with preferred vendors (suppliers). So far, *Biotech* has identified three such vendors. The procurement department already attributes one major success to its new procurement process: It has been able to increase the discounts previously offered by its three preferred vendors by a further five percent (15% overall). The vendor Internet sites were linked into the SAP procurement system, allowing Biotech research staff with no training to use e-procurement on the company's own intranet and to purchase from both the internal catalogue and external online catalogues. This was made possible by a specially developed open catalogue interface and common items numbers.

Case 5. *Novartis*, a global leader in the life sciences focused on improved health and well being. The 'simple order, rapid delivery' (SORD) project integrated with R/3 based business processes, was straightforward and required minimal maintenance effort. An intuitive Web interface enabled deploy and employee procurement solution to more than 2,000 users. The aim was to reduce the overall procurement costs while improving efficiency and service. This was coupled with Intranet solution for knowledge collaboration. Organisational culture readiness varied across IT and HR staff. Many customers also benefited from the ease of implementing SAP Internet solutions and the resulting increase in agility, including Novartis Services, "The SAP Internet procurement solution represented the ideal way for us to empower our end users and reduce the overall procurement costs while improving efficiency and service," (A4: 7)

Case 6. *Statoil* the world's largest supplier of crude oil, implemented the "SAP B2B Procurement" software for processing internal and external procurement of supplies across the entire enterprise. The company processes more than 350,000 invoices annually, and awards over 40,000 contracts. "By using SAP B2B Procurement to leverage the existing SAP R/3 Oil and Gas industry solution, the

company sought to take full advantage of business processing via the Internet" (SAP, 1999i). The company estimates a considerable improvement in the ratio of invoices to orders as well as a tangible contribution to revenue earnings.

Prior to the introduction of the B2B^s project the company foresaw the potential of the Internet for its competitiveness in the Oil and Gas industry. It established the BRA (Norwegian for good) data quality programme, for 'a better and faster' global administration. This programme was used to raise the level of Internet skills throughout the company. Employees were encourage to work from home with their administrative work. Venkatraman et al. (1999) reports this resulted in a variety of unexpected benefits. Later, implementing the SAP software allowed approximately 18,000 employees direct access to Internet catalogues. They could select supply items as they required, freeing resources in the purchasing department for strategic tasks. This B2B^s project was viewed as an enhancement of B2E. Further benefits were **employees** performing their own airline reservations and travel arrangements.

Case 7. *Employ-Nat*, a major recruitment and employee services company, implemented SAP's Internet suite of **employee self-service** applications. This was used to network more than 1,400 employees in more than 200 offices, countrywide. It included an employee **procurement** solution to realise cost savings in the purchasing and human resources. It helped reduce administration tasks and paper forms. For example, filling in forms for leave applications, distribution of personnel information. Staff reported the Web-based leave applications were user friendly for non-trained users.

As administrators reported, the nature of the business they were in was getting the long term unemployed (candidates) back into jobs. This often necessitated purchasing basic work items for candidates to get them over small barriers to work, e.g. shoes, glasses. The procurement system was designed mainly for small irregular items where it processed the accounts and the expenditure automatically for candidates. It tracked the activities of the consultants, and provided an order chain of order numbers and vendors and debtors.

However, many users tended to revert back to the old paper-based system as they experienced difficulties in following and using Web-based SAP R/3 online purchasing. The purchase of small irregular purchases was scrapped and only regular purchases such as office materials (MRO) were supported online. This appeared to be inspired by an IT driven project mindset.

A summary of lessons learned from the four B2B^s cases

To maximise the benefits:

- Roll-out of the e-business solutions needs to be achieved very quickly for ROI. Also, there needs to be 'full cooperation between industry partners.'
- Increase the availability of supplier catalogues and encourage collaboration between suppliers by standardising catalogue item numbers. Efficiency was derived from approval process.
- Strive for better level vendor (supplier) communication, 'It is only with content that you gain a win-win, e.g. industry catalogues'. This emphasises the importance of the B2B value chain.
- Embrace organisational change to make use of SAP's industry portal.

To minimise the barriers:

- Design and build a Web interface that users comprehend and will use. 'Although the SAP was obviously good as a back-end business system, the interface lacked a sense of user friendliness.'
- Understand that corporate paranoia is in the minds of managers and consultants. 'We need to understand the environmental factors and more practical issues, not only the IT infrastructure.'
- Implement a change management programme to address employee and partner resistance to change.
- Aim to pitch the interface to the lowest common level of end-user and then provide training to bring up to the necessary level of competence.
- Communicate the benefits for the user of the business processes. To be more productive users need to appreciate the changes to the key business processes.

In summary by allowing employees appropriate access to purchasing systems:

- (i) The B2B^s projects enabled all organisations to **reduce costs** in purchasing and lower inventory through standardised catalogues, standardised vendor interfaces, and open catalogue interface which will enable sharing of profits between companies and their preferred vendors.
- (ii) Procurement solution enabled *Statoil* to benefit from **revenue generation**.
- (iii) The B2B^s projects enabled all organisations to benefit from **efficient service**.
- (iv) Organisations also benefited from **process improvement** and further with communication with suppliers.
- (v) In all cases the e-Procurement applications offered collective use of many functions or **shared services** across operational and administrative groups.

Finally, the cases represent a new approach towards cost reductions for both partners. But the benefits are by no means all one-sided. SAP B2B Procurement gives partners plenty of opportunities, such as direct ordering. In maximising the benefits and minimising the barriers, the focus is not only on **improved efficiencies, but also on** other improvements that rely on **ESS** and competencies. The four organisations above reported that their e-ERP technology will play an integral part in helping established enterprises build and operate online business-to-business models. In particular, the B2B^s e-procurement developments were expected to lead to industry specific or private e-marketplaces. The companies believed future benefits will come from industry portals, e.g. Chems, Oil & Gas marketplaces.

B2C Special Cases of Extending B2B^c

The cases profiled in Table 5.6 demonstrate the use of an e-business 'sell-side' application. This category of application links a company's ERP catalogues and ordering processes to the Web, e.g. SAP's "Online Store." It represents a primary stage of an e-ERP implementation. The motivation for these developments or business driver is cost reductions and customised products from B2c interaction. The cases are presented in order of increasing e-ERP sophistication.

Table 5.6: Business-to-consumer (B2C) Cases

B2C Interaction	*#. Case	Consumers	e-Business example	No. of Users
Internet access to ERP	8. Wine Society	Members	e-Shopfront for wines sales and services to registered members.	~60 staff
Internet access to ERP by ASP	9. UNICEF Aust.	Citizens & corporate	1 st Australian charity Web site for sales of greetings cards etc.	~35 employees + 30 volunteers

* 2 SMEs with consumer access (24x7) to R/3 sales catalogues and order data, decreasing level of ownership

B2C Online Store is for improved access to customised products and services. Two models for B2C interaction for a single ERP enabled organisation are illustrated by Figures 5.4 and 5.5.

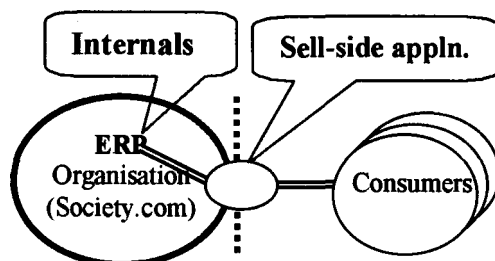


Figure 5.4: B2c Model of a Single ERP enabled Organisation for Consumers

[Source: Observations from Case Interviews, Nov 1999]

Case 8. Using SAP's suite of e-business applications, the *Wine Society* was able to move its mail order business in a greater variety of directions without having to re-engineer its business processes, e.g. any time, anywhere. They report from feedback through the website of 20 to 30 emails per day, 'we are beginning to understand what our members want', - 'although we have not yet delivered this'. In addition, some technical issues were encountered, e.g. the lack of available business application interfaces from SAP.com.

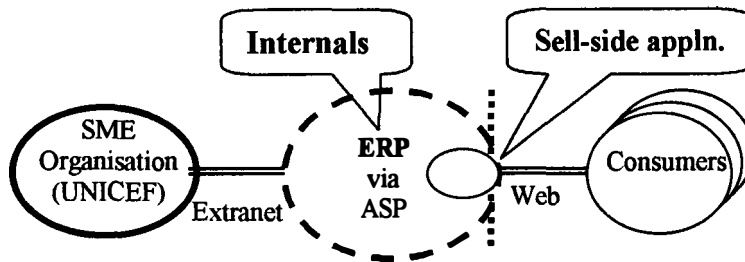


Figure 5.5: B2C Model of an ASP hosting e-ERP for Consumer Sales

[Source: Observations from Case Interviews, Nov 1999]

Case 9. In 1999-2000 *UNICEF* Australia, a division of the global organisation pioneered a B2c 'Online Donations Facility'. This was achieved by outsourcing its total IT support to an application service provider (ASP). This was the first Australian ASP solution to use the Internet with R/3. This infrastructure provided a fully integrated business administrative solution for the organisation's existing Web site, for the online sales of gift cards. It allowed for an improved product range (online) and a new business image. But 'how do we let people know we have a web presence?' Some technical issues remain with matching business processes with R/3. The information gathered on this case forms the basis of the ASP issues.

To maximise benefits:

- Be more pro-active by making the web site enjoyable.
- Utilise synergy between industry networks, email lists, web links,
- Improve the product education on the web site.
- Improve publicity via emails and online catalogues.

To minimise barriers:

- Tackle all unresolved basic business issues (inefficient and ineffective processes within the e-ERP). For example, to improve the tracking of orders as well as resolve out-of-stock procedures.
- Take charge of the ethical issues in credit taken from members before stock is processed.
- Set up communication between branches.
- Empower staff in customer care.

In summary, by allowing consumers customised access to core systems:

- (i) UNICEF was able to **reduce costs** in its business admin and high cost of e-ERP ownership by application hosting from an ASP.
- (ii) In both cases the e-ERP solutions enabled the organisations to benefit from **revenue generation**.
- (iii) The customers in the UNICEF case were able to benefit from **efficient service**.
- (iv) In both cases the e-ERP applications offered collective use of many functions or "**shared services**" across certain groups (Perez et al. 1999, p.49).

Finally, the two cases represent a new approach towards revenue generation. For maximising the benefits and minimising the barriers, harnessing **employee self-service** is critical.

B2B^C: Developments in Single and Multiple SAP-based Organisations

The cases profiled in Table 5.7 demonstrate the use of an e-business 'sell-side' application. This category of e-business applications links a company's ERP catalogues and ordering processes to an intelligent Web site, e.g. SAP's Online Store. It represents a primary stage of B2B^C implementations. The motivation for these developments or business driver is benefits from the optimisation of order processes, cost reductions and customisation of products and services.

Table 5.7: Business-to-Customer B2B^C

B2B Interaction (level)	*#. Case	B2B Sub-class	e-Business example	No. of Users
Single ERP to corp. customers	10a. FSC (cross-divisional)	B2B ^C	e-Store across a global network of divisions, within a conglomerate	~11,000
Multiple ERP to corporate customers	10b. FSC within a 1 st stage business network	B2B ^C	e-Mall of 3 e-Store divisions across a global network	~11,000
Integration of B2B ^C and B2B ^S ERP to ERP	10c. FSC (linked to) SAP	B2B ^C with B2B ^S	Private e-marketplace- order request system integrated with SAP procurement system	~11,000 22,000
Integration of B2B ^C and B2B ^S non-ERP to ERP	11a. Dell Corp. with 11b. LSI Electronics	B2B ^C with B2B ^S	Customised online sales integrated with customers MRO procurement	~27,000 ~14,000

***3 Stages of Cases representing 1 industry, ordered by increasing level of B2B interaction

Case 10a: Single B2B^C Interaction for sales efficiency, reliability, and customer care

Fujitsu Siemens Computers (FSC) implemented its own SAP solutions for a sell-side systems. The SAP-based Order and Request System (ORS) was developed by the parent company's Business Services group and has been deployed in eight European countries. The system was developed to optimise processes between FSC corporate customers and all other divisions of its global parent company.

FSC's business revolves around independent partners known as *valued-added* resellers and *key accounts*. In the past, system orders from partners were taken over the phone or in writing and then typed manually into the R/3 system. To make ordering faster and more secure, partners now submit their orders to FSC fully electronically via the Internet. During the main periods of access (from 11 am to 4 pm), an average of a R/3 sales order entry of 6.5 items is received every 30 seconds and an average of 600 order tracking requests. In parallel to its release at FSC in Germany, the ORS was rolled out on an international scale. Already it has been deployed in England, France, and Italy, and in early 2000 Austria, Belgium, Spain and Switzerland followed (Siemens, 1999a).

For FSC, the effect of integrating R/3 with Internet radically improved sales efficiency. By November 1999, some 80% of orders from 2200 key accounts throughout Germany were handled by ORS. Also, there was reasonable acceptance by the end-users, with less order errors aided by the reliability of SAP R/3 data. In addition to standard features, such as the ability to browse a catalogue, collect items in a shopping cart, and place an order, ORS provides the following capabilities:

- Premium pages with the user's specific list of commonly purchased items.
- Order tracking, for the capability to follow the progress of an order.
- Document tracking; an extension to the order tracking, which allows the electronic SAP R/3 documents to be viewed in a highly secure environment.
- Help facility, with information on setup, FAQs and a Help Wizard.
- Download page, with additional tools and documentation.
- News Channel, for announcements and a News Forum, for customer debate.

To maximise benefits these organisations needs to:

- Be pro-active in making the web site a dynamically 'enticing-to-buy' experience for the public.
- Promote each corporate sponsor's particular charitable/social image with intelligent web links.
- Provide the online capability to educate the public about product lines specials.
- Improve publicity online catalogues and emails with attachments as customised catalogue.

To *minimise barriers these organisations need to:*

- Tackle the unresolved basic business issues of inefficient and ineffective processes within the R/3. Improve the tracking of orders and out-of-stock procedures.
- Resolve of the legal issues in 'credit taken from end-users' before orders are processed.
- Ensure effective communication links between branches.

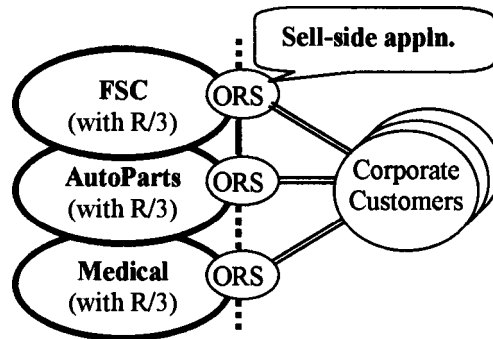
In summary by allowing customers appropriate access to core systems:

- The B2B^C solution enabled *FSC*, to **reduce costs** with business administration,
- and benefit from new **revenue generation**.
- FSC* was able to deliver **efficient service** for its customers.
- The B2B^C applications offer collective use of many functions or **shared services** such as document tracking and order tracking across organisational groups.

Finally, the case represents a first stage towards revenue generation. To **maximise** the benefits, *FSC* sort to deliver cheaper products with efficient service by utilising **customer self-service**.

Case 10b: e-Mall as multiple B2B^C interaction to service corporate customers

An e-Mall is demonstrated by the second B2B^C implementation profiled in Table 5.7
An e-Mall is an Internet marketplace for a group of companies to sell their products and services to their corporate customers.



Figures 5.6: e-Mall as a B2B^C Group of e-Stores for Corporate Customers

[Source: Observations from Case Interviews, June 2000]

Figure 5.6 illustrates the system architecture with the capability to connect and interact with a range of *Buyer* company's SAP R/3 and R/2 systems, and other ERP systems. By June 2000, the company's e-Mall had progressed to version 2 with three companies: *FSC*, *AutoParts*, *Medical*. The benefits include those detailed in the previous B2C cases. In addition, the benefits of e-Mall flow from the streamlining of 'sell-side' business processes:

- Partner group specific product presentation;
- Integration of Group's products, materials, systems through intelligent links;
- "One face" to the customer for the holding company;
- Sales group presence 24x7 and world-wide with complementary offerings;
- Reduction of incorrect orders and changes to orders;
- Most up-to-date offerings with high visualisation and interaction;
- Customer feedback through an open e-community.

The lessons learnt about maximising the benefits and minimising the barriers, include: the importance of the quality of the Web interface from the end-users view, the agreement of partners on a common IT platform, and with appropriate marketing. The cases demonstrate a shift from simply utilising **customer self-service** through buying incentives to empowering **customers** to be effective in placing orders.

Cases 10c and 11: B2B e-commerce integration for complementary benefits

The third implementation profiled in Table 5.7 demonstrates the integration of two e-business implementation models, B2B^C and B2B^S. It also illustrates the use of two complementary applications for doing e-business via the Internet. A 'sell-side' application of a supplier, with a 'buy-side' application of a corporate customer. *FSC* and *SAP* began conducting e-business in December 1999, in a point-to-point Internet buying and selling solution. The system was developed to optimise processes between *FSC*'s 'Order and Request System' and *SAP*'s 'SAP B2B Procurement' across the Internet.

The solution links the *SAP* B2B Procurement solution to *FSC*'s Order and Request System (ORS) where the implementation of ORS was realised through *FSC*'s Business Services (Siemens, 1999a; *SAP*, 2000).

The B2B^S + B2B^C model for the integration of Customer and Supplier ERPs, is illustrated by Figure 5.7.

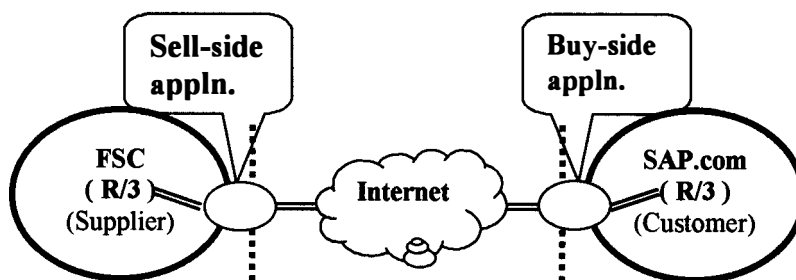


Figure 5.7: B2B Model for Case 8c: Supplier linked to a Corporate Customer

[Source: Observations from Case Interviews, June 2000]

Case 11 In 2000 *Dell* pioneered (implemented) its first business-to-business 'B2B e-Business Integration' with one of its largest customers (*LSI*). This case illustrates a first stage system architecture to inter-enterprise computing. In this example, the integration of the system architecture is made possible through a variety of 'back-end', 'sell-side' and 'buy-side' systems.

LSI was able to leverage its existing SAP 'back-end' system and SAP Business Connector powered webMethods technology, to communicate directly with *Dell's* component-based e-business system. The integration of *LSI's* ERP (SAP R/3) system and (SAP B2B) procurement application to *Dell's* Web catalogues, automates the e-procurement of all computer products from via the Internet (Fan et al., 2000). In this implementation model of complementary systems the shared benefits are summarised in Table 5.8. Shared savings are realised through the optimisation of a variety of functions: sales, orders, purchases, and payments within a negotiated agreement between the partners. The intuitive and easy-to-use Internet interface enables users with a minimum of training to create purchase requisitions for indirect materials.

Table 5.8: B2B e-Business Integration for Complementary Benefits

FSC Benefits	Partner Benefits
<ul style="list-style-type: none"> • Ordering times optimised through online connection • Shorter and therefore faster ordering times • Incorrect orders reduced to minimum • Presentation of configurable products on the Internet • Information management for CRM 	<ul style="list-style-type: none"> • Available 24 hours a day, 7 days/wk. • Simpler ordering, resulting in savings in cost and time • Automatic online information on order changes and delivery notifications • Tracking of orders at any time • Pre-testing of products • Customised service

In addition to the standard benefits from B2B^C and B2B^S models, Table 5.8 identifies **customised service** as a extra benefit. Within a negotiated arrangement and with real time access to customer purchasing data, employees of *FSC* are now able to use information management tools to deliver customised services. Similarly, the employees of *SAP* benefit from customised documentation and software testing tools. This case demonstrates a shift from utilising **employee and customer self-service** to empowering employees in customised service using information management techniques. The next stage of evolution of this case is to become a private e-marketplace.

5.4 IMPLICATIONS OF FINDINGS

The findings are analysed according to the stages of sophistication of the e-business interaction models. Collectively, they demonstrate that greater benefits flow from an increased level of e-business interaction, as shown partly in Table 5.8. On reflection complementary benefits were found to exist in all classes of B2B models. The lessons learnt for benefits realization include: the quality of the Web interface from the end-user's perspective, the agreement of partners on a common IT platform, the purchasing agreement of suppliers, and communication of the business strategy to employees.

Empowerment Model with B2B Interactions

Figure 5.8 is developed as a comprehensive model to bring together the key elements and their relationships of this study into e-business interaction. This model illustrates how change in industry practices and e-ERP developments relate to the B2E and the B2B sub-models: B2B^C and B2B^S. It identifies that there is an accelerated symbiotic relationship between e-business technologies and business improvement caused by a shift in customer demand. The arrows connecting customers, employees, suppliers indicate the business interactions through self-service, care and empowerment.

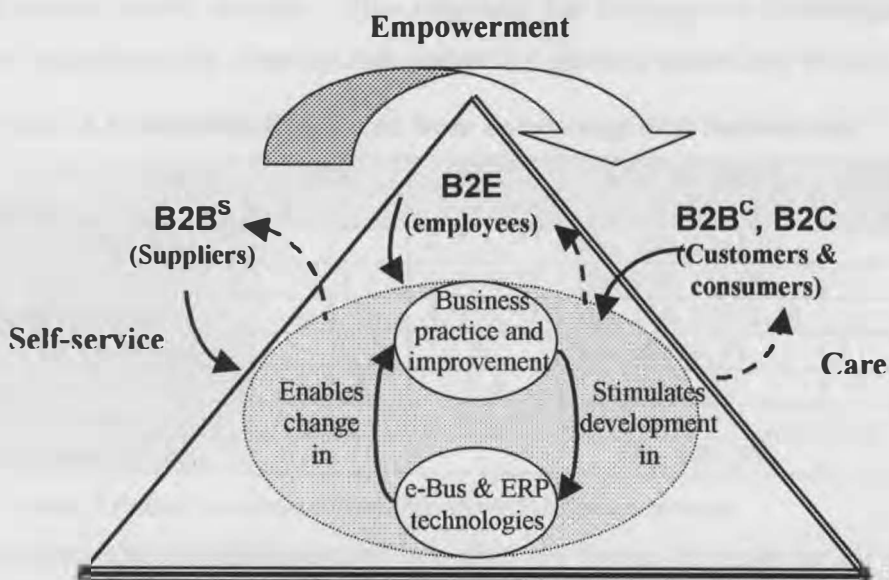


Figure 5.8: Empowerment Model with B2B Interactions

To realise the benefits from the symbiosis of e-ERP developments and business practice, organisations are optimising three B2B models:

- to offer cheaper products with efficient service by utilising **customer self-service** in B2B^C,
- to procure materials cheaper and efficiently through **e-procurement** agreements in B2B^S, and
- to optimise both B2B^S and B2B^C for customised service by utilising **employee self-service** in B2E.

Figure 5.8 presents an up to date view of the foundations of this study; technology (e-ERP), business practice (e-business), and people (relationships).

B2B Benefits Scorecard

Those cases that were observed to have realised some benefit are identified in Table 5.9. For example in the B2B^S model, employees of *Biotech* (4) and *Statoil* (6) reported an improvement in the quality of their work life, whereas in the case of *Employ-Nat* (7) the procurement system failed to reduce costs and deliver efficiency gains for many employees. In this example, the power of complementary benefits is easily demonstrated. While both companies (4) and (6) reaped the benefits of reduced item costs in procurement of supply, their employees benefited from their involvement and the reduction in the order cycle time from order-to-delivery. In case 7, the employees found the online ordering frustrating, and preferred to use the old paper-based system. This negated the savings in purchasing items from preferred suppliers for *Employ-Nat*. Table 5.9 gives a summary of the findings.

Table 5.9: Benefits Scorecard from Increasing B2B Interaction

Benefits	Model	B2E	B2B ^S	B2B ^C & (B2C)	B2B ^C with B2B ^S Integration
Reduce Costs		1	4, 5, 6, *7	10a, 10b, 11a (9)	10c, 11
Efficient Service		2, 3	4, 5, 6, *7	10a, 10b, 11a (9)	10c, 11
Shared Services		1, 2, 3	4, 5, 6, *7	10a, 10b, 11a (8, 9)	10c, 11
Revenue Generation		-	6	10a, 10b (8, 9)	10c, 11
Quality of work life		1, 2, 3	4, 6	-	10c, 11
Process Improvement		-	4, 5, 6, *7	-	10c, 11
Customised service		-	-	10a, 10b (9)	10c, 11

* Case 7 Failed to achieve Benefits from B2B procurement

On reflection, the complementary benefits are found to exist in all classes of B2B models. However the greatest benefit was found to occur through B2B^C with B2B^S integration (Table 5.9). The real savings from integration of B2B - back-end and front-end integration requires a dual approach;

- inside-out optimisation of business processes witnessed by early adopters,
- outside-in optimisation of business processes will be driven by Customer and Supplier Relationship Management (CRM) and (SRM).

In maximising the benefits and minimising the barriers, the focus has moved beyond **self-service and care** issues to **customer and employee empowerment** (Markus et al., 2000):

- Empower customers with more effective and efficient ordering, using the more visual and up-to-date power of the Web.
- Empowering customers through the development of an e-community.
- Empowering employees with decision-making skills

The overall findings from the set of e-business cases demonstrate that three stages of the business interaction model (B2E, B2B^s, B2B^c, and B2B^s with B2B^c) provide a framework for studying e-business benefits. These three stages typically progress through three levels of benefits: **self-service, quality of work life and care, and empowerment**. While this research found an important role for ERP in support of e-business, the message from these case studies is that the business model should drive an e-business implementation, not the technology (Fan et al., 2000).

Unexpected Findings

The preliminary investigation of local Western Australian SAP sites revealed little of the importance of environmental conditions for e-business change (Ash, 2000), for example, the capability to share knowledge, the importance of the learning organisation, or even the role of IT alignment between the ERP and its e-Business project. Being relatively “new comers” with ERP, the local SAP-based organisations were pre-occupied with enhancing or optimising their internal processes with their R/3 product.

In contrast, at this stage of the study all cases collectively showed a shift from technology change to business change for doing business online. These intranets integrated with SAP R/3 were seen as the first Internet experience. They affected greater awareness of the business environmental factors. Therefore, there is the need to understand the environmental factors including IT infrastructure.

The responses in Table 5.10 were captured from the interviews, conducted during phase 2.1. These comments offer rich advice about the challenges of change. They emerged as a bi-product of the first interviews. “Rather than emphasising technological issues the focus is clearly on cultural change and organisational performance issues” (Guha et al., 1997, p.122). For example, only one company *Statoil* referred to need for cultural readiness to maximise benefits, whereas *UBS* complained about corporate paranoia to minimise barriers.

Table 5.10: Comments that Support a study of e-Business Change Management

eBC Management Components	Case (Alias)	Comments about Key Issues from Nov - Dec 1999 Interviews
Business Environment		
<i>Strategic Initiatives</i>	UNICEF	1 st Australian ASP solution using I-R/3 – by adding integrated business process (back-end) to an existing www interface. To isolate SAP R/3 from the business strategy is impossible.
<i>Cultural Readiness</i>	Novartis	Organisational culture readiness varied across IT and HR staff, with some resistance to change.
<i>IT Leveragability</i>	Halliburton	Readily available accurate management information for optimising scarce human resources in offshore projects.
<i>Knowledge Capability</i>	Statoil	SAP lacks content – move to an industry portal with R/3 to help manage industry geological knowledge.
<i>Relationship building</i>	Biotech	Reduced purchasing cycle time (~1/4), freed up time for research staff to work on their individual projects.
<i>Learning Capacity</i>	UBS	Intranet system should be created as a learning system.
Management Practice		
<i>Change Mgt Practice</i>	Bertelsmann	Change management programme is a part of tactics for being successful at networking the enterprise for e-commerce survival.
<i>e-Business Mgt Practice</i>	Statoil	The real challenge is the management of the generic business processes; e.g. B2B e-Procurement
Performance Gains		
<i>Quality of working life</i>	UBS	An Intranet to facilitate the networking of all employees (45, 000) in the merger of two large banks.
<i>Efficient resourcing</i>	LSI	B2B integrated solution, enabled a major business partner to reduce the overall procurement costs while improving efficiency & service.
<i>Customer success</i>	Dell	We must learn and be able to deliver our corporate customer expectations
<i>Gaps between expectations & actual performance</i>	Wine Society	We understand what our customers want even though/if we have not yet delivered their expectations.

Also, the comments formed part of the inputs for the next research stage - an examination of *e-business change management*. Significantly these comments fulfilled all the components of an e-business change (eBC) model, the subject of the next chapter. In order to avoid an original IT-centric position, eBC is defined therefore as an organisational initiative to design an e-business project “to achieve significant (breakthrough) improvements in performance” (Guha et al., 1997, p.121). Table 5.10 shows that all the components of business environment, management practice, and performance gains are candidates for further study.

5.5 SUMMARY

The first part of the descriptive research phase was designed to examine the organisational benefits arising from e-business applications. An interview-based vehicle was used to collect data on a variety of established organisations from a diverse range of industries. The findings were analysed according to the level of sophistication of e-business model providing an extended classification of B2B. Eleven case studies of e-business integration have been analysed in the context of this classification. Collectively the set of case studies is used to demonstrate the

effects of increasing benefits from higher levels of sophistication of e-business integrating front and back-end systems through a network of e-business enabled organisations.

The early adopters of e-business applications show a trend towards realizing benefits from B2B procurement and employee self-service applications. To maximise the benefits from these types of applications, employee involvement is essential. Combined, these applications offer use of many functions or "shared services" across operational and administrative groups. All this relies heavily on employee self-service and leads towards new work roles.

Recently, organisations have begun to undertake revenue generation from e-Stores and e-Malls. A complex case with B2B e-business integration of a global computer supplier and a large corporate customer demonstrates the integration of e-business applications across ERP systems. With Web-based technologies this provides an architecture to optimise the overall B2B value chain. The case is used to emphasize the synergistic benefit stream from B2B e-business integration, of the B2B interaction models. The findings of all cases are analysed according to the stages of sophistication of the e-business models. Collectively, they demonstrate that greater benefits flow from an increased level of e-business B2B integration.

Some organisations have begun to undertake e-business initiatives to meet strategic goals. They recognise that they will only accomplish their objectives through people, and therefore place importance on improving the quality of work-life issues. If effectively managed, employees should ultimately be more productive in their work tasks and better able to serve customers, suppliers, and business partners. An empowerment model of B2B interaction (Figure 5.8) is proposed for future research on e-business implementations with ERP. It embodies a symbiosis of e-ERP development and business practice for B2B interaction. In this model, the realisation of complementary benefits for all business partners is viewed as a necessary and sufficient for measure of success.

As business thinking shifts from cost saving to revenue generation, this model is offered as a research tool, for future study of the broad and complex phenomenon of e-ERP implementations. The next step is to examine the management of e-business change. This emerged as a key issue from this stage of this study.

CHAPTER 6

E-BUSINESS CHANGE MANAGEMENT IN ERP ENVIRONMENTS

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6.0 INTRODUCTION

In trying to bring about e-business change (eBC), "managers would do well to recognise the complementary nature of technology, business models, and e-business readiness throughout the value chain from their suppliers to their customers." (Barua et al., 2001, p. 39)

This chapter examines a model that proposes various antecedents to e-business change management success in ERP environments. The focus is on environmental, management and organisational performance issues. The challenge is to determine facilitators that lead to e-ERP project success from the change efforts. Several case studies with varying dimensions of e-business scope are described in the context of this model.

The chapter details the second stage of a longitudinal multi-case study, carried out during June-July 2000, of organisations that recently pioneered the use of e-business applications with their ongoing SAP R/3 implementations. Eight of the eleven organisations from the first interviews agreed to participate. The cases spanned across a range of industries and B2B models. A structured interview questionnaire was used to collect the primary research data on each organisation. The case data was captured into the proposed model for e-business change (eBC).

The initial findings rate all components within the three sub-sections of the research model: *business environment*, *management practice*, and the *outcomes and performance gains* (Figure 6.0). The ratings suggest that a successful project should have facilitators in all components of the framework, including the business environment and management practice. Also, the least successful project would lack facilitators in the area of cultural readiness and change management.

Four cases are singled out for detailed analysis of each construct to confirm the initial findings, within the context of the B2B interaction models in chapter 4.

Finally, a summation of the findings from the four case studies are captured into a pattern of generalisations for each construct. Various patterns are developed as *indicators* of success, trends and variance that have implications for both research and practice. This suggests an improved model of eBC management, refined in terms of the relationships between the elements of the model. Such a model would represent a comprehensive tool, for assisting managers in diagnosing the key facilitators and inhibitors of successful e-ERP projects for B2B interaction.

6.1 E-BUSINESS CHANGE

Kalakota et al. (1999, p.60) state that "the creation and implementation of an e-business project is inextricably linked to the management of change." This requires systematic attention to learning processes, organisational culture, technology infrastructure, people and systems thinking. e-business change (eBC) is defined here as an organisational initiative to design an e-business project "to achieve significant breakthrough improvements in performance" (Guha et al., 1997, p. 121). For example; "cost, quality, responsiveness, flexibility, satisfaction, shareholder value, and other critical" e-business measures. These performance gains can be achieved through changes in relationships between management, information, technology, organisational structure, and people. Hesterbrink (1999) further emphasises the importance of alignment of those dimensions with respect to ERP and e-business implementations.

Planning and managing such systems requires an integrated multi-dimensional approach across the e-business and the development of new business process models (Kumar & Crook, 1999; Scheer & Habermann, 2000).

Therefore, in any examination of outcomes, consideration should be given to (a) the environmental conditions for change and (b) the ability of the organisation to manage change in those conditions. The components presented in the eBC management framework are based on relevant work in "organisational change, strategic management innovation, and information systems" (Guha et al., 1997, p. 123).

Components of eBC (within 3 levels)

e-Business Environment:

- Strategic Initiatives
- Cultural Readiness
- Learning Capacity
- IT Leveraging
- Knowledge Capability
- Relationship Building

e-Business Change Management:

- Change Management
- e-Business Management

e-Business Outcomes and Performance Gains:

- Quality of Work Life
- Efficient Resourcing
- Customer Success

(Adapted from Guha et al., 1997)

Components of eBC Model

The model in Figure 6.0 guides this study in identifying the components that may facilitate and/or inhibit success of e-business change.

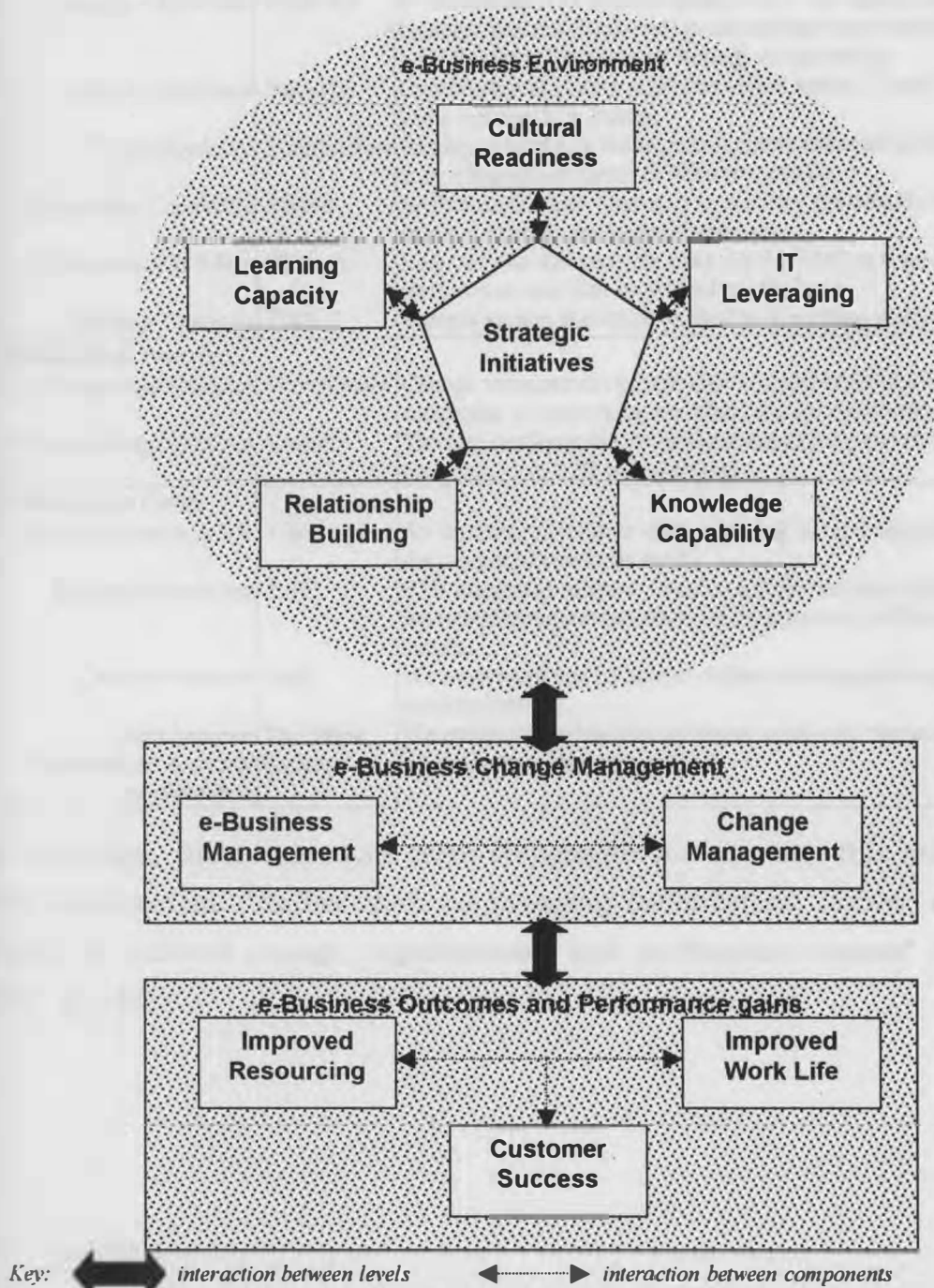


Figure 6.0. A Theoretical Framework of e-Business Change Management
(Source: Adapted from Guha et al. 1997, p. 121)

Emergent eBC Issues for Management

The comments in Table 6.1 emerged as a bi-product of the first interviews. They were captured from phase 2.1 interviews, conducted during November-December 1999. These comments offer rich advice about the challenges of e-business change. They are used to substantiate/validate all the components of the eBC model.

Table 6.1: Managers Comments about each component of eBC Model

eBC Model <i>Components</i>	Case (Alias)	Comments about Key Issues from Nov-Dec 1999 Interviews
Business Environment		
<i>Strategic Initiatives</i>	UNICEF	1 st Australian ASP solution using I-R/3 – by adding integrated business process (back-end) to an existing www interface. To isolate SAP R/3 from the business strategy is impossible.
<i>Cultural Readiness</i>	Novartis	Organisational culture readiness varied across IT and HR staff, with some resistance to change.
<i>IT Leveragability</i>	Halliburton	Readily available accurate management information for optimising scarce human resources in offshore projects.
<i>Knowledge Capability</i>	Statoil	SAP lacks content – move to an industry portal with R/3 to help manage industry geological knowledge.
<i>Relationship building</i>	Biotech	Reduced purchasing cycle time (~1/4), freed up time for research staff to work on their individual projects.
<i>Learning Capacity</i>	UBS	Intranet system should be created as a learning system.
Management Practice		
<i>Change Mgt Practice</i>	Bertelsmann	Change management programme is a part of tactics for being successful at networking the enterprise for e-commerce survival.
<i>e-Business Mgt Practice</i>	Statoil	The real challenge is the management of the generic business processes; e.g. B2B e-Procurement
Performance Gains		
<i>Quality of working life</i>	UBS	An Intranet to facilitate the networking of all employees (45, 000) in the merger of two large banks.
<i>Efficient resourcing</i>	LSI	B2B integrated solution, enabled a major business partner to reduce the overall procurement costs while improving efficiency and service.
<i>Customer success</i>	Dell	We must learn and be able to deliver our corporate customer expectations
<i>Gaps between expectations & actual performance</i>	The Wine Society	We understand what our customers want even though/if we have not yet delivered their expectations.

On reflection, these comments were responsible for directing this study towards eBC management. “Rather than emphasising technological issues, the focus is clearly on cultural change, organisational and performance issues” (Guha et al. 1997, p. 122).

6.2 METHODOLOGY

Descriptive Research Phase 2.2

Figure 6.1 highlights the second part of the descriptive phase of the composite case-based research method. This details research activities of case studies (Table 3.3) for describing theory associated with the 2nd research question: What are the critical success factors of e-ERP projects? This question was reinforced by the findings from the previous chapter (stage 2.1).

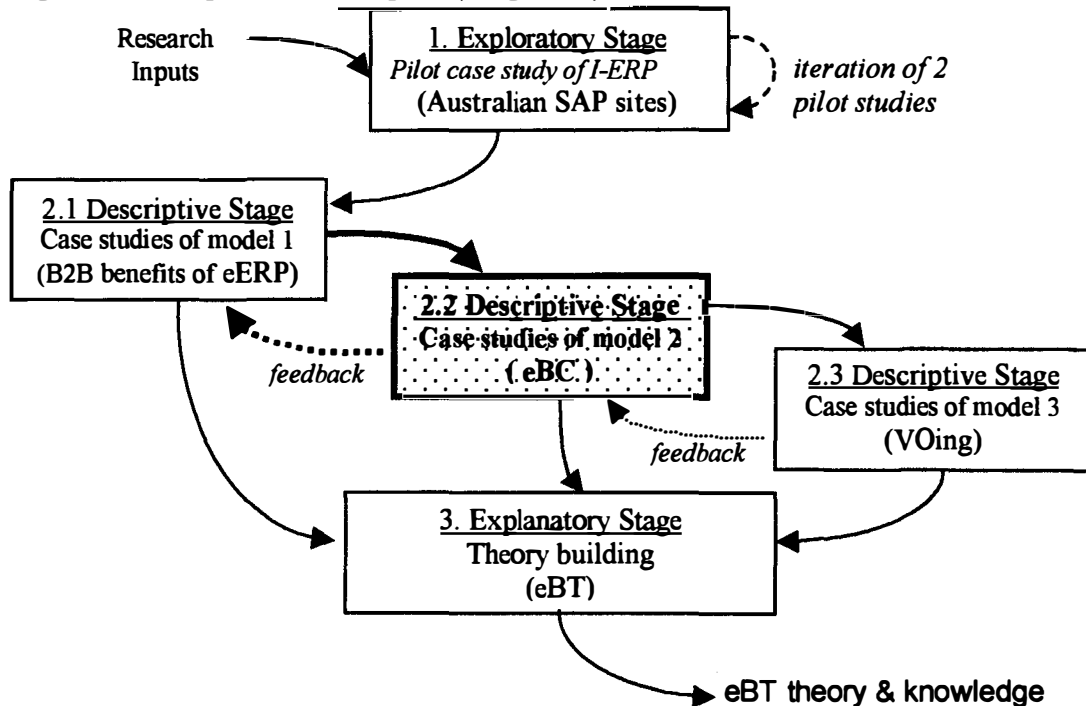


Figure 6.1: Phase 2.2 of Composite Case-based Research Method

Research Scope and Assumptions

The study used an established theoretical framework from business process change (BPC) research (Guha, 1997), for identifying and examining the facilitators and inhibitors of successful e-business projects within SAP-based organisations. 'Embedded' multiple case-study analysis was chosen to investigate the research questions concerning the complex phenomenon of e-business change projects. Embedded approaches enlist the use of multiple units of analysis: (1) the company (strategy), (2) the project team, and (3) the project. This triangulation attempts to validate primary data. The case-studies selection criterion required a major e-business project, which had organisational implications. Also, as the focus was on studying antecedents to organisational performance, a set of projects having a range of B2B initiatives with variance across cases, but with the same outcome measures was required: cost reductions, responsiveness, flexibility, satisfaction, shareholder value, and other e-business metrics.

2nd Research Question:

Q.2 What facilitates and inhibits the success of e-business implementations through ERP?

- (i) How are these processes for change managed?
- (ii) Is there a pattern of change management?

Translated in term of the eBC model these questions are re-stated as:

What components of eBC model facilitate and/or inhibit success of e-ERP projects?

- (i) What are the critical success factors of e-ERP projects?
- (ii) Is the eBC model appropriate for identifying patterns of change?

Data Collection and Analysis Matrix

Information for this study was gathered from three data sources;

- Primary data – from interviews conducted between June and July 2000.
- Secondary data – from company documents collected or sent via emails.
- Tertiary data – from case articles written by authors or researchers.

Data-collection methods included a semi-structured case protocol; a qualitative interview questionnaire, multiple documents and archival records, and telephone interviews. Such triangulation reduces bias and is recommended in case research (Kean & Parent, 1998, p.308).

Literature regarding eBC projects, including data on company performance, was studied prior to and after each set of interviews. This approach provided richness and depth and enhanced the construct validity of the study. Interviews provided the major source for primary data. Several case respondents provided the researcher with reports and memoranda directly related to their e-ERP project. They included an overview of the project, consultant presentations of systems or business plans, and objectives compiled by the team. Other sources included company public information such as annual reports for the current year as well as for the period during which the e-ERP projects were conducted. Online searches yielded several articles regarding the project or various issues, plans, or financial conditions that would provide additional insight into the case profile.

Each interview was conducted using a semi-structured questionnaire to ensure reliability. This resultant protocol, exhibited in Appendix 6.1, was based on the eBC components model (Figure 6.0). It contains the constructs with probes used to solicit responses in a semi-structured manner. "How" and "why" questions were raised in an open-ended fashion.

Table 6.2 summarises the data collection and analysis process for the research questions.

Table 6.2: Research Questions Matrix

Question	Data Collection Instrument	Data Analysis
Which elements of the eBC model facilitate and/or inhibit e-ERP success?	Structured interview questionnaires; used June-July 2000	Match case content to each component and within each level of the eBC model.
a. What are the critical success factors of e-ERP projects?	2 nd Interview instrument - structured Questionnaire constructs of components for e-ERP project success	Content analysis of components summary data. Content analysis of constructs to determine the factors that contribute to success or failure.
b. Is the eBC model appropriate for identifying patterns of change?	Semi-structured interviews & questionnaires; June 2000	Revise the eBC model using the findings of the e-ERP success.

Case Selection

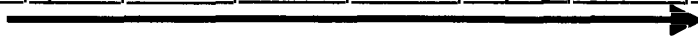
From the original sample of eleven SAP-based organisations that participated in phase 1, eight agreed to participate. They represented all the B2B interaction models. During June - July 2000, the eight organisations were visited at their headquarters. In each case, a senior e-business project manager was questioned to collect the detailed information for this study, using the following protocol:

- A qualitative structured interview questionnaire was used for the second visit to collect primary data for the study from eight (8) SAP sites
- Multiple archival documents as well as many conversations via e-mail.
- In each case the focal point of contact was the most senior level IT/SAP project manager.

The *e-Business project* selection criteria used is summarised in Table 6.3.

Table 6.3: Project Selection Criteria for (8) cases

Criterion of Project	Wine Society	UNICEF	Employ-National	UBS	Halli-burton	British Biotech	FSC	Dell
<i>i. Major e-business project</i>	B2C	B2C	B2B ^E	B2B ^E	B2B ^E	B2B ^S	B2B ^C	B2B ^S + B2B ^C
<i>ii. Project completed</i>	✓	Staged	✓	✓	✓	✓	✓	✓
<i>iii. Expected breakthrough</i>	✓	✓	✓	✓	✓	✓	✓	✓
<i>iv. Inter-organisation focus*</i>	nil	nil	nil	nil	nil	low	moderate	high
<i>v. Unambiguous outcomes</i>		✓	✓	✓	✓	✓	✓	✓
No. of Employees	50	35+	11000	45000	1200	240	11000	27000
Project Focus	Admin	Admin by ASP	National network	Staff network	Personnel mgt	B2B Buying	B2B Sell-side	B2B Buy+sell

* Ascending order of B2B interaction 

All eight cases are mapped against the project selection criteria in Table 6.3. Updated from Guha et al. (1997) study of business process change, criterion (iv) (bolded) was changed from an 'inter-functional' to an 'inter-organisational' focus.


Therefore the eight cases are exhibited in Table 6.3 by ascending order of B2B interaction. This ranking is based on the logic and findings developed in the last chapter.

6.3 INITIAL FINDINGS

All eight cases were used for an initial assessment of the components of the eBC model. A 'Summary of Comments' table was constructed for each case by collating the comments captured from each interview. Table 6.4 was then used to collate the ratings across all eight cases. In each case, the components were assessed for their contribution or influence to the project success, using a 3-point scale; "low", "moderate", or "high." The rating scale is used here to initiate indepth investigation.

Table 6.4: Ratings of the Components of eBC

eBC Model <i>Components</i>	Wine Society	UNICEF	Employ- National	UBS	Halli- burton	British Biotech	FSC	Dell
Environment								
<i>Strategic Initiatives</i>	High	High	High	High	Moderate	High	Moderate	High
<i>Cultural Readiness</i>	Low	Moderate	Low	Moderate	Moderate	High	Low	High
<i>IT Leveragability</i>	High	High	High	High	High	High	High	High
<i>Knowledge Capability</i>	Moderate	Moderate	Moderate	High	High	High	Moderate	High
<i>Relationship building</i>	Moderate	Moderate	Moderate	Moderate	Moderate	High	Moderate	High
<i>Learning Capacity</i>	Moderate	Low	Moderate	Moderate	Moderate	High	Low	High
Management								
<i>Change Mgt Practice</i>	Low	Low	Moderate	Moderate	Moderate	High	Moderate	High
<i>e-Business Mgt Practice</i>	Low	Moderate	Low	High	High	High	Moderate	High
Performance Gains								
<i>Quality of working life</i>	Low	Moderate	Low	High	High	Moderate	Low	High
<i>Business resourcing</i>	(future)	(future)	Moderate	(future)	(future)	High	(future)	High
<i>Customer interaction</i>	Low	Moderate	(future)	(future)	(future)	(future?)	High	High
<i>gaps between expected & actual performance</i>	small	small	small	small	small	small	some	small
e-ERP Success	Very low	Moderate	Low	Moderate	Moderate	High	Moderate	Very high
* B2B Interaction	nil	nil	nil	nil	nil	Low	Moderate	High

* Ascending order of B2B interaction 

Ratings:

Low	Moderate	High
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Overall the findings in Table 6.4 show *Dell* achieved most success, *Halliburton* achieved moderate success, and *Wine Society* was least successful. Again, the cases in Table 6.4 are exhibited in ascending order of B2B interaction. If we assume these ratings reflect the presence of facilitators and inhibitors, then the initial findings indicate that a successful project should have facilitators in all components, including the business environment and project management, e.g. *Dell*. Further there is the implication that the least successful e-business projects

will have inhibitors in both dimensions, especially in the area of cultural readiness and change management practice, e.g. *Wine Society*.

Table 6.5 shows the ratings applied in one case. For *Halliburton, IT Leveragability* was rated 'high' as managers made use of 'superior statistics graphics for reporting from R/3 HR data'. The comments captured focused on the positive contributions towards each component. The 'Summary of Comments' tables for determining the ratings for other cases were developed and are included in Appendix: A6.2.

Table 6.5: Summary of Comments for Halliburton

Business Framework Components	Rating low to high	Summary of Comments
Environment		
<i>Strategic Initiatives</i>	High	A pro-active, incremental HR Internet initiative to manage offshore contract employees, while minimising labour costs. It has been expanded to include IT dept's hardware tracking system
<i>Cultural Readiness</i>	Moderate	The introduction was reasonably well accepted by the users within the local division. Some reluctance was evidenced from the users of the local partner division.
<i>IT Leveragability</i>	High	This HR manager web-enabled reporting system was implemented to leverage R/3's strength (data integration). It made superior use of statistics graphics for reporting R/3 HR data.
<i>Knowledge Capability</i>	High	Making good use of insight into Norwegian employment regulations, help a closer knowledge of each others function,.
<i>Relationship building</i>	Moderate	<i>Knowledge capability</i> enabled a better quality of this HR workplace activity and improved links with Government agencies.
<i>Learning Capacity</i>	High	Instructor led training at upper levels of key users. Also Intranet documents for users to reference to support learning by doing.
Management		
<i>Change Mgt Practice</i>	Moderate	Participative change tactic resulted in an evolutionary change.
<i>e-Business Mgt Practice</i>	High	Some technical improvements from feedback on the use of reporting tools.
Performance Gains		
<i>Working life</i>	High (for a small project)	Improved user satisfaction – a current study by HQ has recommended the in house intranet using R/3 personnel tables be adopted globally. It has been expanded to include two more HR reporting tools.
<i>Business resourcing</i>	Moderate	For agency workers: cost savings (+ ve), reliability (+ve)
<i>Customer interaction</i>	Not yet	In the future...
<i>Expectations & actual performance</i>	small gap	No significant gap. Now under consideration for globally adoption.

[Interview date: 29 – 6 – 00

Location: Stavanger, Norway]

At this level of analysis, making generalizations is difficult. However, comparisons between the cases in Table 6.4 helps to focus on the most likely key components (shaded) for further detailed examination. For example; *Cultural Readiness* from eBC environment, *Change management practice* from management, and the *quality of work life* from outcomes and performance gains.

6.4 CASE BACKGROUND

In Chapter 4, the benefits realized from B2B interaction were examined in order of B2E, B2B^S, B2B^C, and B2B^C with B2B^S. In this chapter, the four cases (shaded) in Table 6.3 are used to explore the detailed findings, because of their variance across the B2B interaction domain [*italics*]: The four cases, discussed below, provide the content for analysis against the eBC model. *Halliburton* is the representative of the cases in Table 6.5 that exhibit little or no inter-organisational focus; that is with 'nil' B2B interaction:

- Case 1, *Halliburton* [nil] business-to-employee (B2B^E) "Employee Tracking"
- Case 2, *Biotech* [low] business-to-supplier (B2B^S) "B2B Procurement"
- Case 3, *FSC* [moderate] business-to-customer (B2B^C) "Online Sales"
- Case 4, *Dell + LSI* [high] B2B^S + B2B^C "e-Commerce Integration"

Case 1 A large global engineering company with its headquarters in USA. *Halliburton* is a global leader in energy equipment, energy services, engineering, and construction. It had three main goals to achieve with its initial SAP R/3 implementation: (i) to standardize business processes globally across business units and functional lines, (ii) to migrate *Halliburton* into a process-driven organization, (iii) and to provide managers of *Halliburton* easy access to decision-quality information. It has about 17,000 SAP users worldwide, with the potential for this figure to increase to about 26,000 users (SAP, 1999c). The specific country group examined was based in Norway.

Halliburton's - "Personnel Tracking and Reporting" Intranet

This in-house Web initiative that allows access to R/3 personnel data. It is an incremental HR Intranet to support project management of offshore skilled agency workers. Its application has proven to be a major tool for supporting decision making for minimising labour costs. It has been expanded to include a computer hardware tracking system. With the aid of computer graphics this Intranet system provides a simple "walk-up" user interface for casual users, including project managers who have little or no training for using the R/3 HR module.

Case 2 *British Biotech* is a research and development stage pharmaceutical company based in UK. Its mission is to create partnerships with pharmaceutical companies to complete the development and marketing of its compounds. Founded in 1986, *Biotech* currently employs approximately 250 staff.

Biotech's - "B2B e-Procurement" project

The primary objective of the "SAP B2B Procurement" project was to ease the workload of the company's procurement department by automating the old, paper bound purchasing process. With some 3,000 active vendors on their books, the procurement department's four members were often left floundering hopelessly in a sea of paper. 'We were determined to cut this high number of vendors. The next step of the project is to negotiate more favourable conditions with our slimmed-down vendor base and build up closer business relationships.'

Case 3 Fujitsu Siemens Computers (FSC) is a global leader in IT equipment, has its headquarters in Amsterdam, Netherlands. With extensive European manufacturing facilities, customer-focused companies in 25 European countries and more than 9,000 experienced employees. Compect.com is aiming to be the No. 1 computer company in its home market in Europe by the year 2001. FSC provides the industry's most complete portfolio of best-in-class IT products, from the smallest notebooks to the most powerful data centre solutions. Developed and manufactured in Europe for European customers, the product portfolio benefits from the technologies and worldwide sourcing networks of the parent companies (Siemens, 1999b). The specific country group examined was based in England.

FSC's "Order and Request System" Online Sales R/3-based solution

FSC e-business aimed to realise its global sale revenue potential. For FSC, the Order and Request System (ORS) was developed in-house, to optimise processes between FSC and partner organisations (Siemens, 1999a). The Order and Request System (ORS) was introduced in 1997 as an electronic commerce system in the business-to-business sector. It builds on the SAP strategy to link the R/3 system and the Internet, and supports the logistics processes of the parent company across divisions and regions. Each registered partner is able to place orders online at any time via the Internet, track those orders, and request current information on orders and delivery dates.

Cases 4a and 4b Dell, is a leading PC and Server provider based in USA. Using Dell's intelligent Web site, corporate customers and end-consumers can validate system design and system configurations, before making their online PC purchases. LSI is one of Dell's largest corporate customers. LSI Logic is an established USA based manufacturer of electronic components and circuits.

"B2B e-Commerce Integration"

In June 2000, *Dell* implemented its first "B2B e-Commerce Integration" system with *LSI*. The system fully integrates *LSI's* "B2B Procurment" system with *Dell's* "Online Sales" system. This enabled *LSI* to leverage its existing SAP backend system with *Dell's* component-based e-business system. Both companies are expecting to extend the use of this inter-organisational development with other partners. Finally, the project represents a foundational infrastructure for private e-Markets.

6.5 DETAILED FINDINGS

This section covers the detailed findings on the constructs of the eBC model with summative findings for each case. Three appendices were instrumental in capturing the qualitative data for this section:

- Appendix 6.1 shows the structured interview sheet that was used to probe a further level of abstraction within each component.
- Appendix 6.2 contains the case background and corresponding B2B interaction models used as the focus throughout this section of the chapter.
- The data captured in Appendix 6.5 provided content and discovery of elements that surround each construct to identify the facilitating and inhibiting factors that contribute ultimately to eBC success.

Evaluation of e-ERP Success of 4 Cases

Consistent with the research objectives, specific probes were made concerning each construct. Table 6.6 below shows the specific data gathered on each construct. In addition, any construct that had a positive or negative influence on conducting eBC, or on overall eBC effectiveness, was documented with either a plus (+) or a minus (-) sign. These positive or negative influences were identified and cross-validated either through direct statements by the respondents during the interview or from other data sources.

Those with significant impact on the project success are in bold type (+) or (-). In some cases, both positive and negative (+ & -) contributions were found from one component variable. For *Halliburton*, *leadership* was found to exhibit (+ & -) contributions. Whenever appropriate, respondents' statements are quoted to illustrate the construct. Comments helped verify the individual (+ / -) contributions towards eBC success, of the individual constructs within each component. In some instances, respondents chose multiple values for a specific construct.

Findings on Each Construct for Cases 1 - 4

In this study the focus is on a flat model of eBC management, where all constructs are considered antecedents to success. Table 6.6 below shows the core data gathered on each construct from the case study interviews. The data of the two companies in case 4 are notated by (a) and (b) in superscript.

Table 6.6: Detailed Findings for each Construct with + & - Identified

eBC Components <i>Constructs</i>	Case #1 Halliburton	Case #2 Biotech	Case #3 FSC	Case #4. ^a Dell & ^b LSI ^b
Strategic Initiatives <i>stimuli</i> <i>formulation scope</i> <i>decision making</i> <i>strategy led</i>	+ pro-active? incremental	+ pro-active incremental	+ pro-active revolutionary	+ ^a pro-active ^b + ^a incremental, revolutionary ^b + ^a champion emergence ^b + ^a onset ^b +
Cultural Readiness <i>change agents & leadership</i> <i>risk aversion</i> <i>extent of open communication</i>	+ & - welcomed +	+ welcomed +	- cautious -? ?	^a + + ^a welcomed ^b + +
Learning Capacity <i>improve efficiency</i> <i>adaptation</i> <i>learning type</i>	learning by doing + learning from others double-loop	learning by doing response to IT change + double-loop	learning by doing response to IT change single-loop	+ ^a learning by doing ^b + ^a learning from others response to IT ^b + ^a double-loop single-loop ^b +
Knowledge Capability <i>external information use</i> <i>declarative knowledge</i>	boundary spanners knowledge base	technology gate keeper R&D resources IT development	boundary spanners, customers + R&D resources IT, knowledge base	+ ^a boundary spanners, technology keeper ^b + ^a focus on core competencies ^b
IT Leveragability <i>role of IT</i> <i>use of Internet technology</i>	+enabling & socio- technical + superior	dominant factor + adequate	dominant factor + adequate	+ ^a enabling ^b + + ^a superior ^b +
Network Relationships <i>inter-organisational linkages</i> <i>cross-functional cooperation</i>	+ cooperative adequate	+ cooperative + superior	? cooperative adequate	+ ^a cooperative ^b + + ^a adequate ^b +
Change Mgt Practice <i>mgt's readiness to change</i> <i>pattern of change</i> <i>scope of change</i> <i>managed change</i>	participative + improvement alleviation of dissatisfaction	committed + radical change + well managed process for change	- participative - improvement vision for change, and well managed process for change	+ ^a committed, participative ^b + ^a ^a improvement, radical change ^b + ^a evolutionary, revolutionary change tactics ^b +
e-Business Mgt Practice <i>e-business measurement</i> <i>use of tools and techniques</i> <i>use of team-based structure</i>	improvement feedback loop + adequate +	improvement feedback loop adequate +	e-business information capture + superior +	+ ^a use e-bus metrics, audit ^b + ^a superior, adequate ^b + ^a

Key: + = facilitator, - = inhibitor, + & - = facilitator and inhibitor, ? = unknown

Appendix (A6.5) provides detailed analysis for this Table 6.6

Outcomes and Performance Gains

Outcomes of e-business change can be measured at various levels of the broad complex phenomenon of any e-ERP project. Venkatraman and Henderson (1998) argue that leading firms have recently begun to undertake e-Business to meet strategic goals, recognising that they only accomplish their objectives through people. Therefore placing importance on improving the quality of work-life issues. If effectively managed, employees should ultimately be more productive in their work tasks and better able to serve customers, by working more efficiently with suppliers and business partners. The key constructs that can be probed here are gaps between effectiveness expectations (goals) and actual performance improvements, and more specifically: employee work satisfaction, efficient resourcing of materials, and customer success. The findings on outcomes are summarised in Tables 6.7a.

Table 6.7a: Outcomes

Outcomes & Performance Gains <i>Constructs</i>	Case #1 Halliburton	Case #2 Biotech	Case #3 FSC	#4. "Dell & LSI"
<i>Gaps between effectiveness expectations & actual performance</i>	HR staff - none	Some initial technical problems	Little acceptance by other divisions	Learn to wait on our customers and expectations
<i>Quality of work life (QWL)</i>	employee satisfaction	employee satisfaction	neutral	employee satisfaction
<i>Business resourcing</i>	cost savings, quality	cost savings, reliability	cost savings, reliability, choice	cost savings, reliability, quality, choice
<i>Customer success</i>	n/a	n/a	remote service, customer base	Expect to add new customers/suppliers
e-Business Success	Moderate	Moderate	Low	High

Qualitative Ratings:

Low	Moderate	High
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(i) Outcomes

Case 1 It was reported that from the outset the project helped to improve the Quality of Work Life (QWL), through easy access and better presentation of R/3 HR data. Cost savings in sourcing and managing of contract staff in off-shore projects was achieved. As a further measure of its success and/or acceptance, the e-ERP solution was expanded to include the IT department's computer hardware tracking system. Finally, promotion to the company's global solution is evidence of the strategic importance of the project.

Case 2 Despite some technical problems with automation of vendor emails with *Biotech's* ERP, there was an immediate improvement in the QWL. Because it is used primarily to procure chemicals and lab equipment, the new, automated purchasing process meant that *Biotech's* scientists could concentrate on their research rather than wasting valuable time on purchase-order administration.

Improved business resourcing was seen as significant. And indeed, not a single member of the procurement department has been forced out of a job by the new systems. As a measure of its success and/or acceptance, the extranet solution was expanded to include the staff "time sheet" system.

Case 3 It was reported that from the outset the project showed an improvement in ordering of computer equipment. Errors with placing orders was reduced, while order tracking increased. Premier page development gave rise to an improved portfolio of offerings. However, in parallel to its release at FSC in Germany, the ORS was rolled out on an international scale. Initially it was deployed in England (site of case 3), France, and Italy. Then in early 2000, it was deployed in the rest of Western Europe. However, the uptake of this e-ERP solution by other divisions was disappointing. By June 2000, a strategic sell-side innovation "e-Mall" developed with FSC and two other divisions (is further detailed in chapter 8).

Case 4 Dell's rise to prominence was based on the "Direct Selling Model." With no slow-moving indirect distribution channels to impede delivery, customers receive the very latest technology in their Dell systems. Dell operates on six days of inventory, keeping related costs low. The Dell Direct model assures customers that no third party will dilute the quality of Dell's products and services, nor will anyone stand in the way of using modern technology to benefit the user. This has the added value to the company's brand integrity of reliability of sales and service response, with customised information spontaneously given away, anytime, anywhere to LSI employees.

(ii) Performance Gains

The findings on performance gains are summarised in Table 6.7b.

Table 6.7b: Performance Gains

Outcomes & Performance Gains <i>Constructs</i>	Case #1 Halliburton	Case #2 Biotech	Case #3 FSC	Case #4. *Dell and ^b LSI
<i>Gaps between effectiveness expectations & actual performance</i>	HR staff - none	Some initial technical problems	Little acceptance by other divisions	Learn to wait on our customers and expectations
<i>Quality of work life</i>	Easier HR mgt task	Extra time for research	Neutral	Trend to CRM
<i>Business resourcing</i>	Reduced penalties, improve recruitment	Cost savings, reliability	Cost savings, reliability, choice	Cost savings, reliability, quality, choice
<i>Customer networking</i>	N/A	N/A	Remote service, customer base	Expect to add new customers/suppliers
e-Business Success	Moderate	Moderate	Low	High

Qualitative Ratings:

Low	Moderate	High
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Case 1 The performance gains were achieved from two sources; labour cost savings in hiring agency contract employees, and access to reliable (real-time) employee data via mobile technology. The project enabled efficiency gains from minimising of offshore labour costs, and effectiveness gains from optimising opportunity labour costs. For example, when the offshore work was delayed or ahead of schedule, the on site project managers had mobile phone access to online real-time data for deciding on the optimal allocation of agency workers. This type of cost savings through operational efficiencies of labour sourcing, can be compared to the cost savings (efficiencies) in the e-procurement case studies.

Case 2 The performance gains were achieved from two sources: time and cost reductions through the new vendor arrangements, and access to reliable (real-time) catalogue data via extranet. The project enabled efficiency gains from lowering the order-to-delivery time from 10 days to less than 3 days, and effectiveness gains from optimising opportunity for staff to increase their job satisfaction. Having achieved shorter lead times, *Biotech* now no longer needs to keep such large stocks of materials, so expenditures are down and cash flow is healthier. Indeed, the company expects to save between ten and 15 percent on the cost of purchasing materials. Another goal of the B2B project was to build more long-term links with preferred vendors. So far, the company has identified three such vendors. Their Internet sites are to be linked into the SAP procurement system, allowing *Biotech* employees to use SAP B2B Procurement on the company's own intranet and to purchase from both the internal catalogue and external online catalogues. This will be made possible by a specially developed open catalogue interface. The procurement department already attributes one major success to its new procurement process: It has been able to hike the discounts previously offered by its three preferred vendors a further five percent. This type of cost savings through purchasing efficiencies for *Biotech's* sourcing of materials compares favourably to the cost savings (efficiencies) in procurement case 4b. Finally, the benefits are by no means all one-sided, "B2B Procurement enables vendors to do direct selling."

Case 3 In the past, system orders from partners were taken over the phone or in writing and then typed manually into the R/3 system. Currently 80% of incoming orders from 2200 key accounts are handled by the Order and Request System (ORS) and with order mistakes reduced. Partner business revolves around independent partners known as *valued-added* resellers and *key accounts*. To make

ordering faster and more secure, partners now submit their orders to FSC electronically via the Internet.

During the main periods of access (11 am to 4 pm), an average of 13 items for R/3 sales orders and order tracking requests averaged 1200 every minute.

The performance gains were achieved from two sources: reduction of administrative costs, and improvement in the accuracy of orders. The reduction of costs and the efficiency gains, appear less competitive than those in case 4a, below.

Case 4a *Dell's* web presence has delivered substantial savings the company can pass on to customers via lower prices. Customer self service is employed to shift much of the administration burden onto *LSI's* employees. There are no sales commissions to pay. Service calls on order status have dropped by 75 percent, and technical calls by 25 percent. *Dell's* Direct model assures customers of "undiluted" quality of *Dell's* products and services, by using modern technology providing a comfortable environment that optimises the customer selection process.

Case 4b 50% of purchases are for single items. To save the customer time and expense of dealing with multiple vendors, the burden of matching software to system requirements is relieved. This helps to eliminate worries that products from multiple sources will not work together, and spares the headaches of installation, debugging, returns, and support calls, "the things people don't like about buying computers."

6.6 GENERALISATIONS AND IMPLICATIONS

Case Summary

Case 1 The primary beneficiaries were the offshore project managers who needed access to the HR employee tables for personnel management and gained this through the innovative use of web-based technology. The result was one of considerable costs saving and improvement of staff resourcing through improved decision making by the project managers when working off shore. The intrinsic motivation and self-management of autonomous knowledge within the development team played an important role in the successful implementation. The emphasis was much more on collective performance rather than individual, but at the same time, development and maintenance of personal and professional reputations was a significant driver. Interestingly, while the project was rated highly successful there was strong opposition from their partner operations to implement the same system which came from the counterpart HR staff who had not been exposed to the participative development process. The organisational management was luke warm in their support initially, viewing the proposed system as a threat to a strongly centralised control culture. Once the results broke down their initial reluctance, management assumed responsibility for the success and leadership for global implementation. *'We are very proud of our Web-based Personnel Reporting system.'*

Case 2 Biotech is a research and development stage pharmaceutical company based in UK. Its mission is to create partnerships with pharmaceutical companies to complete the development and marketing of its compounds. The SAP B2B Procurement project was able to ease the workload of the company's procurement department by automating the old, paper-bound purchasing process. The next step of the project was to negotiate more favourable conditions with the slimmed-down vendor base and build up closer business relationships with each one. Where is beginning of quotation? Apart from more efficient purchasing procedures, the company's buyers have a more interesting job. Biotech's scientists should be relieved of routine paperwork, enabling them to concentrate more on research. SAP B2B Procurement will broaden people's day-to-day task base considerably. *'They'll have more time to spend on nurturing relationships and working on optimisation of projects and other duties.'*

Case 3 This case study shows how computer technology division within a large global organisation succeeded in making the sell-side business processes of their ERP systems available over the Internet. An Order and Request (extranet) System

was developed as an appropriate online sales system by leveraging the power of graphics and Internet technology, thus extending the reach of the R/3 logistic module for cross-divisional users. The efficiency gains came from speed, accuracy and security of order transactions. The primary beneficiaries were the other business partners (divisions) and independent partners. The result was one of considerable cost saving and greatly improved online sales, through any time, anywhere access.

Interestingly, while the project was rated moderately successful due to luke warm support and the early interest by business partners, the opposition came from the partner reluctance to implement the same system due to the conflict of the established offline sales channels. Further, the lack of a coordinated corporate wide strategy by the parent company was viewed as the main obstacle for uptake of the system by the business partners.

The lessons learnt were two fold; (i) the use of a common platform (SAP-based) needs the agreement of all functionality, (ii) The internal and external marketing of the facility is essential to the acceptance of divisional business network and to foster end-user acceptance of the technological change in business practice. Once the results broke down their initial reluctance, management "assumed" responsibility for the success and leadership for global implementation.

"We are beginning to recognise the potential benefits of leveraging our SAP R/3 business processes and functionality through the new Web-based environment."

In this case study acceptance of the project management initiatives required a comprehensive global deployment. It highlights the need to evolve a coordinated corporate strategy and encourages the balancing of conflicting organisational knowledge when contemplating the adoption of e-business solutions.

Case 4 In 2000 Dell pioneered its first B2B "e-Business Integration" with an established customer company, LSI. This case demonstrates a comprehensive approach to inter-enterprise computing. This is an example of an integration architecture is made possible through a variety of backend systems and procurement systems.

LSI, was able to leverage its existing SAP backend system and SAP business Connector (powered webMethods technology) to communicate directly with Dell's e-business system. The integration between LSI's SAP system and B2B e-procurement application to Dell catalogues automated the procurement of Dell products via the Internet (Dell, 2000).

'We are beginning to recognise the potential benefits of leveraging our partners SAP R/3 business processes and functionality through the e-Commerce integration.'

General Results

Table 6.6 offers, under each of the eBC framework's major concepts, a synopsis of significant constructs and the context in which they were viewed as either facilitators or inhibitors in the outcome of each case. Overall, the results from the four case studies demonstrated that constructs capturing dimensions of the eBC management framework provide a method for studying e-business change. In addition, this research indicates that certain constructs in the model had more impact on the outcomes of projects than others. These were primarily due to the change environment within which eBC occurs.

While the granularity of this analysis does not allow us to "predict" success, based on a simple summation of facilitators and inhibitors in each case, the results seem to indicate that successful projects have more facilitators. Some may have a more local impact on a certain aspect or phase of eBC. However, we believe that the inference that a highly successful eBC effort should demonstrate numerous positive facilitators and minimize inhibitors is reasonable.

In Table 6.6, *Dell* was classified as the most successful project consistently showing positive facilitators in all components of the eBC model. At the other extreme, *FSC*, which had many more inhibitors, was the least successful project. Inhibitors show the greatest clustering in the areas of cultural readiness and change management. In this case study, acceptance of the project management initiatives requires comprehensive global deployment. It highlights the need to evolve a coordinated corporate strategy and encourage the balancing of conflicting organisational knowledge when contemplating the adoption of e-business solutions. These, in fact, were the major issues that the respondents continuously pointed to during interviews as the major problems they foresaw in future eBC efforts. While this research found an important role for IT in support of eBC, the message from these case studies is that IT should not drive e-ERP projects.

These results confirm that the more successful projects were found to have facilitators in all components of the eBC framework, including the change environment and project management. Further, there is the implication that the least successful e-business projects will have inhibitors in both dimensions, especially in the area of cultural readiness and change management.

Summary of Outcomes and Performance Gains

To achieve the outcomes from e-ERP projects, organisations are utilising three B2B models. They offer customers cheaper products with efficient service by utilising customer self-service in B2B^C. They source materials cheaper and more efficiently through procurement agreements in B2B^S and utilising employee self-service, in B2B^E. They now optimise processes in B2B^S with B2B^C for customised service by utilising employee self-service in B2E.

Within the issue of performance gains, most significant were seen as:

- improved customer response and an expanding customer base,
- 25% cost savings, and reduced order cycle time from 2 weeks to 2 days,
- reduced rogue purchasing and automated purchase approvals for employees.

The performance gains for e-procurement were achieved from two sources: 25% cost savings, and reduced cycle time from 2 weeks to 2 days, from customer access (24x7) to supplier data via e-ERP technology. The project enabled efficiency gains from minimising of delays in customer orders, and effectiveness gains from optimising employee/staff time. The cost savings through operational efficiencies of all equipment resourcing, compare favourably to the cost savings (efficiencies) in other e-procurement case studies. However, improvements for staff 'quality of work life' appear the same.

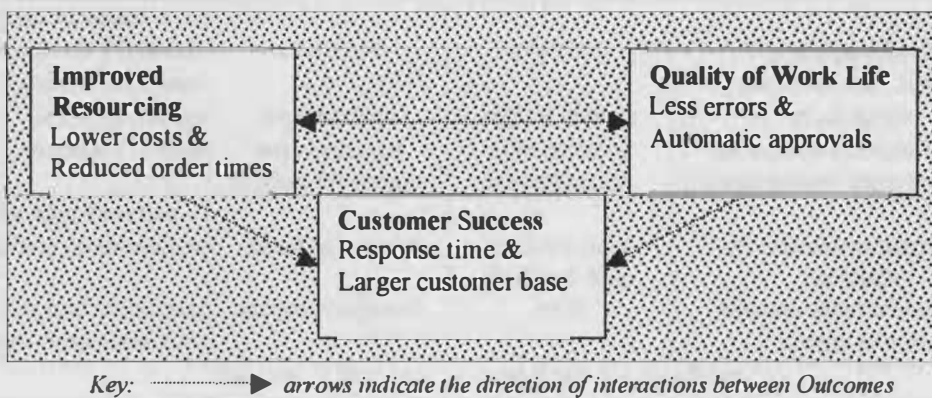


Figure 6.2 Measures for eBC Outcomes and Performance gains

Figure 6.2 shows the generic performance measure and the relationships between them. As an indicator of success and acceptance, a comprehensive e-business solution has to include the B2B e-procurement of office equipment and supplies.

Patterns and Critical Success Factors

Table 6.8 is especially useful in separating those constructs that have variance across the range B2B Interactions and those that have none. For *stimuli* all four case were the same, *proactive* but reacted very differently to stimuli.

Table 6.8: Benefits Realisation Factors by Construct

Components <i>Constructs</i>	Most Successful	Least Successful	Benefits Realisation
Strategic Initiatives <i>stimuli</i> <i>formulation scope</i> <i>decision making</i> <i>strategy led</i>	pro-active & reacting incremental champion emergence Business a IT driven	reactive revolutionary autocratic IT strategy lead	pro-active in reacting incremental in practice champion leadership IT aligned to strategy
Cultural Readiness <i>change agents & leadership</i> <i>risk aversion</i> <i>extent of open communication</i>	+ welcomed +	- cautious targeted	need for change leader welcome change open communication
Learning Capacity <i>adaptation</i> <i>improve efficiency</i> <i>learning type</i>	learning from others learning by doing double-loop	response to IT change learning by doing single-loop	*learning induced by IT change learn to be efficient learning from feedback
Knowledge Capability <i>external information use</i> <i>declarative knowledge</i>	boundary spanners focus on core competencies	technology gate keeper R&D resources IT development	collaboration with partners and competitors *acknowledge knowledge is a corporate asset
IT Leveragability <i>use of Internet technology</i> <i>role of IT</i>	+ superior enabling & socio- technical	- poor dominant factor	superior IT not required but * ensure IT is adequate intrinsic to work operations
Network Relationships <i>inter-organisational linkages</i> <i>cross-functional cooperation</i>	cooperative superior	non-cooperative/ competitive poor	* Trust and commitment not imperative but needs collaboration for emergence
Change Mgt Practice <i>mgt's readiness to change</i> <i>pattern of change</i> <i>scope of change</i> <i>managed change</i>	committed + improvement well managed process for change	resistant - radical change alleviation of dissatisfaction,	* Mgt committed to communicate change at all levels all aspects in evolutionary change pattern more successful
e-Business Mgt Practice <i>e-business measurement</i> <i>use of tools and techniques</i> <i>team-based structure</i>	use e-bus metrics adequate/superior +	improvement feedback loop poor -	user e-business metrics for feedback educate about techniques * reward teaming

Key: + = facilitator, - = inhibitor, * = satisficing

To be successful, eBC management must support a *proactive* way the organisation *reacts* to the stimuli. While most successful organisations had positive characteristics, not all characteristics were seen to be equally important or indeed to directly influence success. Those constructs identified by (*) were seen as 'satisficing' factors, that is, they needed to be present but not necessary to be excellent. These involve components other than strategy and cultural readiness.

The patterns in Table 6.8 indicate several important indicators that have implications for both research and practice.

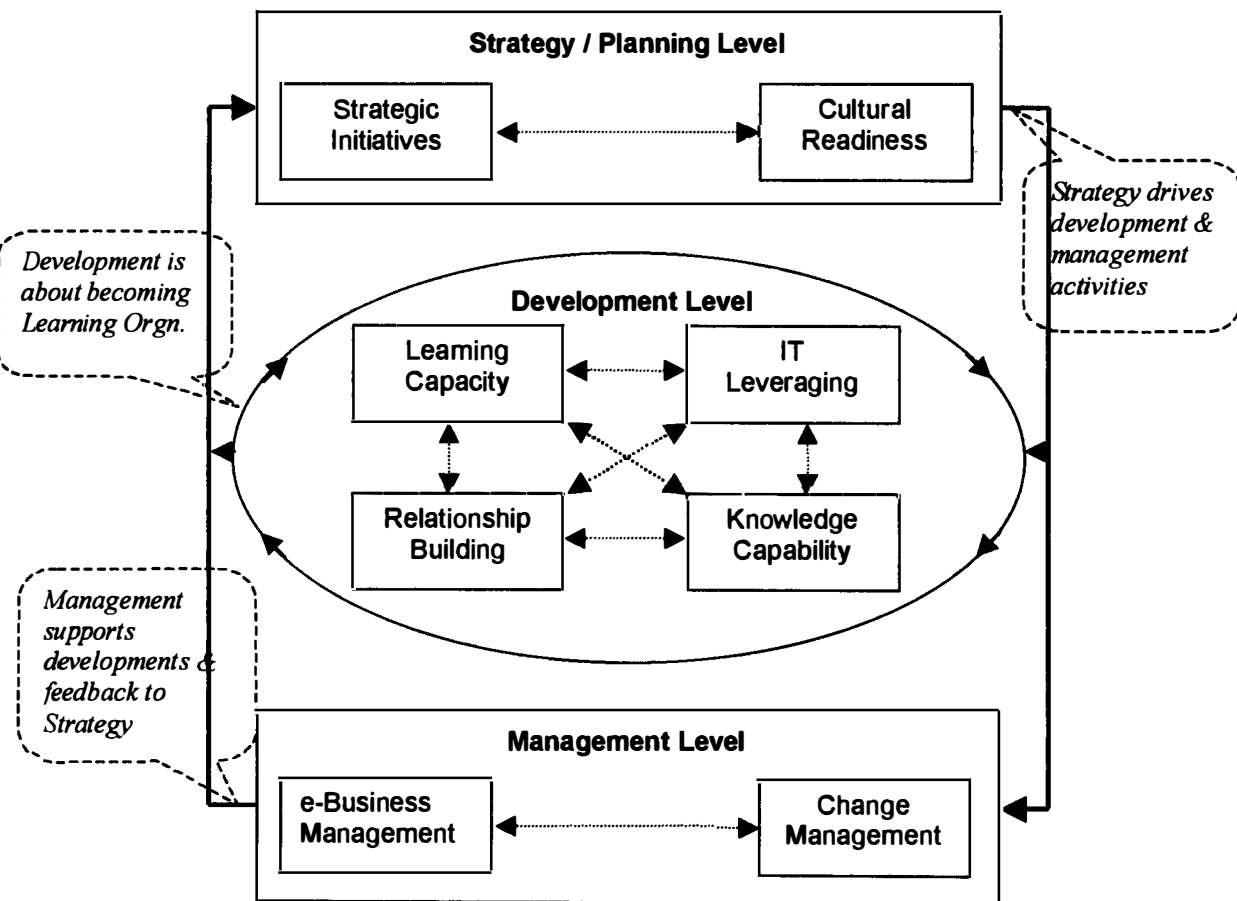
Interpretations of Findings

- Strategic initiatives and cultural readiness are key drivers of eBC.
- eBC management does not have to be *proactive* to be successful, but is influenced by the way the organisation reacts to the stimuli.
- There tends to be strategic "stimuli" ranging from competitive pressures, continued market leaderships, customer expectations, employee dissatisfaction and organisation inefficiencies that trigger firms to undertake eBC management.
- What is not clear was the extent of the reaction to stimuli versus proaction.

6.7 REFINED MODEL OF E-BUSINESS CHANGE

While the study used a flat eBC model where all constructs were considered antecedents to success, a more elaborate testing would involve interrelationships. A new refined research eBC model is proposed for future studies to examine the inter-relationships between components.

Figure 6.3, illustrates the relationships between components of the eBC model, discovered during the analysis process at three levels.



Key: —> direction of interaction between levels > direction of interaction between components

Figure 6.3 New Theoretical Framework of e-Business Change Management

Figure 6.3 is a refined research model proposed for future studies to examine the inter-relationships between components. The overall inspection from Figure 6.3 is

that organisations need to align their ICT resources with their strategies. To reduce resistance to change, each component must be aligned, along with the enabling technology, to the strategic initiatives (Statoil Data Quality Manager; 2000; Luftman, 2000; Hesterbrink, 1999). Barua et al. (2001) specifically refer to the success of a company's e-business initiatives coming in part from the readiness of customers and suppliers to engage in electronic interactions.

Extended Measures for eBC Outcomes and Performance Gains

Figure 6.2 shows the generic performance measure and the relationships between them. However, the "Benefits Scorecard" from increasing B2B Interaction (Chapter 5: Table 5.9) offers a more comprehensive set measures for eBC.

Interactions between Components of Model of eBC

The patterns in Table 6.9, highlight several important *indicators* that have implications for both research and practice. For e-ERP projects, what pattern of the eBC model is an indicator for success, failure, a tendency to mediocrity? And do they have variances across the B2B Interaction domain?

Table 6.9: Findings of Interactions between Components

eBC Components	Interactions
Strategic Initiatives (SI)	Incremental eBC initiatives can work but appears to be appropriate when risk aversion is welcomed and within a culture of e-business readiness. (SI ↔ CR).
Cultural Readiness (CR)	Right cultural mix by leadership from managers and initiatives from employees, together with an atmosphere of open communication, participation, committed cross-functional access to experts and inter-organisational focus. (CR ← LC, IL, KC, RB). To address reluctance to change, an organisation's "vision" for change must be embraced throughout all levels. (CR ↔ CM)
Learning Capacity (LC)	Learning whereby employees individually and collectively reflect on their past experiences, supported best practice leverage external information and experts, and focus on core competencies. (LC ↔ IL, KC, CM and CR)
Relationship Building (RB)	Commitment between partner organisation to use common IT platform and sharing of corporate information. (RB ← IL, KC)
Knowledge Capability (KC)	Suggestion - IT should be aligned to all components to support SI. O&Gas Mgr (All components ← IL)
IT Leveragability (IL)	Suggestion - IT should be aligned to all components to support SI. O&Gas Mgr (All components ← IL)
Change Management (CM)	The nature of change was reported to be participative change resulting in an evolutionary change tactic. Continuous articulation and communication of the value of reporting results and how each individual can contribute. How the eBC will improve employee satisfaction (CM ↔ QWL)
e-Business Management (BM)	eBC involves the coalescence of "IT" and e-business best practice, whereby IT plays a supportive (BM ↔ LC, IL)

[Key: ← = supported by, ↔ = interacts]

(i) Strategy / Planning Level**Strategic Initiatives (SI)**

There tend to be strategic "stimuli" ranging from competitive pressures, continued market leaderships, customer expectations, employee dissatisfaction and/or organisation inefficiencies that trigger firms to undertake eBC management.

- According to these findings, eBC management has to be *proactive* to be successful, but by the way the organisation is *reactive* to the stimuli. This is viewed as a satisficing condition for eBC management success.
- *Incremental* eBC can work but appears to be appropriate when risk aversion is welcomed. Also *incremental* projects were perceived as *revolutionary* in nature.
- Successful eBC projects establish an objective and unbiased team or individual *champion* that continues to push the organisation and groups to find new innovative processes. These *champions* must be empowered to implement the changes within a culture of e-business readiness.

Cultural Readiness (CR)

To address complexities of change, each component must be aligned, along with the enabling technology, to the strategic initiatives:

- An organisation attempting to change performance radically seems to require some "sense of urgency" in their business situation, which translates in turn into a compelling vision that is espoused throughout the organisation.
- To overcome pockets of reluctance to change, an organisation's vision for change must provide an atmosphere of communication where individual concerns are not seen negatively but rather welcomed.
- An important ingredient in the right cultural mix for successful eBC is leadership from the top and initiatives from employees, together with an atmosphere of open communication, participation, committed cross-functional access to experts, and committed inter-organisational focus.

(ii) Development Level**Learning Capacity (LC)**

Successful eBC projects are enabled in organisations that:

- have a propensity to learn from best practice and customer needs, exhibit learning whereby employees individually and collectively reflect on their past experiences, modify their course when necessary, and discover new opportunities, a new culture of the learning organisation.

Relationship Building (RB)

Successful eBC projects require commitment between partner organisations to use common IT platforms and sharing of corporate information.

Knowledge Capability (KC)

Successful eBC projects are enabled in organisations that leverage external information and experts, and focus on core competencies.

IT Leveragibility (IL)

Successful eBC involves the coalescence of "IT" and e-business best practice, whereby IT plays a supportive, but not always commanding role that is linked to the business case for eBC. A balanced consideration of the social, technical, and business value elements should be maintained throughout the project.

(iii) e-Business Change Management Level:

- The nature of change was reported to be participative change resulting in an evolutionary change tactic. This was viewed as a "waterfall" progression of change, starting with an alleviation of dissatisfaction by employees and eventually working towards a well-managed e-business implementation:
 - ↳ alleviation of dissatisfaction,
 - ↳ vision for change,
 - ↳ evolutionary change tactics,
 - ↳ a well-managed process for change.
- To achieve this requires continuous articulation and recognition of the value of reporting results, as well as monitoring each individual's contribution and accountability to the overall company's change effort. At this individual level, concern should be placed on how the eBC will improve employee satisfaction and the quality of work life.
- Measurement is a means to success. A well-defined transparent management approach should include a documented methodology of change, use objective and quantified metrics showing the value of change, continuously communicate process metrics to senior management, and possess a well-documented rollout of the new e-business design.

While broad generalizations from the four case studies are viewed as premature, various patterns of constructs were developed as *indicators* that have implications for both research and practice. For e-ERP projects, these patterns represent indicators for: success, failure, a tendency to mediocrity, and variances across B2B interaction, where the latter is regarded as the most significant indicator. In order

to avoid an original IT-centric position, we emphasise the importance of managing the change of e-business projects. Further there is the implication that the least successful e-business projects will have inhibitors in both dimensions, especially in the area of cultural readiness and change management.

6.8 SUMMARY

An established research framework of e-Business change is used to identify the factors for success of this e-business project within an ERP environment. The qualitative data provided content and discovery of elements that surround each construct to identify those facilitating and inhibiting factors that lead to ultimate eBC goals. The results confirm that a successful project was found to have facilitators in all components of the eBC management framework, including the change environment and management practice. Further, there is the implication that the least successful e-business projects will have inhibitors in both dimensions, especially in the area of cultural readiness and change management.

The cases presented used an established research framework for gathering evidence to identify the factors for success of an e-business project. In order to avoid an original IT-centric position, we emphasise the importance of managing the change of e-business projects. This research framework was chosen as a method for its ability to examine complex phenomena. It is seen as evolutionary in nature, and was content driven. It is essentially a diagnostic tool for identifying factors contributing to success of new business models. It is not seen as a prognostic tool. It specifically explores the areas related to the successful learning organisation where the key issues remain as people oriented organisational issues.

While broad generalizations from the four case studies are viewed as premature, various patterns of constructs were developed as *indicators* that have implications for both research and practice. For e-ERP projects, these patterns represent indicators for success, failure, a tendency to mediocrity, and variances across B2B interaction, where the latter is regarded as the most significant indicator.

The current findings are based on the analysis of only four key case studies, the eBC management framework did provide an appropriate method for case study. While the study used a flat eBC model where all constructs were considered antecedents to success, a more elaborate testing would have involved interrelationships. A refined eBC model is proposed for future studies to examine the inter-relationships between components (Figure 6.3).

These are complex issues that can never be solved with technology alone. They require leadership, appropriate problem solving skills, lots of hard work and executive commitment and a culture that embraces the ideals of the learning organisation as a team and community oriented work process. The organisational design, learning environment, and human-to-human communication and collaboration must be aligned to the enabling technology. One should always keep in mind "the alignment of people, business processes, technology and organisation between ERP and e-Business" (Hesterbrink, 1999, p.5). In a labour force of inter-divisional virtual teams, management will be more about motivation, and governance may be largely a question of self-regulation rather than traditional managerial control.

CHAPTER 7

E-BUSINESS THROUGH ERP AS A MODEL OF VIRTUAL ORGANISING

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7.0 INTRODUCTION

The 20th models of strategy and structure appear inadequate to meet the challenges of the global, digital economy. For this reason, Venkatraman and Henderson (1998) undertook a systematic study of companies doing business online to conceptualise the business framework of virtual organizing (VOing). In defining VOing, they describe the online developments of 21st century enterprise as occurring in three aspects of business.

"Virtualness" is treated as a strategic characteristic applicable to every organisation. Specifically, VOing is a comprehensive plan that focuses on three interdependent dimensions for doing business online: *Customer Interaction, Asset Configuration, Knowledge Leveraging*. Venkatraman and Henderson (1998, p.47) argue: "it will be difficult – if not impossible - to craft an effective strategy and structure without harmony among the dimensions." These pillars of online business are described at three stages of greater virtual progression. This business logic places at the centre of the new business architecture of VOing, a significant information and communication technology, such as e-Business applications with ERP (e-ERP).

This chapter describes the third phase of a longitudinal multi-case study, carried out between September 1999 and June 2001, of organisations that pioneered the use of e-business applications with their existing SAP R/3 systems. The same sample of eleven case studies was used to test the hypothesis: the strategies and performance objectives of VOing are applicable to all ERP enabled organisations when adopting e-business.

Semi-structured interviews were used to collect the primary research data about the case organisations (A7.1). The case material collected is used to verify all the strategic characteristics of VOing and to demonstrate the business tactics possible from VOing (Table 7.0). This is described as closeness of strategic fit. In addition, the case material is offered to illustrate exemplars of VOing tactics.

The case findings are analysed according to increasing virtual progress in all three dimensions of the VOing model. This was accomplished by capturing actual case performance objectives into the VOing Table 7.0. The challenge for this chapter is to develop an improved model of VOing, refined in terms of the case performance objectives, and extra strategic issues such as the demand for self-service. The findings demonstrate that the stages of virtual development of work units, organisation, and inter-organisation need to be supported along each dimension.

7.1 THEORETICAL CONCEPTS

Although the technologies of ERP and the Internet have distinctly different functions, integrated they offer a sound infrastructure for doing business on-line (Venkatraman & Henderson, 1998). Further, e-business, in addition to encompassing e-commerce, includes both front-office and back-office applications that form the engine for modern business (Kalakota & Robinson, 1999).

Virtual Organising Model

To develop a precisely defined research model of VOing, we begin by identifying the basic framework using Figure 7.0. Next the detail descriptors or components were examined from the findings of Venkatraman and Henderson (1998) and identified as in Table 7.0.

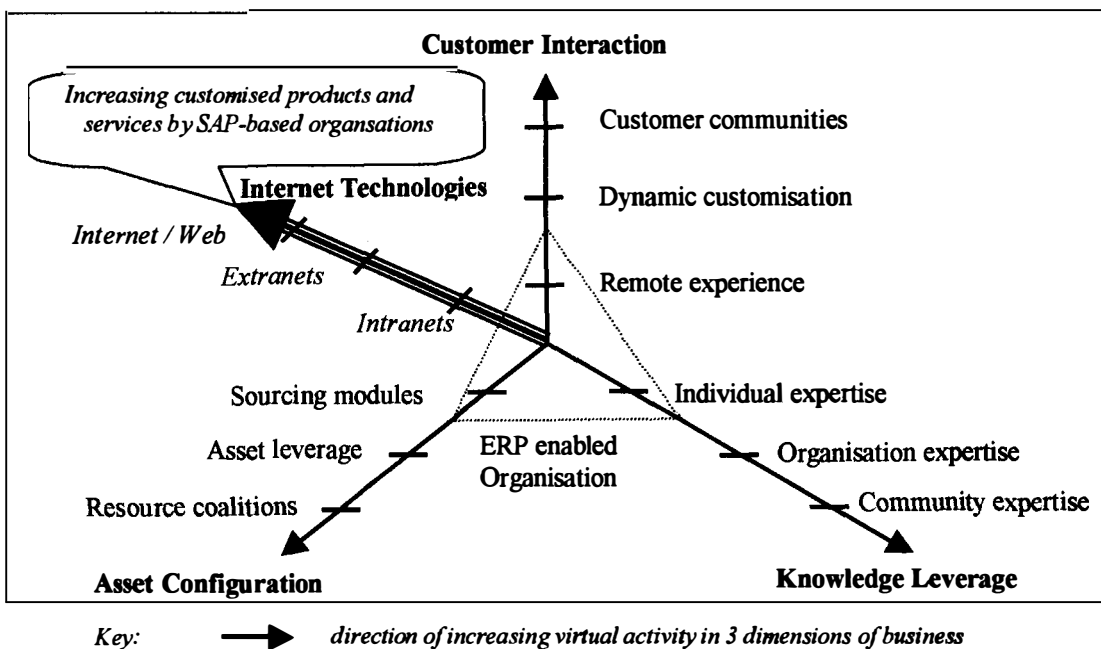


Figure 7.0: Virtual Organising Model for e-ERP Implementations
(Source: Adapted in 2001 from Venkatraman & Henderson, 1998)

Figure 7.0 interprets VOing as a comprehensive model that focuses on three stages of development along three interdependent dimensions of online business: *Customer Interaction*, *Asset Configuration*, *Knowledge Leveraging*.

- (i) *Customer Interaction* - refers to the extent to which customers virtually interact with the market defined at three stages of greater virtual progression;
- (ii) *Asset Configuration* - refers to asset and competency sourcing;
- (iii) *Knowledge Leveraging* - refers to the virtual progression of harnessing knowledge sharing (Venkatraman & Henderson, 1998, p. 35).

Each dimension is further described at three stages of greater virtual progression. Progress in the first stage focuses on the task units such as customer service, purchasing, or new product development. The second focuses on the organisational stage on how to coordinate activities to create superior economic value. The third stage focuses on the inter-organisational network to design and leverage multiple interdependent communities for innovation and growth, (p.35).

Research Scope and assumptions of the VOing Model

This part of the study examines whether the stages are interdependent by supporting each other, or independent of each other. This is especially so with respect to the *business focus* and the *performances objectives* (Table 7.0) where *efficiency* supports *value adding* which supports *sustained growth*.

The VOing model specified by Table 7.1 views business focused at three stages of development, each with performance objectives for greater virtual progression:

Stage 1 - work-units focus on improved operating efficiency.

Stage 2 - organisation focus on virtual and economic value adding.

Stage 3 - inter-organisation focus on sustained innovation and growth.

Table 7.0: Descriptors of VOing for each Dimension at each Stage

VOing Dimensions	Stages of Development		
	Stage 1	Stage 2	Stage 3
1.Customer Interaction (virtual encounter)	Remote experience of Products & Services Online Storefronts Complementary sites Product Companies *Redefine brand-integrity	Dynamic Customisation Modularity Intelligent Organisation *Intelligent sites	Customer Communities Content accessed by wider community, Appreciates member generated content Distinct focus of *e-customer communities
2.Asset Configuration (virtual sourcing)	Sourcing Modules EDI Efficiency Procurement networks Sourcing logic revision	Process Interdependence Process outsourcing Asset utilisation IT affects business scope	Resource Coalitions Dependent on relationships for assembling capabilities *Balance your strengths by competition v cooperation
3.Knowledge Leverage (virtual expertise)	Work-unit Expertise More tasks & demands Groupware for effective processes	Corporate Asset Intranet access to company knowledge *Knowledge as corporate asset should be managed	Professional Community Expertise Expertise of customers & foster employee expertise Emerging collaborative communities or Wine Society
Business Focus	Work-unit	Organisation	Inter-organisation
Examples	Customer service, purchasing, product development	Assemble and coordinate assets; creating value through use of digital info.	Business network to design and leverage interdependent e-communities
Outcomes & Performance Objectives	Improved operating efficiency (ROI)	Virtual and economic value added (EVA)	Sustained innovation and growth (SIG)

Details and key issues (*) were extracted from Venkatraman and Henderson's 1998 paper

7.2 METHODOLOGY

Descriptive Research Phase 2.3

Figure 7.1 highlights the third part of the descriptive phase of the composite case-based research method. This details research activities of case studies (Table 3.3) for describing theory associated with 3rd research question: Do effective strategies for e-ERP implementations fit the VOing model? This question was reinforced by the findings of eBC strategies from the previous chapter (stage 2.2).

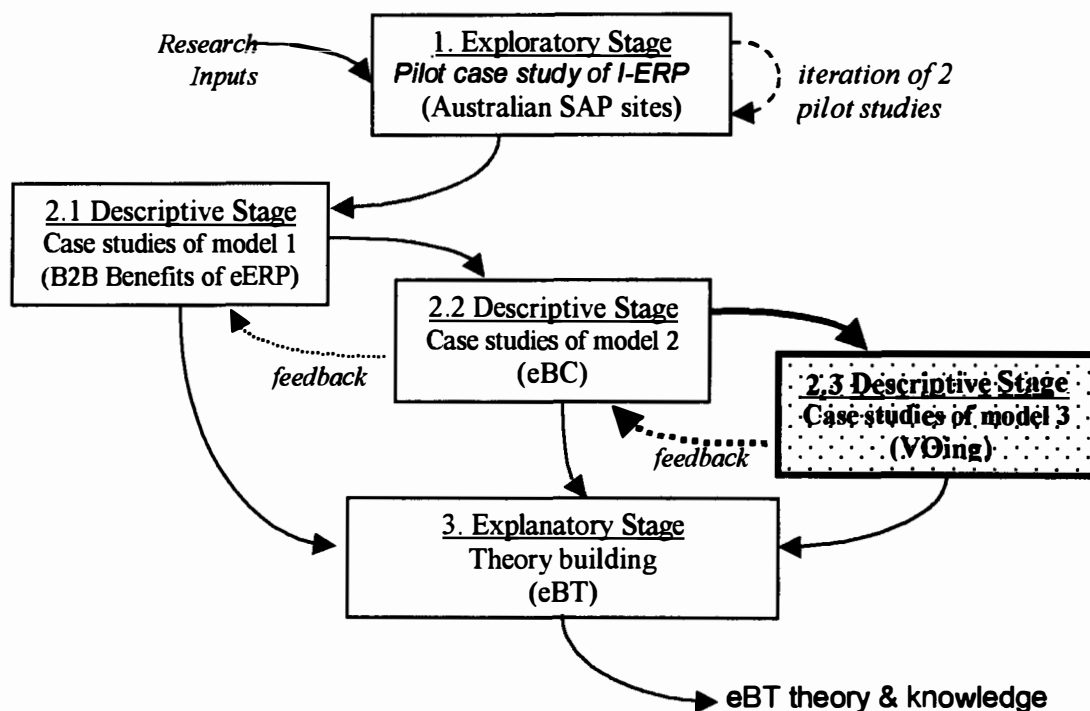


Figure 7.1: Phase 2.3 of Composite Case-based Research Method

3rd Research Question:

Q.3 Do effective strategies for e-ERP implementations fit the VOing model?

- (i) What is the pattern of growth in e-Business through ERP? and in addition,
- (ii) What is the most effective pattern for benefits realisation?
- (iii) Are the VOing performance objectives appropriate for e-ERP projects?

Data Collection and Analysis Matrix

Data was gathered from three sources: primary, secondary and tertiary:

- Primary data – from interviews conducted November 1999 using Appendix A7.2, June 2000 using A6.1, and industry presentations in June 2001,
- Secondary data – from company documents collected or sent via emails,
- Tertiary data – from case articles written by third party authors/specialists.

Table 7.1 summarises the data collection and analysis activities.

Table 7.1: Data Collection and Analysis Matrix

3 rd Question	Data Collection Instrument	Data Analysis
Do effective strategies for e-ERP implementations fit the VOing model?	Semi-structured interviews questionnaires; Nov 1999: Q.4 - 8	Match case content to each dimension and within each stage.
a. What is the pattern of growth for e-Business through ERP? b. What is the most effective pattern for benefits realisation?	Semi-structured interviews questionnaires; June 2000.	Cross-case content analysis to demonstrate the issues of VOing
c. Are the <i>performance objectives</i> appropriate for e-ERP projects?	Final case interviews; June 2001.	Cross-case content analysis of objective measures.

After collection, case data was collated and analysed according to: the literature, technology developments, perceived findings of B2B models, and reflections of the researcher.

The following data collection protocol was used:

- (i) Qualitative structured interview questionnaires (Appendix 5.1, 6.2) were used during the two visits to collect primary data for the study from eleven (11) SAP worldwide sites, as seen in Table 7.2.
- (ii) Multiple archival company documents, and many conversations via e-mail.
- (iii) In each case the focal point of contact was the most senior stage IT/SAP project manager.

Finally, a conference presentation from *Siemens's* project staff revealed essential case data on the company's VOing experiences.

Table 7.2: Target Organisations with Stages of data collection,

#	Case	Industry	Interviewed			Business Model:			VOing Performance Measure
			1 st Nov-99	2 nd Jul-00	3 rd Jun-01	B2B ^A	B2B ^C	B2B ^E	
1	UBS	Banking	•	•				•	EVA
2	Biotech	Bio-technology	•	•		•			ROI → EVA
3	UNICEF	Charity	•	•			B2C		ROI → EVA
4a	Dell*	Computing	•	•				•	ROI & EVA
4b	LSI*	Electronics	-	•		[•—•]			ROI
5	Employ-Nation/1	Employment	•	•				•	ROI
6	Halliburton	Engineering	•	•				•	EVA
7	Burtelsmann	Media	•			•			ROI → EVA
8	Statoil	Oil & Gas	•	•		•			ROI
9	Novartis	Pharmaceutical	•					•	EVA
10a	Siemens**	Science/electric	Phone &	•	•	[•—•]			MVA
10b	(FSC)	technology.	emails	(•)			(•)		(ROI)
11	The Wine Society	Wine Retailing	•	•			B2C		EVA

11 cases, across 11 industries, from Australia, Europe, Scandinavia, UK, USA (ordered by industry type)

* Dell and LSI represent a B2B twin case - supplier and customer

** Siemens represents the parent company of Fujitsu Siemens Computers (FSC) division.

7.3 FINDINGS ON VIRTUAL ORGANISING DIMENSIONS

This section is divided into sub-sections 7.3.1 – 7.3.3 to examine each of the three dimensions of the VOing model. Within these sub-sections the three stages embedded in each dimension will be examined using the following:

Stage No., Examples, Extra Issues, Critical Issues, and Performance Objectives

7.3.1 Customer Interaction or Virtual Encounter

The *customer interaction* (CI) dimension deals with the opportunities and challenges for company-to-customer interactions. In the emerging global, digital economy IT (such as Internet with ERP systems) enables business customers as well as end consumers to: (i) remotely experience products and services, (ii) actively participate in dynamic customisation, (iii) and foster mutually reinforcing customer communities. But how do organisations assess their progress in the CI dimension as the marketplace demands greater remote access, dynamic customisation, and participation in the customer community?

(i) Remote experience of Products and Services

The first stage of *customer interaction* is classified by Venkatraman and Henderson (1998, p. 34) as the “remote experience of products and services.” e-ERP systems must allow for the establishing and leveraging of a “two-way remote” information link between a company and its customers and end-consumers; “a Web site is essential.” The case studies in Table 7.3.1(i) are used to assess how their products and services can be experienced virtually for improved efficiency.

Table 7.3.1(i): Remote experience of Products and Services

Virtual Organising's Dimension 1, Stage 1	B2B ⁺ & B2C Case(#)	Characteristics or Opportunities
<ul style="list-style-type: none"> • Online Store • Complementary sites • Product Companies 	<p>4a, 10b</p> <p>4a, 3</p> <p>4a, 10b</p>	<p>Real-time (24x7) monitoring of shipments and stock portfolios.</p> <p>Sites that complement and supplement services.</p> <p>Remote experience of products and services?</p>
Extra Issues	4a	Customer self service to leverage the customer value chain.
Critical Issues	4a, 11, 10b,	Customer links as brand identity and brand integrity are redefined.
Outcomes & Performance Objectives	3, 4a, 10b, 11	Improved operating efficiency (ROI)

Cases used to examine this cell of VOing: UNICEF(3), Dell(4a), FSC(10b), Wine Society(11)

Table 7.3.1(i) summaries the characteristics used to examine the fit of cases to VOing in the customer interaction dimension at the work-unit stage.

Online Store - Real-time (24x7) monitoring of shipments and stock portfolios.

Dell began its transition to an Internet direct marketing model in early 1997. "Many customers select *Dell* for the simple reason that their site is so much easier to navigate than those of its competitors" (Dell & Fredman, 1999). For *Dell* a fundamental principle of sales is making it easy for customers to buy their products.

ORS was developed initially to optimise processes between *Siemens's* Computer division (*FSC*) and its partners. Both *FSC* and *Dell* provide standard Web sites with features such as the ability to browse a catalogue, collect items in a shopping cart, and place an order. Also with all online purchasers, customers can use the Web site to track the order and delivery status of their purchases. For *FSC*, the over-riding goal was to implement an international online store (e-store) as a multi-language development, across Europe.

Complementary sites - Web sites that complement or supplement products and or services.

At *Dell* the Web site architects realized that customers want ease of ordering and rapid deployment - not just for *Dell's* own products, but also for third party software and peripherals that run on their products. *Dell* implemented *DellWare*, that allows customers to select a vast array of products from *Dell's* many corporate allies. The site's ability to automatically present prerequisites and recommend options was extended to cover these third-party tools.

When visiting the *UNICEF Australia* web site, users are invited to respond to a series of 'banner ads' promoting the online donation campaign that has also been established through commitment from many Australian leading corporate web sites. When the user clicks on one of these ads, they will automatically be taken to the donation site. The "online donation facility" was developed to promote professional business image. In addition, it promoted a charitable organisation image for their corporate sponsors/customers. These customer links helped to identity brand and brand integrity in the virtual space.

Product Companies - How to remotely experience products and services?

Dell rose to prominence through the Direct sales of best-of-breed products and services. With no slow-moving indirect distribution channels to impede delivery, customers receive the very latest technology in their *Dell* systems. *Dell* operates on six days of inventory, keeping related costs low. The *Dell* Direct Model assures customers that no third party will dilute the quality of *Dell's* products and services, nor will anyone stand in the way of using modern technology to benefit

the user. For many of *Dell's* competitors, e.g. *FSC*, there are third parties standing in the way of exploiting online sales to the full. The array of resellers, distributors, and retailers fear they will be left out of the 'selling chain'.

Extra Issues

The Wine Society believes no matter how smooth an experience they have designed, they still inevitably go through multiple rounds of redesign based on feedback from focus groups and test subjects, to achieve greater experience than their co-existing mail drop brochures. '*We know what our members want.*'

Companies like *UNICEF*, that have a pre-existing global brand, are co-opting goodwill celebrity names (Audrey Hepburn, Bob Geldoff, Rolf Harris) to the task of continually improving the image of their sites. Their challenge is to redefine their brand identity from an association with their corporate sponsors.

Critical Issues

The core issue is stated as how best to use the Web's power to create superior linkages with customers? A Web site is essential. Therefore designing an e-business site correctly is not taken lightly. No matter how smooth an experience companies like *Dell* believe they have designed, they inevitably go through many rounds of redesign based on feedback from focus groups and test subjects.

Performance Objectives (ROI)

Dell's web presence has delivered substantial savings the company can pass on to customers via lower prices. Customer self service is employed to shift much of the administration burden onto the customer. There are no sales commissions to pay. Service calls on order status have dropped by 75 percent, and technical calls by 25 percent. The *Dell* Direct Model assures customers of 'undiluted' quality of *Dell's* products and services by using modern technology providing a comfortable environment that optimises the customer selection process.

Efficiency comes from the ease of use of *Online Stores* that offer reliable ordering and service response with better products. The task remains of continually improving a site and making the online experience as rich and fulfilling as possible for the customer. Further, customised intelligence is spontaneously given away anytime, anywhere to entice customers into self-service. This scenario is more suited to product companies and where the online sales channel can be monopolised. Partner Web links help redefine brand identity through the partner's image or brand integrity.

(ii) Dynamic Customisation

The second stage of *customer interaction* focuses on the opportunities and challenges in dynamically customisation of products and services. E-ERP systems must enable companies to respond to competitive markets and rapidly eroding margins by offering customised products and services. Venkatraman and Henderson's (1998) view of dynamic customisation is based on the principles of modularity, intelligence and organisation. The case studies in Table 7.3.1(ii) are used to assess how their offers are being customised. "Intelligence through continuous information exchange with customers, companies can create products and processes using the best possible modules" (Venkatraman & Henderson's 1998, p.37). In addition, dynamic customisation requires an organisation that is focused on assembling modules for delivering customised configurations of modules for enhanced value.

Table 7.3.1(ii): Dynamic Customisation

Virtual Organising's Dimension 1, Stage 2	B2B ^c + B2C Case(#)	Characteristics or Opportunities
<ul style="list-style-type: none"> • Modularity • Intelligent • Organisation 	<p style="text-align: center;">4a</p> <p style="text-align: center;">4a, 10b</p> <p style="text-align: center;">4a</p>	The partitioning of a product into independent functional modules Intelligent web sites that learn their visitors tastes - personalised Company must be organised into supporting modularity, intelligence.
Extra Issues	10a	Customer self service
Critical Issues	4a	Intelligent Web sites.
Outcomes & Performance Objectives	4a, 10a, 10b	Virtual and/or economic value added (EVA)

Cases used to examine this cell of VOing: UNICEF(3), Dell(4a), Siemens(10a), FSC(10b),

Table 7.3.1(ii) summaries the characteristics used to examine the fit of cases to VOing - in the customer interaction dimension at the organisation stage.

Modularity - The partitioning of a product into independent functional modules.

At Dell's Web site customers use DellWare to specify a complete multi-vendor solution. Third-party products can be pre-loaded and pre-tested at the factory through the DellPlus program so that the system arrives ready to work. The goal of DellWare and DellPlus is to save the customer the time and expense of dealing with multiple vendors and relieve the burden of matching software to system requirements. This eliminates worries that products from multiple sources will not work together, and spares the pain of installation, debugging, returns, and support calls - *the things people don't like about buying computers.*

Intelligent Sites - Intelligent web sites that learn their visitors' tastes using personalised Web pages.

The FSC "Premier Page" service is a personal computer Web site and customised online business link to FSC (A7.4.1). Designed by the customer and the FSC account team, it is tailored specifically to match the needs of individual businesses. For example, a customer who frequently wants a particular set of options can have those options presented by default. This saves the user time and avoids mistakes. The *Premier Page* format and language can be customised for ease of understanding and propagation throughout an organisation. Pricing may reflect individual corporate discounts in effect. Detailed purchasing history reports can be called up on screen. As with other online purchasers, customers can use Premier Pages to track the order and delivery status of their FSC equipment. Employees of corporate customers are assigned specific rights to place orders and access different layers of information.

Dell made its Web site more sophisticated to increase corporate usability further. While the masses want an open book to fill with the *Dell* products of their choice, many repeat-buyer corporate customers can save time by linking quickly to specialized *Premier Pages* tailored specifically to their requirements. On these pages, they find pre-configured systems that fit their recurrent needs. The introduction of *Dell's Premier Pages* greatly bolstered corporate customers' use of the Web for placing orders, and accelerated their use of *Dell* products throughout their enterprises.

Organisation - Companies must be organised into supporting modularity and intelligence.

Dell adopted segmentation as an organisation structure. Segmentation is employed to deliver "*Dell Direct*" selling model for new global regions. Alongside best-of-breed products and services, *Dell's* rise to prominence was based on the "Direct" model. Under this model no middlemen are involved in customer sales and service. With no slow-moving indirect distribution channels to impede delivery, customers receive the very latest technology in their *Dell* products - PC systems.

Extra Issues - "Sites that Dynamically Customise products and services".

The *Siemens* e-Mall is an Internet marketplace for *Siemens'* subsidiaries to sell their products and services to corporate customers. The system architecture has the capability to connect/interact with a range of 'buyer' companies' SAP R/3 and R/2 systems, and other ERP systems. The benefits of an e-Mall flow

from the streamlining of sell-side business processes. Integrated presentation of the group's products, materials, and systems service is provided through intelligent links.

Critical Issues

Creating a CRM site is critical to customer self service where the array of resellers, distributors, and retailers they employ are left out of the selling chain.

Performance Objectives (EVA)

Effectiveness comes from customer self-service that delivers reduced administration and more time for core business. The desired customer 'stickiness' is achieved by well managed *premier pages* for offering customised value added product and services. The presentation of configurable products on the Internet was achieved by the organisation of components into modules, through intelligent sites that lead the user through the configuring process with third party options.

(iii) Customer Communities

The third stage of *customer interaction* and potentially "the most profound aspect of interaction in the virtual model is the emergence of electronic customer communities" (Venkatraman & Henderson 1998, p.38). e-ERP systems must enable companies to effectively link together customers (and end-consumers) into a single e-community. This signals a power shift from producers to consumers. The case study in Table 7.3.1(iii) is used to assess how it is collecting and using personal information for building links with the customer's value chain.

Hagel and Armstrong's (1997) five defining characteristics of virtual communities are offered by Venkatraman and Henderson (1998) as the theoretical framework for this attribute of VOing:

- Distinctive focus for the e-community – *Dell with general customers*
- Capacity to post their own content for access by wider community – *Novartis*
- Appreciation of member generated content - *Wine Society*
- Access to competing offerings – *Siemens' eMall*
- Commercial orientations – possibly Dell with SAP competence centres.

Tables 7.3.1(iii): Customer Communities

Virtual Organising's Dimension 1, Stage 3	B2B ^c + B2C Case(#)	Characteristics or Opportunities
<ul style="list-style-type: none"> • Content access • Content Generation • Products and brands 	<p>3, 10a 4a 4a</p>	<p>Content accessed by wider community, Appreciates member generated content Distinct focus of products and for e-communities.</p>
Extra Issues	10b	
Critical Issues	4a	Role of marketing in forming e-communities around products and brands
Outcomes & Performance Objectives	3, 4a, 10a, 10b	Sustained innovation and growth (SIG)

Cases used to examine this cell of VOing: UNICEF(3), Dell(4a), Siemens(10a), FSC(10b)
Table 7.3.1(iii) summaries the characteristics used to examine the fit of cases to VOing - in the customer interaction dimension at the inter-organisation stage.

Content access by wider Customer community

UNICEF is endeavoring to form a high profile community of corporate sponsors to market high brand products from well known artists and celebrities to the wider community of consumers. It tries to customise a community for each charity campaign. The company is orchestrating a leading charities web site.

Unlike buying cooperatives such as *The Wine Society*, members within a customer community retain their rights about brand preferences and purchase decisions.

Generation of Content -Appreciates member generated content.

Dell opened the SAP Center of Expertise in Austin, Texas and the Dell Competence Center at the SAP PartnerPort in Walldorf, Germany. The two facilities allow customers to validate system design and configuration without disrupting their live computing networks. These facilities also provide customers with systems design and application tuning support and allow them to create various hardware and software configurations before making a purchase decision (Vridhagiri, 1999).

Dell uses its Competence Centers to leverage the alliances of technology partners. The Dell-SAP alliance is the most critical to Dell's success in the R/3 market. Although Dell-SAP alliance is a recent development, Dell servers have been running R/3 since 1997. There are more than 200 installations of R/3 on PowerEdge servers in 27 countries across six continents. Dell established a goal of increasing its market share from 10% to 25% through sizing their systems as a foundation for a successful SAP Implementation" (Vridhagiri, 1999).

Products and Brands for e-communities.

Dell is the No. 2 server provider in the United States and the No. 3 server provider worldwide. Corporate customers can employ Dell's carefully designed

e-business Web site (Appendix 7.4) to configure and order not only *Dell* server products, but also complete ERP industry solutions, in particular, SAP R/3. The *Dell* Direct R/3 solutions program minimizes time-to-benefit by combining the speed and ease of the *Computer* Direct Web site with Accelerated SAP Solutions (ASAP). This is SAP's offering that helps small and midsize enterprises to rapidly tap the benefits of rapid, low cost implementation methods for SAP R/3 (*Dell*, 1999). This type of marketing engages in forming e-communities around best of breed products.

Extra issues

One-to-many exchanges controlled exclusively by one company are blowing away the many-to-many public exchanges devoted to establishing vast online bazaars with as many players as possible, (eMarketer, 2000). For *Siemens*, "implementing private marketplaces seems to be the right way to go" (Freist, 2001). *Siemens* has begun to implement an e-Utilities industry specific private marketplace. Issues of content providers are yet to be resolved before *Siemens's* two projects should be considered exemplars of customer communities. The challenges ahead for *Siemens's* projects are detailed in Chapter 8 as stage 6.

Critical Issues

Again the most profound aspect of interaction in the virtual model is the emergence of electronic customer communities in which customer self-service has customer demand, thereby reversing the direction of information flow in the supply chain.

Performance Objectives (SIG)

Customer communities have emerged having a distinctive focus on products through electronic community facilities, such as a Centre of e-Excellence that require members to post their own content for access to the wider community, as well as an alliance network with member generated content.

7.3.2 Asset Configuration or Virtual Sourcing

The *Asset Configuration* (AC) dimension deals with the acquisition of critical assets and resources from a network of suppliers. "Firms using the Internet with ERP systems for business-to-business transactions can structure and manage a dynamic portfolio of relationships to assemble and coordinate the necessary assets for delivering value to customers" (Venkatraman & Henderson, 1998, p.36) conceptualise AC as:

- (i) efficiently sourcing standard components (modules),
- (ii) actively pursue business process outsourcing,
- (iii) and participate in a dynamic network of supplier, vendors, and other business partners.

In the emerging global, digital economy how do organisations assess their progress in the AC dimension as they strive to efficiently source modules, dynamically outsource non-core standard processes, and orchestrate or join in resource coalitions?

(i) Sourcing Modules

The *asset configuration* stage is classified by Venkatraman and Henderson (1998, p. 34) as the "sourcing modules." e-ERP system design must allow for the establishing and leveraging of a company's supplier networks. Baldwin and Clarke (1997) argue that in a new age of modularity, the value-adding role of a corporation is less in the manufacture of a critical component than in the creation of a product or service system. The case studies in Table 7.3.2(i) are used to assess how components of their products and services can be virtually sourced for improved efficiency.

Table 7.3.2(i): Sourcing Modules

Virtual Organising's Dimension 2, Stage 1	B2B ^o Case(#)	Characteristics or Opportunities
• Efficient procurement	2, 8	Reduction of material costs and lead times for orders. Sourcing standard components helps shift the focus to the value-adding role of product and service design or architecture. Web-based access to ERP order data from anywhere.
• Procurement networks	2	
• Online data interchange	8	
Extra Issues	10a	Employee self service to leverage the supplier value chain
Critical Issues	2, 8	Sourcing logic is subject to external market forces. What is the procurement strategy?
Outcomes & Performance Objectives	2, 8, 10a	Improved operating efficiency (ROI)

Cases used to examine this component of VOing: Biotech(2), Statoil(8), Siemens(10a)

Table 7.3.2(i) summaries the characteristics used to examine the fit of cases to VOing - in the asset configuration dimension at the work-unit stage.

Efficient procurement process

Biotech implemented the SAP B2B Procurement software, primarily to purchase chemicals and lab equipment. In contrast to *Biotech's* previous paper-based purchasing system (A7.4.2), lead times were reduced from five days to just one, from the point in time when an employee identifies the item required to actual delivery. An unexpected bonus was the reduction in stock inventory.

Statoil implemented the SAP Oil&Gas procurement component designed to reduce costs and shorten program runs, boosting company earnings and supporting the strategic objectives of supplier management. The intuitive and easy-to-use Internet interface enables users with a minimum of training to create purchase requisitions for indirect materials. The Internet-enabled process flows provide a flexible, standardized control layer that regulates the forwarding of requisitions and purchase orders to the right person for approval.

Procurement networks

Another goal of *Biotech's* B2B project was to build more long-term links with preferred vendors. So far, the company has identified three such vendors. Their Internet sites were linked into the SAP procurement system, allowing *Biotech* employees to use the company's own Intranet and to purchase from both the internal catalogues and external online catalogues. This was made possible by a specially developed open catalogue interface. It has been able to improve the discounts previously offered by these three preferred vendors to a further five percent. But the benefits are by no means all one-sided. "This procurement solution gives vendors plenty of opportunities, such as direct ordering from their original suppliers" explained the B2B project manager (*Biotech*, 1999).

Online Data Interchange - Web-based access to R/3 data from anywhere

The world's largest supplier of crude oil, *Statoil* implemented the SAP B2B procurement software for processing internal and external procurement, across the entire enterprise. The goal was to reduce its purchasing costs and to win a significant competitive advantage from fullest use of SAP B2B with SAP Oil & Gas. *Statoil* processes more than 350,000 invoices annually, awarding over 40,000 contracts. The B2B software allows approximately 18,000 *Statoil* employees from anywhere, direct access to Internet catalogues where they can select materials as required, freeing resources in the purchasing department for strategic tasks.

Extra Issues: e-Procurement Centres

The "Gatecentre" is an electronic procurement centre for *Siemens*' companies to purchase their products and services from business suppliers. The worldwide presence of the *Siemens* purchasing network supports global sourcing and corporate-wide combined requirements. *Siemens* globally has 520 purchasing departments. The intended benefits of Gatecentre flow from the streamlining of buy-side business processes from using SAP B2B Procurement with SAP R/3: individualised offers, up to date cross group *Siemens* offerings, and convenient ordering at any time and anywhere. The potential for procurement is characterised by the company focus on cost reduction.

Critical Issue - Sourcing logic revisions

Companies should revise their sourcing logic, subject to external market forces. Because it is used primarily to procure chemicals and lab equipment, the new, electronic purchasing process means that *Biotech*'s scientists can concentrate on their research rather than wasting valuable time on purchase-order administration. Which, in view of the speed at which the bio-technology market moves, translates into a distinct competitive advantage. The same issues apply for professional staff at *Statoil*. What is the procurement strategy - indirect and/or direct procurement of materials? Does a shift to direct procurement procedures demand employee self-service duties by non-professional procurement staff?

Performance Objectives (ROI)

Statoil's efficiency with online procurement comes from access to electronic catalogues and automation of purchase approvals. This achieved shorter lead times and a reduction in inventory as an unexpected bonus. Apart from easing the procurement department's workload, the new procurement system supported electronic purchasing and vendor communication. The sourcing logic of this procurement demands new employee self-service tasks and requires new IT skills.

The lessons learnt in achieving shorter lead times, lower material costs include:

- Standardised catalogues ,
- Standardised vendor interfaces,
- Open catalogue interface will enable sharing of profits between companies and their preferred vendors (suppliers).

(ii) Process Interdependence

The second stage of *asset configuration* focuses on the opportunities and challenges in dynamically customising products and services. E-ERP systems must enable companies in responding to competitive markets and rapidly eroding margins by offering customised products and services. The case studies in Table 7.3.2(ii) are used to assess how their offers are being customised.

Table 7.3.2(ii): Process Interdependence

Virtual Organising's Dimension 2, Stage 2	B2B ^o Case(#)	Characteristics or Opportunities
• Process outsourcing	3	Information intensive processes can be outsourced to external specialists.
• Asset utilisation and therefore,	3	External providers of standard bus processes helps in utilising assets, so a benefits and risk analysis of carrying out own
• IT affects business scope	2, 8	processes indicates that IT is affecting business scope.
Extra Issues	2	Loss of control with outsourcing
Critical Issues	3	Cost of ownership of e-ERP systems
Outcomes & Performance Objectives	2, 3, 8	Virtual and/or economic value added (EVA)

Cases used to examine this component of VOing: Biotech(2), UNICEF(3), Statoil(8)

Table 7.3.2(ii) summaries the characteristics used to examine the fit of cases to VOing - in the asset configuration dimension at the organisation stage.

Process outsourcing - Information intensive processes can be outsourced to external specialists

In 1998, *UNICEF* Australia announced the first live online donation facility Web site. The technology infrastructure for this e-business strategy is made available from an application service provider (ASP). This uses the ASP computing model detailed in Appendix: A7.4. The solution uses a powerful application server to hosts a single instance of R/3 implemented as a standard financials business process module.

Asset utilisation

The emergence of external providers of standard business processes helps in utilising assets for *UNICEF* Under the ASP computing model business applications are hosted under best business practice and state of the art ERP packages, e.g. SAP R/3, at a convenient networked computing centre or bureau. The computing centre is operated and maintained by a team of skilled and experienced IT specialists. By allowing the ASP to provide business applications and taking charge of the management and maintenance of the infrastructure, the company can focus on core business competencies and utilizing assets.

IT Affects Business Scope

For *Statoil* and *Biotech*, the advantages of SAP B2B Procurement included:

- realtime integration of the supplier in the external procurement process, freeing purchasing personnel capacity for selecting sources of supply and negotiating contracts freeing resources in the purchasing department for strategic tasks,
- a reduction of static purchasing costs as the procurement process is integrated in an Internet process flow.

Extra Issues

UBS reports that using external specialists to provide intensive information services without the loss of control presents many problems for global companies.

Critical Issues

Cost of Ownership with the ASP model is especially appropriate for the SME market. Organisations in this market are now able to access enterprise applications without the prohibitive cost, IT skills and management implications. Scarce monetary resources can be applied towards investments for developing core business. Furthermore, SMEs can be serviced by ASP hosted ERP software for a period rental that can be scaled to match business growth. Furthermore, development and training to date can be leveraged to great effect. One such ASP hosted ERP software solution was recently launched in Western Australia by Solution 6 (Figure A7.1).

Performance Objectives (EVA)

Effectiveness comes from less administration, leaving more time for employees to exercise core competencies. Standard administrative intensive ERP components outsourced to external ASP specialists, allow the focus to be on core business competencies and utilizing assets. The sourcing of standard components helps shift to design of value-adding of product and service architecture. A benefits and risk analysis on e-business processes shows that IT is affecting business scope.

(iii) Resource Coalitions

The third stage of *asset configuration* is about "the establishment of a resource network." e-ERP systems must enable companies to effectively link business partners and competitors into dynamic resource coalition. This signals a shift towards balancing competition with cooperation. Moore (1999) argues that such coalitions are like organisms that require nurturing. The case study in

Table 7.3.2(iii) is used to assess how it is gaining position due to superior resource networks.

Tables 7.3.2(iii): Resource Coalitions

Virtual Organising's Dimension 2, Stage 3	B2E [®] Case #	Characteristics of Opportunities
<ul style="list-style-type: none"> • Relationships • Orchestrate/participate • 	2 3	Dependent on relationships for assembling capabilities. Which role is best – orchestrate or participate in a coalition?
Extra Issues Identified	2	Supplier self-service.
Critical Issues	10a	*Balance strengths by competition or cooperation e-Clusters of business segments.
Outcomes & Performance Objectives	2, 3, 10a	Sustained innovation and growth (SIG)

Cases used to examine this component of VOing: *Biotech(2), UNICEF(3), Siemens(10a)*

Table 7.3.2(iii) summaries the characteristics used to examine the fit of cases to VOing - in the asset configuration dimension at the inter-organisation stage.

Relationships

Novartis is dependent on relationships for assembling capabilities using “mySAP.com” workplace deployment for a Chemicals dedicated marketplace (A7.4.2b). By May 2000, SAP helped launch a dedicated marketplace for the chemicals and pharmaceuticals industry. Participants on the buyer side are companies like BASF, Bayer, Degussa-Hüls, Henkel, and Wacker-Chemie, and on the seller side are KSB, Linde, Sartorius, *Siemens*, and Heinz Wollschläger. The mySAP.com marketplace is particularly beneficial for the *Novartis*-ceuticals research and development specialist. *Biotech* anticipates that the marketplace could significantly simplify the process of inviting bids for and selecting certain products and raw materials in comparison with R/3. The company envisaged advantages from ordering MRO items (materials, repair and operations), as well as new ways of searching for services.

Orchestrate or participate

UNICEF is endeavoring to form a high profile community of corporate sponsors to market high brand products from well known artists and celebrities to the wider community of consumers. The company is orchestrating a leading “charities” web site. It organises a customised community of corporate sponsors for each charity campaign.

Extra Issues

Biotech envisages supplier self service as the means to optimise resource coalitions.

Critical Issues

No case material has yet been discovered for balancing the companies strengths with its competitors strengths, with cooperation. Instead, an allied issue of "e-Clusters" was identified.

Siemens is piloting a private marketplace with cross-divisional offerings for the customer clusters utilities in Mid-Southern Europe. The marketplace project is a collaboration hub that allows participants exchange information and discuss offers and projects while also acting as a discussion forum and a calendar to arrange appointments. In addition the concept includes e-learning and travel management. It will also be possible to select and order products, solutions and services. Plans additionally foresee the inclusion of partners and local services.

Performance Objectives (SIG)

The building relationships through assembling capabilities in private e-marketplace. A marketplace project as a collaboration hub gives cross-divisional offerings for the customer clusters for a given business segment. For leading companies, the preferred role in a resource coalition is to be an orchestrator. The role of procurement staff moved from purchase order administration to strategic negotiations with vendors (suppliers).

7.3.3 Knowledge Leverage or Virtual Expertise

The *Knowledge Leverage* (KL) dimension deals with the opportunities and challenges for leveraging intellectual and knowledge assets from internal and external sources. In Quinn's view (1992), "these knowledge assets can disintermediate bureaucracies, dramatically lower overhead costs, support rapid execution of strategies, and substantially increase the learning rate of employees and their response to customers" (cited in Venkatraman & Henderson, 1998, p.44). IT such as e-ERP systems, now enables employees as knowledge workers in creating value. In the emerging global digital economy how do organisations assess their progress in the KL dimension as they strive to:

- (i) harness work-unit experience,
- (ii) realise knowledge and intellect as corporate assets, and
- (iii) gain access to professional community expertise?

(i) Work-unit Expertise

The first stage of *knowledge leverage* is classified as the "work-unit expertise", e.g. customer service, purchasing, and product development. e-ERP system must allow for establishing and leveraging a "two-way remote" information link between company employees, and across departments and stages of management. This is critical if employees are to create superior linkages with corporate suppliers, customers and end-consumers. The case studies in Table 7.3.3(i) are used to assess how their work processes and tasks can be improved.

Table 7.3.3(i): Work-unit Expertise

Virtual Organising's Dimension 3, Stage 1	B2B ^E Case(#)	Characteristics or Opportunities
<ul style="list-style-type: none"> • Effective work processes • Skilled tasks 	1 6	Groupware for effective work processes Increased admin and communication skills and knowledge sharing
Extra Issues	1	Employee rewards schemes that fit the performance objectives
Critical Issues		Employee rewards need to fit the performance objectives
Outcomes & Performance Objectives	1, 6	Improved operating efficiency (ROI)

Cases used to examine this component of VOing: UBS(1), Halliburton(6)

Table 7.3.3(i) summaries the characteristics used to examine the fit of cases to VOing - in the knowledge leverage dimension at the work-unit stage.

Effective work processes

UBS developed an Intranet with R/3 to facilitate the networking of the staff in the merger of two large banks into the new global banking organisation. The SAP R/3 internet solution for internal address management covered all

organisational information within the bank and was the most-used Web application, available for all 45, 000 employees, with 300,000 transaction calls per day. This form of groupware was the UBS's generic 'Employee Self Service' back-office solution, not a R/3 banking solution. The groupware goal was for effective work processes.

Skilled tasks

Halliburton developed "Management Reports, Personnel System, and Employee Tracking." This in-house Intranet using SAP personnel tables was an incremental HR Internet initiative for project management of offshore skilled agency workers. It has been expanded to include a computer hardware tracking system. With the aid of computer graphics, this Intranet systems communicates via a simple "walk-up" Web interface for casual users - project managers who have little or no training on the R/3 HR sub-system. Further, the use of mobile phone technology has given access to industry knowledge to project managers whilst offshore (Dahlbom & Ljungberg, 1999).

Extra Issues or Critical Issues

Any employee rewards scheme needs to be aligned to the e-business strategy.

Performance Objectives (ROI)

Efficiency comes from Intranet access (24x7) to corporate information by all employees. Intranet Groupware applications are used to ease work tasks, save time and reduce administrative costs, and less organisational paper, but demands greater employee self service performance. The Intranet Groupware capability requires a higher stage of IT skills for improved communication, and greater knowledge sharing. This signals a need for different employee training and rewards.

(ii) Corporate Asset

The second stage of *knowledge leverage* focuses on harnessing the collective expertise from all work-units. For example, assemble and coordinate assets. E-ERP systems must enable companies to systematically manage their corporate knowledge. The case studies in Table 7.3.3(ii) are used to assess how knowledge is regarded as a corporate asset and utilised for value adding.

Table 7.3.3(ii): Corporate Asset

Virtual Organising's Dimension 3, Stage 2	B2B ^E Case(#)	Characteristics or Opportunities
• Intranet access to company knowledge	9,6	Intranet access (24x7) to company knowledge by employees The rewards need to be in keeping with the realisation that * ??
Extra Issues	1, 6,8, 10a	A learning system and sharing of content Augmentation of improved value added processes, data quality
Critical Issues	10a	Knowledge as corporate asset should be managed
Outcomes & Performance Objectives	1, 6, 8, 9, 10a	Virtual and/or economic value added (EVA)

Cases used to examine this component of VOing: UBS(1), Halliburton(6), Statoil(8), Novartis(9), Siemens(10a)

Table 7.3.3(ii) summaries the characteristics used to examine the fit of cases to VOing - in the knowledge leverage dimension at the organisation stage.

Intranet access to corporate knowledge

Novartis introduced a company intranet called "Knowledge MarketPlace" as the first stage of its knowledge management developments. The "Knowledge MarketPlace" consists of three linked Web instruments: a directory of internal experts (Yellow Pages), a directory of external experts (Blue Pages), and a discussion forum that works like a news group (Virtual Forum). With the Yellow Pages, an employee decides on and provides the content for their personal profile. The goal of the Novartis "knowledge management programme was to convert accumulated knowledge into a company asset," with "measures intended to ensure that knowledge is used across barriers" (Probst, et al., 2000, p. 303).

For Halliburton, the HR intranet application has proven to be a major tool for decision making support to minimise labour costs. Its use is aligned to a corporate goal. Adoption of SAP R/3 was to provide managers with easy access to decision-quality information.

Extra Issues

UBS envisages creating the Internet system as a 'learning system.' As banking is the main driver, "managers and IT specialists must learn together and very fast, to seek new business models."

Statoil envisages augmentation beyond automation. Automation is about efficiency through electronic data processing which may have no influence on effectiveness such as a reduction of incorrect orders. Savings are guaranteed by augmentation, not automation. (Onarheim & Syvertsen, 1999, p. 2). The BRA programme at Statoil exemplifies the shift from automation of processes (efficiency alone) to augmentation of improved value added processes

(effectiveness) through the use of digital information from a common source of quality data (p. 5). *Halliburton*, *Statoil*, and *Siemens* are exemplars of this similar strategy with their SAP systems.

Critical Issues - knowledge as corporate asset should be managed

Siemens's ICN group went live with the R/3 System in 1995, and implemented the SAP ITS as an Internet platform together with *Siemens* Mail and Online Business System in mid-1998. The experiences gained were reflected in the company's multi tier strategy for Internet commerce (A7.4.3)

As a move to an e-business platform the Business Connector was implemented in June 1999 as the backbone of the multi-tier strategy and replaced the existing ITS installation. The *Siemens* division now embeds R/3 process logic and data transparently in its customer or supplier ERP or Internet catalogue systems, without having to access a common basis. The solution is more agile and cost-effective than the company's previous (1997/8) data connection now that the ERP systems are completely Web-enabled, from SAP R/3 to 'Advanced Planner' and Optimiser, SAP Business Information Warehouse to B2B Procurement. This allows for work to be done when and where desired. "*Now I can work from my hotel or living room and not be tied to the office*" (*Statoil* Data Quality Manager).

Performance Objectives (EVA)

The effectiveness of Intranet projects comes from utilising income opportunities. Organisational savings are guaranteed by augmentation not automation. Augmentation is considered as opportunistic gains from information sourcing and knowledge sharing. Completely Web-enabled ERP systems with a common source of quality data have become more agile and cost-effective. The realisation that "knowledge as corporate asset should be managed" is driving a revision of employee reward schemes (Venkatraman & Henderson, 1998, p.38).

(iii) Professional Community Expertise

The third stage of *knowledge leverage* focuses on the community of professional expertise. e-ERP systems must enable companies to dynamically link their employees (with core expertise) and their partners (with external expertise) into a virtual expert team. This signals a shift in the company payroll to a skeleton of professional staff supported by a pool of contracted professionals. The cases in Table 7.3.3(iii) are used to assess how it is leveraging a community of professionals to sustain innovation and growth.

Tables 7.3.3(iii): Professional Community Expertise

Virtual Organising's Dimension 3, Stage 3	B2B ⁺ Cases(#)	Characteristics or Opportunities
• Expertise of customers, employee, suppliers	1, 10a	Combined expertise from of customers, partners and employee
• Collaborative community	10a	Emerging collaborative communities
Extra Issues Identified	10a, 4a-b	Employee self service to leverage the employee value chain
Critical Issues	10, 4a-b	Multi-tier strategy for e-business architecture
Outcomes & Performance Objectives	1, 3, 4a-b, 10a	Sustained innovation and growth (SIG)

Case(s) used to examine this component of VOing: UBS(1), UNICEF(3), Dell(4a)-LSI(4b), Siemens(10a).

Table 7.3.3(iii) summaries the characteristics used to examine the fit of cases to VOing - in the knowledge leverage dimension at the inter-organisation stage.

Expertise of customers, employees, and other partners

Siemens's Center of e-Excellence is committed to collaborate internally and externally employee expertise. By May 2000 the fragmented e-business landscape in Siemens's regions and groups required a corporate approach via centres of 'e-Excellence' and Internet access for all employees. Successful e-business transformation at Siemens demanded a unified web presence for all divisions.

The change process was being driven by e-community through centres of 'e-Excellence'.

Collaborative communities

By mid-1999, Siemens had moved towards a global engineering network (GEN) (A7.4). "GEN's overall goal is to make structured information and knowledge easily accessible in all business processes" (Timmers, 1999, p.93). As a concept, GEN not only enables faster access to information, it also leads to better management of information. Customers can search for specific components, design or services. Data can be pulled together to build up a complete project involving partners.

Timmer's (1999, p.96) rates Siemens as an e-business company with mixed capabilities for success in developing the GEN concept. The core of the GEN concept is a collaborative design and engineering platform. As such, it is of an infrastructural nature and likely to be most effective if it is used throughout an industrial sector or business segment "number one". To this end, a center of e-Excellence was created to be a corporate global community, to promote and coordinate:

- Constitution of the e-community Competencies and corporate e-services
- Lead projects and accelerator programsControlling and scorecards.Extra or

Critical Issues

The multi-tier strategy for e-business (A7.4.3) gives rise to two requirements that are covered by the Siemens Business Connector: on the one hand, exchanging company, master, and transaction data with external systems, both R/3 and non-R/3 systems, and on the other hand, presenting data or process logic in the context of external systems process sharing e-business. Case 4a-b in Chapter 5 represents an exemplar of e-business integration between R/3 and non-R/3 systems.

Performance Objectives

The goal of emerging collaborative communities is to make structured information and knowledge easily accessible in all business processes across organisational boundaries. The shift from a fragmented conglomerate to an integrated global engineered network (GEN), was driven by the e-community through the creation Center of e-Excellence. Such networked communities used a multi-tier strategy for e-business, based on a hybrid R/3 open system architecture.

7.4 SUMMARY OF FINDINGS

Table 7.4 represents a map of the final analysis of the findings. It is used to demonstrate the interdependence of the development stages of virtual progress and the power of self-service.

Table 7.4: Summary Map Virtual Organising Stages of Development

VOing Dimensions	Stages of Development		
	1. Unit tasks	2. Organisation	3. Inter-organisation
Customer Interaction (virtual encounter)	Online stores for enticing customer self-service to reduce static costs	Intelligence sites for customisation to achieve customer "stickiness"	Orchestrate a customer e-community for feedback to drive new product/services
Asset Configuration (virtual sourcing)	Online procurement for control of employee self-service to reduce costs	ASP for outsourcing all standard info intensive fns to utilise core assets	Strategic negotiations to assemble capabilities for e-marketplace
Knowledge Leverage (virtual expertise)	Groupware for sharing information by employee self-service	Scheme for managing teams to make corporate knowledge an asset	Centre of e-Excellence for creating a global network of knowledge assets to grow
Outcomes & Performance Objectives	Improved operating efficiency (ROI)	Virtual and economic value added (EVA)	Sustained innovation and growth (SIG)
Examples	Customer service, purchasing, product development	Assemble and coordinate assets; creating value through use of digital info.	Business network to design and leverage interdependent e-communities

**No one dimension adequately captures the potential opportunities of VOing.*

Summary of the Customer Interaction or Virtual Encounter

The efficiency gains from Online Stores are enhanced by intelligent systems for adding value to products and services, and in turn expanded to designing and building customer communities. To this end, companies are making the online experience rich and fulfilling for customer expectations and demands. Their goal is to be the best Web site for selling the best possible products and services.

The competitive desire to reduced costs through Online Stores has end-consumers, and corporate customers *permitting* their employees, to greater self-service buying.

↳ Improved intelligent Web sites offer customised value added products and services to enhance customer "stickiness".

↳ So, customer communities have emerged having a distinctive focus on products through electronic community designs and facilities.

Summary of Asset Configuration or Virtual Sourcing

Procurement logistic concerns operate cost-reduction through standard procurement processes, and optimization of time, costs, and quality. Procurement marketing involves strategic cost-reduction through global sourcing, market transparency, and supplier management and demand bundling.

The efficiency gains of Online Procurement comes from standardised catalogues and Web interfaces, with automatic approvals has companies *committing* their employees to greater self-service purchasing of materials.

↳ ASP of standard information intensive processes allows more time for staff to concentrate on core business competencies and for the firm to better utilise assets.

↳ The role of procurement staff, shifted from purchase order administration to strategic negotiations with vendors, has been utilised through assembling capabilities of private e-marketplace.

Summary of Knowledge Leverage or Virtual Expertise

The Intranet groupware applications enabled efficiency gains with administrative tasks of communicating and sharing corporate information, for saving time and costs. Easy to use Web interfaces are essential to exploiting employee self-service.

↳ The Intranet groupware enabled effectiveness gains from optimizing processes.

An employee reward scheme to foster employee self-service, should be aligned

↳ the realisation that knowledge as corporate asset should be managed.

The shift from an e-business to a global engineered network of business is most possible if driven by the e-community through the creation Center of E-Excellence, and supported by open R/3 system architecture.

Interweaving of VOing Dimensions

The issue of interweaving of the dimensions of VOing looks at the implementation of multiple e-business initiatives and the corresponding complexities. Further research, how does the issue of interdependency between the three *dimensions* of VOing affect performance? Table 7.5 summarises the interweaving of VOing dimensions found in the various case studies.

Table 7.5: Interweaving of Virtual Organising Dimensions (D)

VOing Dimensions (D)	Stages of Development	
	Stages 1 and 2	Stage 2 and 3
<u>1. Customer Interaction</u> linked with <u>2. Asset Configuration</u>	i) FSC with SAP e-Commerce process optimisation between FSC's ORS and SAP's B2B procurement	ii) Dell with LSI Customised online sales integrated with customers MRO procurement
<u>1. Customer Interaction</u> linked with <u>3. Knowledge Leverage</u>	iii) Siemens eMall e-Store across a global network of divisions, within a conglomerate	iv) Siemens (GEN) Access to structured information & knowledge in business processes
<u>3. Knowledge Leverage</u> linked with <u>2. Asset Configuration</u>	v) Employ-National B2B Procurement with Intranet access to Personnel data	vi) Statoil B2B Procurement , and updated by Intranet access to Personnel data
<u>1. Customer Interaction</u> linked with <u>2. Asset Configuration</u> and linked with <u>3. Knowledge Leverage</u>	vii) O&Gas e-Marketplace Private e-marketplace- order request system integrated with SAP procurement system	viii) Siemens (eUtilities) From collaboration and optimisation of business competencies, Siemens' divisions have across regional private e-marketplace for utilities.

D1- Customer Interaction with D2 - Asset Configuration

- i. The system was developed to optimise processes between *FSC*'s 'Order & Request System' and *SAP*'s 'SAP B2B Procurement' across the Internet.
- ii. This integration enables the selection and purchase of *Dell* systems within the customer's *SAP* B2B Procurement application.

D1- Customer Interaction with D3 - Knowledge Leverage

- iii. *Siemens*'s e-Mall is an Internet marketplace for a group of companies to sell their products and services to their corporate customers.
- iv. To achieve the benefits for business customers, *Siemens* move from a fragmented group of companies, towards a global engineering network (GEN) concept.

D3- Knowledge Leverage with D2 - Asset Configuration

- v. *Employ-Nat*'s procurement solution was designed to realise cost savings in the purchasing and human resources, together with a HR Intranet to reduce administration tasks and remove paper forms.
- vi. The *BRA* programme was used to raise the level of Internet skills throughout the company, and later implemented the *SAP* software allowed employees direct access to Internet catalogues for supply items as required.

D1- Customer Interaction with D2 - Asset Configuration with D3 - Knowledge Leverage

- vii. An open collaborative business environment of personalised solutions on demand, it hosts the marketplace to enable leading oil and gas companies to collaborate and conduct commerce over the Internet.

viii. By collaboration and the optimisation of business competencies, Siemens' divisions are now building a cross divisional/cross regional private e-marketplace for utilities business segment.

Interpretation of Findings

- (i) No one dimension adequately captures the potential opportunities of VOing.
- (ii) The tendency of enterprises is not to develop at all stages of VOing. Improving performance along all dimensions, although rarely practiced, is essential to VOing.
- (iii) VOing should be focused on business models, not be industry based. It will vary in terms of the business focus of the organisation with services towards customer and suppliers with traditional products.
- (iv) Further research on how the issue of interdependency between the *dimensions* of VOing affects performance given, for e.g. *Dell* and *UBS D1* with *D2*, *Statoil* and *UBS D2* with *D3*, *Siemens D1* with *D2* with *D3*. On reflection there is a shift from single to multiple applications involving the VOing dimensions. This is even more interesting as a measure of e-business acceptance.
- (v) Variance with previous findings and the interpretation of the model of ICT induce business transformation:
 - The increased benefits come from the synergy of all components not as previously stated. Venkatraman, (1991; 1994); El Sawy et al. (1999) say that benefits increase as the firms migrates along *transformation* dimension.
 - These findings suggest that a comprehensive view where all elements of both dimensions are necessary for benefits realisation, as competitive advantage.
 - Further, findings support Venkatraman and Henderson's (1998) implication from virtual organising, that there is an interdependence between e-ERP technological change and business transformation.

7.5 SUMMARY

The chapter used VOing as a summative approach to draw together all data gathered from phase 2 of the study, as well as further supporting documentation. Content and comparative analysis was used to examine the 3rd research question about e-business strategy through ERP. A model of VOing as described by Table 7.0 was used as a detailed benchmark to evaluate the progress in the virtual space, made by a particular set of SAP-based organisations. This utilised the basic performance objectives of VOing.

The case material was found to be completely mapped by VOing model as captured by Table 7.4. This demonstrated the completeness of e-business strategies rather well. No one dimension adequately captures the potential strategic opportunities of VOing. In addition, VOing should be focused on business models, not be industry based. For example, the early pioneers of e-business systems concentrated on cost reductions from online stores, B2B procurement and employee self-service applications.

The findings substantiated the VOing model represents a generic and complete map that should assist ERP-enabled organisations in developing their e-business strategies. Although the case material was limited to discrete snapshots, the data gathered demonstrated the capability to examine the performance objectives at each stage and the underlying factors to craft an effective strategy and structure. There is a tendency of enterprises not to develop at all stages of VOing. Improving performance along all dimensions, although rarely practiced, is essential to VOing. Similar to Venkatraman and Henderson's emphasis on the interviewing of the core business dimensions of VOing, this chapter has focused on the development of work-units, organisation structure, and the extended business community.

In recent times, there has been a shift to e-malls and e-marketplaces, as an extension of online stores with B2B procurement systems to support. The next chapter, one case study, *Siemens* is examined in all details of VOing using case material gathered during a three year period, 1999 – 2001 to determine stages of e-business process .

CHAPTER 8

STAGED IMPLEMENTATION OF E-BUSINESS NETWORKS THROUGH ERP:

A CASE STUDY OF SIEMENS (1999-2001)

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8.0 INTRODUCTION

In this chapter a case study of the Siemens Corporation is used to identify the stages of e-business implementation through ERP that contribute to organisational transformation. The case of Siemens' e-business evolution is viewed in terms of buy-side and sell-side solutions and services that inter-relate. These e-Business solutions were seen to evolve in six stages with increasing business value and network complexity from infrastructure to e-marketplaces.

By viewing the Siemens case as a staged implementation, it may easily be evaluated in terms of the attributes of the virtual organising or VOing model.

8.1 CONCEPTUAL FOUNDATIONS

New Model of Benefits from Internet Extended SAP Implementations

A visit to ten WA SAP-based organisations was carried out during - February 1999 (Chapter 4, Table 4.1). From the interview of one company, Woodside Energy, an extended IT model was captured. Figure 8.0 presents this as an IT strategy model. It details the stages of adoption and implementation of ERP (SAP R/3) for an organisation, followed by Internet technology. It represents an evolutionary or staged implementation approached that is common to Australian "follower" type organisations (NNI Report, 1998).

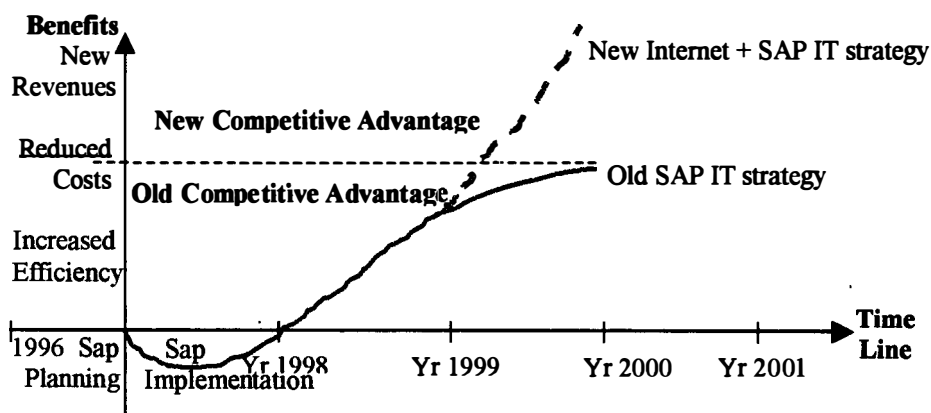


Figure 8.0: Competitive Advantage from Internet extended SAP R/3

With the release of the SAP R/3 release 3.1 with Internet extensions, the German software company SAP AG delivered a comprehensive enterprise wide e-commerce solution (SAP, 1998). "The majority of the benefit will be returned to customers and suppliers connecting through this interface - and will have a propensity to cannibalise revenue from the existing physical channel as suppliers and customers find ways of dealing more efficiently with organisations through the electronic interface" (Dobis, 1998, p.1).

Stages of Growth Model

The stages of growth for e-business (SOG-e) model by McKay et al. (2001) is offered as a framework to help practitioners understand and describe the current state and position of an organisation with respect to e-business. This includes an assessment of maturity with respect to e-commerce, in addition to an understanding of the maturity of an organisation's "back office" IS/IT investments. Also, this embraces the features "e-Commerce Maturity" model (KPMG, 1998) discussed in section 2.6. The integrated model of e-business maturity can be achieved through mapping the Internet based stages of growth model onto the IS/IT stages of growth model. The result is called the SOG-e Model as illustrated in Figure 8.1.

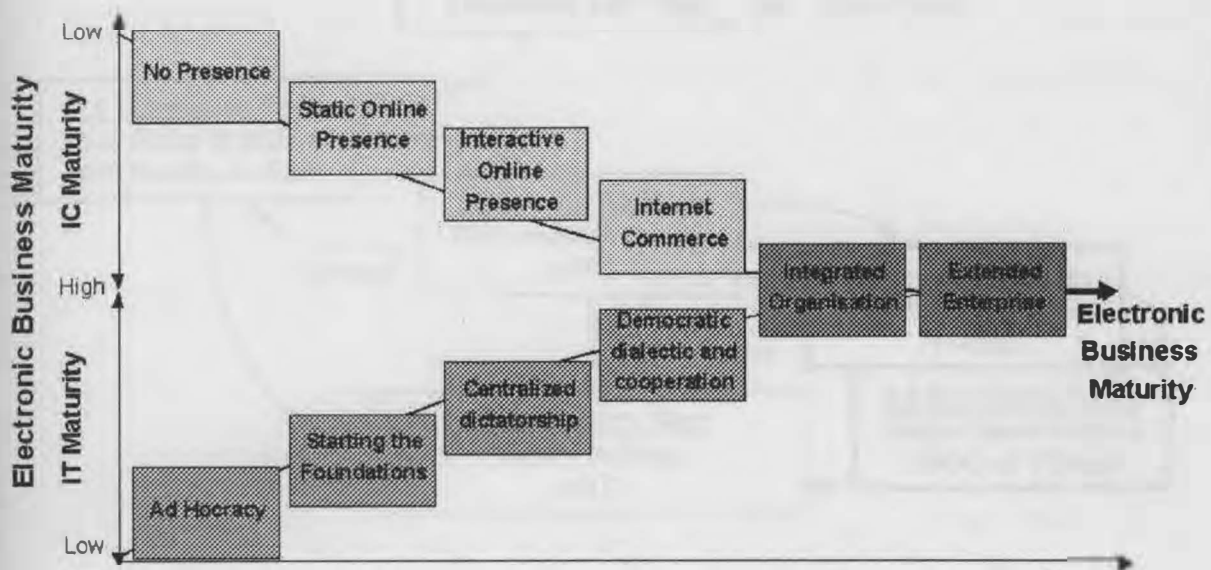


Figure 8.1: The SOG-e model (Source: McKay et al, 2001, p. 1079)

Typically IT stages of growth models concentrate solely on the issue of a traditional IT, or the "back-office", within an organisation without considering the impact of the Internet technologies in the organisation. This is understandable, as the IT stages of growth models were developed before the burgeoning of Internet technologies, the emergence of e-commerce and an increasingly interconnected world of e-business. On the other hand, the Internet based stages of growth models focus solely on the Internet or e-commerce side of the organisation, or the "front-office", while paying less or no attention to the more traditional IT.

The authors of the model viewed it as a guide to understanding, diagnosing and evaluating the current position as well as providing insights and guidance on future progression and direction in e-business, including the realisation of future business benefits. A major criticism of this model is its lack of actual detail, especially in evaluating the outcomes and performances of SOG of e-business.

8.2 METHODOLOGY

Descriptive Research Phase 2.3 on a Single Case Study

Figure 8.2 highlights the third part of the descriptive phase of the composite case-based research method. This details research activities of case studies (Table 3.3) for describing theory associated with refined a sub-question from 3rd research question: Identify the stages e-business implementation through ERP that contribute to organisational transformation. This question was elicited by the findings on VOing strategies from the previous chapter.

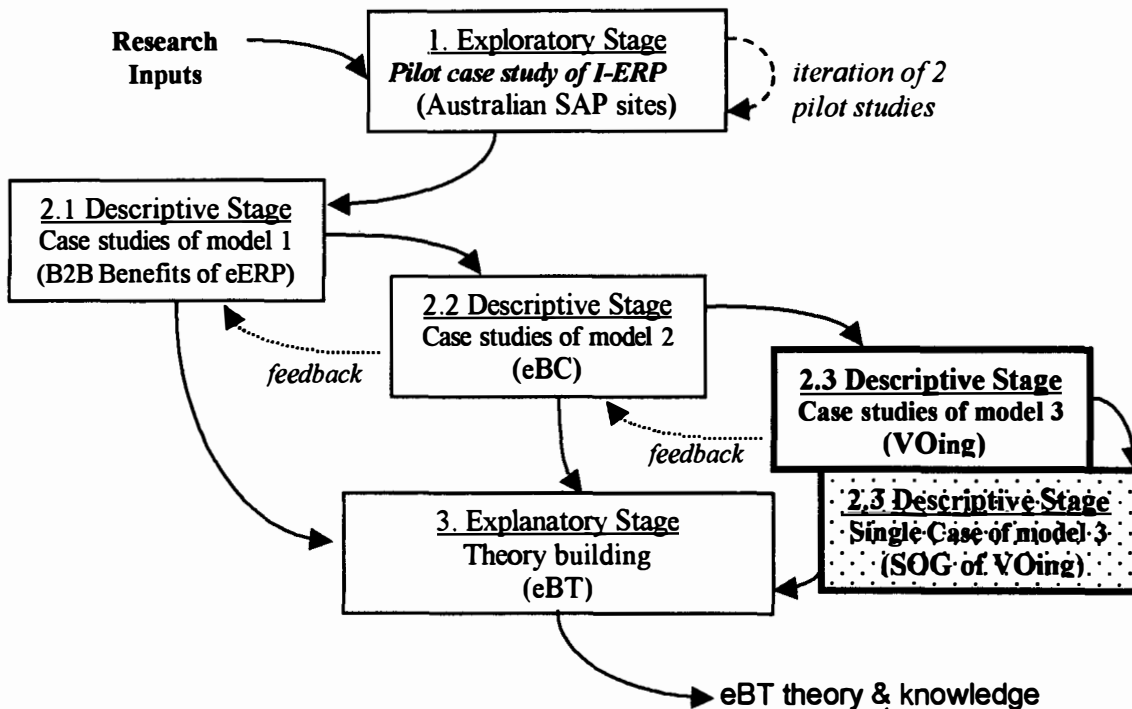


Figure 8.2: A Single Case of Case-based Research Method

Refining of 3rd Research Question

The research questions identified at this stage of the study are subordinated to the original 3rd research question (Q.3): Do effective strategies for e-ERP implementations fit the VOing model?

The following subordinate questions are refined from the questions left unanswered from the last chapter.

- (i) What is the pattern of growth in e-Business through ERP?
 - (ii) What is the most effective pattern for benefits realisation?
- and
- (iii) What are the stages e-business implementation through ERP that contribute to organisational transformation?
 - (iv) Does this follow a specific pattern?

In chapter 5 the B2B models were used as a general guide to analyse the e-business implementation patterns of ERP enabled organisations. The summary of the results showed that a staged pattern of change was the preferred transition route to e-business through ERP.

Longitudinal Single Case Study

In this chapter we illustrate a stage pattern using the case of Siemens Corporation. The study took place over a three year period of Fujitsu Siemens Computers (FSC) with at least two face-to-face interviews with SBS UK over the three year period supported by document analysis, telephone calls, e-mails and web searches.

- (i) Initial investigation into e-Business at SAP sites, e.g. Siemens UK in 1999.
- (ii) Investigation of FSC UK through face-to-face interviews and e-mails in 2000.
- (iii) Detailed case analyses of 2 projects in South Middle Europe through follow-up interviews in 2001.

Table 8.0: Summary of Data Collection Protocol for Fujitsu-Siemens

Stage: mon-yy	Interview Protocols		
	Interviews	Telephone calls	Emails
1 st Nov-99	nil	10 & 11 Nov Mr N Markovits - e-Business Consultant, (SBS), Woking, England	12 Dec N Markovits - Siemens, (1999c). 15 July -
	3 July: Mr N Markovits - e-Business Consultant, (SBS), Woking, England		11 July - Appdx 6.4 p.4
	3 July: Ms E Easton - ORS project engineer, (SBS), Woking, England		15 July - Siemens, (2000).
2 nd Jul-00	3 July: Mr Martin Wilson - e-Commerce Development Manager, (SBS), Woking	•	
3 rd Jun-01	26 Jun - Mr G. Freist, Siemens e-Business Program. Bled, Slovenia:	•	17 June - Slide presentation

8.3 CASE BACKGROUND

Siemens is a global powerhouse in electrical engineering and electronics, with its headquarters in Germany. Established in 1842, Siemens is a global player in over 190 countries and the fourth largest electrical and electronics manufacturing company in the world. In 1999 the annual turnover was 68 billion euros with R&D expenditure of 5.6 billion euros (Siemens, 2000).

Siemens has major business segments in Energy, Healthcare, Information and Communication, Industry, Components, Transportation, Household, and Lighting (Figure 8.3). The Information and Communications business segment consists of three groups: Information and Communication Networks (59,000 employees, \$13

billion in sales), Information and Communication Products (33,000 employees, \$11 billion in sales) and Siemens Business Services (21,000 employees, \$4 billion in sales). The Communication Devices Division (within the ICP group) is the world's leading provider of digital phones (Siemens, 1999b).

The ICP product group is positioned in the strategic growth fields of information and communication technology, and offers the entire product range of IT and communications from a single source: from PCs, notebooks, servers and mainframes, all the way to digital products and corded, cordless and mobile phones. The strategy for the mobile phone business is to expand its global market share while SBS complement the portfolio with an emphasis on value-added services.

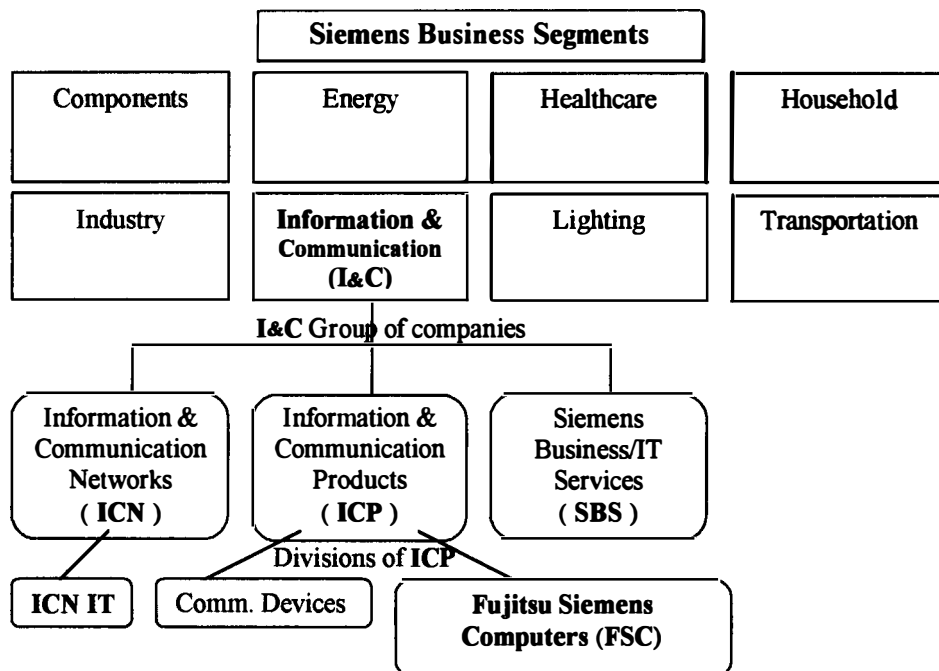


Figure 8.3: Part of Siemens' Organisational Structure

Fujitsu Siemens Computers (FSC) was formed through a joint venture between Fujitsu and Siemens and commenced operations on Oct. 1, 1999. The company is jointly owned and has its headquarters in Amsterdam. From extensive European manufacturing facilities, customer-focused companies in 25 European countries and more than 9,000 experienced employees, FSC aims to be the No. 1 computer company in its home market by the end of year 2001 (Siemens, 1999b).

8.4 STAGED IMPLEMENTATION

In the Beginning - e-Business Platform (1995-1999)

Siemens ICN IB, a subsidiary of Siemens AG, has approximately 1,400 employees, with post annual revenues of DEM 3.5 billion, and is represented in 160 countries across the globe. The company is a strategic partner for network providers and companies operating in the market for ICP's network solutions. Siemens ICN IT went live with the R/3 System in 1995, and implemented SAP Internet Transaction Server (ITS) as an Internet platform together with Siemens Mail and Siemens' Online Business System in mid-1998 (Siemens, 1999b).

As a move to an e-business platform, the SAP Business Connector (BC) was implemented in June 1999 as the backbone of the multi-tier strategy and replaced the existing ITS installation. This e-business infrastructure is illustrated in figure 8.4.

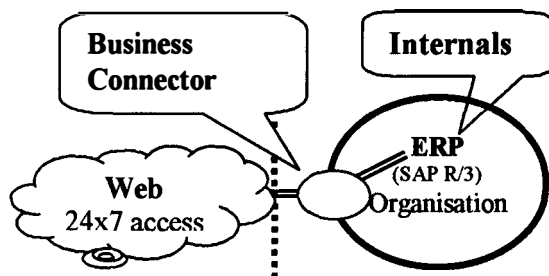


Figure 8.4: B2B Infrastructure Based on ERP

The Siemens subsidiary can now embed R/3 process logic and data transparently in its customers' or suppliers' ERP or Internet catalogue systems – without having to access a common database. Interaction is guaranteed by using BC templates that visually displays data in charts and control user actions. SAP's Business Connector now promotes data exchange between ERP systems on the Web using XML as the business language (Figure 8.4). The solution is more agile and cost-effective than the company's previous (1997/8) data connection. SAP software is now Web-enabled. From SAP R/3 to Advanced Planner and Optimiser, SAP Business Information Warehouse to SAP Business-to-Business Procurement (Siemens, 1999b).

The multi-tier strategy gives rise to two requirements that are covered by the Business Connector:

- exchanging company, master, and transaction data with external systems - both R/3 and non-R/3 systems,
- presenting data or process logic in the context of external systems - process shared.

At this time, an inhouse e-business development was having impact in the Computer Systems division (FSC) of the company (Siemens, 1999c).

Stage Two - e-Store at Siemens 1997-1999

The SAP-based order and request systems (ORS) was developed by Siemens Business Services (SBS), and has been used at FSC since 1998 on the most diverse SAP R/3 systems all over Europe (Siemens, 1999c). ORS was created primarily to optimise processes between FSC and its partners. In July 1997 SBS in Germany were commissioned to develop an Internet connection for its three SAP R/3 retailing systems. An "inside-out" approach to implementation was adopted using the SAP Internet Transaction Server running SAP R/3 release 3.0 F. The overriding goal of Siemens Computers was to implement an international reference solution in Germany with a view to multi-language development (Siemens, 1999c). The first group of functions related to *Order Tracking* was released in March 1998. This was followed in July 1998 by *News Channel* functionality, the active provision of information to users by means of order and delivery notifications. Since October 1998 it has been possible to display *original R/3 order documents* online in PDF format. *Online Ordering* was then introduced in December 1998 and additional configuration tools were incorporated online at the client end. Figure 8.5 illustrates the final touch was added to the classical e-store in the first quarter of 1999 by the release of customer specific *Premium Pages* (Siemens, 1999d).

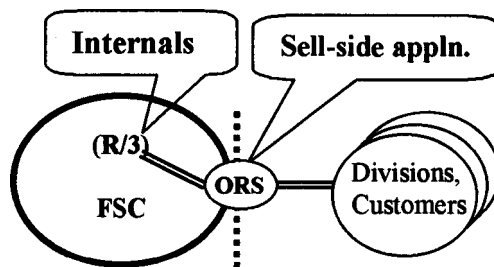


Figure 8.5: B2B^c Model of an e-Store for Corporate Customers

The Order and Request System (ORS) provides Fujitsu Siemens Computers with a simple way of presenting its configurable products for sale via the Internet. The online connection optimizes ordering time and simultaneously minimises the number of incorrect orders. All sales executives and partners are able to place orders online at any time and track their progress or request current information on the orders and delivery dates. A news channel is provided to enable customers and partners to obtain information automatically on their orders. The range of products can be presented in a hierarchical form in shops that serve a particular clientele. To simplify ordering, *premium pages* address specific customers and show

products and configurations frequently ordered by those customers. This demonstrates a move towards intelligent web sites as in virtual organizing (VOing). Developed and manufactured for European customers, the product portfolio benefits from the technologies and worldwide sourcing networks of the parent companies. FSC demonstrates the connecting into the customer's value chain.

Stage Three - Global Engineering Network (1999-2000)

Given its geographic expanse, Siemens decided to create national accounting service centres in countries where it had a significant presence. It also created cross-border accounting centres to support its smaller offices with cost cuts of 30%. This involved personnel issues of training, motivating and transitioning of accounts from a head-quarters style accounting approach to a service model where "accounting people are no longer overhead producers, but quality producers at a measurable price" (Hoffman, 2000, p.48). By mid 1999, Siemens had moved towards a Global Engineering Network (GEN) development. "GEN's overall goal is to make structured information and knowledge easily accessible in all business processes" (Timmers, 1999, p.95). As a concept, GEN not only enables faster access to information, but also leads to better management of information. Customers can search for specific components, design or services. Data can be pulled together to build up a complete project involving multiple partners (Timmers, 1999, p.96).

Table 8.1*: Assessment of Siemens Attributes for Global Engineering Network

<p>Key Assets:</p> <ul style="list-style-type: none"> • Strong presence in Germany and in many other countries • Strong information technology base • Near to implementation of GEN-like system 	<p>Key Weakness:</p> <ul style="list-style-type: none"> • Relatively strong national orientation • Management commitment not clear • Relatively new electronic commerce services division
---	---

**Source: Timmers (1999: p.96)*

Table 8.1 shows Timmers (1999, p.93) assessment of Siemens as a company with mixed capabilities for success within developments of the GEN concept. In addition, the core of the GEN concept is a collaborative design and engineering platform. As such, it is of an infrastructural nature and likely to be most effective if it is used throughout an industry sector or business segment to "be number one or nothing" (Freist, 2001, p.3) By June 2000, the company's increasing experience with electronic commerce had led to two strategic innovations of sell-side and buy-side of e-SCM; e-Mall and e-GateCentre (Siemens, 2000; Freist, 2001). An extended study by Tabor (2000, p. 670) found, "An aggressive business strategy is a stronger

driver of EC technology adoption than IS strategic orientation.” Siemens by now had incorporated EC with the overall business strategy.

Stage Four – The e-Mall (2000)

The Siemens' e-Mall is an Internet marketplace for Siemens' companies to sell their products and services to business customers. The system architecture has the capability to connect/interact with a range of *Buyer companies* SAP R/3 and R/2 systems, and other ERP systems.

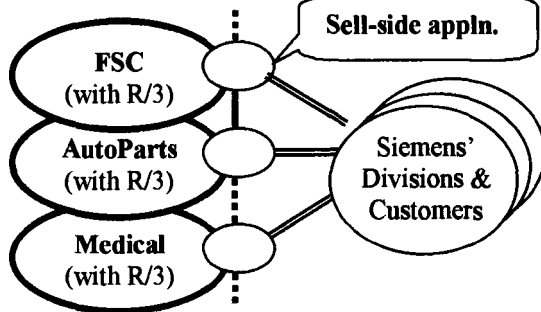


Figure 8.6: e-Mall as a Group of Companies with e-Storefronts for Customers

The intended benefits of e-Mall flow from the streamlining of sell-side business processes:

- Siemens group specific product presentation;
- Integration of Group's materials systems;
- "One face" to the customer;
- Sales presence round the clock and world-wide

By June 2000, the company's e-Mall had progressed to version 2 with three companies - ICP, A & D, Medical (Siemens, 2001).

- (i) Siemens Computer Supplies (MRO) using Order and Request System (ORS)
- (ii) Siemens Insurance Mall /MedShop
- (iii) Siemens Auto-Parts Distribution

The lessons learned were two fold;

- The use of a common platform (SAP-based) needs the agreement on all functionality.
- The internal and external marketing of the facility is essential to initialise and develop customer base.

In the near future the next step will be the evolution to Siemens Corporate Portal for B2B procurement of supplies.

Stage Five – Corporate Portal (2000 - 2001)

In 2000 Siemens introduced "Gatecentre" as an Internet marketplace for 520 Siemens' companies to purchase their products and services from business suppliers. The worldwide presence of the Siemens purchasing network supports global sourcing and corporate-wide combined requirements.

The intended benefits of Gatecentre flow from the streamlining of buy-side business or procurement processes into a single corporate solution. Gatecentre featured individualised offers, up-to-date cross group Siemens' offerings, and convenient ordering at any time and anywhere (Siemens, 2000).

The B2B^s model in Figure 8.7 used the SAP B2B Procurement application to link supplier catalogues with the individual Siemens Companies' R/3, through a common gateway.

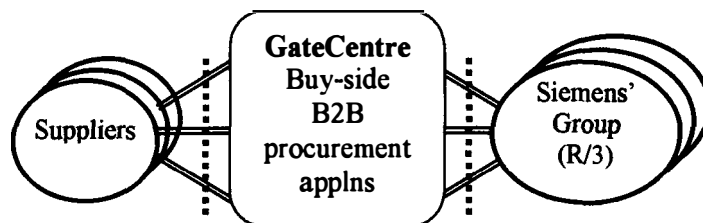


Figure 8.7: B2B^s Model of e-Procurement from Supplier Catalogues to Siemens Group

The potential for procurement was defined by the company focus on cost-reduction. This was assessed in terms of procurement marketing and procurement logistics:

- Procurement Marketing – strategic cost-reduction through global sourcing, market transparency and supplier management and demand bundling.
- Procurement Logistics – operative cost-reduction through standard procurement processes and optimization of time, costs, and quality.

By June 2000, the company's Gatecentre had progressed to the capability for answering the challenges of procurement landscape. An independent market analysis confirmed that this corporate Portal would eventually lead to a complete supply chain management (Gartner Group, 2000). The next stage of a private e-marketplace was trialed in June 2001 to test supply chain management.

The Final Stage - Private e-Marketplace (2000 -)

In May 2000 the company's fragmented e-business landscape in the regions and groups produced a corporate initiative and access to the Internet for all employees. For e-business at Siemens to be successful would require transforming a fragmented web presence to a company-wide approach. Here the change process is being driven by the "e-community" and the "Centre of e-Excellence" (Fr, 01).

The Centre of e-Excellence is committed to collaborate internally and externally and promote a constitution of the e-community competencies and company e-services, and promote lead projects and accelerator programs using controlling scorecards.

The specific tasks include:

- e-learning by HR training, in regions from SBS groups.e-technology by corporate R&D.
- Marketplace sell by regions and groups.
- Marketplace buy by corporate procurement and logistics.
- e-Logistics by corporate logistics.

Two cross-regional and cross-divisional e-business related projects, are currently running in the Mid-Southern Europe (MSE) mandated by the MSE-board. e-MSE and e-Utilities are the two lead projects to define the marketplace development process for Siemens in general. A definition of regional customer-clusters for private marketplaces including, e-readiness evaluation and e-business organization, is creating "cross-border and cross-divisional optimization of business competencies, with one face to our customers" (Freist, 2001, p. 11).

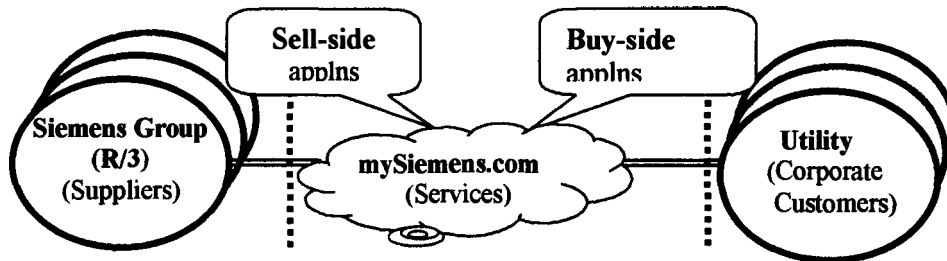


Figure 8.8: B2B Model of a Private e-Marketplace

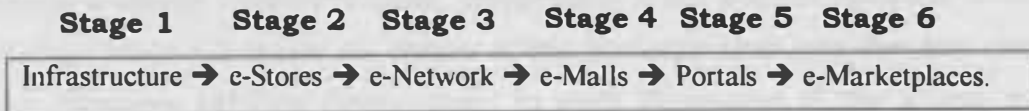
Figure 8.8 illustrates the development of *mySiemens.com* as cross-divisional Siemens private electronic marketplace for utilities companies. The project e-Utilities was initiated by utility companies in Austria who wanted to have a shared communication platform with Siemens. By May 2001 the first e-Utilities project had begun in the MSE (Mid South Europe, 17 countries) region. France has also committed to participate in this marketplace, and other countries are preparing to join. The goal was to offer customers a personalized marketplace in their own language and corresponding to their needs. They are offered news and information about Siemens products, services, and e-business solutions.

The private e-marketplace will be a collaboration hub to let participants exchange information and discuss offers and projects while also acting as a discussion forum and a calendar to arrange appointments. In addition, the concept includes e-learning and travel management. It will also be possible to select and order products, solutions and services. Additional plans foresee the inclusion of partners and local services. The Siemens internal R/3-based business rules remain unchanged (Freist, 2001).

8.5 TWO VIEWS OF ORGANISATIONAL TRANSFORMATION

Siemens Case as a Model of Stages of Growth in e-Business

In the Siemens case, the e-business evolution is presented in six stages with increasing business value and complexity, from e-business infrastructure to private e-marketplaces:



These six stages demonstrate good fit to the SOG-e model as illustrated in Figure 8.9. However, it has to be emphasised that the pattern of “stages of growth” will be unique to any organisation. In the case of Siemens, this is illustrated more clearly in Table 8.2 where the stages of growth is shown in a non-sequential pattern.

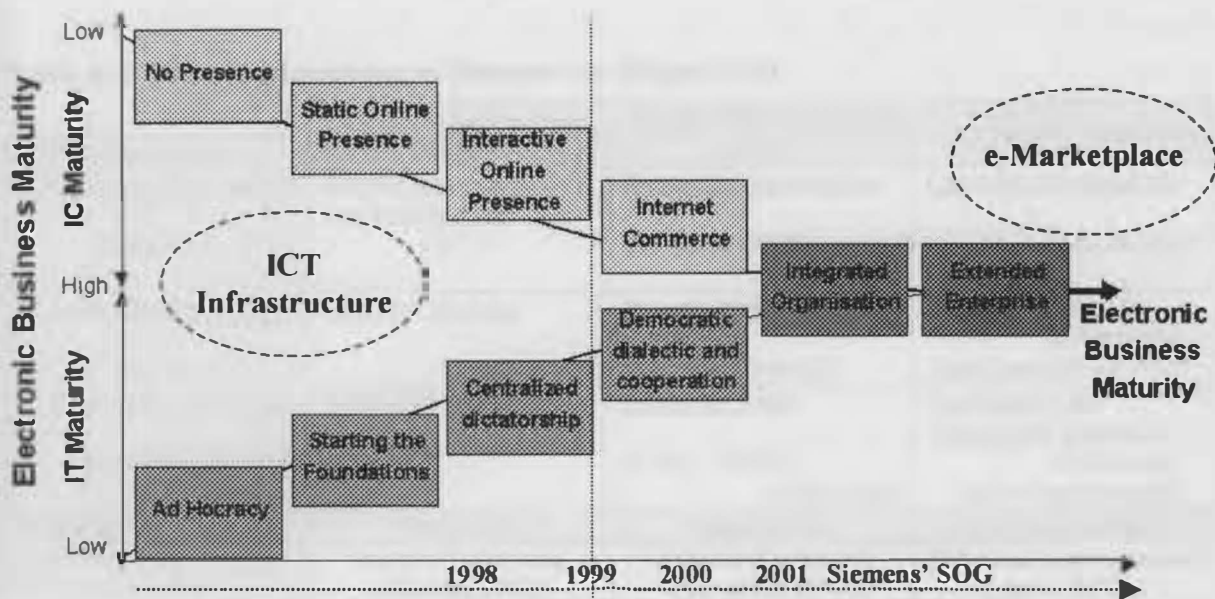


Figure 8.9: The SOG-e model (Source: McKay et al, 2001)

Siemens Case as a Model of Virtual Organising

Venkatraman and Henderson, (1998) have defined their e-business model for the learning organisation that promotes harmony over three dimensions: customer/market interaction, asset configuration, and knowledge leverage, supported by a strong information technology platform. They see this as the virtual organising model for the 21st Century and as such a management strategy in itself. Figure 8.9 gives a view of an organisation using an ERP system such as SAP R/3, as an integrated system to support the management of the flow of information in the three interdependent dimensions of e-business.

Siemens is about the transition of a large German based conglomerate through a cultural change management process towards doing business online. Siemens' corporate wide e-business strategy is presented as a new customer focus through speed, innovation, and optimisation of business competencies.

Siemens within its various divisions including INC and FSC, can be used to illustrate a staged implementation, progressing in all of three stages of development of VOing. Table 8.2 maps six stages of the Siemens case into the key elements of VOing. Siemens exhibits development in each dimension of the VOing model but the order of implementation did not reflect increasing stages of complexity in a sequential manner - see the pattern of numbers captured in Table 8.2. For example at a very early stage Siemens knowledge leverage systems both the work unit and the corporate stage simultaneously.

Table 8.2: Virtual Organising of Siemens by Stages (1-6)

VOing Dimensions	Stages of Development		
	Stage 1	Stage 2	Stage 3
1. Customer Interaction	Remote experience of Products/Services FSC(2)	Dynamic Customisation FSC(2), GEN(3), eMall(4)	Customer Communities eUtilities(6) Mall(4)
Case(Stage)			
2. Asset Configuration	Sourcing Modules GateCentre(5)	Process Interdependence GateCentre(5)	Resource Coalitions eUtilities(6) GateCentre(5)
Case(Stage)			
3. Knowledge Leverage	Work-unit Expertise ICN(1)	Corporate Asset ICN(1), GEN(3), eUtilities(6)	Professional and Community Expertise eUtilities(6) and eCommunity(6)
Case(Stage)			
Business Focus	Task-units	Organisation	Inter-organisation
Outcomes and Performance Gains	Improved operating efficiency (ROI)	Virtual and economic value added (EVA)	Sustained innovation and growth (MVA)

In summary, the case is about an innovative "sell-side" system developed initially to optimise processes between FSC and its partners. To achieve the benefits for business customers, Siemens then moved from a fragmented group of companies, towards a global engineering network (GEN) concept. Next the company's Gatecentre progressed to the capability of answering the challenges of the procurement landscape. By collaboration and the optimisation of business competencies, Siemens' divisions are now building a cross divisional/cross regional private e-marketplace.

At this final stage, the change process is driven by the "e-community" and the pursuit of "e-excellence" managed through "Centre of e-Excellence". By viewing the Siemens case as a staged implementation, it can easily be evaluated in terms of the

attributes of the VOing model . This model in Table 8.2 helps to focus on two related issues. The company was able to leverage the latent resources of networking its R/3 systems and as well as the worldwide presence of the Siemens purchasing network.

8.6 IMPLICATIONS OF FINDINGS

An important new dimension of the SOG-e model, however, is to recognise that within the same organisation, there may exist different stages of maturity for the different components of IT use. Thus it is conceivable that an organisation may be at Stage 3 or 4 with respect to its use of traditional IS/IT, but may still be at Stage 2 with respect to its maturity in e-commerce. 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.

The six stages of the case are shown collectively to demonstrate all the elements of VOing, ie the e-business completeness of the VOing model. This case suggests the VOing model is useful for examining all elements of e-business strategy. In doing so the case study makes a contribution to better understanding the theory of VOing. Table 8.2 shows VOing as theory and one example of VOing in practice. The theory of VOing offers a framework for checking e-business opportunities and progress in each dimension and at the different stages of development. In practice, the case demonstrates interdependency between dimensions of VOing (CI, AC, KL) and through stages of development. Significantly for senior managers Table 8.2 specifies generic VOing measures. This table or matrix offers a framework for evaluating progress in e-business development.

8.7 SUMMARY

The case of the Siemens Corporation was able to identify six stages e-business implementation through ERP that contribute to organisational e-business transformation. The case demonstrated the transition of a large German based conglomerate through a change in attitude towards doing business online. Siemens' corporate wide e-business strategy is presented as a new customer focus through speed, innovation, and optimisation of business competencies.

To achieve the outcomes from e-ERP projects, Siemens utilised three B2B models to offer customers cheaper products with efficient service in B2B^C , and resourcing materials cheaper and more efficiently through procurement agreements in B2B^S ,

and optimising processes in B2B^s integrated with B2B^c for customised service by utilising employee self-service in e-communities.

For e-business to be successful at Siemens required transforming a fragmented web presence into a company-wide solution. If successful, Siemens will become Germany's first digit economy conglomerate through a massive e-business push to conduct 50% of sales online. It will have evolved through six stages with increasing business value and complexity, from ERP based infrastructure to private e-marketplaces.

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 e-business, including an assessment of maturity with respect to e-commerce. In addition, it is useful 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 specific pattern six stages of growth of e-business maturity, progress and increasing B2B sophistication with e-business are depicted more informatively by the VOing model shown in Table 8.2. The table represents a planning and evaluating matrix for e-business progress for ERP-based organizations, using two of the three research models, namely: Benefits of B2B, and VOing. In collaboration these two models propose detailed measures for different stages of growth. This and the wider issues of organisational e-business transformation is the final phase of this research and becomes the topic for the next chapter.

CHAPTER 9

A MODEL OF E-BUSINESS TRANSFORMATION THROUGH ERP

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9.0 INTRODUCTION

This chapter presents the consolidated results from a longitudinal study into e-business implementations through ERP (e-ERP). The study consisted of three separate stages, each employing a different research model to investigate three research questions:

- Q.1: How do organisations maximise benefits from e-ERP implementations?
- Q.2: What factors facilitate and/or inhibit success of e-ERP implementations?
- Q.3: Is there a particular pattern of business transformation for successful e-ERP implementations?

We bring together the antecedents of e-business success using the findings from case analyses against three separate research models: B2B interaction, e-business change, and virtual organising. A single model of e-business transformation (eBT) is proposed that focuses on realising the benefits of B2B interaction, that is, from virtual organising by utilising the facilitators of successful e-business change. This model of eBT represents a comprehensive view of e-ERP as the fusion of the three research models, mapped into various stages of e-business development: integration, differentiation, and demonstration of value propositions. The chapter argues that successful e-business transformation with ERP occurs when *value propositions* are realised through *integration* and *differentiation of technologies* used to support new *business models* to deliver *products and services* online. The associated management practice evolves through efficiency from self-service, effectiveness from empowerment towards and value enhancement from extensive relationship building with multiple alliances.

9.1 THEORETICAL FRAMEWORK: SYNTHESIS OF RESEARCH MODELS

A comprehensive model of e-ERP implementations may be presented simply as the fusion of three interrelated models. Figure 9.1 illustrates e-ERP as a primitive composite view of the three research models: *Benefits of B2B*, *e-Business Change*, and, *Virtual Organising* where:

- (i) Benefits of B2B are illustrated by a two dimensional model (1) where value returns are directly proportional to the level of integration of e-business activity across a set of B2B models (Carlson, 1995). B2B refers to the class of business-to-business (B2B) models that include business-to-supplier (B2B^s), business-to-employee (B2E), business to consumer B2C and business-to-corporate customer (B2B^c), described in chapter 5.1.

- (ii) e-Business Change is illustrated by a flat model (2), in which progress is across eleven interrelated components within three broad dimensions based on relevant research in the areas of “organisational change, strategic management innovation, and information systems evaluation” (Guha et al., 1997, p.121).
- (iii) Virtual Organising is illustrated by a three-dimensional model (3) of e-business activity, that is “applicable to any company.” Progress is along the three dimensions of “customer interaction, asset configuration, and leveraging knowledge” (Venkatraman & Henderson, 1998, p.34).

Three Research Models used for Examining e-ERP Success

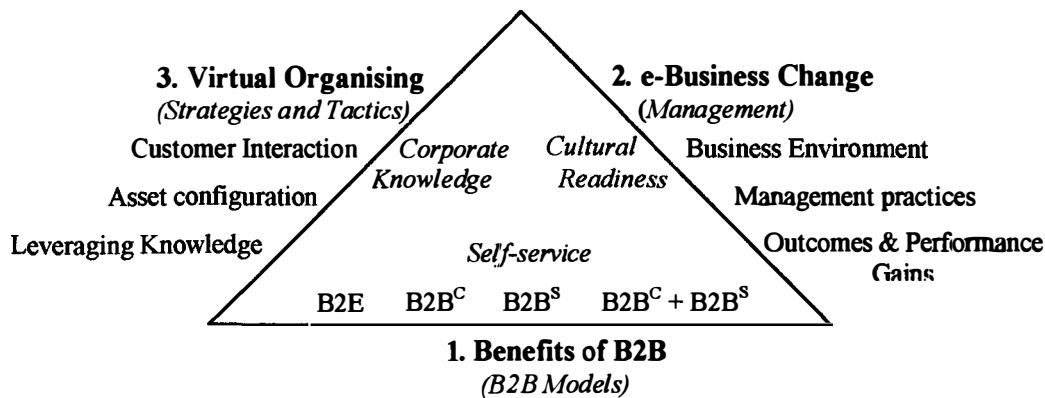


Figure 9.1: Three Faces of e-ERP Implementation

Each research model represented in Figure 9.1 reflects a different business focus covering organisational theory, strategy, change management, and work practices. These models were evaluated at different stages of the study through a composite case based method as shown in Figure 9.2.

9.2 METHODOLOGY

For this research method the detailed descriptions of data collection procedures and analysis have been presented in chapter 4-8:

- (i) Chapter 4 - a pilot case study of nine Australian SAP sites helped ground the theory of the study and identified the first research question.
- (ii) Chapters 5, 6, and 7 - a three-stage case study of eleven international organisations across a diverse set of industries context to examine the three research questions and associated models.
- (iii) Chapter 8 - a single longitudinal case study to examine the research questions of stages of growth and organisational transformation.

This chapter now synthesises these case findings to build a single comprehensive '3x3' matrix as the essential part of a new theory or model of e-Business Transformation (eBT).

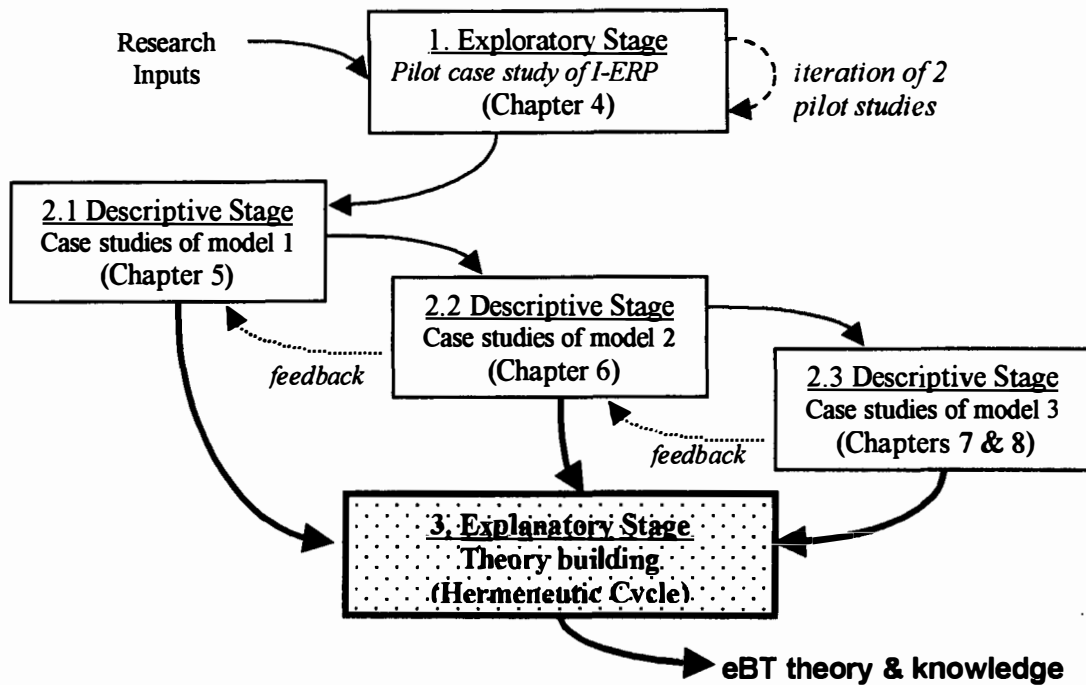


Figure 9.2: Stage 3 of Composite Case-based Research Method

9.3 E-BUSINESS TRANSFORMATION

The final conceptual framework is referred to as e-business transformation (eBT), a term previously observed by Lehmann (2001) and Soni (2001). The concept of eBT is defined as realising the benefits from virtual organising within complex B2B interactions by utilising the facilitators of successful e-business change. To develop a case-based theory of eBT, we begin by identifying the basic research themes, displayed as a model in Figure 9.3.

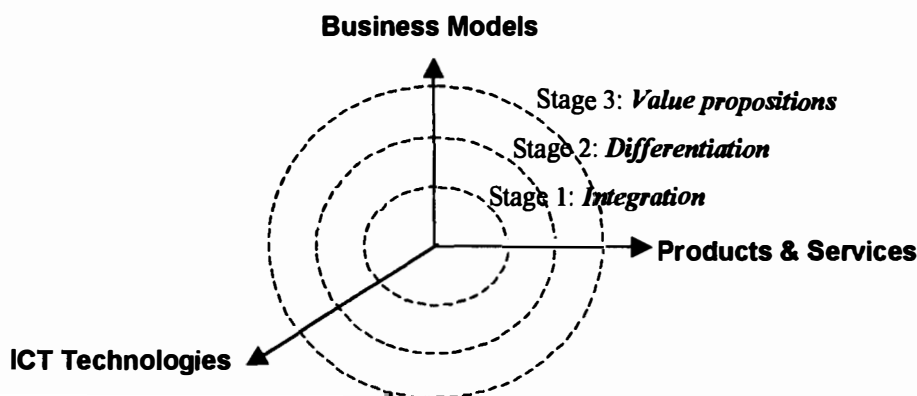


Figure 9.3: e-Business Transformation Model

Figure 9.3 represents eBT as a comprehensive business architecture that focuses on three interdependent dimensions of online business: *ICT technologies, Products and Services, Business Models* where:

- *ICT Technologies* - refers to the convergence of technologies for information flow within and between organisations, e.g. e-ERP implementations;
- *Products and Services* - refers to asset and competency sourcing for providing cheaper, faster, and improved quality of products and services;
- *Business Models* – refers to the architecture of the firm and its network of partners for creating, marketing and delivering value.

Stages of e-Business Transformation

Each dimension of the eBT model is further detailed at three stages of greater e-business commitment to integration, differentiation, and demonstration of value propositions. Progress in the first stage focuses on *integration* for achieving efficiency gains in task units such as, customer service, purchasing, and new product development. The second stage focuses on *differentiation* by selecting the most effective resourcing and marketing activities. The third stage focuses on demonstration of *value propositions* within an inter-organisational network to design and leverage multiple interdependent communities to create superior economic value (Singh & Thomson, 2002; Venkatraman & Henderson, 1998).

Figure 9.4 illustrates the interrelatedness of the three stages of eBT as:

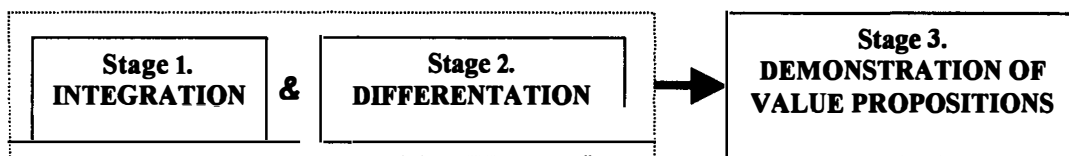


Figure 9.4: Three Stages of e-Business Transformation

Elements of e-Business Transformation

Table 9.1 represents a map of the issues distilled from the findings of this longitudinal three-stage study. It is used to demonstrate the interdependence of the dimensions of e-business architecture and the stages of progression. The results of the analysis can be mapped along the e-business stages of growth as: integration of e-business technologies for e-mails and B2B commerce, differentiation of products and services for e-business positioning, and the realisation of value propositions of the e-partnerships.

Table 9.1: Elements of e-Business Transformation for ERP-based Organisations

Business Dimensions	Stages of e-Business Transformation		
	(1999 -)	(2000 -)	(2001 -)
	Stage 1: Integration	Stage 2: Differentiation	Stage 3: Demonstration of Value Propositions
Technology (virtual infrastructure)	* ICT ERP with e-Sales & e-Procurement applns.	Differential Resourcing ASP vs cost of ownership on the outsourcing spectrum	Innovative Technologies ERP and non-ERP networks for e-marketplaces
Products & Services (virtual experience)	e-Malls e-Mall integration and information exchange	* e-Branding Customisation vs standardisation, Brand identity & integrity	e-Communities Foster customer, supplier, and employee expertise. Emerging collaborative online communities
Business Models (virtual B2B interactions)	e-Commerce Integration B2B Integration of e-Sales & e-Procurement systems B2B ^C + B2B ^S	e-Positioning B2B positioning within a range open to private e-marketplaces	* e-Enterprise One2Many vs One2One Distinct focus of One2One partnerships
Examples	Remote experience of e-catalogues. More tasks. "group ware" skills for online communication.	Assemble and coordinate assets through effective use of online services	Business network to design and leverage interdependent e-communities. Dependent on relationships
Changing Management Objectives across Stages of eBT			
Management focus	Self-service	Empowerment	Relationship building
Change Management focus	Internal	External	Community
Outcomes and Performance Gains	Improved operating efficiency (ROI)	Effective resourcing (QWL)	Virtual and economic value added (EVA)

* The diagonal cells(shaded) represent the critical elements of eBT

* The arrows represent real organisational transformation with e-business

The model of eBT shows business focused at three stages of development with outcomes and performance gains of greater virtual progression:

Stage 1 - Integration of technologies is critical for cost reductions and operating efficiencies;

Stage 2 - Differentiation of products and services is critical for e-business market positioning through effective resourcing.

Stage 3 - Demonstration of value propositions within B2B interactions is essential for superior economic and virtual value.

e-Business Transformation Matrix

In Table 9.1, the three shaded cells in the eBT matrix (3x3) indicate the 'critical' elements that require a cultural shift for a real organisational transformation.

The other elements contribute to the organisation's competitive advantage. The performance gains are centred on improving operating efficiency, effective use of desktop self-service applications by employees, and the realisation of complementary value adding with B2B interaction.

Management practice focuses on the exploitation of self-service, the empowerment of individuals, and the extensive relationship building with multiple alliances.

Transition along the diagonal or critical elements of the matrix, represents real organisational transformation with e-business. This occurs within a culture of e-business readiness of the organisation and its partners.

Outcomes are: efficient operations, effective resourcing, and virtual value adding.

9.4 CASE ANALYSIS FOR E-BUSINESS TRANSFORMATION MATRIX

Stage 1: Integration

Technologies: e-ERP (critical to stage 1)

The findings show that 'back-end' to 'front-end' enterprise application integration is essential to achieve savings and cost reduction. Integration of the system architecture is made possible through a variety of 'back-end', 'sell-side' and 'buy-side' systems; all 11 cases demonstrated this, but specifically Statoil and Siemens with their standardised ERP platform and e-business applications.

Products and services: e-Malls

In a study of Australian e-Malls, Singh and Thompson (2002. p.308) concluded, "it is apparent that for effective B2B exchange in Australia, standards for interoperability between business partners, and technology integration for information exchange on goods and services is essential," e.g. Fujitsu Siemens Computers (FSC). achieved integration of three group's online sales systems.

Business Models: e-Commerce B2B Integration

The integration of e-business models, B2B^C with B2B^S is essential to maximise efficiency gains from supporting technology infrastructure, so that people can get the job done efficiently. Two cases of B2B e-business integration with a global computer supplier and its largest corporate customer demonstrate a more complex model. These exemplar cases demonstrate the integration of ERP and non-ERP systems with other ERP systems, using Web-based technologies to provide the infrastructure required to optimise the overall B2B value chain. Also, the study emphasises the synergistic benefit stream from B2B integration and the interaction of inter-organisation e-business solutions, e.g. Dell and FSC.

Stage 2: Differentiation

Technologies: Differential Outsourcing

Segev and Gebauer (2001, p.249) argue "the mid points of the outsourcing continuum are the most challenging." From case observations they describe the continuum as a wide range from "do it yourself" to complete outsourcing, with an increasing number of possibilities. The one case study where the complete

management of an e-ERP project was outsourced to an ASP, demonstrates the challenge for UNICEF to balance the loss of control against the cost of ownership where as FSC partially outsourced their online sales systems to Siemens Business Systems quite successfully.

Products and services: e-Branding (critical to stage 2)

The e-business tactics for positioning in the virtual space were to:

- differentiate between corporate customers and end consumers; e.g. UNICEF and Dell,
- deliver customised products and services using standard components; e.g. Dell and FSC,
- differentiate between brand identity and brand integrity, where “e-branding becomes a critical issue” (Venkatraman & Henderson, 1998, p. 34); e.g. Bertlesmann, UNICEF, Wine Society, Dell and FSC.

Business Models: e-Positioning

Biotech and Novartis repositioned with largest corporate suppliers. FSC repositioned itself into the computer industry through e-sales. The tendency of these pioneers was to start with development of public relationship building and then shift to private relationship building between suppliers and buyers. This is observed to be more than a passing phase. Further, had the product lines been high technology-based, e.g. Dell and FSC, then it is likely the level of e-business readiness would have been too low to realise and sustain a value proposition.

Stage 3: Demonstration of Value Propositions

Technologies: Innovative Technologies

Halliburton's HR Intranet ERP system demonstrated a B2E value proposition. Their technology innovation was bottom-up driven and from both sides of B2E and B2G of the value chain. This bottom-up approach provided a model for the company's global e-ERP infrastructure.

Employee-Nat demonstrated the integration of ERP and non-ERP systems with Web technologies (Fan et al., 2000). Wine Society found problems with a lack internal expertise with implementing Web-based innovations with their ERP system.

Products and Services: e-Communities

Statoil and UBS used Intranet employee self-service applications to develop a practice of industry-based e-communities. Dell has competence centres where customers can validate system design and configuration without disrupting their live computing network. These facilities act as collaborative online network to

provide customers with systems design and application tuning support, allowing them to test various hardware and software configurations before making a purchase decision; e.g. Dell and FSC.

Business Models: e-Enterprise Model (critical to stage 3)

A pilot approach demonstrating a value proposition is shown in the One2One relationship formed by Dell and LSI. Also, the case emphasises the synergistic benefit stream from B2B integration and the interaction of inter-organisation e-business solutions. In the short term, it may be better to adopt e-commerce implementations (e-sales and e-procurement) with new customers and suppliers. This has the capability of persuading existing customers and suppliers that are more resistant to e-business change of the win-win value propositions; e.g. FSC with SAP, Dell and LSI. In these two 'twin' case studies the focus was on building a 'One2One' relationship. The creation of a 'win-win' value proposition was observed to be a model for other B2B partnering.

In Table 9.2 complementary benefits are identified for FSC's B2B.

Table 9.2: Complementary Benefits from B2B Integration

FSC Benefits	Partner Benefits
<ul style="list-style-type: none"> • Ordering times optimised through online connection • Shorter and therefore faster ordering times • Incorrect orders reduced to minimum • Presentation of configurable products on the Internet • Information management for CRM 	<ul style="list-style-type: none"> • Available 24 hours a day, 7 days/wk. • Simpler ordering, resulting in savings in cost and time • Automatic online information on order changes and delivery notifications • Tracking of orders at any time • Pre-testing of products • Customised service

9.5 CHANGING MANAGEMENT OBJECTIVES IN E-BUSINESS TRANSFORMATION

The changing management objectives across the stages eBT are classified in Table 9.3, and viewed as interdependent and supportive of each other. This is especially so in the area of *outcomes and performances objectives* where *efficiency* through employee self-service and *effectiveness* through empowerment in customer care is used to support *value adding* activities for sustained competitive advantage.

Table 9.3: Stages of Management Practice in e-Business Transformation

	Stage 1	Stage 2	Stage 3
Management focus	Self-service	Empowerment	Relationship building
Change Management focus	Top-down Training Internal	Bottom-up Self-learning External	Visionary Value enhancement Community
Outcomes and Performance Gains	Improved operating efficiency (ROI)	Effective resourcing (QWL)	Virtual and economic value added (EVA)

Key: Return on investment (ROI), Quality of working life (QWL), Economic value added (EVA)

Management Focus in e-Business Transformation

The conceptual model in Figure 9.5 brings together key management issues and their relationships into e-business transformation. This model illustrates how change in industry practices and e-ERP developments relate to B2E, B2C and the B2B^s, and B2B^c models. It identifies the accelerated symbiotic relationship between e-business technologies and business improvement caused by a shift in customer demand. The arrows connecting customers, employees, suppliers indicate the business interactions through self-service, empowerment towards extensive relationship building with multiple alliances.

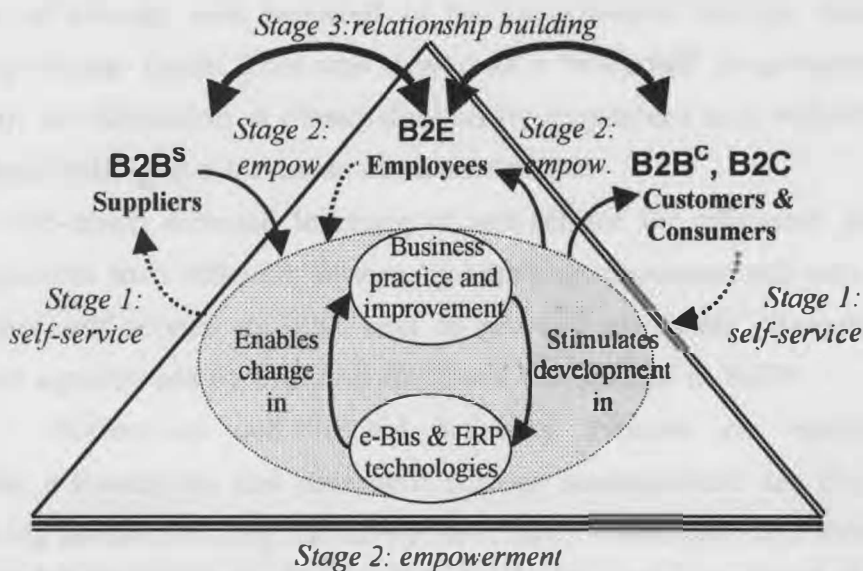


Figure 9.5: Relationships Building Cycle Model from Staged Growth of e-Business

To realise the benefits from the symbiosis of e-ERP developments and business practice, organisations are optimising B2B models:

Stage 1 - To offer cheaper products with efficient service by utilising customer **self-service** in B2B^c, and consumer **self-service** in B2C, and to procure standard materials faster through e-procurement agreements by utilising employee **self-service** in B2B^s.

Stage 2 - To provide customised service in B2B^c, by utilising employee and supplier **empowerment** in B2E and B2B^s.

Stage 3 - To generate value enhanced **alliances** through B2E, B2B^c and B2B^s, with all players in an e-ERP network.

In addition, Figure 9.5 represents a complete view of the foundations of this study: e-ERP technology, e-business practice, and multiple relationships building. One indicator of a successful comprehensive e-business implementation is the wide

spread acceptance by employees of using B2B e-procurement for their own office equipment and supplies.

Change Management Focus in e-Business Transformation

The model for e-business change management represents a comprehensive tool for assisting managers in diagnosing the key facilitators and inhibitors of successful e-ERP projects for B2B interaction. The results confirm that the more successful projects were found to have facilitators in all components of the eBC framework. Specifically explores the areas related to the successful learning organisation where the key issues remain as people oriented organisational issues.

The nature of change was reported to be participative change resulting in an evolutionary change tactic. This was viewed as a "waterfall" progression of change, starting with an alleviation of dissatisfaction by employees and eventually working towards a well-managed e-business implementation:

Stage 1 – Top-down directed learning of self-service for efficiency gains to offer cheaper products with efficient service by utilising customer self-service in B2BC, and customer self-service in B2C, and to procure materials cheaper through e-procurement agreements by utilising employee self-service in B2B^s.

Stage 2 – Bottom-up self-directed learning focuses on external partner effectiveness. e-Readiness and emergent change management are two key factors for influencing people working effectively with new e-business environments. Barua et al., (2001) found that the success of a company's e-business initiatives comes in part from the readiness of customers and suppliers to engage in electronic interactions; e.g. Dell had to wait for LSI to be "e-business ready" for the B2B integration project to be implemented. To address complexities of change, each component must be aligned, along with the enabling technology, to the strategic initiatives (Statoil's Data Quality Manager; Hesterbrink, 1999, p.5). An important ingredient in the right cultural mix for successful eBC is leadership from the top and initiatives from employees, together with an atmosphere of open communication, participation, committed cross-functional. In the new business environment, organisational change is becoming more complex, and training is shifting to self-directed learning.

Stage 3 – Visionary sense of value enhancement utilising e-community to generate effective **alliances** through B2E, B2C, B2BC and B2B^s with all players in the e-ERP environment; e.g. Dell with LSI. Organisations attempting to change performance radically seem to require some "sense of urgency" in their business activities and

situation, translating, in turn, into a compelling vision that is espoused throughout the organisation.

To overcome pockets of reluctance to change, an organisation's vision for change must provide an atmosphere of communication where concerns about eBC are not seen negatively but rather welcomed.

- (i) Achieving this requires continuous articulation and communication of the value of reporting results and monitoring each individual's contribution and accountability to the overall company's change effort. At this individual level, concern should be placed on how the eBC will improve employee satisfaction and the quality of work life.
- (ii) Measurement is a means to success. A well-defined transparent management approach should include a documented methodology of change; use objective and quantified metrics showing the value of change; continuously communicate process metrics to senior management; and possess a well-documented rollout of the new e-business design.
- (iii) Further to the findings, there is a case to be argued on how and why change management is changing. For the issue of change management, we observe a shift towards a learning organisation (Vering & Matthias, 2002, p.159). In support of the claim that "change management" is changing, they argue there is:
 - a new generation of system users,
 - a constant or continuous nature of change,
 - a demand for both top-down and bottom-up change.
- (iv) However, change still requires that resources be matched to the business objects and tasks. What is new is that the Workplace now offers tools and opportunities for implementing change. An organisation that designs its systems in terms of roles for end-users can drive organisational change through workplace implementation. The workplace not only delivers best practices, "as ERP systems do", it provides an understanding of roles and organisational responsibilities that go along with them, "as ERP systems do not" (Vering & Matthias, 2002, p.164).

Outcomes and Performance Gains in eBT

The stages of eBT, identified in Table 9.1, are viewed as interdependent and supportive of each other, as in Figure 9.4. This is especially so with respect to the *business focus* and the *performances objectives* where *efficiency* through employee

self-service and *effectiveness* through empowerment in customer care is used to support *value adding* activities for sustained competitive advantage.

To achieve the outcomes from e-ERP projects, organisations are utilising three B2B models. They offer customers cheaper products with efficient service by exploiting self-service in B2B^C and B2C. They source materials cheaper and more efficiently through procurement agreements in B2B^S and utilization of employee self-service, in B2E. They now optimise processes in B2B^S with B2B^C for customised service by utilising employee self-service in B2E.

(i) Outcomes and Performance Objectives

The eBT matrix classifies the generic outcomes and performance objectives as:

- improved efficiency in decreased order times, automatic approvals to reduce costs,
- greater effectiveness means improved decision making, greater responsibilities,
- value adding refers to complementary benefits realised for all network partners along the value chains when doing business online (Figure 9.6).

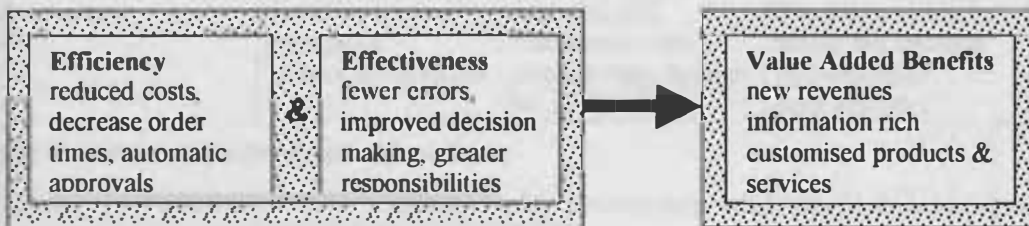


Figure 9.6 Criteria for eBT (matrix) Outcomes and Performance Objectives

Figure 9.6 illustrates the generic outcomes and performance gains and the relationships between them. The performance gains for e-procurement were achieved from two sources: cost savings, and reduced cycle time from customer access (24x7) to supplier data. These projects enabled efficiency gains from minimising of delays in customer orders, and effectiveness gains from optimising employee/staff time. The cost savings through operational efficiencies of all equipment resourcing compare favourably to those cost savings (efficiencies) in other e-procurement case studies. However, the improvement in staff QWL appears to be from learning of new skills, understanding of processes, and acceptance of new responsibilities with greater flexibility.

By taking a more holistic approach, executives can turn these facets of a company's operations into the drivers of e-business excellence. So the central task for senior managers lies in understanding what drives operational excellence in the e-ERP

realm, and then committing the necessary resources (structures, training, responsibilities) to the development of the drivers.

To this end managers should assess the company's operations by looking at both the traditional and e-business measures. For example, Dell and some Siemens companies used the same internal performance measures in both e-business and traditional business operations.

(ii) Extended Performance Objectives from Virtual Organising

Table 9.4 describes the outcomes and performance objectives, within the VOing research model as; (i) improved operating efficiency (ROI), (ii) virtual and economic value adding (EVA), and (iii) sustained innovation and growth (SIG). The latter of these three metrics of VOing proposed by Venkatraman and Henderson, (1998) extend the findings from the case studies to a measure for inter-organisation or B2B activity. This suggests a measure for successful relationships building.

Table 9.4: Summary Map Virtual Organising Stages of Development

	Stages of Development		
	1. Unit tasks	2. Organisation	3. Inter-organisation
Outcomes & Performance Objectives	Improved operating efficiency (ROI)	Virtual and economic value adding (EVA)	Sustained innovation and growth (SIG)
Examples	Customer service, purchasing, product development	Assemble and coordinate assets; creating value through use of digital info.	Business network to design and leverage interdependent e-communities

(iii) Measures of e-Business Success

Figure 9.7 identifies the measures for outcomes and performance gains and the relationships between them within the e-business change research model. These measures intersect the measures of the proposed eBT model described in Table 9.3. They canvass the measures at the level of employee performance.

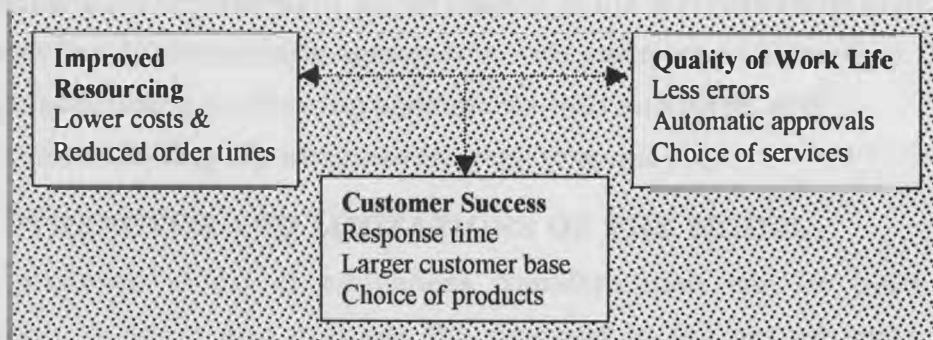


Figure 9.7 Measures for eBC Outcomes and Performance gains

An indicator of a successful comprehensive e-business implementation is the wide spread acceptance by employees of using B2B e-procurement for their own office equipment and supplies.

(iv) Measures of Benefits from B2B Interaction

The benefits constructs in the first column of Table 9.5 are a comprehensive list of outcomes or objectives of e-business excellence. This “B2B Benefits Scorecard” was established from the case findings as recommended criteria of e-business outcomes. In addition, specific outcomes and performance gains for each type of B2B interaction cell can be found in Table 9.5. The greatest benefit was found to occur through B2B^C with B2B^S integration. Further, this corresponds to complementary benefits found to exist in this form of B2B partnering – evidenced in Table 9.5.

Table 9.5: Benefits Scorecard from B2B Interaction

Benefits	Model	B2E	B2B ^S	B2B ^C & (B2C)	B2B ^C with B2B ^S Integration
Reduce Costs		1	4, 5, 6, *7	10a, 10b, 11a (9)	10c, 11
Efficient Service		2, 3	4, 5, 6, *7	10a, 10b, 11a (9)	10c, 11
Shared Services		1, 2, 3	4, 5, 6, *7	10a, 10b, 11a (8, 9)	10c, 11
Revenue Generation		-	6	10a, 10b (8, 9)	10c, 11
Quality of work life		1, 2, 3	4, 6	-	10c, 11
Process Improvement		-	4, 5, 6, *7	-	10c, 11
Customised service		-	-	10a, 10b (9)	10c, 11
Relationships Building		-	4, 5, 6,	10a, (9)	10c, 11

* Case 7 Failed to achieve Benefits from B2B procurement

The real savings from integration of B2B back-end and front-end integration result from a dual approach (Perez; 1999, p. 53):

- inside-out optimisation of business processes witnessed by early adopters,
- outside-in optimisation of business processes driven by customer and supplier relationship management.

To realise the superior benefits, the following essential factors were found to apply:

- continuous improvement of the quality of the Web interface from the end-user’s perspective,
- formalising agreements with partners on a common IT platform,
- standardising purchasing agreements with suppliers, and
- communicating the business strategy to employees.

9.6 STRENGTHS AND LIMITATIONS OF THE MODEL

The proposed model of e-business transformation can be used as a detailed criterion to direct and evaluate the progress in the virtual space for traditional organisations or new entrants. The nature and value of the model is based on a set of exemplar SAP-based organisations (innovators) that pioneered e-business implementations through their ERP systems for sustained competitive advantage.

Although limited to discrete snapshots of each organisation's e-business transformation, the proposed model of eBT nevertheless serves the purpose of demonstrating the transition rather well, that is, a model that represents a documented comprehensive and long term plan that should assist managers of ERP-based organisations in migrating their company towards a successful e-business organisation. Similar to VOing, the eBT model offers a foundational perspective of strategies, tactics and performance objectives for e-ERP implementations. As a theory, its strength is based on the synthesis of case snapshots. It is seen as evolutionary in nature and content driven. The synthesis of the research frameworks provides a method for study at appropriate levels of complexity.

Claims of external validity must await further examination with a wider sample of projects with different contexts and motives. Extra case material was gathered to validate the final research framework and to confirm the factors for success of an e-business implementation (Appendices: A9.1 - A9.3).

9.7 SUMMARY

A new conceptual framework of e-business transformation (eBT) demonstrates the stages of growth in which improvement is along the three dimensions of business activity: *integration* is tempered by *differentiation* for realising B2B *value propositions*. It identifies the antecedents of successful e-business implementations within ERP environments (e-ERP). As a final research model of e-ERP phenomena, it represents the synthesis of three interdependent research models: virtual organising through e-ERP, e-business change with critical success factors and facilitators, and complementary benefits from B2B interaction. Each model exhibits attributes that have varying influences at different stages of e-business implementation.

The eBT model is essentially a diagnostic tool for identifying factors that contribute to success by adopting new e-business models. It is not seen as a prognostic tool. It specifically explores all areas related to the successful learning organisation where the key issues remain as people oriented organisational issues. The focus of management evolves through self-service, as well as empowerment towards extensive relationship building with multiple alliances.

The proposed model of e-business transformation (eBT) can be used as a detailed criterion to direct and evaluate progress in the virtual space for traditional organisations or new entrants.

CHAPTER 10

CONCLUSIONS

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10.0 INTRODUCTION

The proposed model of e-business transformation (eBT) can be used as a detailed criterion to direct and evaluate the progress in the virtual space for traditional organisations or new entrants. Although limited to discrete snapshots of each organisation's e-business transformation, nevertheless the proposed model of eBT was formed from such case material to illustrate the full complexity of the phenomenon. The model represents a comprehensive framework to assist managers of ERP-based organisations, in navigating and migrating their company towards a e-business organisation.

The main message to executive managers is that e-business transformation presents a complex journey for achieving long term e-business goals. Organisations should select their own pathways through this journey according to the level of virtual organizing they are prepared to support.

The chapter sets out the achievements and limitations of the study, and recommends the topics for further research:

- (i) The achievements of this work are the development of a multi-view research method, evaluation and extension of three different models for e-business change, and the development of new theory for eBT.
- (ii) The limitations are the result of premature technology uptake, access to organisations, and lack of testing of sustained benefits measures.
- (iii) The topics for further research are formulated to match the new theory of eBT. The topics are presented as a comprehensive set of topics, at three levels of abstraction.

10.1 ACHIEVEMENTS OF THE REASEARCH

Comprehensive Research Methodology

A comprehensive research framework based on structured case studies was developed for this study. This framework used three different models at three different stages of research to give a multi-faceted view of each case. The combined application of case methods by Carroll et al. (1998), Klein and Myer (1998), and Eisenhardt (1989) is proposed as an appropriate method for maintaining a balance between research rigour and relevance. This composite case-based method provides a focused yet flexible, structured yet dynamic approach to case study interpretive research. *Other researchers are urged to apply similar multi-viewed analysis.*

Longitudinal Study on e-ERP

As the research was viewed as foundational, eleven cases were chosen across a wide range of industries. They were viewed simply as pioneers of e-ERP technologies on a continuum of e-business adoption from pioneers, innovators, early adopters, to followers. This longitudinal study identified different stages of progression along eBT journey. Through this study the complexity of eBT was examined through the development of three research models:

- Empowerment model with B2B Interactions – Chapter 5 (Figure 5.8).
- Refined e-Business Change model - Chapter 6 (Figure 6.3).
- Virtual Organising model – Chapter 7 (Table 7.4) and Chapter 8 (Table 8.2).

B2B Benefits Model

The following conclusions address the research questions used to investigate the 'Benefits' research model, (Chapter 5, Table 5.2):

- (i) Combined, B2B applications offer use of many functions or "shared services" across operational and administrative groups. All this relies heavily on employee self-service and leads towards new work roles. To maximise the benefits from these B2B applications, employee acceptance is essential.
- (ii) With e-ERP technologies the integration of e-business applications across ERP systems provides an essential technology for optimising the overall B2B value chain. The case of B2B "e-Commerce integration" represents the exemplar case of the "Empowerment B2B interaction" model (Figure 5.8).
- (iii) The stages of sophistication of the e-business B2B models collectively demonstrate that greater benefits flow from increased level of B2B e-business interaction – "Relationships Building Cycle" model (Figure 9.5).
- (iv) The real savings from integration of B2B - back-end and front-end integration requires a dual approach;
 - inside-out optimisation of business processes witnessed by early adopters,
 - outside-in optimisation of business processes will be driven by customer and supplier relationship management.

e-Business Change Model

The following conclusions address the research questions used to investigate the e-Business Change research model, (Chapter 6, Table 6.2):

- (i) A successful project was found to have facilitators in all components of the eBC management framework, including the change environment and management practice. Further there is the implication that the least successful e-business

projects will have inhibitors in several dimensions, especially in the area of cultural readiness and change management.

- (ii) As all cases were proactive by definition, the researcher believes that eBC management does not have to be *proactive* to be successful but by the way the organisation *reacts* to the stimuli.
- (iii) When organisations undertake e-business initiatives, they need to recognise that they will only accomplish their objectives through people. Therefore placing importance on improving the quality of work-life becomes a critical issue. If effectively managed, employees should ultimately be more productive in their work tasks and better able to serve customers, suppliers, and business partners.
- (iv) These are complex issues that require leadership, appropriate problem solving skills, lots of hard work and executive commitment and a culture that embraces the ideals of the learning organisation.

VOing Model

The following conclusions address the research questions used to investigate the VOing model, (Chapter 7, Table 7.2):

- (i) VOing model represents a generic, comprehensive, and long term plan that should assist ERP-based organisations, in developing e-business strategies.
- (ii) No one dimension adequately captures the potential opportunities of VOing.
- (iii) VOing should be focused on business models, not industry based. It will vary in terms of the business focus of the organisation, customer focused, or product focused.
- (iv) The tendency of enterprises is not to develop at all stages of VOing. Progress along all dimensions, although rarely practiced, is essential to VOing.
- (v) Although limited to discrete snapshots of each organisation's progress they can be completely mapped by the VOing model. Further it serves the purpose of demonstrating the components of transition rather well.

Three Interdependent Models - Scorecards

- A wider scope, Table 9.6 "B2B Benefits Scorecard" identifies the e-business outcomes objectives, including B2B integration highlighted.
- At a deeper level of performance, Table 9.4 "Complementary Benefits of B2B Integration", identifies the specific B2B outcomes and performance gains, and with specific measures.

- Finally, Figure 9.7 identifies the measures within the e-business change model at the level of employee performance.

Development of eBT Model

An eBT model was developed that identifies the stages of e-business growth and development as a comprehensive plan that should assist managers of ERP-based organisations in migrating their company towards a successful e-business organisation. The model offers a foundational perspective of strategies, tactics and performance objectives for e-ERP implementations. The strength of the theory lies in the synthesis of multiple case analyses using three different lenses over three separate time periods. The synthesis of the three research frameworks provides a method for study at appropriate levels of complexity. It is evolutionary in nature and is content driven. Supplementary case material was gathered to validate the final research framework and to confirm the factors for success of an e-business implementation.

Development of eBT Matrix

The eBT matrix detailed in Table 10.1 represents the highest level of detail within the eBT journey. Specifically this represents the highest level of abstraction of a model of eBT. The model is viewed as progress in 3 stages of continuous change of eBT. Migration at each stage should be interpreted as all aspects of business improvement during *integration* tempered by *differentiation*, for realising B2B *value propositions*. The changing management objectives across the stages eBT progress through the exploitation of self-service, the empowerment of employees, and the e-readiness of business partners essential to accommodating emergent change.

Table 10.1: Matrix of e-Business Transformation for ERP-based Organisations

	Stages of e-Business Transformation		
	(1999 -)	(2000 -)	(2001 -)
Business foundations (Virtual Dimensions)	Stage 1: Integration	Stage 2: Differentiation	Stage 3: Demonstration of Value Propositions
1. Technologies (virtual infrastructure)	*ICT	Differential Resourcing	Innovative Technologies
2. Products/Services (virtual experience)	e-Malls	* e-Branding	e-Communities
3. Business Models (B2B interactions)	e-Commerce Integration	e-Positioning	* e-Enterprise

* The diagonal cells(shaded) represent the critical elements of eBT and the arrows represent real organisational transformation with e-business

As the final conceptual framework the matrix recommends that e-business should be focused on business models, not technology, and where the management of change is critical. It will vary in terms of the business focus of the organisation, such as customer or product or service focus:

- (i) No one element of the eBT matrix adequately captures the potential opportunities afforded by e-business.
- (ii) The critical elements (shaded) of the matrix are; *integration of information technologies, differentiation of products and services, and value propositions with business models*. Transition along these diagonal or critical elements of the matrix, represents real organisational transformation with e-business.
- (iii) Transition along the non-critical elements - horizontal or vertical - leads to improved efficiencies but not any organisational transformation for e-business.

eBT Matrix - Outcomes and Performance Gains

In chapter 9 Figure 9.4 represents the generic eBT outcomes and Performance objectives and the relationships between them; efficiency, effectiveness, virtual and economic value adding. This presents new theory of changing management objectives. Improving performance in all elements of the eBT matrix is the means to sustain competitive advantage.

A Likely indicator of eBT Success

A key indicator of a successful comprehensive e-business implementation is; the wide spread acceptance by employees of using B2B e-procurement for their own office equipment and supplies.

Conclusions from eBT Matrix

All the eBT outcomes and performance gains detailed in chapter 9.3, are now pieced together into hierarchical structure at three levels of abstraction. The resultant framework is recommended as a comprehensive measure of e-business transformation success.

- (i) eERP based architecture or equivalent is a necessity to optimise the overall B2B value chain. B2B e-business integration represents the foundation of the next generation of ERP systems.
- (ii) The technology support for e-business implementation comes from innovation that is "bottom-up" driven and from both sides of the value chain. This requires a "top-down" approach to provide the ICT architecture.
- (iii) As e-business activities become common place, corporate portals for empowering employees for doing business online with partners will be considered as a competitive necessity.

10.2 LIMITATIONS OF THE RESEARCH

Premature Research Context

The research within Australia was found to be premature. This problem presented itself in two ways as, immature use and the rapid developments of the technology. The use of e-ERP technologies by the case organisations was exacerbated by the speed and expansion of technological experimentation – see chapter 2: Table 2.2 and Figure 2.4. This was demonstrated by the interviewees reluctance to share details about their immature experiences with e-ERP and to share their premature ideas with the researcher. This was overcome to a considerable extent by extending the study to international organizations although this limited direct access.

The VOing model recommends sustained innovation and growth (SIG) as the measure for inter-organisational success. The period of the research was insufficient to gauge sustainable gains. The eBT model recommends this measure from VOing theory. However, the thesis failed to test and validate SIG as a measure of the eBT journey, simply because of the time and cost involved.

The eBT model fails to embrace a third e-business metric, nor does it sustain innovation and growth (SIG). This measure is taken directly from the VOing model. The thesis failed to confirm or deny support for sustained innovation and growth (SIG) as a measure of inter-organisation success, due to the time limitations for completion of the study (5 years).

Table 10.2 Target organisations

Case	e-Business Example	Level of e-Business Maturity*
1. Wine Society	e-Sales for wines sales and services to registered members.	Very Low
2. Employ-Nat	B2B Procurement with Intranet access to Personnel data	Low
3. UNICEF	1 st Australian charity Web site for sales of greetings cards, gifts	Moderate
4. Halliburton	HR reporting and tracking of skilled contractors	Moderate
5. UBS	Networking of employees across very large bank	Moderate
6. Bertelsmann	Networking of employees across a global media corp.	Moderate
7. Novartis	B2B procurement of chemicals	Moderate
8. Biotech	B2B procurement of bio-chemicals items as core business.	Moderate
9. Statoil	B2B Procurement, and updated by Intranet access to Personnel data	High
10 FSC	e-Store across a global network of divisions, within a conglomerate	High
11. Dell	Customised online sales integrated with customers MRO procurement	Very high

**11 Cases representing 9 industries, rated subjectively by increasing level of e-business maturity*

The level of e-business maturity with “knowledge” and “experience” was subjectively evident at each interview. Table 10.2 indicates the level of e-business maturity and expertise. This also had has an impact on the researchers confidence.

Verification and Interpretation

The research method of synthesising distinct models was chosen for its ability to examine complex phenomena at various levels of abstraction. Clearly research is repeatable. Claims of external validity must await further examination with a wider sample of projects with different contexts and motives.

A weakness in the application of the research method was the openness to a variety of interpretations.

At a technical level the weaknesses included:

- verification of interview data,
- interpretation of data collected, and
- perception bias of the researcher

The quality of the findings can be evaluated using the seven principles by Klein and Myers (1998) summarised in Chapter 3: Table 3.3.

Table 10.3a Evaluation of Quality of Findings

Case	1	2	3	4	5	6	7	Quality of Findings
Dell	m(p & w)	r(h & s)	r(m & d)	i(a & g)	c(t v f)	s(dif)	s(b & d)	high
FSC	m(p & w)	r(h & s)	r(m & d)	i(a & g)	c(t v f)	s(dif)	s(b & d)	high
Statoil	m(p & w)	r(h & s)	r(m & d)	i(a & g)	c(t v f)	s(dif)	s(b & d)	high
Biotech	m(p)	r(h)	r(m & d)	i(a & g)	c(t v f)	s(dif)	s(b & d)	moderate
UNICEF	m(p & w)	r(h)	r(d)	i(a & g)	c(t v f)	s(dif)	s(b)	moderate
Halliburton	m(p)	r(h)	r(m & d)	i(a & g)	c(t v f)	s(dif)	s(b)	moderate
UBS	m(p)	r(h)	r(m & d)	i(a & g)	c(t v f)	s(dif)	s(b)	moderate
Employ-Nat	m(p)	r(h & s)	r(m & d)	i(a)	c(t v f)	s(dif)	s(b)	moderate
Wine Society	m(p)	r(h)	r(d)	i(a)	c(t v f)	s(dif)	s(b)	moderate
Novartis	m(p)	r(h)	r(d)	i(a)	c(t v f)	s(dif)	s(b)	low
Bertelsmann	m(p)	r(h)	r(d)	i(a)	c(t v f)	s(dif)	s(b)	low

Key to abbreviations see Table 10.3b eg m(p & w)

In Table 10.3a the quality of findings for all cases are classified against each of the seven principles, using the abbreviations defined in Table 10.3b - from the highest to lowest. The abbreviations show some deficiencies in practicing each principle. E.g. in the Novartis case, interpretation occurred through abstraction but not generalisation This serves to qualify the overall findings of this case based study.

Table 10.3b Klein and Myer's (1998) 1-7 Research Criteria 1-7.

1. The Hermeneutic circle: - m(p & w) = meaning of parts and whole
2. Contextualisation: - r(h & s) = reflection on historical and social back ground
3. Interactions between Researchers and Subjects: - r(m & d) = reflection on materials and data
4. Abstraction and Generalisation: - i(a & g) = interpretation through abstraction and generalisation
5. Dialogical Reasoning - c(t v f) = contradictions between theoretical preconceptions and actual findings
6. Multiple Interpretations: - s(dif) = sensitivity to differences (multi-interviews)
7. Suspicion: - s(b & d) = sensitivity to biases and systematic distortions

Klein and Myer's (1998, p.7) research criteria.

10.3 FURTHER RESEARCH

The future research issues are framed as a structured map to communicate the main ideas of the thesis to practitioners and researchers (Figure 10.1). They are presented at three levels of abstraction to match the theory of e-business transformation (eBT) developed in the thesis.

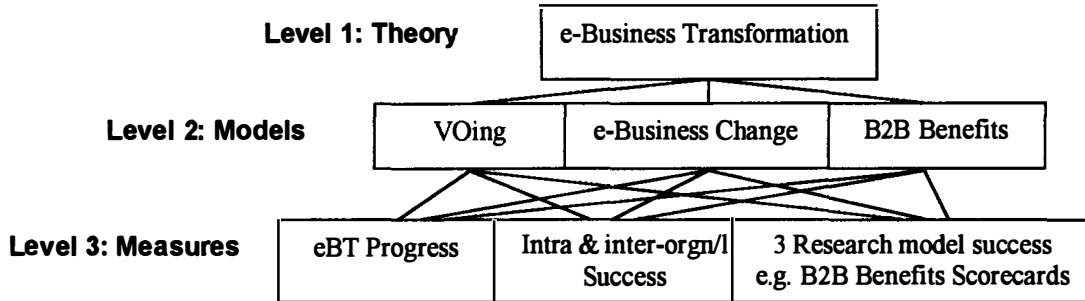


Figure 10.1: Structured Framework for Future Research

In addition Table 10.3 below maps the further research and corresponding measures of success as follows:

Level 1. eBT theory - model developed in chapter 9.

At the highest level of understanding eBT is a continuous change through 3 stages; integration, differentiation, B2B value propositions. Essential elements for eBT: Integration of ICT, e-Branding identity and integrity, and Value propositions through B2B partnerships.

Level 2. Three interdependent research models - described in chapters 5 to 7.

VOing dimensions and measures present e-business completeness. e-Readiness and change mgt are key facilitators for success. Increased benefits can be realised from greater B2B interactions.

Level 3. Measures of e-business success - detailed in chapters 5 to 8.

Sustained innovation and growth – a recommendation. Efficiency and self-service, effectiveness through empowerment, virtual and economic value added. Select detailed measures at various levels of outcomes and performance gains aligned to strategy.

Table 10.4 Summary of Further research at 3 levels

Level of Abstraction	Further Research
L1. eBT Model: 1.1 Journey of eBT 1.2 eBT Matrix and stages of growth	Establish the nature of eBT journey, CSFs at each stage Establish the nature of the effect Differentiation with Integration Customer focused, or product focused Test the individual, diagonal, and all cells for sustained growth
L2. Research Models: 2.1 VOing 2.2 eBC and Success 2.3 Benefits of B2B interactions	Interweaving of VOing dimensions; e.g. CI with AC with KL Understand consequences of ICT, change management, and e-readiness Testing the “empowerment” and “relationship building” models.
L3. Measures: 3.1 eBT Progress 3.2 Intra & inter-orgn/l success 3.3 3 Research models - success	Establish and test measures of eBT journey, e.g. SIG Establish and test as measure of inter-organisational success, e.g. SIG Develop and test measures of 3 models, e.g. Benefits scorecard.

Measures of eBT Success

Establish and test measures of eBT journey, particularly, sustained innovation and growth. For example, ASPs become common place, organisations will have to balance their core activities with non-core e-business activities hosted by ASPs to maximise their competitive advantage.

Establish and test measurement framework of eBT, e.g. Benefits scorecard.

Further Research by Models

(i) Theory building - Empowerment and Relationship Building B2B Interaction Models

A candidate model for further research on e-business implementations with ERP is proposed as the “empowerment” and “relationship building” models (Figures 5.8 and 9.5). It embodies a symbiosis of e-ERP developments and business practice for B2B interaction. In these model, the realisation of complementary benefits for all business partners is viewed as necessary and sufficient for success.

(ii) Interweaving of Virtual Organising Dimensions

As organisations shift from single to multiple applications interweaving VOing dimensions becomes an issue. How does the issue of interdependency between the *dimensions* of VOing affect performance? In chapter 7, Table 7.5 summarises the level of interdependency of the cases in this study: The issue of outcomes is even more interesting for future research.

(iii) Emerging Change Issue

Examine “top-down” standardisation of business processes optimisation and “bottom-up” creative innovation. This reflects a staged view from self-service to empowering of employees. Are innovator organisations more likely to succeed than adopter organisations of e-ERP technologies?

Examine individual management practices for 'One2One' relationships and One2Many relationships to identify and test individual versus multiple relationship building success factors, e.g. e-business readiness, or change management.

(iv) Implications for Change Management

Is there a case to be argued on how and why change management is changing?

Vering & Matthias, (2002: 159) argue that change management is changing due to:

- A new generation of system users
- Constant or continuous nature of change
- The need for both top-down and bottom-up change

What is new is that the Workplace now offers tools and opportunities for implementing change. An organization that designs its systems in terms of roles for end-users can drive organisational change through workplace implementation.

Further Research: In the new business environment organisational change is more complex, is training shifting to self-directed learning.

(v) Implications for e-Business Readiness

Barua et al, (2001) specifically refer to the success of a company's e-business initiatives comes from in part, the readiness of customers and suppliers to engage in electronic interactions. "To overcome resistance to change, each component must be aligned, along with the enabling technology, to the strategic initiatives" (Statoil's Data Quality Manager; Hesterbrink, 1999, p.5).

Further research about organisational culture of e-readiness includes an exploration of the critical success factors; executive leadership and commitment, employee initiatives and participation, an atmosphere of open communication, and partner inter-organisational commitment.

10.4 FINALE

In the previous chapter, a single model of e-business transformation (eBT) was developed as the fusion of the three research models, *Virtual Organising*, *e-Business Change*, and *Benefits of B2B interactions* (Figure 9.1). This model represents the main outcomes of the research, as a new theory for e-business adoption by ERP-based organisations. The collective findings from the in depth research into each separate model provides a useful "road map" for both practitioners and researchers. The three models examine and identify varying influences at different stages and levels of abstraction of the firm's e-business progress. Further, the

management focus is on employee empowerment and e-business readiness along the customer and supplier value chains.

Successful comprehensive e-business transformation with ERP occurs when the benefits of *value propositions* are realised through *integration* and *differentiation*, of *technologies* needed to support new *e-business models* aimed at delivering *products and services* online. Also, benefits realisation is facilitated by a culture of e-business readiness and emergent change management.

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APPENDICES (A)

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APPENDIX 2.1

TEXTS, PAPERS, AND STUDIES ON THE TOPIC

1. Key Texts on the Topic

- a. Curran, T., Keller, G., & Ladd, A. (1998). *Sap R/3 business blueprint: Understanding the business process reference model* (ch. 15).
- b. Deise, M.V., Nowikow, C., King, P., & Wright, A. (2000). *E-business: From tactics to strategy* (ch. 1, 5, 6, 8, 9, 10).
- c. Fellenstein, C., & Wood, R. (2000). *Exploring e-commerce, global e-business, and e-societies* (ch. 3, 8, 11, 15, 19, 20, 21).
- d. Gonzalez, J.S. (1998). *The 21st-Century intranet* (ch. 7, 8).
- e. Kalakota, R., & Robinson, M. (1999). *e-Business: Roadmap for success* (ch. 2, 7, 8, 9, 12).
- f. Kale, V. (2000) *Implementing SAP R/3: The guide for business and technology and managers* (ch. 15, 19, 20, 21).
- g. Norris, G., Hurley, J.M., Hartley, K.M., Dunleavy, J.R., & Balls, J.D. (2000). *E-business and ERP: Transforming the enterprise* (ch. 1 - 8, 11).
- h. Perez, M., Hantusch, T., Matzke, B., (1999). *The Sap R/3 System on the Internet* (ch. 1, 2, 3, 5).
- i. Sculley, A.B., & Woods, W.W.A. (1999). *B2B exchanges: The killer application in the business-to-business Internet revolution*, (ch. 4).
- j. Shields, M.G. (2001). *E-business and ERP: Rapid implementation and project planning* (ch. 1, 2, 5, 6, 7, 9).

Table 2.1: Key Texts that Canvas each Sub-topic

*Text	*a	b	c	d	*e	f	g	h	i	j
Sub-topic	1998	2000	2000	1998	1999	2000	2000	1999	1999	2001
(1) Internet enabled ERP	ch.15					ch.19	Intro.	ch.2, 3, 5		ch.1
(2) e-Business	ch.15	ch.1	ch.3, 19	ch.5, 7	ch.2, 3		ch.1, 6, 7	ch.5	ch.4	
(3) e-Business with ERP	ch.15	ch.3	ch.20		ch.7 5-9		Ch.1 to 5			ch.1, 9
(4) e-Business with change Mgt		ch.10	ch.8, 15			ch.20	ch.8			ch.2, 5, 6
(5) e-Business transformation through ERP	ch.15	ch.2, 4-6	ch.11 21		ch.12	ch.21 15	ch.9, 10	ch.1		

* Also see 2nd editions below

Part 2 of Lesser Key Texts:

- k. Callaway, E. (2000) *ERP - The next generation : ERP Is Web Enabled for E-Business*, Paperback Computer Technology Research (CTR), report July, USA
- l. Curran, T. Ladd, A. (2000) *Sap R/3 Business Blueprint : Understanding Enterprise Supply Chain Management*, Prentice Hall; **Ch. 17**, 339-361
- m. Blain, J. (1999), *Special Edition: Using SAP R/3 (2nd/3rd Edition)*, ASAP World Consultancy, Que Corporation. Chapter 23 "Electronic Commerce" pp.502-527
- n. Figallo, C. (1998) *Hosting Web Communities*, John Wiley & sons, USA - Also, Rheingold, (1993) *The Virtual Community* and Hagel, (1997) *Net Gain* in Figallo, C. (1998) *Hosting Web Communities*, John Wiley & sons, New York, NY.
- o. Hinrichs, R.J. (1997) *Intranets, What's the Bottom Line?* Prentice Hall, Mountain View, CA: 25, 152-169
- p. Kalakota, R. Robinson, M. (2001), *e-Business 2: Roadmap for Success*, Addison-Wesley Longman, 2nd ed. Reading, MA: ch.3 "e-Business Patterns"
- q. Pepper, D., & Rogers, M. (2001) *ONEtoONE B2B*. Capstone, Oxford, UK (Cases; Dell and Novartis: ch.3, 6)
- r. Probst, G. Raub, S. Romhardt, K. (2000) *Managing Knowledge: Building Blocks for Success*, John Wiley & Sons, Chichester, UK: Apx.1
- s. Savage, C.M. (1996) *The Fifth Generation Management: Co-creation through Virtual Enterprising, Dynamic Teaming, and Knowledge Networking*, Butterworth-Heinemann
- t. Stacey, R. (2000) *Strategic Management and Organisational Dynamics*, 3rd Edition, Pearson Pub. London; Chapter 11, 12.
- u. Thorpe, J. (1998) *Information Paradox: Realizing the Business Benefits of Technology*, McGraw-Hill, Canada: Chapter 4

2. Papers that Canvas the Topic

1. Al-Mashari, M. (2000). Constructs of process change management in ERP context: A focus on SAP R/3, *Proceedings of the 6th Americas Conference on Information Systems* (pp. 977-980). Long Beach, California: USC.
2. Ash, C.G. (1998). Knowledge management and the electronic consultative enterprise: A case for integrating SAP R/3 with the Internet. *Proceedings of the 8th Workshop of Information Technology Systems* (pp. 77-86). Helsinki: University of Helsinki.
3. Boey, P., Grasso, M., Sabatino, G., & Sayeed, I. (1999). *Architecting eBusiness Solutions*. 2 (7), Retrieved Feb 1, 2000, from Cutter website: <http://www.cutter.com/consortium/freestuff/dcar9907.html>
4. Burn, J., & Hackney, R. (2000). Strategies for I-Business change in virtual markets: A co-evolutionary approach (pp. 879-890). *Proceedings of AMCIS 2000*, Long Beach, California: USC.
5. Currie, W.L. (1999) Management Innovation and Change Panaceas: Strategic Vision or Tunnel Vision (pp. 92-100)., *Proceedings 7th ECIS'99*, Copenhagen, Danmark: Copenhagen Business School.
6. Hesterbrink, C. (1999). *e-Business and ERP: Bringing two Paradigms together*. Retrieved Sep 15, 1999, from PriceWaterhouse Coopers website: <http://www.pwc.com/>
7. Larsen, C. (2000). *The Fusion of ERP and the Internet*. Retrieved March 22, 2000, from eBiz website: http://www.ebizchronicle.com/spl_reports/march/erp05_saphtm
8. Palmer, J.W. (1998). Modeling electronic commerce: Key interorganisational boundaries. *Proceedings 6th European Conference of Information Systems* (pp. 315-317), Aix-en-Provence, France:
9. Pant, S., & Ravichandran, T. (2000). A Framework for Planning E-business Information Systems: A Research Proposal (891-893). *Proceedings of AMCIS 2000*, Long Beach, CA: USC.
10. Prior, D. (2000). *45b Enterprise Resource Planning Scenario: A Five Year Overview*. Gartner Symposium ITXPO 2000. Retrieved Nov 1, 2000, from Gartner Group website: <http://www.gartnergroup.com/>
11. Rosemann, M., & Wiese, J. (1999). Measuring the performance of ERP software - A balanced score card. *Proceedings 10th ACIS'99* (773-784). Wellington, New Zealand:
12. Saarinen, T., & Tuunainen, V.K. (1999). Research challenges in electronic commerce. *Scandinavian Journal of IS*, 10 (1&2), 241-248.
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14. Scheer, A. W., & Habermann, F. (2000). Making ERP a success. *Communications of the ACM*, 43 (4), 57-61.
15. Seddon, P.B. Staples, D.S. Patnayakuni, R. Bowtell, M.J. (1998). The IS Effectiveness Matrix: The Importance of Stakeholder and Systems Measuring IS Success. ICIS 1998, Helsinki: University of Helsinki.

16. Spencer, R. (2000). Managing change. *Electronic Perspectives* (12-20). Jan/Feb, 25 (1): Washington.
17. Sumner, M. (1999). Critical Success Factors in Enterprise Wide Information Management Systems Projects. (297-304). *Proceedings 5th AMCIS2000*, Long Beach, CA: USC.
18. Siemens, (1999a). Success Story Linking SAP R/3 and the Internet Nov '99, Siemens Business Services GmbH & Co. <http://www.siemens.de/sap/>
19. Venkatraman, N., & Henderson, J.C. (1998). Real strategies for virtual organising. *Sloan Management Review*, Fall, 33-48.
20. Viehland, D.W. (2000). Critical success factors for developing an e-business strategy. *Proceedings of 6th Americas Conference on Information Systems* (pp. 911-915). Long Beach, CA: USC.

3. Studies that Canvas the Topic

1. Chan, C., & Swatman, P.M.C. (1999). B2B E-Commerce Implementation: The Case of BHP Steel. *Proceedings 7th ECIS'99* (pp. 70-82). Copenhagen, Denmark:
2. Delphi Group (2000). e-active: How Leading Edge of e-businesses are Transforming Themselves and Their Industries, Survey Analysis of 600 F1000 Respondents, Boston, MA, <http://www.delphigroup.com>
3. Edwards, P., & Newing, R. (2000). Application integration for e-business, *Business Intelligence 2000*, London, UK: (Siemens 1995-99).
4. El Sawy, O.A., Young, K.M., Malhotra, A., & Gosain, S. (1999). The relentless pursuit of "Free.Perfect.Now": IT-enabled value innovation at Marshall Industries. *Sloan Management Review*, Fall, 305-333. Retrieved Feb., 1999 from <http://www.simnet.org/public/programs/capital/97paper/paper1.html>
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6. Kumar, R.L., & Crook, C.W. (1999). A multi-disciplinary framework for the management of inter-organisational systems, *The DATA BASE for Advances in Information Systems*, 30 (1), 22-37.
7. Porra, J. (2000). Electronic commerce Internet strategies and business models - a survey, *Information Systems Frontiers*, 1 (4), 389-399.
8. Pouloudi, A., (1998). NHSNET: Opportunities, problems and lessons for interorganisational systems Implementation. *Proceedings 6th European Conference of Information Systems* (pp. 1500 - 1509). Aix-en-Provence, France:
9. Tabor, S.W. (2000). Electronic commerce adoption and success: A study of organisational factors and influences", *Proceedings of 6th Americas Conference on Information Systems* (pp. 669-671). Long Beach, CA: USC.
10. Wieder, B., Matolcsy, Z., & Booth, P. (2000). *ERP-systems and functional integration in Australia's industry*. Presentation at IHL SAPPHIRE '2000, Brisbane: SAP Australia.

4. Summary by Texts, Papers and Studies

In Tables A2.2, A2.3, A2.4 classify organisations in terms of their position on each of the three key factors/dimensions:

Table A2.2: Texts that illuminate e-Business & ERP Issues

IS Topic	-1998	1999	2000 - 2001
e-Communities; e-Societies	Figallo		Fellenstein & Wood
ERP Implementation & Business engineering	Curran & Keller	Welti	Kale, Curran & Ladd
e-Business; e-Markets		Kalakota & Robinson; Sculley & Woods	Deise et al. Pepper & Rogers (2001)
ERP & Internet;	Curran & Keller ch.15	Perez et al.	Kale, ch. 21
e-Business & ERP		Kalakota & Robinson ch.7	Norris et al. Shields (2001)

Table A2.3: Papers that illuminate e-Business & ERP Issues

IS Topic	-1998	1999	2000 - 2001
e-Communities; e-Societies	Venkatraman & Henderson		
ERP Implementn. & Business engineering		Rosemann & Wiese	Prior, Al-Mashari
ERP & Internet;	Ash	SAP (1999a)	Burn & Hackney
e-Business & ERP		Hesterbrink, Larsen	Scheer & Habrmann

Table A2.4: Case studies that illuminate e-Business & ERP Theory

IS Topic	- 1998	1999	2000 - 2001
e-Communities &; e-Societies	Pouloudi	Ash & Zach Kumar & Crook	Porra Tabor
ERP Implementn. & Business engineering	Guha et al. (1997)	El Sawy Kalakota & Robinson	Delphi Group
e-Business &; e-Markets		Chan & Swatman;	Kalakota & Robinson
ERP & Internet;			Weider et al. Edwards & Newing
e-Business & ERP	???	???	???

APPENDIX 2.2

E-COMMERCE MODELS

At stage 1 of the literature review three business models were found examined. Fundamental to each model is the business strategy of migrating the organisation through three stages of development. At each stage the level of integration with IT adoption is seen to increase. This logic is to enable organisational benefits:

1. **e-Commerce Maturity model** - integration of technology across the enterprise.
2. **Customer Focused model** - developments in customer choice, "Free-Perfect-Now".
3. **ERP Enhanced Virtual Organising Model** - virtual organising of ERP enabled organisations.

E-COMMERCE MATURITY MODEL

The model of organisational growth in the electronic economy was developed by the Nolan Norton Institute (NNI) (KPMG, 1998). It identifies the stages an organisation moves through in terms of adoption and implementation of electronic commerce technology. As an organisation shifts to the next stage the benefits increase from IT adoption. The model illustrated in Figure A2.1, represents the notion that organisations which “adopt a fully integrated approach to e-commerce are in the best position to achieve benefits” in terms of productivity and cost savings (KPMG, 1998: 12).

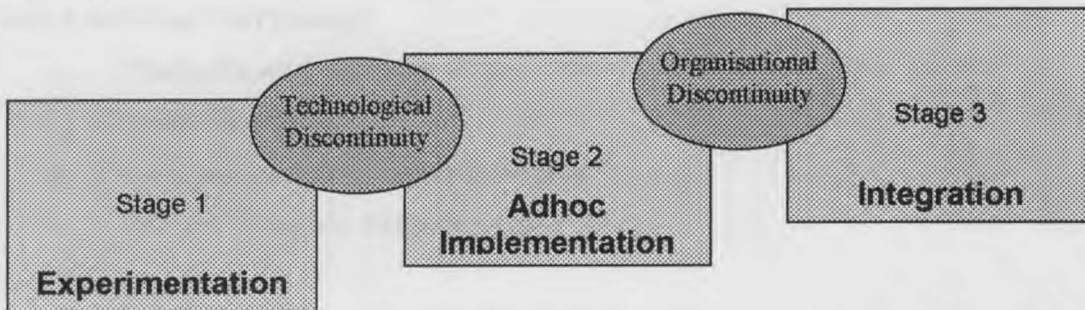


Figure A2.1: e-Commerce Maturity Model

At stage 1, there is a basic online presence such as a web site with a one-way flow of information to customers. *Technology discontinuity* exists while IT spending is ineffective and integration of technology across the enterprise is poor.

At stage 2, some two-way flow of information and cross-functional integration of the application portfolio begins. *Organisational discontinuity* exists while business units compete for resources and communication between units is hampered by different IT solutions

At stage 3, change becomes a managed process and business units have responsibility for their own development. This final stage is key to the model's value of enlightenment. Here the modes of communication and business relationships are well understood. The integration of technology across the enterprise is extensive.

CUSTOMER FOCUSED MODEL - "NOW-PERFECT-FREE"

Marshall Industries is the fourth largest distributor of industrial electronic components and production supplies in the USA. The model illustrated in Figure 5 was developed from a research study of "IT enabled value innovation" for this Californian electronics distributor. The model identifies the stages an organisation moves through in terms of adoption and implementation of electronic commerce" (Young et al., 1997, p.3; el Sawey et al., 1999, p.3).

As the name suggests, this model represents a customer-centric vision of this organisation for moving forward. It focuses on the fundamentals of customer choice (always wanting everything):

1. Products and services at the lowest possible **cost** with highest possible **quality**
2. Greatest possible **customisation**
3. Fastest possible **delivery time**

The insights drawn from the Marshall Industries study can be applied to any organisation, but may not be very appropriate. Generically the model presents the activity of going forward into the electronic economy. This is centred on a comprehensive IT enable business strategy. Those organisations where the core business is associated with "demanding customers and fast moving suppliers" are very suited to the strategy of IT enabled Value Innovation (p.16).

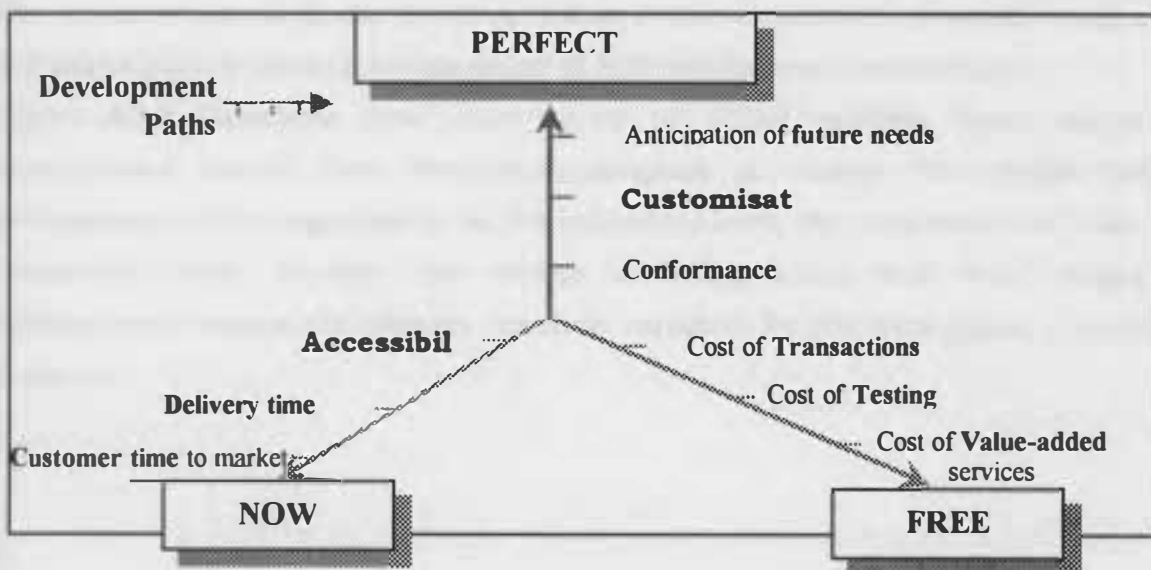


Figure A2.2: IT enabled Value Innovation

ERP ENHANCED VIRTUAL ORGANISING MODEL

This model is derived from extending the basis theory and studies on "virtual organising" by Venkatraman and Henderson (1998). Central to the model is the role of a powerful integrated Information and Communication Technology (ICT) in virtual organising (VOing), where ICT is the technology enabler and VOing is the business strategy. Here virtualness is viewed as a strategic characteristic applicable to every organisation. VOing is defined as "a strategic approach that is singularly focused on creating, nurturing, and deploying key intellectual knowledge assets while sourcing tangible, physical assets in a complex network of relationships" (Venkatraman & Henderson, 1998, p. 34).

To build the model we begin by capturing the basic characteristics of VOing and then fit the infrastructure of an integrated ICT infrastructure to form an holistic model. VOing as a business strategy focuses on three interdependent developmental vectors:

1. Virtual Encounters or *customer interaction*
2. Virtual Sourcing or *asset configuration*
3. Virtual Work or *knowledge leveraging* (Venkatraman & Henderson, 1996)
 - Virtual Encounters - refers to the extent to which customers virtually interact with the market defined at three levels of greater virtual progression;
 - Virtual Sourcing - refers to asset competency leveraging;
 - Virtual Work - refers to the virtual progression of harnessing the sharing of knowledge.

The objective here is to derive virtual value, in the context of a powerful integrated ICT infrastructure formed by the union of ERP and Internet technologies.

Figure A2.3 illustrates how each vector of VOing exhibits three stages of development, rather than continuous progress of change. The stages reflect development of the organisation at the individual level, the corporate level, and the community level. Further, the vectors of VOing along with their stages of development become the primary research variables for the next phase of work in progress.

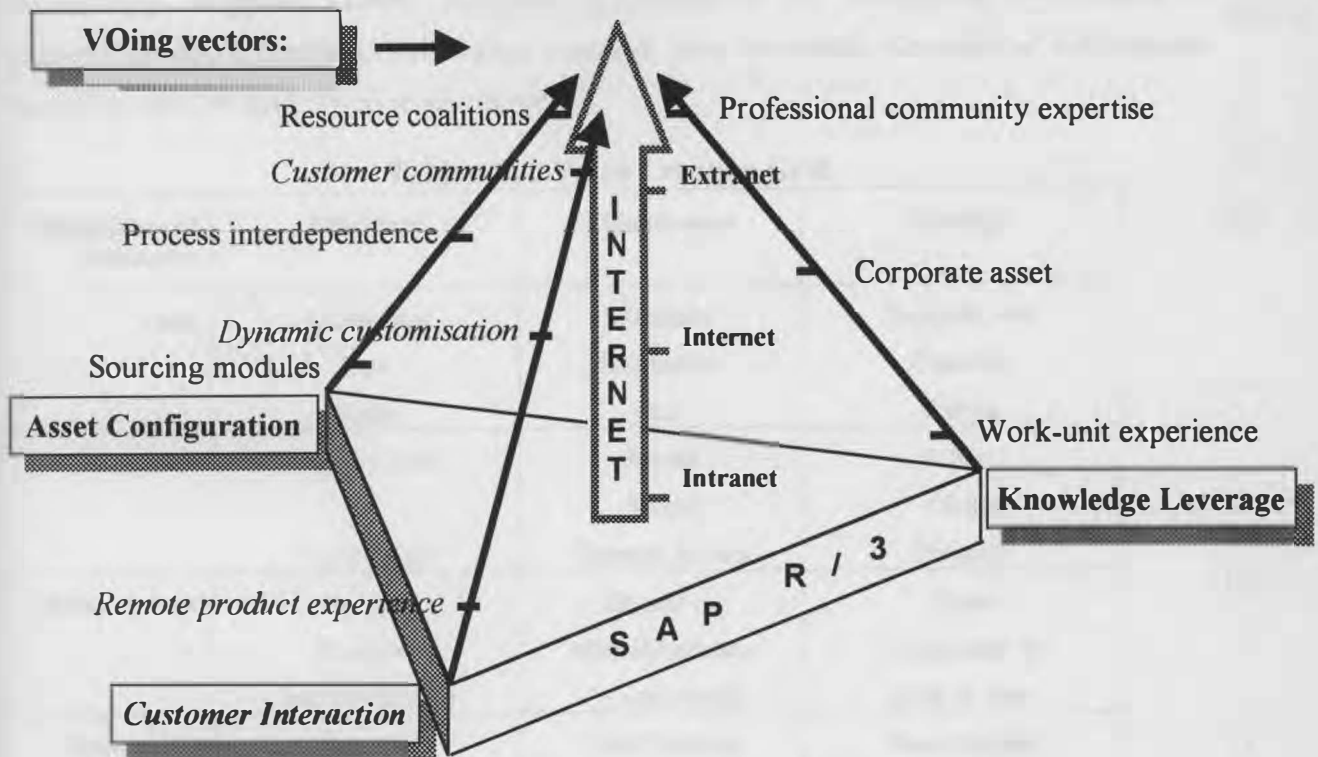


Figure A2.3: ERP Enhanced Virtual Organising Model - attributes and relationships

The model also illustrates the effects of the increased use of ICT in enabling the organisation to progress (migrate) along each vector in stages. Venkatraman and Henderson (1998), developed their logic of VOing by placing a powerful integrated ICT at the centre. In the absence of the necessary technology platform the strategy of VOing will be impossible to implement. Importantly the ERP enhanced model takes advantage of the integration of business processes across the enterprise, while maintaining the fundamental components of the VOing model (vectors and stages of development). Modes of communication and business relationships are also, included in this powerful integrated Information and Communication Technology (ICT). Furthermore, the merging of these two technologies is the basis of a powerful integrated ICT that enables knowledge and expertise to become drivers of value creation and organisational effectiveness. This is key reason for adopting this business model as the e-commerce strategy for further research.

In addition **Riggins, (1998)** suggests a framework for identifying Web-based e-Commerce opportunities. This value creation map is useful measure of e-Business found in the 2nd and 3rd models above.

Table A2. 5 Value Creation Grid

Dimensions of Commerce	Efficiency	Effectiveness	Strategy
Time	Accelerates User Tasks	Eliminate Information Float	Establish 24x7 Customer Service
Distance	Improve Scale to Look Large	Present Single Gateway Access	Achieve Global Presence
Relationships	Alter Roles of Intermediaries	Engage in Micro-Marketing To Look Small	Create Dependency to Lock in User
Interaction	Make Use of extensive User Feedback	User Controls detail of Information Access	Users Interact via Online Community
Product	Automate Tasks using Software Agents	Provide Online Decision Support Tools	Bundle Information, Products and Services

Table A2.1: e-Commerce Value Grid

(Source: **Riggins, 1998**)

References:

- KPMG, (1998) "Electronic Commerce - The future is here!" Nolan Norton Institute Report, KPMG Australia, Sept. '98 [<http://www.kpmg.com.au/>]
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- el Sawy, O.A. Young, K.M. Malhotra, A. Gosain, S. (1999) "The Relentless Pursuit of Free.Perfect.Now: IT-Enabled Value Innovation at Marshall Industries", *Sloan Management Review*, Fall
- Riggins, F.J. (1998). A Framework for Identifying Web-based Electronic Commerce Opportunities, *Journal of Organisational Computing and Electronic Commerce*, <http://riggins-mgt.iac.gatech.edu/papers/ecvalue.html>

APPENDIX 3.1

List of Case Organisations Interviewed: Nov '99 & June '00

Case Organisation	Country
1. UBS	Switzerland
2. British Biotech	UK
3. UNICEF Australia	Australia
4. Dell Computers	USA
5. Employ-Nat	Australia
6. Halliburton	Norway
7. Bertelsmann	Germany
8. Statoil	Norway
9. Novartis	Switzerland
10. Siemens	UK
11. Wine Society	Australia

Other Organisations contacted:

12. Electronics.com	Germany
13. ERP.com	Germany
14. Furniture.com	Sweden
15. HighTech.com	Austria
16. Telco.com	Germany

SAP Sites Interviewed: 1st Interviews, Nov '99; 2nd Interviews, June '00;

Table A3: Two stage data collection

#	Organisations	Country	Industry	Nov '99 1 st Interviews	Jun '00 2 nd Interviews	Bus-to-Bus Scenarios		
						B2B ^S	B2B ^C	B2B ^E
1	UBS	Switzerland	Banking	x	x			•
2	British Biotec	UK	Bio-technology	x	x	•		
3	Charity.org	Australia	Charity	x	x			
4a	Dell* &	USA	Computer Sales	x	x			
4b	LSI*	USA	Electronics	-	x			
5	Employ-Nat	Australia	Employment	x	x			•
6	Halliburton	Norway	Engineering	x	x			•
7	Bertelsman	Germany	Media	x	-	•		
8	Statoil	Norway	Oil & Gas	x	x	•		
9	Novartis	Switzerland	Pharmaceutical	x	-	•		
10	Siemens **							
10b	(FSC)	UK	Scientific-techn.	telephone	x	•	•	
11	Wine Society	Australia	Australia	x	x			

* Dell and LSI are a combined case of supplier-to-customer B2B.

** Siemens is a cross-divisional case; includes LSI as the main subsidiary case.

APPENDIX 4.1**PILOT STUDY (A) OF 5 AUSTRALIAN SAP SITES****List of Australian SAP Sites Interviewed Sep'98 and Feb'99**

- | | |
|-------------------------------------|----------------------------------|
| 1. WA Police Service | Perth, Western Australia |
| 2. WA Water Corporation | Perth, Western Australia |
| 3. Wine Society of Australia | Sydney, NSW |
| 4. Woodside Energy | Perth, Western Australia |
| 5. Worsley Alumina | Colley, Western Australia |

Pilot Study (a) Interview Questionnaire**/next page**

PILOT STUDY (A) INTERVIEW QUESTIONNAIRE:**"Integrating SAP R/3 with the Internet"****SAP-based Organisation :****Contact:****Date :**

-
1. Why was SAP chosen?:
 2. What is the implementation time frame?
Started -
Finished -
 3. How is/was it implemented?
Consultants -
In-house team -
Accelerated SAP -
PANDESIC solution -
 4. Standardised SAP - what % of SAP has/will be customised?
 5. **Is your Organisation moving towards Internet/Intranet with SAP?**
To what extent -
Time frame -
 6. **IMPACT - What changes have occurred?**
Roles
Procedures
Reporting
 7. **Perceived Benefits?**
 8. **Implementation Problems?**

Colin Ash
ECU
Sep 1998

(i). Used for "getting started" in September 1998)

(ii) Used for "follow up" in February 1999; Q.5 & Q.7)

APPENDIX 4.2**PILOT STUDY (B) SAP SITES INTERVIEWED AUG'99**

(All Local Cases used for establishing a CF₁ for e-ERP projects)

List All Western Australian SAP Sites

1. **Alinta Gas**
2. **BHP Iron Ore**
3. **Co-operative Bulk Handling**
4. ***Hamersley Iron (includes Dampier Salt)**
5. ***Millenium Inorganic Chemicals**
6. **WMC Resources**
7. **WA Police Service**
8. **WA Water Corporation**
9. **WA AustPost**
10. **Woodside Petroleum**
11. **Worsley Alumina**

* Cases 4 and 5 were unavailable for interview

Letter of Introduction**Pilot Study (b) Interview Questionnaire**

EDITH COWAN UNIVERSITY
SCHOOL OF MANAGEMENT INFORMATION SYSTEMS

Letter of Introduction:

“A survey of Western Australian SAP enabled organisations”

Mr

During the past twelve months, the Western Australia business community has witnessed the uptake of two separate information technologies; the Internet and the application of enterprise resource software. While Government agencies have been pro-active in encouraging and promoting E-commerce industry solutions, a range of influences, both technical and organisational, have been driving an increase in SAP R/3 implementations. The purpose of this survey is to establish the current use and expected use of Internet technology for extending the R/3 business functions for the benefit of customers and business partners.

Benefits of the Research

This survey is designed to identify the current position of Western Australia's SAP enabled organisations with respect to the adoption of Internet enabled R/3 systems. The data being collected is viewed as preliminary information necessary for directing further investigations into organisations (interstate and overseas) that are using advanced Internet enabled SAP R/3 solutions.

Data Security

Your organisation's identity will be kept completely isolated from all data collected. To ensure complete anonymity, the data collected from this questionnaire will be “de-identified” by destroying all links to your organisation's identity. The data collected from the survey will be used for the purpose of my PhD and associated conference papers. Any further use of this data will require your consent. So a participant is free at any time not to consent to further involvement in any ongoing research.

The research results will be made available to the survey participants.

Thank you for your participation.

Colin Ash

August 1999

Student No.	0974718
Email:	c.ash@ecu.edu.au
Institution:	Edith Cowan University
Programme:	Doctorate of Philosophy
Principal Supervisor:	Prof Janice M. Burn

**“A SURVEY OF WA SAP-Based ORGANISATIONS
FOR THE
USE OF INTERNET TECHNOLOGY - PRESENT AND FUTURE”**

Conducted by

Colin Ash

(Lecturer and PhD Student)

at

EDITH COWAN UNIVERSITY

SCHOOL OF MANAGEMENT INFORMATION SYSTEMS

Student No.

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Edith Cowan University

Doctorate of Philosophy

Prof Janice M. Burn

August '99

1. Organisational Data

Industry: (eg Chemical, Mining, Petroleum, Retailing, Utility) []

Implementation Dates: [] to []

R/3 release: (eg 3.0, 3.1, 4.0, 4.5, Pandesic) [];

1.1 Business-to-Employee (B2E) No. of Employees: [];

Type of Employees:

1.2 Business-to-Customer (B2C) No. of Customers: [];

Type of Customers:

1.3 Business-to-Business (B2B) No. of Business Partners: [];

Type of Business Partners:

1.4 Supply Chain Management (SCM) No. of Suppliers: [];

Type of Suppliers:

2. List Internet technology USE - not integrated with R/3 for:

(Please use **A** or **E** to indicate Actual or Expected or future use)

2.1 Business-to-Employee (B2E)

2.2 Business-to-Customer (B2C)

2.3 Business-to-Business (B2B)

2.4 Supply Chain Management (SCM)

3. List Internet technology use - integrated with R/3 for:

(Please use **A** or **E** to indicate Actual or Expected or future use)

3.1 Business-to-Employee (B2E)

eg SAP's Employee Self services (E) [?]

3.2 Business-to-Customer (B2C)

eg SAP's Online Store B2C (E) [?]

3.3 Business-to-Business (B2B)

eg SAP's B2B Procurement (E) [?]

eg SAP's B2B Online Store (E) [?]

3.4 Supply Chain Management (SCM)

eg SAP's Procurement Chain Management (E) [?]

Effects of integrating your R/3 with Internet technology

4.1 What parts of your R/3 system should be integrated with Internet technology?

4.2 What benefits could be gained from integrating your R/3 with the Internet?

4.3 What factors in your organisation would likely inhibit success of integrating your R/3 with the Internet? eg Unstable R/3 implementation

4.4 What should be done to maximise the benefits derived from integrating your R/3 system with the Internet? eg Stabilise your R/3 implementation

4.5 What business drivers are effecting the integration of your R/3 system with the Internet?

4.6 What else?

5. How closely does this model fit your organisation?

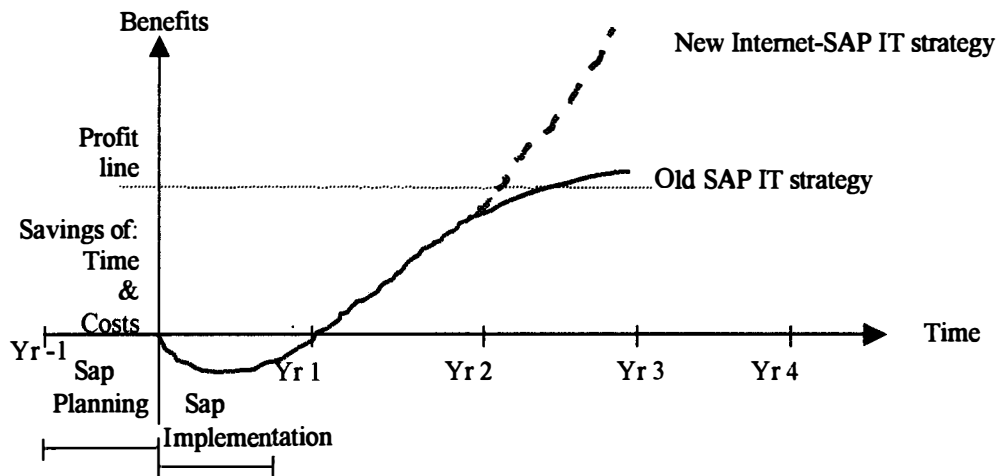


Figure A4.2: Adopt Internet technology with SAP R/3 to increase profits

-- End --

“A survey of Western Australian SAP-enabled organisations”

I give my consent to the use of the data (obtained from this questionnaire) for the purpose as stated in the covering “Letter of Introduction”.

Signature: _____ Date: _____

APPENDIX 4.3

PILOT STUDY (A) OF (5) AUSTRALIAN SAP SITES-

Page

List of Australian SAP Sites Interviewed Sep'98 and Feb'99

6. WA Police Service	Perth, Western Australia
7. WA Water Corporation	Perth, Western Australia
8. Wine Society of Australia	Sydney, NSW
9. Woodside Energy	Perth, Western Australia
10. Worsley Alumina	Colley, Western Australia

Table A4.3a: Data Collected from Pilot Study (a) Interviews , Sep'98

Table A4. 3b: Data Collected from Pilot Study (a) Interviews , Feb'99

Table A4. 3c: "Expected Use of Internet with SAP" from Interviews - Feb'99

Table A4. 3d: "Perceived Benefits" Data from Interviews- Feb'99

Table A4. 3e: Key Comments for Q.5 - Interviewed Feb'99

Table A4. 3f: Initial Interviews of Five SAP-enabled Organisations - Feb'99

Table A4.3a: Initial Interviews of Five Australian SAP Sites – September 1998

Questions \ Organisations	1. Alumina.com.au	2. Petrol.com.au	3. Service.gov.au	4. Society.com.au	5. Utility.gov.au
Contact - Interview Date - Industry -	SAP project Consultant 16-Sep-98 MINING	SAP Project Mgr 1-Sep-98 OIL&GAS	Project Dir, RMIS 9-Sep-98 PUBLIC SERVICE	IT Mgr 24-Sep-98 RETAIL	IS Services/Outs. Mgr 18-Nov-98 PUBLIC UTILITY
1. Why was SAP chosen?	Planning & Budgeting, Y2K, Decision support	Shell recommended, Y2K, Info integration	Y2K, Secure admin bus and reporting solutions.	Focus on Internet connect the Society to members.	Initiated by outsourcing; Y2K,
2. Implementation time? Started - Finished -	2 yr 1 yr planning; 1997 Phase 1; Jan - Apr '98 Phase 2; Nov '98	3 yr Jan '98 Fi, Co, MM, HR at present.	> 1 yr Dec '98 - Jan '99 Fi, HR Aug '99 - PM mm, PS	> 1 yr Planning started Jan '98 Phase 1: Sep '98 - + ?	Planning + 1 yr for Impl Nov 97 Nov 98 live, HR, Fi, PM, PS-mm
3. How was it implemented? Consultants - In-house team -	PriceWaterhouse consults: staff = 1:4 (max of 38)	PriceWaterhouse 60% inhouse team	Deloits ICS methodology	Initially PANDESIC, then a change to ASAP	GEC IS, + Requisite bus process owners (max 150)
4. Standardised SAP? % Standard SAP - % SAP to be customised -	80% max core SAP fn. >20% PP, PM, QM. HR was better process fit.	40% customised. Major effort was in developing an understanding the business processes, NOT in the configuration.	> 90% of standard SAP, except in HR where there are covert operatives.	> 90% of standard SAP, except where there are membership requirements under the Act.	80% to capture competitive advantage. Poor fit to Asset/Work Maintenance – required customisation.
5. Moving to Internet-SAP? To what extent - Time frame -	Some Intranet fn. ESS for Late 1999	Unknown – “just bedding down”	Some Intranet fn. ESS for Late 1999?	Internet e-mailings and online orders. Sep-98 -	“GRANGE” for customer service & “SCOPE” - SCM
6. What changes occurred? Roles, Procedures, and Reporting -	Unable to change work practices, decided to change to SAP process.	Change plan requires change managers and agents.	N/A: Expected improved reporting and online communication.	Overhaul the Society’s total bus processes from sales order to inventory and delivery.	Change from paper based to e-docs. A re-focus on the prior to order process.
7. Perceived Benefits?	PM & Decision support	Reporting; analysing costs, searching for best suppliers.	Value added through: Admin costs savings.	Growth in e-business, leading to growth in our customers/ membership.	Improved flow of data, integration of modules to support effective admin.
8. Implementation Problems?	30% loss PM fn. Trg was forgotten. Business language barrier – SAP consults and orgn team	Benefits do NOT fall into place easily - integration - some data warehouse problems.	N/A = yet to implement.	Lack of understanding core e-business processes by management.	Data architecture prob. Inappropriate config. left significant data cleansing problems.

Table A4.3b: "Follow up" Interviews of Five Australian Sites - February 1999

#. ORGANISATION <i>Contact - Interview Date -</i>	QUESTIONS	DATA RECORDED FROM INTERVIEWS
1. Alumina.com.au <i>SAP project Consultant 13-Feb-99</i>	Q.5 Internet with SAP? To what extent - Time frame - Q.7 Perceived Benefits?	SCM - the company is concerned with the Inbound side, but can easily switch to the Outbound side. eg. This can eliminate the invoice cycle. With I-SAP a complete strategic 5 yr plan is needed, see updated graph. Virtual organising should be e-business driven. An improvement in MRO, retailing? The supplier's catalogues will require a trustworthy interface for their valuable intellectual property. A trend in the merging of both parties' intellectual properties (catalogues). Also, autonomous software agents to support catalogue management. Knowledge mgt of your supplier's business.
2. Petrol.com.au <i>SAP Project Mgr 12-Feb-99</i>	Q.5 Internet with SAP? To what extent - Time frame - Q.7 Perceived Benefits?	B2B - Procurement and logistics, access to supplier's catalogues. Unknown - see New IT-SAP strategy graph for perceived developments Lower oil prices puts pressure on management to combat spiralling admin costs. Access to supplier's catalogues. Perceived: Internet can lift efficiency; Value adding comes from increased transparency.
3. Service.gov.au <i>Act. Dir, RMIS 11-Feb-99</i>	Q.5 Internet with SAP? To what extent - Time frame - Q.7 Perceived Benefits?	Use intranets for creating timely, accurate and relevant management information. B2E - Intranet SAP for Employee-self-service HR business Update to web-enabled SAP 4.6 not expected before late in year 2000 Updating to web-enabled SAP 4.6 will; save license costs, enable Intranet reporting, save admin costs. Improved reporting 1st steps towards knowledge management as a means of organisational sharing
4. Society.com.au <i>IT Mgr *24-Sep-98 *(original interview only)</i>	Q.5 Internet with SAP? To what extent - Time frame - Q.7 Perceived Benefits?	B2C - Total integration of the society's business processes including Internet mailings and orders. Sep-98 - ? Growth in e-business, leading to growth in our customer-base. Tracking and servicing of member needs - demographics. Effective staff services through improve processes/work behaviour
5. Utility.gov.au <i>Client Services Mgr 12-Feb-99</i>	Q.5 Internet with SAP? To what extent - Time frame - Q.7 Perceived Benefits?	B2G - Business Mgr. is commissioned to ensure we receive the business benefits from SAP. eg Attempting payment on delivery for contractual arrangements - to change negative attitudes from past practice. Trialing a Telstra Internet customer payment system. This is seen as a PR exercise to woo back public customer confidence - as only 5% of customers use the Internet. SAP self help training via intranet.

Table A4.3c: "Expected Use of Internet with SAP" Data from Interviews - Feb 1999

#. ORGANISATION Contact - Interview Date -	DATA RECORDED AT INTERVIEWS: Q.5
1. Alumina.com.au 13-Feb-99 SAP project Consultant	SCM - the company is concerned with the Inbound side, but can easily switch to the Outbound side. eg. This can eliminate the invoice cycle. With I-SAP a complete strategic 5 yr plan is needed, see updated graph.
2. Petrol.com.au 12-Feb-99 SAP Project Mgr	B2B - Procurement and logistics, access to supplier's catalogues. Unknown - see New IT-SAP strategy graph for perceived developments
3. Service.gov.au 11-Feb-99 Act. Dir, RMIS	B2E - Intranet SAP for Employee-self-service HR business. Use intranets for creating timely, accurate and relevant management information. Update to web-enabled SAP 4.6 not expected before late in year 2000.
4. Society.com.au *24-Sep-98 IT Mgr	* comments from Sept '98 only B2C - Total integration of the society's business processes including Internet mailings and orders. Sep '98 ?
5. Utility.gov.au 12-Feb-99 Client Services Mgr	B2G - Business Mgr. is commissioned to ensure we receive the business benefits from SAP. eg Attempting payment on delivery for contractual arrangements - to change negative attitudes from past practice.

Table A4.3d: "Perceived Benefits" Data from Interviews- February 1999

#. ORGANISATION Interview Date - Contact -	DATA RECORDED AT INTERVIEWS: Q.7
1. Alumina.com.au 13-Feb-99 SAP project Consultant	Virtual organising should be e-business driven. An improvement in MRO, retailing? The supplier's catalogues will require a trustworthy interface for their valuable intellectual property. A trend in the merging of both parties' intellectual properties (catalogues). Also, autonomous software agents to support catalogue management. Knowledge mgt of your supplier's business.
2. Petrol.com.au 12-Feb-99 SAP Project Mgr	Lower oil prices puts pressure on management to combat spiralling admin costs. Access to supplier's catalogues. Perceived: Internet can lift efficiency; Value adding comes from increased transparency.
3. Service.gov.au 11-Feb-99 Act. Dir, RMIS	Updating to web-enabled SAP 4.6 will; save license costs, enable Intranet reporting creating timely, accurate and relevant management information., save admin costs. Improved reporting 1st steps towards knowledge management as a means of organisational sharing
4. Society.com.au *24-Sep-98 IT Mgr	*(original interview only) Growth in e-business, leading to growth in our customer-base. Tracking and servicing of member needs - demographics. Effective staff services through improve processes/work behaviour - Internet mailings and orders.
5. Utility.gov.au 12-Feb-99 Client Services Mgr	Business Mgr. is commissioned to ensure we receive the business benefits from SAP, to change negative attitudes from past practice. Trialing a Telstra Internet customer payment system. This is seen as a PR exercise to woo back public customer confidence - as only 5% of customers use the Internet. SAP self help training via intranet.

Table A4.3e: Key Comments for Q.5 - Interviewed February 1999

#. ORGANISATION Interview Date	INDUSTRY	EXPECTED USE OF INTERNET WITH SAP Key comments from interviews
1. Alumina.com.au 13-Feb-99	Mining	SCM - supply chain management Company uses the Inbound side, but needs Outbound side.
2. Petrol.com.au 12-Feb-99	Oil & Gas	B2B - business-to-business Procurement and logistics, access to supplier's catalogues.
3. Service.gov.au 11-Feb-99	Gov. Service	B2E - business-to-business Intranet SAP for Employee-self-service HR business
4. Society.com.au *24-Sep-98	Retail	B2C - business-to-Customer Extension of business processes with Internet mailings and orders.
5. Utility.gov.au 12-Feb-99	Gov Utility	B2G - business-to-government Attempting payment on delivery for contractual arrangements.

Table A4.3f: Initial Interviews of Five SAP-enabled Organisations - February 1999

#. ORGANISATION Interview Date	INDUSTRY	B2E	B2B	B2C
1. Alumina.com.au 13-Feb-99	Mining		Expect: SCM (2001?)	
2. Petrol.com.au 12-Feb-99	Oil & Gas		Expect (?)	
3. Service.gov.au 11-Feb-99	Gov. Service	Expect (late 2000)		
4. Society.com.au *24-Sep-98	Retail			Imminent (Nov 1998?)
5. Utility.gov.au 12-Feb-99	Gov Utility		Expect: B2Gov (2001?)	

APPENDIX 4.4

Interviewed August 1999

List All Western Australian SAP Sites

- 12. Alinta Gas**
- 13. BHP Iron Ore**
- 14. Co-operative Bulk Handling**
- 15. *Hamersley Iron (includes Dampier Salt)**
- 16. *Millenium Inorganic Chemicals**
- 17. WMC Resources**
- 18. WA Police Service**
- 19. WA Water Corporation**
- 20. WA AustPost**
- 21. Woodside Petroleum**
- 22. Worsley Alumina**

* Cases 4 and 5 were unavailable for interview

Tables 4.4 A Summary of Factors Influencing Internet with SAP R/3 Use

Tables 4.5 A Profile of Factors Influencing Internet with SAP R/3 Use

Table A4.4a: A Summary of Factors Influencing Internet with SAP R/3 Use - Interviewed August 1999

Case #. Enterprise Alias	1. Alumina .com.au	2. Co-op .org.au	3. IT-div .com.au	4. Mining .com.au	5. Petrol .com.au	6. Postal .gov.au	7. Service .gov.au	8. Utility1 .com.au	9. Utility2 .gov.au
Interview date	19-8-99	26-8-99	18-8-99	20-8-99	17-8-99	12-10-99	23-8-99	18-8-99	19-8-99
Q.1 Enterprise Data:									
Industry	Mining	Distribution	IT/Industrial	Mining	Oil & Gas	Service sector	Public sector	Utility	Utility
Implementation Period	3/97 – 12/97	1/98 – 8/98	Since 93	1/97 – 6/98	8/96 – 1/98	95 - 96	11/98 – 1/99	10/97 – 3/98	1/98 – 11/98
R/3 release	4.0b	3.1G	3.0,3.1,4.0,4.5	3.0F	3.0D	3.0B	3.1H	3.0, 4.0 11/99	3.1H
No. of employees	1000	890 + 1100	1700	3000	1200	2500	6500	390	2200
No. of customers	No trading	3 + 30	200 business	50 + 1450	<50	Australia	N/A	400,000 + oth	350,000
No. of business partners	Joint venture	JV	“ “	N/A	JV, Alliances	Not yet	N/A	N/A	7
No. of suppliers	200 +	?	500	~12,000	1300	1500+	?	100 + 3900	2500
Q.2 Internet without SAP Use:									
B2B = business-to-business	-	email	EDI, email eft	small extranet	email	-	-	Online orders	-
B2C = business-to-customer	-	EDI forms	PR reports	Web sales CO	PR+ web site	Web site	PR web site	PR Web site	e-pay, land ap
B2E = business-to-employee	-	Intranet docs	Intranet docs	Intranet docs	Intranet docs	-	Intranet docs	Intranet docs	Gen orgn doc
SCM = Supply chain mgt	-	E (sup catal)		E (3 models)	Sup. catalog	-	-	Bill payments	E (purchases)
Q.3 Internet with SAP Use:									
B2B = business-to-business	E (e-procure)	E (JV BI)	E (e-catalog)	E (e-procure)	E (partner Rpt)	-	E (e-procure)	E (B2B mgt)	E (e-procure)
B2C = business-to-customer	-	?	E (ordr/billing)	E (Sell-side)	?	-	-	E (Cust mgt)	- (stand alone)
B2E = business-to-employee	E (ESS)	E (ESS licen)	E (HR payroll)	E (ESS)	E (HR ESS)	E (Fi intranet)	E (rostering)	E (Wk flow)	E (e-Depot)
SCM = Supply chain mgt	E (SCM)	E (potential)	E (PC rollout)	E (3 models)	E (e-procure)	-	E (Transport)	E (e-proc, eft)	E (SCM)
Q.4 Effects of Internet-SAP:									
Key processes for e-business	Procurement	KPIs – Fi, Co	HR. MRO	Procu & sales	HR tracking	Split I & SAP	All int/ext pro	M/M, PM, PA	remote access
Benefits	+ve ordering	HR admin	Access prods	Customer rel.	Input output	I-SAP is not	Data qual/secu	Admin saving	Cost savings
Inhibiting factors of I-SAP	-ve awareness	W-interface?	Cost/network	Very few	See potentials	e-bus platform	IT infrastruct	Complexities	No e-supplier
What could maximise benefits	Sell benefits	Focus on bus	Who/what data	Benefits model	Process orgn	Lack of catal.	Roll out to all	Web frontend	SAP licences
Business drivers of I-SAP	Autom e-proc	Opportunities	Cost/value,	Peer com adv	Simplify bus	R/3 goes with	Speed of pay	CRM	No e-bus yet
Other	-ve suppliers	Adv of Intern	cust. demand		Align goals	Warehousing	4.6 in 2001	Web interface	Retire IT equip
			Comp adv					Effectiveness	older technol
IT-SAP Strategy graph:									
Perceived trends?	Flatter curve cost sav/effic	Flatter I-SAP curve, opport.	Diff from Cust &/ Part	2 nd wave IT opportunities	Set of J-curve IT enabled.	-	HR admin cost savings	Lifts effec- iency curve	A slow then extra boost

Table A4.4b: Summary of Q.3 – “Expected Use of Internet with SAP”

Case #. Alias	Interview Date	Bus-to-Bus (B2B)	Bus-to-Cust (B2C)	Bus-to-Emp (B2E)	Supp. chain (SCM)	Expected Year of Use
1. Alumina	19-8-99	E	na	E	E	2002
2. Co-op	26-8-99	E	?	E	E	2002
3. IT-div	18-8-99	E	E	E	E	2000/1
4. Mining	20-8-99	E	E	E	E	2000/1
5. Petrol	17-8-99	E	?	E	E	2001
6. Postal	12-10-99	na	na	E	na	unknown
7. Service	23-8-99	E	na	E	E	Jan 2001
8. Utility1	18-8-99	E	E	E	E	2001/2
9. Utility2	19-8-99	E	?	E	E	Jul 2001

Key: E – Expected use of I-SAP ? – Unknown na – Not applicable

Table A4.4c: Q.4 Effects of Internet with SAP?

Q.4 Effects of Internet-SAP:	1	2	3	4	5	6	7	8	9
Key processes for e-business	Procurement	KPIs – Fi, Co	HR, MRO	Procu & sales	HR tracking	Split I & SAP	All int/ext pro	MM, PM, PA	remote access
Benefits	+ve ordering	HR admin	Access prods	Customer rel.	Input output	I-SAP is not	Data qual/secu	Admin saving	Cost savings
Inhibiting factors of I-SAP	-ve awareness	W-interface?	Cost/network	Very few	See potentials	e-bus platform	IT infrastruct	Complexities	No e-supplier
What could maximise benefits	Sell benefits	Focus on bus	Who/what data	Benefits model	Process orgn	Lack of catal.	Roll out to all	Web frontend	SAP licences
Business drivers of I-SAP	Autom e-proc	Opportunities	Cost/value,	Peer com adv	Simplify bus	R/3 goes with	Speed of pay	Bus intelligen	No e-bus yet
Other	-ve suppliers	Adv of Intern	cust. demand		Align goals	warehousing	4.6 in 2001	Web interface	Retire IT equip

Table A4.4d: Q.6 IT-SAP Strategy graph

IT-SAP Strategy graph:									
Perceived trends?	Flatter curve cost sav/effic	Flatter I-SAP curve, opport.	Diff from Cust &/ Partr	2 nd wave IT opportunities	Set of J-curve IT enabled.	-	HR admin cost savings	Lifts effec-ency curve	A slow then extra boost

Table A4.4e: Summary of Q.3 v Q.4 – “Major Expectations for Internet with SAP”

Case #. Alias	Interview Date	Bus-to-Bus (B2B)	Bus-to-Cust (B2C)	Bus-to-Emp (B2E)	Supp. chain (SCM)	Expected Year of Use
1. Alumina	19-8-99	E	na	E	E	2002
2. Co-op	26-8-99	E	?	E	E	2002
3. IT-div	18-8-99	<u>E</u>	<u>E</u>	<u>E</u>	E	2000/1
4. Mining	20-8-99	E	E	E	E	2000/1
5. Petrol	17-8-99	E	?	E	E	2001
6. Postal	12-10-99	na	na	E	na	unknown
7. Service	23-8-99	E	na	E	E	Jan 2001
8. Utility1	18-8-99	E	E	E	E	2001/2
9. Utility2	19-8-99	E	?	E	E	Jul 2001

Key: E – Expected use of I-SAP ? – Unknown na – Not applicable

Table A4.4f: Mapping of Q.4 (Expectations of using Internet with SAP) onto the VOing “Cube”

Case #. Alias	Interview Date	Customer Interaction	Resource Configuration	Leveraging Expertise	Activity Focus	Performance Gains
1. Alumina.com	19-8-99	na	2	1	1	1
2. Co-op.org	26-8-99	1	1	1	1	1
3. IT-div.com	18-8-99	2	2	2	2	2
4. Mining	20-8-99	1	2	1	1	1
5. Petrol	17-8-99	na	2	1	1	1
6. Postal	12-10-99	1	1	1	1	1
7. Service	23-8-99	na	1	2	1	1
8. Utility1	18-8-99	1	1	1	1	1
9. Utility2	19-8-99	1	1	1	1	1

Key: 1 = Stage 1 | 2 = Stage 2 | 3 = Stage 3 of Virtual Organising

Each enterprise is rated as a stage 1, or 2 or 3 for all components of VOing using the interview data.

This should be regarded as a first test of observing and reconciling theory with business or organisational practice.

Table A4.4g: Mapping of Q.4 (Expectations of using Internet with SAP) onto the VOing “Cube”

VOing Bus. Scenarios	Resource Configuration	Customer Interaction	Leveraging Expertise	Activity Focus	Performance Gains
B2B	Case 1, 3, 4, 5			e-procurement	Reduced Costs,
B2C		Case 3		Customer Relations	Improved CR
B2E			Case 2, 3, 6, 7, 8, 9	Employee self service	Improved Admin

Table A4.5a: A Profile of Factors Influencing Internet with SAP R/3 Use - Interviewed August 1999

1 Alumina.com.au	Mining	Actual Data Collected: 19-8-99
Q.1 Implementation period R/3 Release/ver.	3/97 – 12/97 4.0b	Go live 1/1/1998 4.0b
No. of employees	1000	All staff
No. of customers	No trading	Joint Venture producer only – no trading, no sales;
No. of business partners	Joint venture	Not yet, Joint Venture separate from owners group structures
No. of suppliers	200 +	Not yet, potentially 200 suppliers
Q.2 Internet without SAP Use:		
B2E = business-to-employee	-	None
B2C = business-to-customer	-	None
B2B = business-to-business	-	None
SCM = Supply chain mgt	-	None
Q.3 Internet with SAP Use:		
B2E = business-to-employee	E (ESS)	Low priority at present - no plans over the coming 3 years.
B2C = business-to-customer	-	No! We do not sell our product.
B2B = business-to-business	E (e-procure)	No definite plans; will be evaluated.
SCM = Supply chain mgt	E (SCM)	No plans, but potentially part of a future development.
Q.4 Effects of Internet-SAP:		
Key processes for e-business	Procurement	Procurement processes (MM), Accounts Payable (FI). Internal front ends, using Internet technology
Benefits	+ve ordering	Reduced inventory holdings, efficiencies in ordering and records processing. Availability to larger database of supplies (catalogues) held by vendors information/knowledge. Improved supplier relationships. Decentralise procurement processes away from buyer. Areas deal directly with suppliers on the web. Buyers better utilised for strategic purchasing deals rather than just raising purchase orders on request. Less paper and corresponding resources involved in current processes.
Inhibiting factors of I-SAP	-ve awareness	Limited funds and resources available for development. Lack of appreciation of strategic benefit available from use of the technology.
What could maximise benefits	Tell benefits	Educate and communicate requirements and benefits. Make SAP R/3 more user friendly. Internet technology can assist with this. Build interfaces initially but upgrade to 4.6c when available (mySAP.com).
Business drivers of I-SAP	Autom e-proc	The need to improve automation of procurement. Users wanting friendlier interfaces.
Other	-ve suppliers	Progresses are also significantly affected by suppliers' systems and capacity to interface with us. A lot of work will be required in this area.
IT-SAP Strategy graph:		
Perceived trends?	Flatter curve cost sav/effic	I would not expect such a marked improvement from Internet-SAP IT Strategy. Curve would be flatter. Other items are bigger potential cost savings and efficiency.

Table A4.5b: A Profile of Factors Influencing Internet with SAP R/3 Use - Interviewed August 1999

2 Co-op.org.au	Distribution	Actual Data Collected: 26-8-99
Q.1 Implementation period R/3 Release/ver.	1/98 – 8/98 3.1G	Jan 98 to Aug 98 3.1?
No. of employees	890 + 1100	890 F/t, 1100 P/t
No. of customers	2 major /30	2 major (AWB, GranPoolWA) is 90% of services out of 30 customers
No. of business partners	JVP	A Joint Venture
No. of suppliers	?	
Q.2 Internet without SAP Use:		
B2E = business-to-employee	Intranet docs	Intranet docs. for policies and procedures.
B2C = business-to-customer	EDI forms	EDI form for bulk transactions will continue.
B2B = business-to-business	email	email
SCM = Supply chain mgt	E (e-catalog)	Investigating - stream lining purchases using supplier e-catalogues.
Q.3 Internet with SAP Use:		
B2E = business-to-employee	E (ESS licen)	(E) Licence for SAP ESS. Yet to be implemented
B2C = business-to-customer	?	Unknown - there are others in the industry with R/3. This needs exploring further.
B2B = business-to-business	E (JV BI)	For Joint Venture? A thought use Data Warehouse to internet with SAP Fi/Co.
SCM = Supply chain mgt	E (potential)	SAP has significant potential in SCM
Q.4 Effects of Internet-SAP:		
Key processes for e-business	KPIs – Fi, Co	Fi/Co are the KPIs
Benefits	HR admin	HR effective operations.
Inhibiting factors of I-SAP	W-interface?	Costs. At present, SAP GUI is not likely to be "bettered" (improved) by HTML.
What could maximise benefits	Focus on bus	Deployment of Internet needs to be focused on business (issues).
Business drivers of I-SAP	Opportunities	Opportunities - customer base is very static. Deregulation will open up the customer base, but not in SAP (business) area
Other	Adv of Intern	
IT-SAP Strategy graph:		
Perceived trends?	Flatter I-SAP curve, opport.	9 months settling-in period with business rules and redefined processes. Unsure about the Internet curve?

Table A4.5c: A Profile of Factors Influencing Internet with SAP R/3 Use - Interviewed August 1999

3 IT-Div.com.au	IT/Industrial	Actual Data Collected: 18-8-99
Q.1 Implementation period R/3 Release/ver.	Since 93 3.0,3.1,4.0,4.5	Experienced in SAP implementations since 1993 From 3.0, to 4.0/5
No. of employees	1700	1500 professional, 200 admin
No. of customers	200 business	200 businesses
No. of business partners	“ “	As above
No. of suppliers	500	~500
Q.2 Internet without SAP Use:		
B2E = business-to-employee	Intranet docs	Intranet - Policies documents, Standards forms, Reporting, Telephone directory.
B2C = business-to-customer	PR reports	Annual reports, Environment reports, Press releases, School projects, Steel catalogue.
B2B = business-to-business	EDI, email eft	Email, EDI, File transfer.
SCM = Supply chain mgt		
Q.3 Internet with SAP Use:		
B2E = business-to-employee	E (HR payroll)	(E) HR annual leave, superannuation, payroll
B2C = business-to-customer	E (ordr/billing)	(E) Customer orders/billings
B2B = business-to-business	E (e-catalog)	(E) Stationery supplies, Online catalogues
SCM = Supply chain mgt	E (PC rollout)	(E) PC leasing and rollouts
Q.4 Effects of Internet-SAP:		
Key processes for e-business	HR: MRO	HR: maintenance repairs operations (MRO)
Benefits	Access prods	More up-to-date pricing/product. Better customers service (access to billing info).
Inhibiting factors of I-SAP	Cost/network	Cost of the equipment and bandwidth required
What could maximise benefits	Who/what data	1. Clear understanding of who will be using the Internet to access what data. 2. Provide the customer with an indication of the response time(s) to expect.
Business drivers of I-SAP	Cost/value,	Cost/ value for money. Customer demand. Competition driving this new channel.
Other	cust. demand	
	Comp adv	
IT-SAP Strategy graph:		
Perceived trends?	Difference bt Cust/Partner	Internet uses varies according to customer and/or business partner (base).

Table A4.5d: A Profile of Factors Influencing Internet with SAP R/3 Use - Interviewed August 1999

4 Mining.com.au	Mining	Actual Data Collected: 20-8-99
Q.1 Implementation period	1/97 – 6/98	1/97 – 6/98
R/3 Release/ver.	3.0F	3.0F
No. of employees	3000	3000 in Australia
No. of customers	50 + 1450	50 major, 14,500 minor
No. of business partners	N/A	Not applicable
No. of suppliers	~12,000	~12,000 vendors
Q.2 Internet without SAP Use:		
B2E = business-to-employee	Intranet docs	Internet - policy manuals, programmes from database, manual telephone, emails for projects
B2C = business-to-customer	Web sales CO	Internet to marketing of COBALT
B2B = business-to-business	small extranet	Limited (Extract) V.P.N.; SAP, ANZ
SCM = Supply chain mgt	(E) 3 models	(E) 3 SCM models: single source, B2B SAP's view catalogues, Portals consortium hosting to third parties
Q.3 Internet with SAP Use:		
B2E = business-to-employee	E (ESS)	With upgrade to (4.6?) Internet enables a web interface with SAP: 1. ESS, then 2. desktop manger, and 3. KMgt cockpit.
B2C = business-to-customer	E (Sell-side)	(E) Selling only to customer. Products – buying online is hardly an issue.
B2B = business-to-business	E (e-procure)	(E) Purchasing cards issues: 80% of purchase orders are low value, and 20% are high value
SCM = Supply chain mgt	E (2 models)	(E) B2B SAP's view catalogues, and Portals consortium hosting to third parties.
Q.4 Effects of Internet-SAP:		
Key processes for e-business	Procu & sales	Have an R/3 that is web-enabled. Procurement and sales products – multi language/currency
Benefits	Customer rel.	Getting close to customers (give choices)
Inhibiting factors of I-SAP	Very few	Very few – uninformed people have had to (change)
What could maximise benefits	Benefits model	Having the right benefits model. Realise the payback in not immediate.
Business drivers of I-SAP	Peer com adv	Peer competitive pressure within the mining industry.
Other		
IT-SAP Strategy graph:		
Perceived trends?	2 nd wave IT opportunities	2 nd wave of benefits after cost savings (1 st wave) drives the curve up.

Table A4.5e: A Profile of Factors Influencing Internet with SAP R/3 Use - Interviewed August 1999

5 Petrol.com.au	Oil&Gas	Actual Data Collected: 17-8-99
Q.1 Implementation period	8/96 – 1/98	8/96 – 1/98
R/3 Release/ver.	3.0D	3.0D
No. of employees	1200	Professional and others
No. of customers	>50	Large non-gov. (10); Domestic gas (10); Large priv (5)
No. of business partners	JV, Alliances	Joint Venture Projects (38); Alliances (2); Others (10)
No. of suppliers	1300	Materials and services.
Q.2 Internet without SAP Use:		
B2E = business-to-employee	Intranet docs	Intra - Communication - Policies, Procedures, Events issues / feedback / Meeting forums
B2C = business-to-customer	PR+ web site	Company public Web site; Distributing company profile; Job vacancies, email
B2B = business-to-business	email	Email
SCM = Supply chain mgt	Sup. catalog	Email; Supplier catalogue reference; Supplier info sourcing
Q.3 Internet with SAP Use:		
B2E = business-to-employee	(E) HR ESS	(E) Expected: HR Employee Self Service (maintain basic data & inquiry); Report distribution; Simple front end, eg Time-sheet writing.
B2C = business-to-customer	?	Unsure (?)
B2B = business-to-business	(E) Partner Rpt	Access to reports for partners.
SCM = Supply chain mgt	(E) e-Procure	Supply chain; Procurement from supplier held catalogues, Online orders - no invoice
Q.4 Effects of Internet-SAP:		
Key processes for e-business	HR tracking	HR; employee details, training course avail. SCM; easy requisition, material tracking. Finance; Easy to use, Simple info out projects
Benefits	Input output	Ease of use; more use, better input, better output. Reduced no. of licences.
Inhibiting factors of I-SAP	See Potentials	Current version of SAP R/3. Demonstrating the potential value. Alignment of goals: Internal customers; SAP; Internet.
What could maximise benefits	Process orgn	Establishing clear process organisation to enable the optimisation of the process.
Business drivers of I-SAP	Simplify bus	Desire to simplify - 20% cost improvement prog. Stabilising the SAP based processes (also, Q3.4).
Other	Align goals	
IT-SAP Strategy graph:		
Perceived trends?	Set of J-curve IT enabled.	From Shared Services, to Business Warehouse, to Internet-enabled, to Specific Process implementation

Table A4.5f: A Profile of Factors Influencing Internet with SAP R/3 Use - Interviewed August 1999

6 Postal.gov.au	Service	Actual Data Collected: 12-10-99
Q.1 Implementation period	95 - 96	
R/3 Release/ver.	3.0B	
No. of employees	2500	2500
No. of customers	Australia	Australia wide delivery service
No. of business partners	Not yet	Not applicable
No. of suppliers	1500+	
Q.2 Internet without SAP Use:		
B2E = business-to-employee	-	
B2C = business-to-customer	Web site	Static Web site
B2B = business-to-business	-	
SCM = Supply chain mgt	-	
Q.3 Internet with SAP Use:		
B2E = business-to-employee	Intranet - Fi	(E) Fi Intranet WAN
B2C = business-to-customer	-	
B2B = business-to-business	-	
SCM = Supply chain mgt	-	
Q.4 Effects of Internet-SAP:		
Key processes for e-business	Split I & SAP	Not proceeding to use Internet with SAP.
Benefits	I-SAP is not	"SAP R/3 is not an e-commerce platform."
Inhibiting factors of I-SAP	e-bus platform	See above - not an e-commerce platform.
What could maximise benefits	Lack of catal.	No catalogues with SAP, and no merchant server.
Business drivers of I-SAP	R/3 goes with	R/3 goes with Warehousing
Other	warehousing	
IT-SAP Strategy graph:		
Perceived trends?	-	SAP will be used for internal Fi processes. MS "Merchant Server e-commerce solution is being trialed.

Table A4.5g: A Profile of Factors Influencing Internet with SAP R/3 Use - Interviewed August 1999

7 Service.gov.au	Public	Actual Data Collected: 23-8-99
Q.1 Implementation period R/3 Release/ver.	11/98 – 1/99 3.1H	Stage 1: 27-11-98 to 8-1-99 Fi, HR payroll. Stage 2: 1-8-99: PM, MM, PS 3.1H (Expect to upgrade to 4.6 in Jan 2001)
No. of employees	6500	6500
No. of customers	N/A	Not applicable
No. of business partners	N/A	Not applicable
No. of suppliers	-	
Q.2 Internet without SAP Use:		
B2E = business-to-employee	Intranet docs	Sharing of info. Files and surveys capture. Expected - policy docs. and law library
B2C = business-to-customer	PR web site	PR Web site. Public info. from a joint Police-Transport database.
B2B = business-to-business	-	
SCM = Supply chain mgt	-	
Q.3 Internet with SAP Use:		
B2E = business-to-employee	E (rostering)	(E) expected
B2C = business-to-customer	-	(E) GUI enhanced Rostering system: shifts, allowances, meals, penalties.
B2B = business-to-business	E (e-procure)	(E) e-procurement with CAMS
SCM = Supply chain mgt	E (Transport)	(E) supply chain with Transport Dept.
Q.4 Effects of Internet-SAP:		
Key processes for e-business	All int/ext pro	Effective contact with internal and external people.
Benefits	Data secu/avail	Improved security and available data, from band width and user friendly interface (advantages).
Inhibiting factors of I-SAP	IT infrastruct	"None, we are lucky!" with a state gov. funded IT strategy.
What could maximise benefits	Roll-out to all	Roll-out to every one asap, from 210 to 2000+/6000 employees online
Business drivers of I-SAP	Speed of pays	Y2K, best practice. How to change strategic
Other	Bus Intelligen	Bus Warehouse our next step.
IT-SAP Strategy graph:		
Perceived trends?	HR admin cost savings	Improved quality and speed of data (eg payments) "that make a jump" in admin activities.

Table A4.5h: A Profile of Factors Influencing Internet with SAP R/3 Use - Interviewed August 1999

8 Utility1.com.au	Utility	Actual Data Collected: 18-8-99
Q.1 Implementation period R/3 Release/ver.	10/97 – 3/98 3.0, 4.0 11/99	10/97 – 3/98 3.0, 4.0B by 11/99
No. of employees	390	390 in WA - mixed staff
No. of customers	400,000 + oth	400,000 residential, 2000 commercial, 300 industrial (80% of use),
No. of business partners	N/A	Not applicable
No. of suppliers	100 + 3900	100 major, 3900 minor
Q.2 Internet without SAP Use:		
B2E = business-to-employee	Intranet docs	Intranet Employee Notification; admin guides, annual reports, document storage, email.
B2C = business-to-customer	PR Web site	Internet Homepage; public info, rates/ tariffs, Y2K reports, campaigns.
B2B = business-to-business	Online orders	EFT, super payments, online ordering, email,
SCM = Supply chain mgt	Bill payments	Credit card Bill payments.
Q.3 Internet with SAP Use:		
		[E] Expected in 12 – 18 Months
B2E = business-to-employee	E (Wk flow)	Quoting from client premises; 24 hr support/maintenance/use; Workflow
B2C = business-to-customer	E (Cust mgt)	Gas reservations, Contract Management.
B2B = business-to-business	E (B2B mgt)	Work management for contract/partners. Retail shop connections. Fleet Mgt
SCM = Supply chain mgt	E (e-proc, eft)	Online procurement/receipting/payments. Interactive product catalogues. EFT Mark 2
Q.4 Effects of Internet-SAP:		
Key processes for e-business	MM, PM, PA	R/3 modules for e-business: FI, MM, PM/PS, HR/payroll.
Benefits	Admin saving CRM	Faster business transactions (same day, accurate), using less admin staff. Business knowledge built into system customer management.
Inhibiting factors of I-SAP	Complexities	Complex config. process/high cost. Lack of suitable in house skills. Limited vendor/industry support. Technology/skills aptitude
What could maximise benefits	Web frontend	Greater availability of templates and Web front-ends; Greater development of business processes over the system.
Business drivers of I-SAP	CRM for key customers	Better "connections" to key customers. Faster translating, accurate, better use of inhouse/client information. Market intelligence.
Other	Web interface	Web interface projects? "We are proactive in wanting to go out to our customers."
IT-SAP Strategy graph:		
Perceived trends?	Lifts effec- iency curve	Improved effectiveness - "does the job better". Internet use does not change our customer base.

Table A4.5i: A Profile of Factors Influencing Internet with SAP R/3 Use - Interviewed August 1999

9 Utility2.gov.au	Utility	Actual Data Collected: 19-8-99
Q.1 Implementation period R/3 Release/ver.	1/98 – 11/98 3.1H	1/1/98 to 2/11/98 3.1H, 4.6 (in 18 months)
No. of employees	2200	~ 2200 (professional and field staff)
No. of customers	350,000	Domestic, business, and major industry.
No. of business partners	7	Maintenance contractors (3), Design (2), IT-services (1), Strategic Mgt (1)
No. of suppliers	2500	~2500 all types
Q.2 Internet without SAP Use:		
B2E = business-to-employee	Gen orgn doc	General information, policy publications, job ads, employee information, internal mail, diary
B2C = business-to-customer	e-pay, land ap	Internet – general corporate information, email, electronic account payments, land development approvals.
B2B = business-to-business	-	
SCM = Supply chain mgt	E (B2B proc)	(E) Business to business purchasing.
Q.3 Internet with SAP Use:		
B2E = business-to-employee	E (e-Depot)	(E) Remote depot usage
B2C = business-to-customer	- (stand alone)	Stand-alone online sales systems "GRANGE". Export data to SAP
B2B = business-to-business	E (e-procure)	(E) e-procurement
SCM = Supply chain mgt	E (SCM)	(E) e-procurement
Q.4 Effects of Internet-SAP:		
Key processes for e-business	remote access	Access to PM for remote user of the virtual community
Benefits	Cost savings	Access, costs savings. R/3 is not for use by customers. CAMS would help solve the suppliers problems. PR initiatives: Info. on dam levels for big TV station, and Internet payments for general community.
Inhibiting factors of I-SAP	No e-supplier	Supplies not being online. Conservative culture of organisation.
What could maximise benefits	SAP licences	ESS (SAP's licence agreement) & ESS licences.
Business drivers of I-SAP	No e-bus yet	No strong business demand at present.
Other	Retirement of older technol.	Corp policy is to be a follower. Not to be a leading edge (bleeding edge) IT adopter.
IT-SAP Strategy graph:		
Perceived trends?	A slow then extra boost	

APPENDIX 5-1 – 1ST INTERVIEW PROTOCOL



“A Study of the Benefits Derived from Organisations Using SAP R/3 Integrated with the Internet”

Letter of Introduction:

Dear

During the past twelve months, the business community has witnessed the uptake of two separate information technologies; the Internet and the application of enterprise resource software. While Government agencies have been pro-active in encouraging and promoting e-commerce industry solutions, a range of influences, both technical and organisational, have been driving an increase in SAP R/3 implementations. The purpose of this survey is to establish the current use and expected use of Internet technology for extending the R/3 business functions for the benefit of customers and business partners.

Benefits of the Research

This survey is designed to identify the current position of SAP enabled organisations with respect to the adoption of Internet enabled R/3 systems. The data being collected is viewed as the information necessary for establishing the benefits of organisations that are pioneers in the use of Internet enabled SAP R/3 solutions.

Data Security

Your organisation's identity will be kept completely isolated from all data collected. To ensure complete anonymity, the data collected from this questionnaire will be “de-identified” by destroying all links to your organisation's identity. The data collected from the survey will be used for the purpose of my PhD and associated conference papers. Any further use of this data will require your consent. So a participant is free at any time not to consent to further involvement in any ongoing research.

The research results will be made available to the survey participants.
Thank you for your participation.

Colin Ash
November, 1999

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Principal Supervisor:	Prof Janice M. Burn

A STUDY OF ORGANISATIONS

USING SAP R/3 INTEGRATED WITH THE INTERNET

To Enable Organisational Effectiveness

Colin Ash

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November 1999

1. Organisational Data

Industry: (eg Mining, Police, Petroleum, Retailing, Utility) [

]

R/3 Implementation Dates: [] to []

R/3 release: (eg 3.0, 3.1, 4.0, 4.5, Pandesic) [];

1.1 No. of Employees: [];

Type of Employees:

1.2 No. of Customers: [];

Type of Customers:

1.3 No. of Business Partners: [];

Type of Business Partners:

1.4 No. of Suppliers: [];

Type of Suppliers:

2. List the uses of Internet technology - integrated with R/3 for:

(Please indicate "a" = Actual or "e" = Expected or future use)

2.5 Business-to-Employee (B2E) eg SAP Employee Self services (a)

2.6 Business-to-Customer (B2C) eg SAP Online Store B2C (a)

2.7 Business-to-Business (B2B, SCM) eg SAP's B2B Procurement (e)

3. Effects of integrating your R/3 with Internet technology

3.1 What parts of your R/3 system have been integrated with Internet technology - for:
Customer Interaction (B2C)

Asset configuration (B2B, SCM)

Knowledge Leverage

3.2 What benefits have been achieved from integrating your R/3 with the Internet?
Customer Interaction (B2C)

Asset configuration (B2B, SCM)

Knowledge Leverage

3.3 What barriers have inhibited success from integrating your R/3 with the Internet?
Customer Interaction (B2C)

Asset configuration (B2B, SCM)

Knowledge Leverage

3.4 What should be done to maximise the benefits derived from your Internet-R/3 system?
Customer Interaction (B2C)

Asset configuration (B2B, SCM)

Knowledge Leverage

3.5 What should be done to minimise the barriers to integrating R/3 with the Internet?
Customer Interaction (B2C)

Asset configuration (B2B, SCM)

Knowledge Leverage

For Questions 4 – 6 use the rating scale to enter a number in each box

Scale: 0 = Nil | 1 = very low | 2 = low | 3 = medium | 4 = high | 5 = Very high (100%)

4. Rate your Basic Performance Improvement in:

- a. Efficiency _____
- b. Effectiveness _____
- c. Empowerment _____

R/3 only | R/3 with Internet

5. Rate your organisation in the following:

- 1. Increased customer base?
- 2. Increased customisation of products/services?
- 3. Increased involvement in customer community
- 4. Improved market image?
- 5. Greater diversity of sourcing from suppliers/partners?
- 6. Greater diversity of suppliers/partners?
- 7. Improved operating efficiency (ROI)?
- 8. Reduced cost of operation?
- 9. Increase in Value added processes?
- 10. Sustained innovation and growth

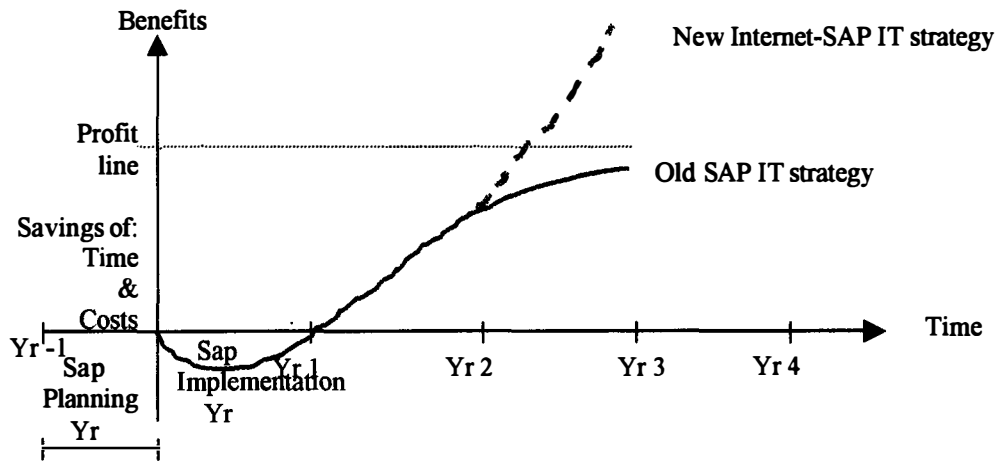
R/3 only | R/3 with Internet

6. Rate the following Challenges for Change:

- 1. Shifting value drivers
- 2. Designing the new business model
- 3. Deploying an integrated IT platform
- 4. Interacting with customers for knowledge leverage
- 5. Navigating across multiple communities
- 6. Governing beyond outsourcing
- 7. Allocating resources under increased uncertainty
- 8. Designing an organisation for knowledge leverage
- 9. Assessing performance along multiple dimensions

R/3 only | R/3 with Internet

7. How closely does this model fit your organisation?



Adopt Internet technology with SAP R/3 to increase benefits

-- End --

“An Interview of organisations advanced in using Internet-SAP R/3”

I give my consent to the use of the data (obtained from this questionnaire) for the purpose as stated in the covering “Letter of Introduction”.

Signature: _____ Date: _____

APPENDIX 5.2**Sample Data Collected from Organisations Interviewed - Nov - Dec 1999**

<u>Case Name</u>	<u>Country</u>
1. UBS	Switzerland
2. British Biotech	UK
3. UNICEF Australia	Australia
4. Dell Computers	USA
5. Employment National	Australia
6. Haliburton	Norway
7. Bertlesmann	Germany
8. StatOil	Norway
9. Novartis	Switzerland
10. Siemens	UK
11. The Wine Society	Australia

UBS AG**Switzerland****Key Findings**

An Intranet to facilitate the networking of the staff in the merger of two large banks. Banking is the main driver. This is a generic back-office solution, NOT a R/3 banking solution. Should create the Internet system as a **learning system**.

Media Release (Sept.'99)

Thomas Bromma, project director for UBS AG, one of the world's leading financial services groups, with headquarters in Switzerland, said, "The SAP internet solution for internal address management covers all organizational information within the bank and is our most-used Web application, available for all 45,000 employees, with 300,000 transaction calls per day. This application has proven to be a major tool for supporting the merger processes of the two former banks SBC and UBS into the new bank UBS AG." AG = Ltd

Company Profile

Leader in banking - one of the world's leading financial services groups

Interview Data:

1. Enterprise Data

Industry: Banking

SAP R/3 Release: 4.0 Implemented: 4.6 in Yr 2000/2qrt

Employees: [40,000 +] 4 or 5 sectors

Customers: N/A, internal

Partners: Yes, collaborative partners; IT: IBM & PwC

Suppliers: [large]mixed range, fluctuates

2. Uses of Internet integrated with R/3 [x] signals expected or future use

Business-to-Consumer (B2C): N/A - not SAP based

Business-to-Business (B2B): Intranet for B2B internal electronic catalogues.

Employee-to-Employee (B2E): Banks own ESS Intranet for employees,

4. Effects of Integrating R/3 with the Internet

Business-to-Employee: Banks own ESS Intranet for employees

IT alignment: Try to align IT with business processes

Benefits: Time savings easy work, less orgn/paper.

Barriers: It is in the minds of Mgrs & PwC. Some technical problems with SAP ITS

Maximise benefits: Better design of intranet for least trained employees.

Minimise barriers: Mgr and IT views must learn together very fast to seek new business models. Should create the Internet system as a **learning system**.

BIOTECH**UK****Key Findings**

Reduced purchasing costs and time (1/3), admin time savings for researchers; improvement of staff working as a collaborative team.

Media Release - Ref: 131 Biotec (28 Oct '99)

See "Biotech Goes Live with SAP Business-to-Business Procurement" and NO. 68 sapinfo.net/pharmaceuticals for secondary data

Company Profile

British Biotech is a research and development stage pharmaceutical company based in Oxford, UK. Its mission is to create partnerships with pharmaceutical companies to complete the development and marketing of its compounds. Founded in 1986, British Biotech currently employs approximately 300 staff and is listed on the London Stock Exchange and on NASDAQ in New York. British Biotech's five-point strategy is to: Focus discovery research on metalloenzyme inhibition. Take one research compound into development annually. Broaden its portfolio by acquiring external opportunities. Focus development capabilities on establishing "clinical proof of principle". Create partnerships for developing and marketing products Worldwide.

Industry: Pharmaceutical (research)

SAP R/3 Release: 3.1 Implemented: Feb '98

Employees: [250 +] professional (with some clerical)

Customers: N/A, in the future hospitals, etc could be our customers

Partners: Collaborative partners; currently, 1 joint venture

Suppliers: [4197] mixed range, fluctuates

2. Uses of Internet integrated with R/3 [x] signals expected or future use

Business-to-Consumer (B2C): N/A, in the future hospitals, etc could be our customers

Business-to-Business (B2B): SAP B2B Procurement went live during Oct '99.

Employee-to-Employee (E2E): Still talking about adopting SAP ESS [x]. Times sheets (CATS) [x]

3. Effects of Integrating R/3 with the Internet

Business-to-Business: SAP B2B Procurement

IT alignment: High (from secondary data see Media Release - Ref: 131)

Benefits: cost saving – identified discounts with vendors, more time for research.

Barriers: No real barriers, but one technical obstacle – our email was not "MAPI" compliant. This meant that business workflow had to be done through B2B. Now rectified, workflow is performed using MS Outlook.

Maximise benefits: Roll-out "asap" to achieve ROI

Minimise barriers: Practical issues – not user friendly, so go to R/3 release 4.6

UNICEF AUSTRALIA**AUSTRALIA****Key Findings**

1st Australian ASP solution using I-R/3 – by adding integrated business process (back-end) to an existing www interface.

Media Release (June '99)

URL = www.solution6.com/rmp.cfm?pid=54&newsid=5506

Company Profile

Australian subsidiary of a world wide children's charity

Interview Data:

1. Enterprise Data

Industry: Charity

R/3, current Release: 4.5b Implemented: Sept. 1999

Employees: [15 +] 60 volunteers varies

Customers: Donors 64,000 + 10% companies

Partners: Gov. + Corporate eg QUANTAS, IT; Soln6

Suppliers: [USA HQ main supplier of cards + Australian art + Corps.]

2. Uses of Internet integrated with R/3 [x] signals expected or future use

Business-to-Consumer (B2C): R/3 is being phased into our web site

Business-to-Business (B2B): N/A

Employee-to-Employee (B2E): Fi, SD, Payroll, Assets, MM company Intranet

4. Effects of Integrating R/3 with the Internet

Business-to-Business: B2B + B2C real workflow with Customer/corporate online purchasing.

IT alignment: To isolate SAP R/3 from the Business strategy is impossible

Benefits: Improved visual product range online, improved business image.

Barriers: How do we let people know we have a web presence – critical mass is not enough. Some technical issues with our business processes v's R/3.

Maximise benefits: Collaboration between SA partnerships.

Minimise barriers: Publicity via emails & catalogues.

EMPLOYMENT NATIONAL

AUSTRALIA

Key Findings

<http://www.employmentnational.com.au/ns3.htm>

Employment National brings years of experience and the latest job-matching technology to today's employment environment – plus unique benefits for employers and job-seekers alike. Our staff are motivated by success in finding jobs for people and people for jobs. Fitting a Square peg into a round "whole"

Media Release (Sept.'99)

A major **recruitment and employee services firm** with headquarters in Sydney, Australia, also found SAP Internet solutions easy to deploy while offering significant benefits, according to Dick Hancock, manager of IT user services. "Using SAP's Internet solutions, we have rolled out a suite of employee self-service applications, including an employee purchasing solution, to our more than 1,400 employees in more than 200 offices throughout Australia," Hancock said. "We expect to realise considerable cost savings in our purchasing and human resources organisations over the next several years."

Industry: (National Employment Agency) []

R/3 Implementation Dates: [] to [] Live late 1997

R/3 release: (eg 3.0, 3.1, 4.0, 4.5, Pandesic) [3.0?];

1.1 No. of Employees: [1200 1/98 to 1900 May 99];

Type of Employees:

1.2 No. of Customers: [1 large; companies, job seekers, special requirement co

Type of Customers: Fed gov \$1b over 2-3 years, companies, job seekers, special companies.

1.3 No. of Business Partners: [one of marketing campaign];

Type of Business Partners:

1.4 No. of Suppliers: [large catalogue];

Type of Suppliers:

Background - Steven was a regional executive officer with experience

Online Purchasing System with Browser

CES - 1996 as Case Mgr

Staff communications

EmpNat -Perth mid Perth Rigorous Psychometric Recruitment:

1st May 99. We started with a clean slate w.r.t. IT adoption 3 components: BUS -recruitment DBMS, SAP HR financials, Avantive voice call system.

Put people in a bad frame of mind.

Critical ranking of the 3 technologies: (1) Avantive, (2) BUS (3) SAP.

SAP training for regional executive officers but not below - training .

Took the path of least resistance.

2. List the uses of Internet technology - integrated with R/3 for:

(Please indicate "a" = Actual or "e" = Expected or future use)

2.8 Employee-to-Business (E2B) eg SAP Employee Self services (a)

Leave applns - was not an easy process to figure out. The Leave appln browser window interface was poorly designed - ugly and very user unfriendly (prior to 4.6).

The issue of

2.9 Customer- to-Business (C2B) eg SAP Online Store B2C (a)

2.10 Business-to-Business (B2B, SCM) eg SAP's B2B Procurement (e)

Web enabled SAP - 1st for online purchasing. Eg Business cards "to me the

Paper-based form was much faster than the online version:

We were forced to use the online system.

Now another period of change: The purchase of small irregular purchases was scrapped. Only regular eg paper.

4. Effects of integrating your R/3 with Internet technology

4.7 What parts of your R/3 system have been integrated with Internet technology - for:
HR payroll, Online purchasing (MRO)

4.8 What benefits have been achieved from integrating your R/3 with the Internet?
Saving time in general

B2B: online purchasing of regular MRO items

Knowledge Leverage?

4.9 What barriers have inhibited success from integrating your R/3 with the Internet?
Too much technology that failed to deliver a acceptable level of user satisfaction. IT driven change.

4.10 What should be done to maximise the benefits derived from your Internet-R/3 system?

Explain the business processes and the benefits for the user. To be more productive users need educating in the (their) key business processes.

4.11 What should be done to minimise the barriers to integrating R/3 with the Internet?

Build a better browser screen - was ugly and did not make sense. Although the SAP was obviously good as a back-end business processor, the interface lacked user friendliness.

Spend a lot of time with people

Try to pitch the interface to the lcd and if this is still not low enough for some users then provide training to bring up to the necessary level of competence

APPENDIX 6.1

2ND INTERVIEW PROTOCOL



EDITH COWAN
UNIVERSITY
PERTH WESTERN AUSTRALIA

Identifying the Factors for Success of an e-Business Project with R/3:

Dear

Thank you for supporting my investigation into the use of SAP R/3 with the Internet, by allowing me to interview you last November.

Can you help me with the last part of my research, by granting me a short and final interview. This will enable me complete the investigation into the benefits from extending SAP R/3 business processes onto the Internet.

I have designed a short interview questionnaire to identify the likely **facilitators** and **inhibitors** for a successful "R/3 e-business" implementation. It should take about 25-30 minutes to complete. All information gathered will be treated with complete anonymity.

My previous investigation of local and overseas SAP enabled organisations, has identified the "....." project at to be an ideal subject for the final part of the study. As a condition of my research I am obligated to provide you with the findings of my work.

My schedule:

Next month I have been asked to present a paper at SAPPHIRE '2000 USA (Las Vegas) on "e-business with SAP R/3 teaching strategy and research". I wish to visit you in, on June, 2000. is my preferred day, at anytime that is convenient. If you are unable to see me, I would like to interview another senior member of your IT team.

Regards

Colin Ash

Lecturer and PhD Student
Email:
Institution:
Programme:
Principal Supervisor:

School of MIS
c.ash@ecu.edu.au
Edith Cowan University
Doctorate of Philosophy
Prof Janice M. Burn

QUESTIONNAIRE FOR 2ND INTERVIEW OF MANAGER OF A SAP SITE

Organisation:

Project:

(For each *Construct*, circle the most appropriate *Category*)

Component	Constructs	Categories
Strategic Initiatives	<i>Stimuli formulation scope decision making strategy led</i>	pro-active v's reactive incremental v's revolutionary autocratic, bureaucratic, champion emergence onset, eventually, none
Cultural Readiness	<i>change agents leadership risk aversion extent of open communication</i>	+ / - + / - cautious, welcomed, aggressive + / -
IT Leveragability	<i>role of IT use of Internet technology</i>	enabling, socio-technical, dominant factor poor, adequate, superior
Network Relationships Balancing	<i>inter-organisational linkages cross-functional cooperation</i>	cooperative, competitive poor, adequate, superior
Learning Capacity	<i>improve efficiency adaptation learning type external information use declarative knowledge</i>	learning by doing response to IT change, learning from others double-loop, deuterio boundary spanners, technology gate-keeper, customers, none R&D resources & IT devel., knowledge base, focus on core competencies
Change Mgt Practice	<i>mgt's readiness to change pattern of change scope of change managed change</i>	committed, participative, resistant + / - improvement, radical change alleviation of dissatisfaction, vision for change, evolutionary or revolutionary change tactics, a well-managed process for change
e-Business Mgt Practice	<i>e-business measurement use of tools and techniques use of team-based structure</i>	use of e-business metrics, e-business information capture, audit, improvement feedback loop poor, adequate, superior + / -
Outcomes of e-Business & Performance Gains	<i>gaps between effectiveness expectations & actual performance quality of work life B2B resourcing B2C networking</i>	+ / - employee satisfaction, dissatisfaction, neutral cost savings(+ / -), choice(+ / -), quality (+ / -), reliable (+ / -) customer base, remote service, collaboration

SIGNATURE: DATE:

PAGE 2 - QUESTIONNAIRE FOR INTERVIEWING

Component	<i>Constructs</i>	Comments
Strategic Initiatives	<i>stimuli formulation scope decision making strategy led</i>	
Cultural Readiness	<i>change agents leadership risk aversion extent of open communication</i>	
IT Leveragability	<i>role of IT use of Internet technology</i>	
Network Relationships		
Balancing	<i>inter-organisational linkages cross-functional cooperation</i>	
Learning Capacity	<i>improve efficiency adaptation learning type external information use declarative knowledge</i>	
Change Mgt Practice	<i>mgt's readiness to change pattern of change scope of change managed change</i>	
e-Business Mgt Practice	<i>e-business measurement use of tools and techniques use of team-based structure</i>	
Outcomes of e-Business & Performance Gains	<i>gaps between effectiveness expectations & actual performance quality of work life B2B resourcing B2C networking</i>	

APPENDIX 6.2

Summary of Comments Tables from Cases (4)

Page

Tables A6.2a-e: Ratings of the Components of eBC Research Framework

Case 1: Halliburton (Intranet for Management Reports and Personnel Tracking)

Case 2: Biotech (B2B e-Procurement)

Case 3: FSC (B2B Online Sales to Corporate Customers)

Case 4a: Dell (B2B e-Business integration, sell side)

&

Case 4b: LSI (B2B e-Business integration, buy side)

Table A6.2: Ratings for each component of the eBC Management Framework

eBC Mgt Model <i>Components</i>	Halliburton B2B ^E	Biotech B2B ^S	FSC B2B ^C	Dell & LSI B2B ^C & B2B ^S
Environment				
<i>Strategic Initiatives</i>	High (Moderate)	High	Moderate	High & High
<i>Cultural Readiness</i>	Moderate	High	Low	High & Moderate
<i>IT Leveragability</i>	High	High	High (Moderate)	High & High
<i>Knowledge Capability</i>	High	High	Moderate	High & Moderate
<i>Relationship building</i>	Moderate	High	Moderate	High & High
<i>Learning Capacity</i>	Moderate (High)	High	Low (Moderate)	High & Moderate
Management				
<i>Change Mgt Practice</i>	Moderate	High	Moderate	High & High
<i>e-Business Mgt Practice</i>	High	High	Moderate	High & Moderate
Performance Gains				
<i>Working life</i>	High	Moderate?	Low	High? & High
<i>Business resourcing</i>	Moderate	High	future	High
<i>Customer interaction</i>	future	future	Moderate	High
<i>Expected versus actual performances</i>	small gap	small gap	some gaps	small & small

Ratings:

Low	Moderate	High
-----	----------	------

Note: Ratings in brackets (??), were revised using detailed findings of the constructs in Table 5.7

Case 1: Halliburton

e-Business Project Title: Intranet for Management Reports and Personnel Tracking

Table A6.2a: Summary of Comments for Engineer

Business Framework Components	Rating low to high	Summary of Comments
Environment		
<i>Strategic Initiatives</i>	High (Moderate)	A pro-active, incremental HR Internet initiative to manage offshore contract employment with cost minimisation. It has been expanded to include IT dept's hardware tracking system
<i>Cultural Readiness</i>	Moderate	The introduction was reasonably well accepted by the users within the local division. Some resistance was evidenced from the users of the local partner division.
<i>IT Leveragability</i>	High	This HR manager web-enabled reporting system was implemented to leverage R/3 integration strength. It made superior use of graphics in reporting.
<i>Knowledge Capability</i>	High	Making good use of insight into Norwegian employment regulations, help a closer knowledge of each others function,.
<i>Relationship building</i>	Moderate	<i>Knowledge capability</i> enabled a better quality of this HR workplace activity and improved links with Government.
<i>Learning Capacity</i>	Moderate (High)	Instructor led training at upper levels of key users. Also Intranet documents for users to reference to support learning by doing.
Management		
<i>Change Mgt Practice</i>	Moderate	Participative change tactic resulted in an evolutionary change.
<i>e-Business Mgt Practice</i>	High	Some technical improvements from feedback on the use of reporting tools.
Performance Gains		
<i>Working life</i>	High (for a small project)	Improved user satisfaction – a current study by HQ has recommended this inhouse intranet using R/3 personnel tables be adopted globally. It has been expanded to include two more HR reporting tools.
<i>Business resourcing</i>	Moderate	For agency workers: cost savings (+ ve), reliability (+ve)
<i>Customer interaction</i>	Not yet	In the future...
<i>Expectations & actual performance</i>	small gap	No significant gap. Now under consideration for globally adoption.

Interview date:29 – 6 – 00.....(1st Interview).....

Note: Ratings in brackets (???), were revised using detailed findings of the constructs in Table 5.7

Case 2 British Biotech

e-Business Project Title: B2B e-Procurement

Table A6.2b: Summary of Comments

Business Framework Components	Rating low to high	Summary of Comments
Environment <i>Strategic Initiatives</i> <i>Cultural Readiness</i> <i>IT Leveragability</i> <i>Relationship building</i> <i>Learning Capacity</i>	High High High High High	A pro-active, incremental, champion emergent project that would have lead to an Internet strategy and e-commerce direction had company not changed direction so drastically. Being an R&D company meant that the improved efficiency aspects of B2B introduction was reasonably well accepted by the end-users. The main driver in this B2B project. Most systems were under reviewed for web-enablement. eg Cost centre manager enquiry system on SAP was already web-enabled. SAP, Biotech and vendors involved. Benefits gained for all. Various department involved in the pilot (and subsequent roll-outs) have gained a closer knowledge of each others function, hence making for a better working environment. Classroom, instructor led. Key users in each area also responsible for training/problem solving and subsequently changed this to Intranet documents for users to reference.
Management <i>Change Mgt Practice</i> <i>e-Business Mgt Practice</i>	High High	Radical change via a well-managed process for change of a committed management. Improvement feedback loop, positive project teams, and adequate use of tools.
Performance Gains <i>Working life</i> <i>Business resourcing</i> <i>Customer interaction</i> <i>Expectations & actual performance</i>	Moderate? High (future) small gap	Improved staff satisfaction - anecdotal evidence only. cost savings (+ ve), choice (+ ve), quality (+ ve), reliability (+ve) In the future... No significant gap between effectiveness expectations and actual performance

Interview date:4 - 7 - 00.....(1st Interview).....

Case 3 Fujitsu Siemens Computers

e-Business Project Title: B2B “Order Request System” (ORS)

Table A6.2c: Summary of Comments

Business Framework Components	Rating low to high	Summary of Findings
Environment		
<i>Strategic Initiatives</i>	Moderate	This project for new division was implemented to improved efficiency and 24x7 access of B2B sales. A pro-active, revolutionary, onset project. In Initially it was IT lead, but now it should be strategy lead. In its infancy it was better than now. We need a real e-business strategy”
<i>Cultural Readiness</i>	Low	Some resistance to e-business by middle managers, in a fragmented group of companies. How do we want to use ORS?
<i>IT Leveragability</i>	High (Moderate)	IT was the main driver in this B2B sell-side project. The system on SAP web-enabled was developed to optimise processes between Comptec and business partners.
<i>Knowledge Capability</i>	Moderate	Corporate knowledge was fragmented and lacked coordination.
<i>Relationship building</i>	Moderate	Cooperative inter-organisational linkages
<i>Learning Capacity</i>	Low (Moderate)	Learning by doing and response to IT change.
Management		
<i>Change Mgt Practice</i>	Moderate	Improved change via a well-managed process for change of a participative management.
<i>e-Business Mgt Practice</i>	Moderate	e-Business information capture, and adequate use of tools.
Performance Gains		
<i>Working life</i>	Low (future)	Neutral affect on quality of working
<i>Business resourcing</i>	Moderate	80% orders handled by ORS. Reliability comes from R/3.
<i>Customer interaction</i>	Moderate	There is the potential for an increase in customer base.
<i>Expectations & actual performance</i>	some gaps	There appears to be a significant gap between effectiveness expectations and actual performance

Interview date: 3 – 7 – 00..... (1st Interview).....

Note: Ratings in brackets (???), were revised using detailed findings of the constructs in Table 5.7

This project represents the fundamental infrastructure for a e-Mall for a specific business segment.

Case 4a Dell with LSI

e-Business Project Title: B2B e-Business Integration with an R/3 Partner

Table A6.2d: Summary of Comments

Business Framework Components	Rating low to high	Summary of Findings
Environment <i>Strategic Initiatives</i> <i>Cultural Readiness</i> <i>IT Leveragability</i> <i>Knowledge Capability</i> <i>Relationship building</i> <i>Learning Capacity</i>	High High High High High	Although regarded as a leader in the computer industry, the company reacts to customer demands that empower it with a supporting IT infrastructure. The B2B team as a whole should be regarded as a "champion" group. More welcomed than aggressive; "we don't want to loose business – we must wait on our customers" It makes advances in Internet technology to enable it connect to a partner's R/3 business processes. Process optimisation "2-way". Corporate knowledge is well managed to sustain growth and be a world leader in online computer sales. There was collaboration with internal competition. The same issues apply with our project partner. Learn to wait on each other. Learning from doing – building online networks with this partner and others by focusing on our core competencies.
Management <i>Change Mgt Practice</i> <i>e-Business Mgt Practice</i>	High High	An improvement in workflow via a well-managed process for change from a committed management. The project partner was driving us to develop the project. Internal company metrics is mandatory in the company. Internal business efficiency is the goal. This is driving a corporate business frictionless process.
Performance Gains <i>Working life</i> <i>Business resourcing</i> <i>Customer interaction</i> <i>Expectations & actual performance</i>	High? High for Customer High for PCsell small gap	Improved employee satisfaction. Too early to judge accurately. cost savings (+ ve), choice (+ ve), quality (+ ve), reliability (+ve) cost savings (+ ve), quality (+ ve), reliability (+ve) No significant gap. Both companies see this as a model for use with other partners.

Interview date: 16 – 6 – 00..... (1st Interview).....

Case 4b LSI with Dell

e-Business Project Title: B2B e-Business Integration with an R/3 Partner

Table A6.2e: Summary of Comments

Business Framework Components	Rating low to high	Summary of Findings
Environment <i>Strategic Initiatives</i> <i>Cultural Readiness</i> <i>IT Leveragability</i> <i>Knowledge Capability</i> <i>Relationship building</i> <i>Learning Capacity</i>	High Moderate High Moderate High Moderate	50% single purchases for employees. Therefore simplify procurement. Revolutionary and champion lead by partner. Initially we welcomed the change, now we're more aggressive. Positive leadership. Communication took some time between us and <i>PCsell</i> . Act as a common interface, and a bridge between technical and social considerations. From "good to becoming better." PCsell is the more knowledgeable. Very positive between us and <i>PCsell</i> . Improved cross functional "adequate to good." Technical improvements by learning from mistakes.
Management <i>Change Mgt Practice</i> <i>e-Business Mgt Practice</i>	High Moderate	Radical change from focussing on the supplier, <i>PCsell</i> . Well managed process → for alleviation of dissatisfaction. Adequate use of tools. Reduction in e-cycle time; from 2 weeks to 2 days.
Performance Gains <i>Working life</i> <i>Business resourcing</i> <i>Customer interaction</i> <i>Expectations & actual performance</i>	High. High small gap	In purchasing, employee satisfaction is high 25% gains cost savings. Reduction in e-cycle time; 2 weeks to 2 days. Very positive due to all factors* In the future No significant gap. Both companies see this as a model for use with other partners.

Interview date: 14 – Nov – 00..... (1st Interview).....

On reflection a top down approach to analysis of findings was adopted, (11-Nov-01).

APPENDIX 6.3

Case Background with B2B Models (4)

Page

Tables 6.3: Summary of Ratings of the eBC Research Framework

Case 1: Halliburton(Intranet for Management Reports and Personnel Tracking)

Case 2: Biotech (B2B e-Procurement)

Case 3: FSC (Online Sales to Corporate Customers)

Case 4a: Dell (B2B e-Business integration, sell side)

Case 4b: LSI (B2B e-Business integration, buy side)

Case 1 Halliburton

A large global engineering company with its headquarters in USA. *Halliburton* is a global leader in energy equipment, energy services, engineering, and construction. It had three main goals to achieve with its initial SAP R/3 implementation; (i) to standardize business processes globally across business units and functional lines, (ii) to move *Halliburton* to a process-driven organization, (iii) and to provide managers across *Halliburton* with easy access to decision-quality information. It has about 17,000 SAP users worldwide, with the potential for this figure to increase to about 26,000 users (SAP, 1999c). The specific country group examined was based in Norway.

e-Business Project Title: Intranet for Management Reports and Personnel Tracking

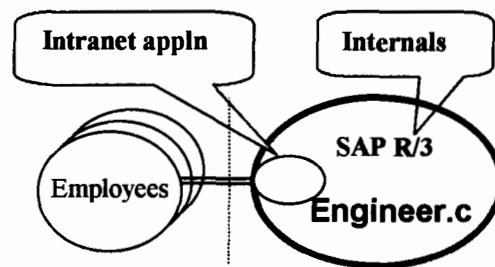


Figure 5. : Halliburton's - "Personnel Reporting and Management Intranet"

This in-house Web initiative that allows access to R/3 personnel data. It is an incremental HR Intranet to support project management of offshore skilled agency workers. Its application has proven to be a major tool for supporting decision making for minimising labour costs. It has been expanded to include a computer hardware tracking system. With the aid of computer graphics this Intranet systems provides a simple "walk-up" user interface for casual users, including project managers who have little or no training on the use of the R/3 HR module.

Case 2 Biotech

Biotech is a research and development stage pharmaceutical company based in UK. Its mission is to create partnerships with pharmaceuticals companies to complete the development and marketing of its compounds. Founded in 1986, *Biotech* currently employs approximately 250 staff.

e-Business Project Title: B2B e-Procurement

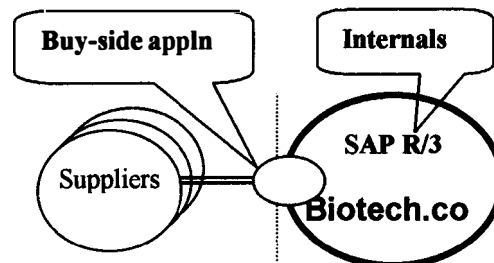


Figure 5. : *Biotech's* – "B2B e-Procurement project"

The primary objective of the SAP Business-to-Business Procurement project was to ease the workload of the company's procurement department by automating the old, paper-bound purchasing process. With some 3,000 active vendors on their books, the procurement department's four members were often left floundering hopelessly in a sea of paper. "We were determined to cut this high number of vendors. The next step of the project is to negotiate more favourable conditions with our slimmed-down vendor base and build up closer business relationships."

Case 3 FSC

FSC is a global leader in IT equipment, has its headquarters in Amsterdam, Netherlands. With extensive European manufacturing facilities, customer-focused companies in 25 European countries and more than 9,000 experienced employees. Compect.com is aiming to be the "No. 1" computer company in its home market in Europe, by the year 2001. *FSC* provides the industry's most complete portfolio of best-in-class IT products, from the smallest notebooks to the most powerful data centre solutions. Developed and manufactured in Europe for European customers, the product portfolio benefits from the technologies and worldwide sourcing networks of the parent companies (Siemens, 1999c). The specific country group examined was based in England.

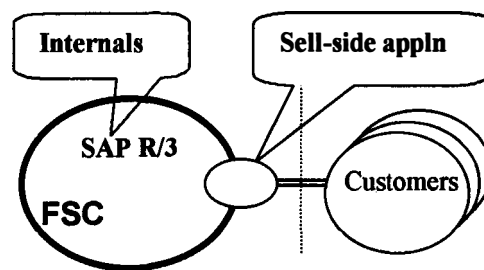
e-Business Project Title: B2B "Order Request System" (ORS)

Figure A5. : FSC's "Order and Request System" (B2B^c)

FSC stands out from the other cases (Table 2) as highly significant because of its shift towards inter-organisational e-business to realise its global sale revenue potential. For *FSC*, the Order and Request System (ORS) was developed in-house, to optimise processes between *FSC* and partner organisations (Siemens, 1999a). The Order and Request System (ORS) was introduced in 1997 as an electronic commerce system in the business-to-business sector. It builds on the SAP strategy to link the R/3 system and the Internet and supports the logistics processes of the parent company across divisions and regions. Each registered partner is able to place orders online at any time via the Internet, track those orders, and request current information on orders and delivery dates. By November 1999 the system was the online ordering platform used throughout Germany by more than 2,200 partners and key accounts.

Case 4a Dell with LSI

Dell, is a leading PC and Server provider based in USA. Using *Dell's* intelligent Web site, corporate customers and end-consumers can validate system design and system configurations, before making their online purchases. One of *Dell's* largest corporate customers, *LSI* is an established USA based manufacturer of electronic components and circuits.

e-Business Project Title: B2B e-Business Integration with an R/3 Partner

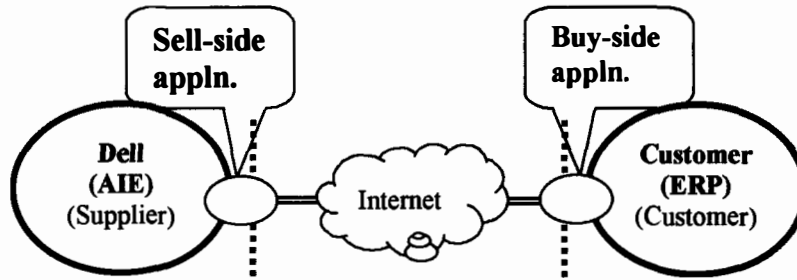


Figure A5.5 : Dell's - "B2B e-Business Integration" System

Case 4b LSI with Dell

By June 2000, *Dell* had implemented its first "B2B e-Business Integration" system with *LSI*. The system fully integrates *LSI's* buy-side system with *Dell's* sell-side system. This enabled *LSI* to leverage its existing SAP backend system with *Dell's* component-based e-business system. Both companies are expecting to extend this inter-organisational development with other partners.

This project represents the fundamental infrastructure for private e-Markets.

APPENDIX 6.4

Data Collected from Case Interviews (4) - Completed Questionnaire

Page

Case 1: Halliburton (Intranet for Management Reports and Personnel Tracking)

Case 2: Biotech (B2B e-Procurement)

Case 3: FSC (Online Sales to Corporate Customers)

Case 4a: Dell (B2B e-Business integration, sell side)

Case 4b: LSI (B2B e-Business integration, buy side)

QUESTIONNAIRE FOR INTERVIEWING PROJECT MANAGER OF A SAP SITE

Organisation: Halliburton

Project: Intranet for Management Reports/Employee Tracking/Personnel system

(For each *Construct*, highlight the most appropriate *Category*)

Component	Constructs	Categories
Strategic Initiatives	<i>stimuli</i> <i>formulation scope</i> <i>decision making</i> <i>strategy led</i>	pro-active v's reactive incremental v's revolutionary autocratic, bureaucratic, champion emergence onset, eventually, none
Cultural Readiness	<i>change agents</i> <i>leadership</i> <i>risk aversion</i> <i>extent of open communication</i>	+ / - + / - cautious, welcomed, aggressive + / -
IT Leveragability	<i>role of IT</i> <i>use of Internet technology</i>	enabling, socio-technical, dominant factor poor, adequate, superior
Network Relationships	Balancing <i>inter-organisational linkages</i> <i>cross-functional cooperation</i>	cooperative, competitive poor, adequate, superior
Learning Capacity	<i>improve efficiency</i> <i>adaptation</i> <i>learning type</i> <i>external information use</i> <i>declarative knowledge</i>	learning by doing response to IT change, learning from others double-loop, deuterio boundary spanners, technology gate-keeper, customers, none R&D resources & IT devel., knowledge base, focus on core competencies
Change Mgt Practice	<i>mgt's. readiness to change</i> <i>pattern of change</i> <i>scope of change</i> <i>managed change</i>	committed, participative, resistant + / - improvement, radical change alleviation of dissatisfaction, vision for change, evolutionary or revolutionary change tactics, a well-managed process for change
e-Business Mgt Practice	<i>e-business measurement</i> <i>use of tools and techniques</i> <i>use of team-based structure</i>	use of e-business metrics, e-business information capture, audit, improvement feedback loop poor, adequate, superior, + + / -
Outcomes of e-Business & Performance Gains	<i>gaps between effectiveness</i> <i>expectations & actual</i> <i>performance</i> <i>quality of work life</i> <i>B2B resourcing</i> <i>B2C networking</i>	+ / - employee satisfaction, dissatisfaction, neutral cost savings(+ / -), choice(+ / -), quality (+ / -), reliable (+ / -) customer base, remote service, collaboration

Verified by (please sign): DATE: ...29 June 2000

PAGE 2 - QUESTIONNAIRE FOR INTERVIEWING

Component	Constructs	Comments
Strategic Initiatives	<i>stimuli formulation scope decision making strategy led</i>	*We are pretty proud of this Intranet solution. It has been expanded to include Compt hardware tracking of the IT dept. cost minimisation of offshore contract employment. Start with local Norwegian government. regulations on temp. employment
Cultural Readiness	<i>change agents leadership risk aversion extent of open communication</i>	HR management
IT Leveragability	<i>role of IT use of Internet technology</i>	Relatively OK, good use of graphics Online access to Norwegian employment regulations
Network Relationships Balancing	<i>inter-organisational linkages cross-functional cooperation</i>	**Very helpful for tracking agency employees working offshore. More about usage.
Learning Capacity	<i>improve efficiency adaptation learning type external information use declarative knowledge</i>	Trained at upper levels
Change Mgt Practice	<i>mgt's. readiness to change pattern of change scope of change managed change</i>	Introduced into HES was +ve, BRES viewed with suspicion. Some resistance due to the HES v's BRES syndome.
e-Business Mgt Practice	<i>e-business measurement use of tools and techniques use of team-based structure</i>	This system has been recommended to HQ in USA to be adopted globally in a comparison of other external solutions. Only in the Personnel tracking system
Outcomes of e-Business & Performance Gains	<i>gaps between effectiveness expectations & actual performance quality of work life B2B resourcing B2C networking</i>	*We are pretty proud of this Intranet solution. It has been expanded to include Compt hardware tracking of the IT dept. Interview Reporting for Mgt/Op. Mgt/HR staff for employee system **Very helpful for tracking agency employees working offshore.

A study by HQ staff in Houston, compared this system to two alternate external systems, has recommended this inhouse Intranet using R/3 personnel tables be adopted globally.

QUESTIONNAIRE FOR INTERVIEWING AN E-BUSINESS PROJECT LEADER A SAP SITE

Organisation: British Biotech

Project: B2B procurement

(For each *Construct*, circle the most appropriate *Category*)

Component	Constructs	Categories
Strategic Initiatives	<i>stimuli</i> <i>formulation scope</i> <i>decision making</i> <i>strategy led</i>	pro-active v's reactive incremental v's revolutionary autocratic, bureaucratic, champion emergence onset, eventually, none
Cultural Readiness	<i>change agents</i> <i>leadership</i> <i>risk aversion</i> <i>extent of open communication</i>	+ / - + / - cautious, welcomed , aggressive + / -
IT Leveragability	<i>role of IT</i> <i>use of Internet technology</i>	enabling, socio-technical, dominant factor poor, adequate , superior
Network Relationships Balancing	<i>inter-organisational linkages</i> <i>cross-functional cooperation</i>	cooperative , competitive poor, adequate, superior
Learning Capacity	<i>improve efficiency</i> <i>adaptation</i> <i>learning type</i> <i>external information use</i> <i>declarative knowledge</i>	learning by doing response to IT change , learning from others double-loop , deutero boundary spanners, technology gate-keeper , customers, none R&D resources & IT devel. , knowledge base, focus on core competencies
Change Mgt Practice	<i>mgt's. readiness to change</i> <i>pattern of change</i> <i>scope of change</i> <i>managed change</i>	committed , participative, resistant + / - improvement, radical change alleviation of dissatisfaction, vision for change, evolutionary or revolutionary change tactics, a well-managed process for change
e-Business Mgt Practice	<i>e-business measurement</i> <i>use of tools and techniques</i> <i>use of team-based structure</i>	use of e-business metrics, e-business information capture, audit, improvement feedback loop poor, adequate , superior + / -
Outcomes of e-Business & Performance Gains	<i>gaps between effectiveness</i> <i>expectations & actual</i> <i>performance</i> <i>quality of work life</i> <i>B2B resourcing</i> <i>B2C networking</i>	+ / - employee satisfaction , dissatisfaction, neutral cost savings(+ / -), choice(+ / -), quality (+ / -), reliable (+ / -) customer base, remote service, collaboration

SIGNATURE: ...M Bicknell..... DATE: 8th July 2000

Questionnaire for Interviewing – page 2

Component	Constructs	Comments
Strategic Initiatives	<i>stimuli</i> <i>formulation scope</i> <i>decision making</i> <i>strategy led</i>	Need to remove paper based requisitioning, reduce costs, create closer relationships with smaller number of vendors, enable management of procurement process with reduced central service, remove maverick purchasing (+) Scope set for small pilot group (35 people) to prove process prior to roll-out to rest of company. Small number of vendors involved initially. From pro-active proposals by individuals for presentation to various project teams for approval. (+) Probably would lead to an Internet strategy and e-commerce direction had company not changed direction so drastically (ie 40% reduction in staff numbers).
Cultural Readiness	<i>change agents</i> <i>leadership</i> <i>risk aversion</i> <i>extent of open communication</i>	Being an R&D company meant that the introduction of a new system was reasonably well accepted by the end-users. (+) Approved by a project sponsor and finally by the Finance Director Risk seen a negligible – not considered a major factor Catalogues & EDI transmission of purchase orders introduced. XML, internet e-mail also seen as future improvement (especially with very small companies with little or no IT skills)
IT Leveragability	<i>role of IT</i> <i>use of Internet technology</i>	Main driver in B2B project Most systems being reviewed for web-enablement. Cost centre manager enquiry system on SAP already web-enabled.
Network Relationships	<i>inter-organisational linkages</i> <i>cross-functional cooperation</i>	SAP, Biotech and vendors involved. Benefits gained for all. (+) Various department involved in the pilot (and subsequent roll-outs) have gained a closer knowledge of each others function, perhaps obvious but this makes for a better working environment.
Learning Capacity	<i>improve efficiency</i> <i>adaptation</i> <i>learning type</i> <i>external information use</i> <i>declarative knowledge</i>	Most users accepted improved efficiency aspects of B2B introduction Original SAP material created a 50 page manual. Subsequently I changed this to Intranet documents for users to reference and ran training sessions as a 2 hour project introductory, demonstration and hands-on session. Classroom, instructor led. Key users in each area also responsible for training/problem solving subsequently. (+) Original input from SAP.
Change Mgt Practice	<i>mgt's. readiness to change</i> <i>pattern of change</i> <i>scope of change</i> <i>managed change</i>	Various department involved in the initial pilot (11 week roll-out) A well managed process of change (+)
e-Business Mgt Practice	<i>e-business measurement</i> <i>use of tools and techniques</i> <i>use of team-based structure</i>	Building data but perhaps still to early to judge accurately From pro-active proposals by individuals for presentation to various project teams for approval. (+)
Performance Gains	<i>gaps between effectiveness</i> <i>quality of work life</i> <i>B2B resourcing</i> <i>B2C networking</i>	

QUESTIONNAIRE FOR INTERVIEWING B2B PROJECT MANAGER OF A SAP SITE (2)

Organisation: FSC

Project : B2B “Order Request System” (ORS)

(For each *Construct*, circle the most appropriate *Category*)

Component	Constructs	Categories
Strategic Initiatives	<i>stimuli</i> <i>formulation scope</i> <i>decision making</i> <i>strategy led</i>	pro-active v's reactive incremental v's revolutionary autocratic, bureaucratic, champion emergence onset, eventually, none
Cultural Readiness	<i>change agents</i> <i>leadership</i> <i>risk aversion</i> <i>extent of open communication</i>	+ / - + / - cautious, welcomed, aggressive + neutral -
IT Leveragability	<i>role of IT</i> <i>use of Internet technology</i>	enabling, socio-technical, dominant factor poor, adequate , superior
Network Relationships	Balancing <i>inter-organisational linkages</i> <i>cross-functional cooperation</i>	cooperative, competitive poor, adequate , superior
Learning Capacity	<i>improve efficiency</i> <i>adaptation</i> <i>learning type</i> <i>external information use</i> <i>declarative knowledge</i>	learning by doing + response to IT change, learning from others double-loop, deuterio <u>boundary spanners</u> , technology gate-keeper, <u>customers</u> , none R&D resources & IT devel., knowledge base, focus on core competencies
Change Mgt Practice	<i>mgt's. readiness to change</i> <i>pattern of change</i> <i>scope of change</i> <i>managed change</i>	committed, participative, resistant + / - improvement, radical change alleviation of dissatisfaction, <u>vision for change</u> , evolutionary or revolutionary change tactics, <u>a well-managed process for change</u>
e-Business Mgt Practice	<i>e-business measurement</i> <i>use of tools and techniques</i> <i>use of team-based structure</i>	use of e-business metrics, <u>e-business information capture</u> , audit, improvement feedback loop poor, adequate , superior + / -
Outcomes of e-Business & Performance Gains	<i>gaps between effectiveness</i> <i>expectations & actual</i> <i>performance</i> <i>quality of work life</i> <i>B2B resourcing</i> <i>N/A B2C networking</i>	+ / - employee satisfaction, dissatisfaction, neutral cost savings(+ / -), choice(+ / -), quality (+ / -), reliable (+ / -) customer base, remote service, collaboration

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PAGE 2 - QUESTIONNAIRE FOR INTERVIEWING

This project was a partnership between SBS (IT developer) and Fjcomp (customer). ORS is in UK took 1 year to implement and has been operational for one year. In the beginning it was IT lead but now it should be strategy lead – “we need a real strategy”. How do we want to use ORS? In its infancy it was better than now.

Component	<i>Constructs</i>	Comments
Strategic Initiatives	<i>stimuli formulation scope decision making strategy lead</i>	Tend to revolutionary After time it seems not to be strategy lead (-)
Cultural Readiness	<i>change agents leadership risk aversion extent of open communication</i>	Overall positive Initially positive but lacked vision of e-commerce (-)
IT Leveragability	<i>role of IT use of Internet technology</i>	The dominate factor was making use of R/3s power
Network Relationships Balancing	<i>inter-organisational linkages cross-functional cooperation</i>	a relationship between an implementation partner and (customer) Hard to define
Learning Capacity	<i>improve efficiency adaptation learning type external information use declarative knowledge</i>	Customer users learnt from experienced partner users Customer feedback Some parts from all
Change Mgt Practice	<i>mgt's readiness to change pattern of change scope of change managed change</i>	For customer it was positive and shifted to negative. (-) A vision for change for i-partner. A well managed implementation (+)
e-Business Mgt Practice	<i>e-business measurement use of tools and techniques use of team-based structure</i>	Superior use of tool for the i-partner (+) Positive for the i-partner
Outcomes of e-Business & Performance Gains	<i>gaps between effectiveness expectations & actual performance quality of work life B2B resourcing B2C networking</i>	Neutral affect on quality of working Reliability comes from R/3. There is the potential to increase customer base.

QUESTIONNAIRE FOR INTERVIEWING *BUSINESS PROJECT* MANAGER OF A SAP SITE

Organisation: Dell

Project: B2B with a large/first customer

(For each *Construct*, highlight the most appropriate *Category*)

Component <i>Constructs</i>	Categories
Strategic Initiatives <i>stimuli</i> <i>formulation scope</i> <i>decision making</i> <i>strategy led</i>	pro-active v's reactive incremental v's revolutionary autocratic, bureaucratic, champion emergence onset, eventually, none
Cultural Readiness <i>change agents</i> <i>leadership</i> <i>risk aversion</i> <i>extent of open communication</i>	+ / - + / - cautious, welcomed, aggressive + / -
IT Leveragability <i>role of IT</i> <i>use of Internet technology</i>	enabling, socio-technical, dominant factor poor, adequate, superior
Network Relationships Balancing <i>inter-organisational linkages</i> <i>cross-functional cooperation</i>	cooperative, competitive poor, adequate, superior
Learning Capacity <i>improve efficiency</i> <i>adaptation</i> <i>learning type</i> <i>external information use</i> <i>declarative knowledge</i>	learning by doing response to IT change, learning from others double-loop, deuterio boundary spanners, technology gate-keeper, customers, none R&D resources & IT devel., knowledge base, focus on core competencies
Change Mgt Practice <i>mgt's readiness to change</i> <i>pattern of change</i> <i>scope of change</i> <i>managed change</i>	committed, participative, resistant + / - improvement, radical change alleviation of dissatisfaction, vision for change, evolutionary or revolutionary change tactics, a well-managed process for change
e-Business Mgt Practice <i>e-business measurement</i> <i>use of tools and techniques</i> <i>use of team-based structure</i>	use of e-bus metrics, e-bus info. capture, audit, improvement feedback loop poor, adequate, superior + / -
Outcomes of e-Business & Performance Gains <i>gaps between effectiveness</i> <i>expectations & actual</i> <i>performance</i> <i>quality of work life</i> <i>B2B resourcing</i> <i>B2C networking</i>	+ / - employee satisfaction, dissatisfaction, neutral cost savings(+ / -), choice(N/A), quality (+ / -), reliable (+ / -) NOT YET customer base, remote service, collaboration

SIGNATURE:

DATE: 16-6-00

Venue: SAPPHIRE 2000 Las Vegas.

PAGE 2 - QUESTIONNAIRE FOR INTERVIEWING

Component	Constructs	Comments
Strategic Initiatives	<i>stimuli formulation scope decision making strategy led</i>	Interestingly, PCsell has a customer direct strategy. In the Comp. Industry. It is pro-active, but reacts to customer demands. Customers are empowered the company - it's IT supporting infrastructure. Revolutionary as a concept. The B2B group as a whole should be regarded as a "champion" group.
Cultural Readiness	<i>change agents leadership risk aversion extent of open communication</i>	Between welcomed and aggressive; We don't want to loose business – so we must wait on our customers
IT Leveragability	<i>role of IT use of Internet technology</i>	Superior, but can be better.
Network Relationships Balancing	<i>inter-organisational linkages cross-functional cooperation</i>	There was collaboration with internal competition. The same issues apply with our project customer (PC)
Learning Capacity	<i>improve efficiency adaptation learning type external information use declarative knowledge</i>	Learning with and from our PC as well as our partners
Change Mgt Practice	<i>mgt's. readiness to change pattern of change scope of change managed change</i>	We needed to get both parties committed. Our PC was driving us.
e-Business Mgt Practice	<i>e-business measurement use of tools and techniques use of team-based structure</i>	Internal company metrics is mandatory in this company. Internal business efficiency is the goal. This is driving a corporate business frictionless process. Superior but the tools can be put to better use.
Outcomes of e-Business & Performance Gains	<i>gaps between effectiveness expectations & actual performance quality of work life B2B resourcing B2C networking</i>	This is the first B2B project

See SAPPHERE 2000 trade display brochure "B2B E-Commerce Integration with ??? Computer Corp:

- B2B Transactions Supported Today
- B2B Solution Requirements
- B2B Integration Benefits

QUESTIONNAIRE FOR AN E-BUSINESS PROJECT WITH SAP R/3

Organisation: 4b. LSI

Project: B2B

(For each *Construct*, circle the most appropriate *Category*)

Before starting please view the diagram on previous page

Component	Constructs	Categories
Strategic Initiatives	<i>stimuli formulation scope decision making strategy led</i>	(+ve) pro-active v's reactive incremental v's revolutionary autocratic, bureaucratic, champion emergence (+ve) onset , eventually, none
Cultural Readiness	<i>change agents leadership risk aversion extent of open communication</i>	+ / - + / - cautious, welcomed , aggressive + / -
IT Leveragability	<i>role of IT use of Internet technology</i>	enabling , socio-technical , dominant factor poor , adequate , superior
Network Relationships	Balancing <i>inter-organisational linkages cross-functional cooperation</i>	(+ve) cooperative , competitive poor , adequate , superior
Learning Capacity	<i>improve efficiency adaptation learning type external information use declarative knowledge</i>	was learning by doing + / - response to IT change , learning from others single , double-loop, deuterio boundary spanners, technology gate-keeper , customers, none R&D resources & IT devel., knowledge base, focus on core competencies
Change Mgt Practice	<i>mgt's. readiness to change pattern of change scope of change managed change</i>	committed, participative , resistant + / - improvement, radical change alleviation of dissatisfaction, vision for change, evolutionary or revolutionary change tactics , a well-managed process for change
e-Business Mgt Practice	<i>e-business measurement use of tools and techniques use of team-based structure</i>	use of e-business metrics, e-business information capture , audit , improvement feedback loop poor , adequate , superior + / -
Outcomes of e-Business & Performance Gains	<i>gaps between effectiveness expectations & actual performance quality of work life B2B resourcing B2C networking</i>	+ / - ? (+ve) employee satisfaction , dissatisfaction, neutral cost savings(+ / -), choice(+ / -), quality (+ / -), reliable (+ / -) customer base , remote service, collaboration

SIGNATURE: DATE: ...14 Nov 2000 - Telephone Interview.

QUESTIONNAIRE PAGE 2

Please record any comments to qualify your answers from previous page.

Component	Constructs	Comments
Strategic Initiatives	<i>stimuli formulation scope decision making strategy led</i>	Computer.com's B2B (R/3) partner using XML engine 50% single purchases
Cultural Readiness	<i>change agents leadership risk aversion extent of open communication</i>	Initially we welcomed the change, now we're more aggressive. This took some time between our company and Computer.com
IT Leveragability	<i>role of IT use of Internet technology</i>	Act as a common interface, and a bridge between technical and social considerations. From "good to becoming better."
Network Relationships Balancing	<i>inter-organisational linkages cross-functional cooperation</i>	From "adequate to good."
Learning Capacity	<i>improve efficiency adaptation learning type external information use declarative knowledge</i>	Technical improvements Learning from our mistakes.
Change Mgt Practice	<i>mgt's. readiness to change pattern of change scope of change managed change</i>	Radical change from focussing on the supplier (PCsell.com) as a model. Well managed process, for revolutionary change tactics
e-Business Mgt Practice	<i>e-business measurement use of tools and techniques use of team-based structure</i>	25% gains cost savings. Reduction in e-cycle time; eg from 2 weeks to 2 days.
Outcomes of e-Business & Performance Gains	<i>gaps between effectiveness expectations & actual performance quality of work life B2B resourcing B2C networking</i>	In purchasing, employee satisfaction is high Very positive due to all factors 75 customers out of 125 are like CISCO, strategically on the Web

APPENDIX 6.5

All Data Captured on Constructs with +/- Identified

Components with *Constructs*

Strategic Initiatives

Stimuli

1. High cost of offshore contract employment that exceeds Norwegian regulations. +
2. Need to remove paper based requisitioning, reduce costs, create closer relationships with smaller number of vendors, enable management of procurement process with reduced central service, remove maverick purchasing. +
- 3 No 1 In computer sales in Europe, Tend to revolutionary. +
- 4 PCsell has a direct approach to customer sales, from its a make-to-order operations. It is pro-active, but reacts to customer demands and expectations. +
- 5 50% purchases are for single items. +

formulation scope

- 1 Start with local Norwegian government. regulations on temp. employment
- 2 Scope set for small pilot group (35 people) to prove process prior to roll-out to rest of company. Small number of vendors involved initially.
- 3 Staged rollout throughout Europe.
- 4 Incremental in development but revolutionary as a concept.
- 5 Viewed as revolutionary, and has emerged as a model for our other suppliers.

decision making

- 1 HR manager support of a local IT initiative within a global organisation centralised in USA. Project was not viewed as champion emergent.
- 2 From pro-active proposals by individuals for presentation to various project teams for approval. +
- 3 Autocratic and fragmented management structure -
- 4 The B2B group as a whole should be regarded as a "champion" group. +
- 5 Champion emergence was driven from supplier's development group. +

strategy led

- 1 Extension of the company's global decision support from using R/3 data.
- 2 Probably would lead to an Internet strategy and e-commerce direction had company not changed direction so drastically (ie 40% reduction in staff numbers).
- 3 After time it seems not to be strategy lead (-)
- 4 Customers are cared by the suppliers IT supporting infrastructure.+
- 5 From onset to eventually emerged as a standard procurement solution. +

Cultural Readiness

change agents & leadership

1 Professional (engineering) expectations of a new system was reasonably well accepted by HR officers and project managers. HR management +

Some resistance was evidenced from the users of the local partner division. -

2 Being an R&D company meant that the introduction of a new system was reasonably well accepted by the end-users. + Approved by a project sponsor and finally by the Finance Director. +

3 Overall positive from a strong traditional selling but with little experience with e-commerce. Initially positive but lacked vision of e-commerce. -

4 PCsell's direct approach (vision) with leadership from B2B Group +

5 Cost savings is the driver. Leadership from the partner's B2B group
risk aversion

1 Risk seen a negligible – not considered a major factor.

2 Risk seen a negligible – not considered a major factor.

3 Conservative middle managers and fragmentation of the global organisation

4 Between **welcomed** and aggressive; We don't want to loose business – so we must wait on our customers. +

5 Initially we welcomed the change, now we're more aggressive. +

extent of open communication

1 Project driven teams of professional engineers and procurement specialist

2 Catalogues & EDI transmission of purchase orders introduced. XML, internet e-mail also seen as future improvement (especially with very small companies with little or no IT skills)

3 Unknown?

4 Some cultural differences exist between the two partners – so.

5 This took some time between our company and *Computer.com*

Learning Capacity

improve efficiency

1 Trained at upper levels

2 Most users accepted improved efficiency aspects of B2B introduction. Efficiency come from the automation of the approval process.

3 In its infancy it was better than now.

4 Employees are highly motivated to learn to use IT to be efficient. +

5 Technical improvements

adaptation

- 1 Learning was driven by HR group +
- 2 Original SAP material created a 50 page manual. Subsequently I changed this to Intranet documents for users to reference and ran training sessions as a 2 hour project introductory, demonstration and hands-on session.
- 3 Traditionally slow with conservative middle managers 'bottleneck'
- 4 Learning with and from our PC as well as our partners +
- 5 Learning from the suppliers' B2B specialists.

learning type

- 1 Project driven teams of professional engineers and procurement specialists
- 2 Classroom, instructor led. Key users in each area also responsible for training/problem solving subsequently. +
- 3 Customer users learnt from experienced partner users
- 4 Learning to wait on our customers +
- 5 Learning from our mistakes. +

external information use

- 1 Web links to regional government data on regulations
- 2 Original input from SAP
- 3 Customer feedback
- 4 Share many links for improved customer experience. +
- 5 Unknown

declarative knowledge

- 1 Professional knowledge can easily managed unlike business knowledge R/3.
- 2 As research company industry knowledge is valued.
- 3 Some parts from all categories.
- 4 Sharing of business and IT knowledge is used to build customers relations. +
- 5 Knowledge comes from the leaders in the electronics industry.

IT Leveragability

use of Internet technology

- 1 Online access to Norwegian employment regulations. +
- 2 Most systems being reviewed for web-enablement. Cost centre manager enquiry system on SAP already web-enabled. +
- 3 making use of data integration between R/3 systems.
- 4 Superior, but can be better. +
- 5 From "good to becoming better." +

role of IT

- 1 Relatively OK, good use of graphics. + (use of R/3 not stated)

2 Main driver in B2B project. +

3 The dominate factor was making use of R/3s data integration. +?

4 Is the open connectivity between ERPs and our component based EAI. +

5 Act as a common interface, and a bridge between technical and social considerations. +

Network Relationships

inter-organisational linkages

1 Very helpful for tracking agency employees working offshore. +

2 SAP, Biotech and vendors involved. Benefits gained for all. +

3 A relationship between an implementation partner and (customer)

4 There was collaboration with internal competition. +

5 Improving +

cross-functional cooperation

1 More about usage.

2 Various department involved in the pilot (and subsequent roll-outs) have gained a closer knowledge of each others function, perhaps obvious but this makes for a better working environment. +

3 Hard to define

4 The same issues apply with our project customer (PC) +

5 From "adequate to good." +

Change Mgt Practice

management's readiness to change

1 Introduced into HES was +ve, BRES viewed with suspicion. Some resistance from HES v's BRES syndrome and past experiences with R/3.

2 Historically conservative but regards change as necessary for growth.

3 The fragmented global structure and traditional management methods is frustrating a global e-commerce face to customers. -

4 We needed to get both parties committed. +

5 Conservative management lead by partner

pattern of change

1 The project has evolved with other Web applications that leverage R/3. +

2 Lead to a comprehensive e-business organisation. +

3 For customer it began as positive project then shifted to a negative. -

4 Dynamic teaming to build customised solutions and partnering. +

5 Continued improvement. +

scope of change

- 1 Benefits were immediately apparent
- 2 Various department involved in the initial pilot (11 week roll-out)
- 3 Apply ORS with Comptec as the global organisation model
- 4 This is the first B2B project. It signal an new era of "frictionless" data exchange information partner
- 5 Radical change from focussing on the PCsell.com as a model supplier.

managed change

- 1 Self-managed induced from alleviation of dissatisfaction.
- 2 A well managed process of change. +
- 3 A vision for change from a well managed implementation by the i-partner.
- 4 Our partner customer was driving us. +
- 5 Well managed process, for revolutionary change tactics. +

e-Business Mgt Practice

e-business measurement

- 1 This system has been recommended to HQ in USA to be adopted globally in a comparison of other external solutions.
- 2 Building data but perhaps still to early to judge accurately
- 3 See Benefits scorecard
- 4 Internal company metrics is mandatory in this company. Internal business efficiency is the goal. This is driving a corporate business frictionless process. +
- 5 25% gains cost savings. Reduction in e-cycle time; eg from 2 weeks to 2 days

use of tools and techniques

- 1 Computer graphics provided easy to use data analysis charts. +
- 2 Applied customised staff training to enable staff proficiencies
- 3 See premier page capabilities. Superior use of tool for the i-partner (+)
- 4 Superior but the tools can be put to better use. +
- 5

team-based structure

- 1 Only in the Personnel tracking system. +
- 2 From pro-active proposals by individuals for presentation to various project teams for approval. +
- 3 Positive for the i-partner.
- 4 The team was dynamically formed for the B2B project. +
- 5

APPENDIX 7.1

Target Organisations with Stages of Data Collection

Table A7.1: Target Organisations with Stages of data collection

Case #	Alias	Interviewed			Business Model:			Industry	VOing Performance Measure
		1 st Nov-99	2 nd Jul-00	3 rd Jun-01	B2B ^S	B2B ^C	B2B ^E		
1	UBS	•	•				•	Banking	EVA
2	British Biotech	•	•		•			Bio-technology	ROI → EVA
3	UNICEF Aust	•	•			B2C		Charity	ROI → EVA
4a	*Dell Computers	•	•		◌ ◌			Computing	ROI & EVA
4b	LSI Electronics	-	•		◌ ◌			Electronics	ROI
5	Employ-National	•	•				•	Employment	ROI
6	Halliburton	•	•				•	Engineering	EVA
7	Bertelsmann	•			•			Media	ROI → EVA
8	Statoil	•	•		•			Oil & Gas	ROI
9	Novartis	•					•	Pharmaceutical	EVA
10	**Siemens (FSC)	Phone &	•	•	◌ ◌			Science/electric	MVA
(b)	Fujitsu-Siemens	emails	(•)			(•)		technology.	(ROI)
11	Wine Society	•	•	Sep-98	B2C			Australia	EVA

11 Cases, across 11 industries, from Australia, Europe, Scandinavia, UK, USA (ordered by alias name and industry type)

* *PCsell.com* and *Customer.com* represent a B2B twin case - supplier and customer

** *Scitec.com* represents the parent company with *Comptec.com* as one division.

APPENDIX 7.2

Data Collection Letter and Interview Questionnaire



“A Study of the Benefits Derived from Organisations Using SAP R/3 Integrated with the Internet”

Letter of Introduction:

Dear

During the past twelve months, the business community has witnessed the uptake of two separate information technologies; the Internet and the application of enterprise resource software. While Government agencies have been pro-active in encouraging and promoting e-commerce industry solutions, a range of influences, both technical and organisational, have been driving an increase in SAP R/3 implementations. The purpose of this survey is to establish the current use and expected use of Internet technology for extending the R/3 business functions for the benefit of customers and business partners.

Benefits of the Research

This survey is designed to identify the current position of SAP enabled organisations with respect to the adoption of Internet enabled R/3 systems. The data being collected is viewed as the information necessary for establishing the benefits of organisations that are pioneers in the use of Internet enabled SAP R/3 solutions.

Data Security

Your organisation's identity will be kept completely isolated from all data collected. To ensure complete anonymity, the data collected from this questionnaire will be “de-identified” by destroying all links to your organisation's identity. The data collected from the survey will be used for the purpose of my PhD and associated conference papers. Any further use of this data will require your consent. So a participant is free at any time not to consent to further involvement in any ongoing research.

The research results will be made available to the survey participants.

Thank you for your participation.

Colin Ash

November, 1999

Student No.	0974718
Email:	c.ash@ecu.edu.au
Institution:	Edith Cowan University
Programme:	Doctorate of Philosophy
Principal Supervisor:	Prof Janice M. Burn

A STUDY OF ORGANISATIONS

USING SAP R/3 INTEGRATED WITH THE INTERNET

To Enable Organisational Effectiveness

Colin Ash

School of Management Information Systems

Edith Cowan University (ECU)

Perth, Australia

Student No.	0974718
Email:	c.ash@ecu.edu.au
Institution:	Edith Cowan University
Programme:	Doctorate of Philosophy
Principal Supervisor:	Prof Janice M. Burn

November, 1999

1. Organisational Data

Industry: (eg Mining, Police, Petroleum, Retailing, Utility) []

R/3 Implementation Dates: [] to []

R/3 release: (eg 3.0, 3.1, 4.0, 4.5, Pandesic) [];

1.1 No. of Employees: [];

Type of Employees:

1.2 No. of Customers: [];

Type of Customers:

1.3 No. of Business Partners: [];

Type of Business Partners:

1.4 No. of Suppliers: [];

Type of Suppliers:

2. List the uses of Internet technology - integrated with R/3 for:

(Please indicate "a" = Actual or "e" = Expected or future use)

2.11 Employee-to-Business (E2B) eg SAP Employee Self services (a)

2.12 Customer- to-Business (C2B) eg SAP Online Store B2C (a)

2.13 Business-to-Business (B2B, SCM) eg SAP's B2B Procurement (e)

3A. Organisational Strategy - Customer Interaction

To what extent does your organisation pursue the following strategies:

Organisation

Activity

Internet SAP

Key:
0 = Nil
1 = 20%
2 = 40%
3 = 60%
4 = 80%
5=100%

For each question **choose** at least **one** option: **A - E** & use

Circle each choice, and enter the number in the box for % use;

(eg) **B** **Customer queries will be replied to within 10 hours** **max.**

A. Customer Interaction strategy - that deals with new challenges and opportunities for company-to-customer interactions? To what extent does your Internet-SAP support;

A.1 customers having **remote access** to experience important product features and services?

- A. Customers can reach you twenty-four hours a day, seven days a week.
- B. Customer queries will be replied to within 10 hours max.
- C. Customers can experience remotely the most important product features.
- D. Your remote access capability ranks better than your competitors.
- E. Customers can access to your databank of answers to FAQ so they can solve some problems themselves.

A.2 customers having interactive links for refining / customising product features over time?

- A. Your marketing capability reflects an inside-out perspective.
- B. Capability of an intelligent site to deliver dynamic personalised information about products and services.
- C. Capability of producing product and service modules that can be configured to customer requirements of increased functionality.
- D. A marketing capability reflects an outside-in perspective.
- E. Capability of dynamically links to customers to refine product features over time.

A.3 the organisation participation in creating a mutually supporting customer community?

- A. No participation with any virtual community.
- B. A passive participant in a virtual community.
- C. A commitment to a virtual community with a distinctive focus.
- D. Capability to post your content for access to the wider community.
- E. Appreciate member-generated content.

A.4 the organisation **virtually connecting** with customers for capturing information and leveraging knowledge?

- A. Your business systems focus on efficiently delivering products and services.
- B. A strategy that virtually connects with your customers for capturing little customer information about products and services.
- C. A strategy that virtually connects with your customers for capturing customer information only.
- D. A strategy that virtually connects with your customers for capturing information and leveraging little knowledge.
- E. A strategy that virtually connects with your customers for capturing information and leveraging knowledge.

3B. Organisational Strategy – Asset Configuration

To what extent does your organisation pursue the following strategies:

Organisation

Activity

Internet SAP

Key:
0 = Nil
1 = 20%
2 = 40%
3 = 60%
4 = 80%
5=100%

For each question choose at least one option: A - E & use

Circle each choice, and enter the number in the box for % use;

(eg) B Customer queries will be replied to within 10 hours max.

B. **Asset Configuration** strategy - that deals with new challenges and opportunities for business-to-business interactions, to manage a dynamic portfolio of relationships to assemble and coordinate the required assets for delivering value to customers? To what extent does your Internet-SAP support:

B.1 your organisation's systematic approach for identifying the modules that you can obtain from external partners?

- A. Web is increasingly used for sourcing standard components.
- B. Reduced procurement time, transaction costs and materials costs.
- C. Capable sourcing from outside without the loss of competitive advantage.
- D. Your sourcing strategy dynamically responds to make-partner-buy decisions.

B.2 your organisation's process outsourcing as the best way to allocate internal resources to high-value-adding areas?

- A. You still carry out processes internally that may best be done outside.
- B. External specialists are used to provide internal services without the loss of control
- C. Now reconfiguring some standard processes across organisational boundaries.
- D. Your focus to core business has improved.

B.3 your organisation in structuring and managing a portfolio of relationships for obtaining its required resources and capabilities?

Your dependence on relationships for assembling complementary capabilities is low.

Your coalition partners favour you over your competitors

You are proactive in adapting your business network to suit your requirements

You orchestrate associate businesses to extend your market presence.

The distinction between competition and cooperation is becoming blurred.

B.4 your organisation in having a logic for sourcing that distinguishes the assets to manage inside from those that can be assembled via relationships in the business network?

- A. IT has allowed us to create opportunities for process outsourcing
- B. Moved away from vertical integration to concentrate on core competencies.
- C. We obtain complementary assets through inter-company relationships.
- D. We participate or orchestrate in a our resource coalition.
- E. We concentrate on creating and deploying intellectual and intangible assets while sourcing tangible.

3C. Organisational Strategy – Knowledge Leverage

To what extent does your organisation pursue the following strategies:

Organisation

Activity

Internet SAP

Key:

0 = Nil

1 = 20%

2 = 40%

3 = 60%

4 = 80%

5=100%

For each question choose at least one option: A - E & use

Circle each choice, and enter the number in the box for % use;

(eg) B Customer queries will be replied to within 10 hours max.

C. Knowledge Leverage strategy - that deals with the opportunities for leveraging diverse sources of expertise within and across organisational boundaries? To what extent does your Internet-SAP support:

C.1 The leveraging of the collective expertise of task units (teams and groups)?

- A. Our performance assessment encourages individual performance.
- B. There is a balance between performance assessment and teamwork incentives.
- C. Shifting from functionally based to a process driven organisation.
- D. Groupware is used for the sharing of knowledge across time and location.
- E. New practices have been designed to harness department expertise.

C.2 The recognising of knowledge as corporate asset?

- A. We regard knowledge as corporate asset
- B. We regard knowledge as a more important corporate asset than tangible assets
- C. Shifted from physical resources or capital to knowledge and intellectual assets.
- D. Your basic economic resource is knowledge and intellectual assets.
- E. Recognises and practice incentives for attracting and keeping knowledge workers

C.3 The positioning of your professional expertise within a community relevant to your business?

- A. We have begun to leverage the expertise from our extended business network
- B. Emerging virtual communities will serve as the primary source for collecting knowledge.
- C. Emerging virtual communities will serve as the primary mechanism for collecting knowledge.
- D. Shifted to an information-based organisation with a network of community knowledge specialists?

C.4 The linking this knowledge to organisational effectiveness?

- A. We have few rewards for confirming knowledge as corporate asset
- B. Capturing customer knowledge has meant an effective response time to customers.
- C. Effectiveness is ensured by practices and systems supported by groupware
- D. We regard knowledge as a corporate wide asset that should be systematically managed.
- E. We recognise and have implemented mechanisms for leveraging knowledge and intellectual assets in creating value?

4. Effects of integrating your R/3 with Internet technology

4.12 What parts of your R/3 system have been integrated with Internet technology - for:

Customer Interaction (C2B)

Asset configuration (B2B, SCM)

Knowledge Leverage

4.13 What benefits have been achieved from integrating your R/3 with the Internet?

Customer Interaction (C2B)

Asset configuration (B2B, SCM)

Knowledge Leverage

4.14 What barriers have inhibited success from integrating your R/3 with the Internet?

Customer Interaction (C2B)

Asset configuration (B2B, SCM)

Knowledge Leverage

4.15 What should be done to maximise the benefits derived from your Internet-R/3 system?

Customer Interaction (C2B)

Asset configuration (B2B, SCM)

Knowledge Leverage

4.16 What should be done to minimise the barriers to integrating R/3 with the Internet?

Customer Interaction (C2B)

Asset configuration (B2B, SCM)

Knowledge Leverage

For Questions 5 – 7 use the rating scale to enter a number in each box

Scale: 0 = Nil | 1 = very low | 2 = low | 3 = medium | 4 = high | 5 = Very high (100%)

5. Rate your Basic Performance Improvement in:

R/3 only | R/3 with Internet

- a. Efficiency _____
- b. Effectiveness _____
- c. Empowerment _____

6. Rate your organisation in the following:

R/3 only | R/3 with Internet

- a. Increased customer base?
- b. Increased customisation of products/services?
- c. Increased involvement in customer community
- d. Improved market image?
- e. Greater diversity of sourcing from suppliers/partners?
- f. Greater diversity of suppliers/partners?
- g. Improved operating efficiency (ROI)?
- h. Reduced cost of operation?
- i. Increase in Value added processes?
- j. Sustained innovation and growth

7. Rate the following Challenges for Change:

R/3 only | R/3 with Internet

- a. Shifting value drivers
- b. Designing the new business model
- c. Deploying an integrated IT platform
- d. Interacting with customers for knowledge leverage
- e. Navigating across multiple communities
- f. Governing beyond outsourcing
- g. Allocating resources under increased uncertainty
- h. Designing an organisation for knowledge leverage
- i. Assessing performance along multiple dimensions

8. Assessment from the use of Internet-SAP R/3

Market/Customer Interaction

8.1 How are you assessing your progress in the customer interaction vector as the marketplace demands greater;

(a) remote access?

(b) dynamic customization?

(c) participation in the customer community?

Asset Configuration

8.2 How are you assessing your progress in sourcing assets as you strive to;

(a) efficiently source modules?

(b) reconfigure processes?

(c) orchestrate a superior position within the resource coalition?

(d) What is your scorecard of financial and operational metrics to monitor your performance?

Knowledge Leverage

(a) What characteristics of the IT platform support knowledge leveraging within the unit?

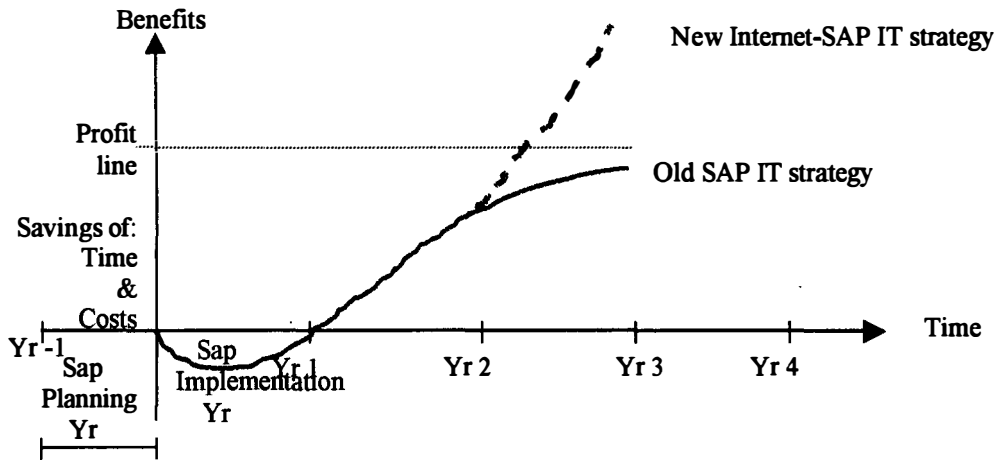
(b) How is knowledge linked to organisational effectiveness?

(c) What is the extent of competition and cooperation (collaboration) amount your business network?

(d) What qualitative and quantitative indicators are you adopting to better leverage knowledge in creating value?

(e) What companies do you use for benchmarking?

9. How closely does this model fit your organisation?



Adopt Internet technology with SAP R/3 to increase benefits

-- End --

“An Interview of organisations advanced in using Internet-SAP R/3”

I give my consent to the use of the data (obtained from this questionnaire) for the purpose as stated in the covering “Letter of Introduction”.

Signature: _____ Date: _____

APPENDIX 7.3

Table A6.1: Perceived Ratings of Internet use with SAP R/3 implementations – 1st Interviews Nov 1999

Q.6 - Q.8 from 1st Interview Questionnaire	Case # 1		2		3		5		6		7		8		9		11	
	Bank.com	Biotec.com	Charity.org	Employ.org	Engineer.com	Media.com	O&Gas.com	Pharma.com	Society.org									
6. Rate your Basic Performance Improvement using:	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3
a. Efficiency	3 4.5	3 5	4 5	4 2	1 3	4 5	4 4	4 5	3 4	3 4+	3 4	3 4	3 4	3 4	3 4	3 4	3 4	3 4
b. Effectiveness	2.5 4.5	2 4	3.5 5	4 2	3 3	4 5	3 4	3 4+	3 4	3 4+	3 4	3 4	3 4	3 4	3 4	3 4	3 4	3 4
c. Empowerment	2.5 4.5	2 5	3 4+	3 1	2 2	2.5 5	4 4	0 1	3 4	3 4	3 4	3 4	3 4	3 4	3 4	3 4	3 4	3 4
7. Rate the following Performance Objectives:	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3
a. Increased customer base	2.5 4.5	3 4			0 0	0 5+	2 3	0 5										
b. Increased customisation of products/services		3 4			0 2	1 5	3 3	3 4										
c. Increased involvement in customer community		3 4			0 1	1 5	3 4	3 4										
d. Improved market image	2.5 4	na na			0 0	na na	4 4	na na										
e. Greater diversity of sourcing from suppliers/partners	No change	3 3			0 0	2 5	2 3											
f. Greater diversity of suppliers/partners		N/A N/A			0 0	2 5	3 4											
g. Improved operating efficiency (ROI)	3.5 4.5	3 4.8			2 3	4 5	1 1	3 5										
h. Reduced cost of operation	3 4.5	3 4.8			0 0	4 5	3 3	3 5										
i. Increase in Value added processes	4 5	2 5			2 3	2 5	4 3	3 5										
j. Sustained innovation and growth	4 5	2.5 4			3 4	2 5	3 4											
8. Rate the following Challenges for Change:	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3	R/3 I-R/3
a. Shifting value drivers		0 0			1 1	na na	3 proc											
b. Designing the new business model	3 5	0 2.3			4 3	0 5	4 4											
c. Deploying an integrated IT platform	4 5	4 5			4 4	3 5	4 future											
d. Interacting with customers for knowledge leverage		0 4			1 1	1 5	2 2											
e. Navigating across multiple communities		0 5			1 1	1 5	4 4											
f. Governing beyond outsourcing		2 5			4 4	2 2	? ?											
g. Allocating resources under increased uncertainty	4 3	3 3			2 1	3 4.5	2 1											
h. Designing an organisation for knowledge leverage	2 5	0 3			3 3	SAP KM	3 1											
i. Assessing performance along multiple dimensions		3 3			1 1		4 1											

APPENDIX 7.4**Siemens Detailed Case Material****6.4.1 The lessons learnt to achieve, a well managed customised Premier pages:**

- Premium pages; the user's specific list of commonly purchased items.
- Order Tracking; the ability to follow the progress of an order.
- Document Tracking; an extension to Order Tracking, which allows the electronic SAP documents to be viewed.
- Help Facility; with information on setup, FAQs and a Help Wizard.
- News Forum; for announcements and customer debate.
- Download page; additional tools and documentation.

(Source: Siemens, 1999)

6.4.2a Biotec.com

The company's previous existing paper-based purchasing procedure: An employee filled out a paper requisition, submitted it to his or her manager for approval, and then placed the requisition in the internal mail for delivery to the purchasing department. Here, a purchase order was entered in the R/3 System, printed out, and faxed to the vendor. Even then, it was still sometimes necessary for the procurement team to contact the vendor and clarify details such as the price and catalogue number for the item required. And, after all that, the order had to be confirmed by telephone". "It was a typical sort of clumsy process really," admits MacNicol. As a result, it took an average of four days for an order to be filled.

6.4.2b Biotec.com

SAP B2B Procurement is a component of mySAP.com, the extensive open environment for cooperative business processing in the Internet. It supports all business processes relating to the procurement of indirect material, including process materials as well as services. The software handles all processes from creating the purchase requisition, from electronic catalogs, to payment of the invoice. One of its main advantages is the minimal training required: SAP B2B has a friendly, Internet-enabled user interface tailored to the needs of occasional users.

6.4.3 O&Gas.com

“By using SAP Business-to-Business Procurement to **complement** the existing SAP R/3 Oil and Gas industry solution, the company can enjoy the full advantages of business processing via the Internet.” The goal was to reduce its purchasing costs and to win a significant competitive advantage from fullest use of SAP B2B with SAP Oil & Gas. Statoil processes more than 350,000 invoices annually, and awards over 40,000 contracts. The company expects a considerable improvement in the ratio of invoices to orders as well as a tangible contribution to revenue earnings.

6.4.4 About ICN Group**SIEMENS ICN IB OPTS FOR SAP BUSINESS CONNECTOR**

Siemens ICN IB – a subsidiary of Siemens AG – has a head-count of roughly 1,400 employees, posts annual revenues of DEM 3.5 billion, and is represented in 160 countries across the globe. The company is a strategic partner for network providers and companies operating in the market for IP network solutions. Siemens ICN IB went live with the R/3 System in 1995, and implemented the SAP ITS as an Internet platform together with Siemens Mail and Siemens' Online Business System in mid-1998. The experiences gained were reflected in the company's multi-tier strategy for Internet commerce. This strategy differentiates between three application profiles:

- Partners (customers, suppliers, or sales partners) using ERP systems – either R/3 or non-SAP systems – with high communication and transaction overhead.
- Partners without an ERP system, or using an ERP system but with low communication and transaction overhead.
- Employees without direct R/3 access.

6.4.5 Emergence of the ASP

With its roots in the bureau principles of the pre-server days of computing and outsourcing, the infant ASP industry is growing rapidly (Solution 6, 1999). Under the ASP computing model, business applications are hosted under best business practice and state of the art ERP packages (eg SAP R/3), at a convenient networked computing centre or bureau. The computing centre is operated and maintained by a team of skilled and experienced IT specialists. By allowing the ASP to provide the business applications and take charge for the management and maintenance of the infrastructure, the company can focus on core business competencies and issues.

The IT enablers can be described as Internet-working and server-based computing, with further support from high-speed communications, new networking data security, and systems performance.

Solution 6's ASP hosting ERP solutions

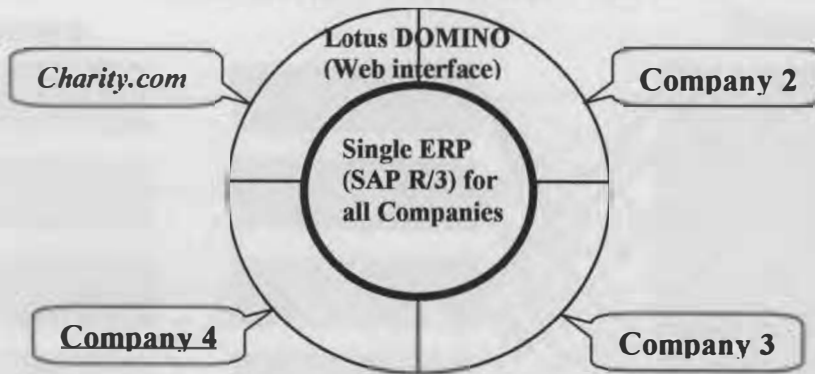


Figure A6a: ASP Model - hosting the ERP solution

6.4.6 Assessment of Scitec Attributes for Global Engineering Network

Key Assets:

- Strong presence in Germany and in many other countries
- Strong information technology base
- Near to implementation of GEN-like system

Key Weakness:

- Relatively strong national orientation
- Management commitment not clear
- Relatively new electronic commerce services division

Source: Timmers, 1999: p.96

6.4.7 Private e-Marketplaces

For most of the year the B2B story has been dominated by the birth of giant public online marketplaces such as Covisint, the automobile parts exchange formed by GM, Ford, Daimler Chrysler and Nissan Renault, and MyAircraft.com, the aerospace marketplace founded by United Technologies, Honeywell, and other avionics players. Yet, even as these exchanges develop, another tribe of online marketplaces has quietly made inroads on their turf: private exchanges.

The Power of Going Private, Edward Robinson (BUSINESS 2.0 21 Nov, 2000). According to *eMarketer*, one-to-many exchanges controlled exclusively by one company are blowing away the many-to-many public exchanges devoted to establishing vast online bazaars with as many players as possible. This year, *eMarketer* projects that private exchanges will process \$172 billion in transaction revenue versus \$13 billion for public marketplaces. For Scitec, "implementing private marketplaces seems to be the right way to go."

6.4.8 Fully personalized web site offers current e-business and more

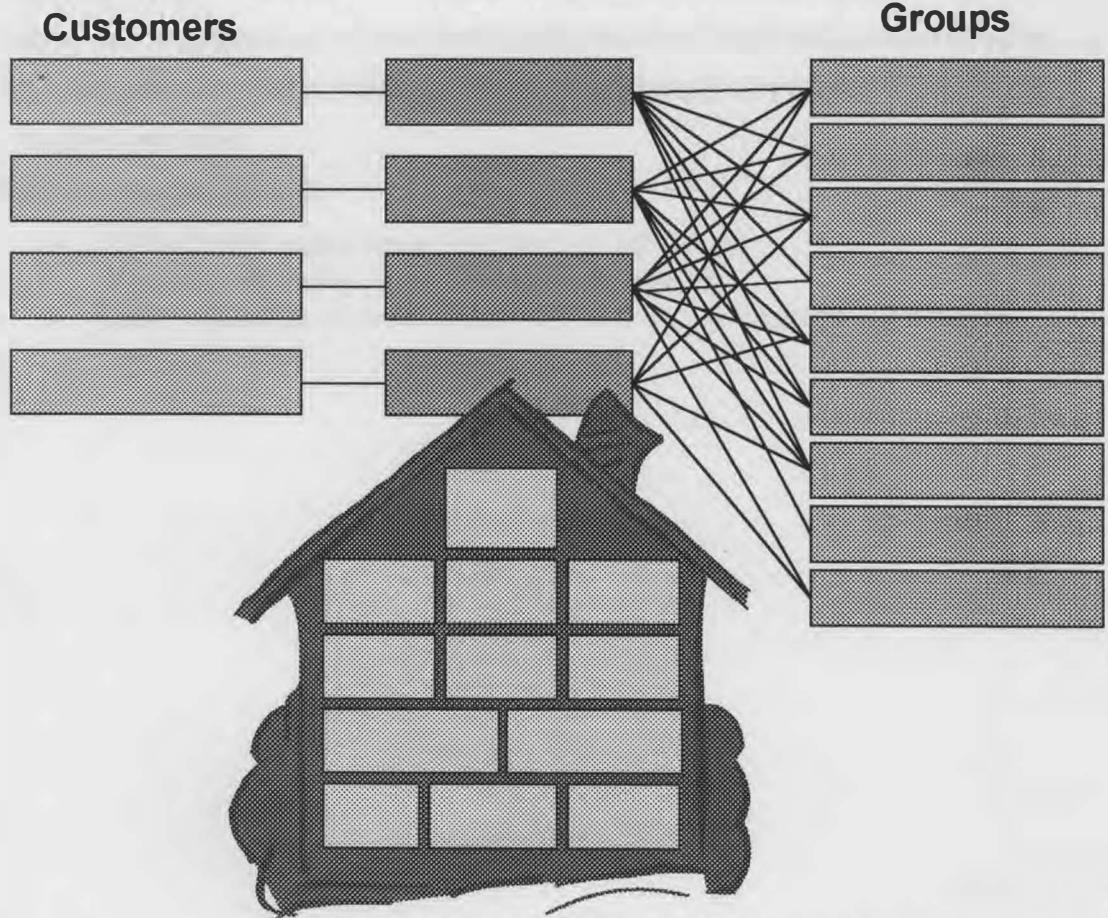


Figure A6b: e-Marketplace Source: Feist, G. and Freese J-M. 2001

APPENDIX 8.1

Siemens e-Business Program: May/2000 to June/2001 Presentation by Freist, G. (2001). Siemens e-Business Program. Presentation at *15th Bled Electronic Commerce Conference*. Bled, Slovenia: University of Maribor.

The Early Days

Freist, G. (2001) slides: s10-11

International business as any other business but more sophisticated ->

even more need for automation, standardization, synchronization ->

more need for e-commerce → utility gains:

efficiency gains - lower purchasing costs, shorter delivery times, reduced inventories, reduced purchasing errors, and lower admin costs eg transaction costs that may shared between partners.

Next wave

Major areas of B2B in international business

- international sales (Siemens 25% of sales)
- internal organization of multinationals (internal logistics, internal sales, ...)
- private market place (value add services strongly supported by e-comm -> higher revenue)

E-business Goals:s-2

- 25% of total sales via e-business (~ 18" Euro)
- 50% of total sales consumer products sales
- Cost reduction of several billion (18 b Euro) through e-business

Siemens e-Business Program 5/2000 to 6/2001

E-business Expected results:How does coordination of Siemens

E-business Goals: s-2

- 25% of total sales via e-business (~ 18" Euro)
- 50% of total sales consumer products sales
- Cost reduction of several billion (18 b Euro) through e-business

E-business Expected results:Increase of

- EVA
- Sales multiples
- Attractiveness for employees

This appears to fit the strategy of VOing

E-business links parts of a company, companies with one another and companies with their customers and partners (24 hours a day, 7 days a week) s-3

Figure 4: Simple e-Business Model for a Single Organisation

Buyer sites and marketplaces

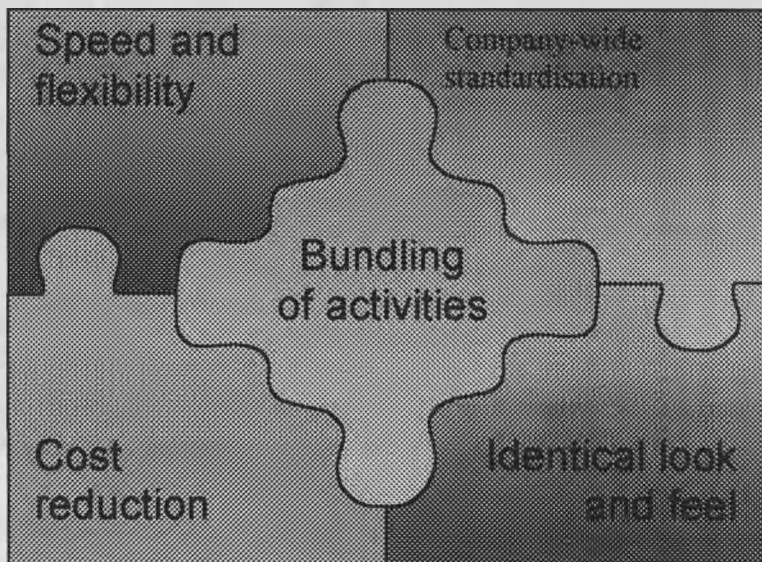
Seller sites and marketplaces

May 1st 2000 Center of E-Excellence

Successful e-business at Siemens will require transforming a fragmented web presence to a company-wide approach s-4

By 1st May 2000 the
Fragmented eBusiness-
landscape in the regions &
groups →

Corporate-approach of
Center of E-Excellence and
access to the Internet for
all employees. Here the
change process is driven by
the "e-community" and the
"Center of E-Excellence"



Constitution of the e-community s-5 Competencies/corporate e-services

- Lead projects & accelerator/programs Controlling/scorecards

Center of E-Excellence Center of E-Excellence - committed to collaborate internally and externally

E-learning – by HR Training, regions and SBS groups E-technology – by Corporate R&D

Marketplace sell – by Regions and groups

Marketplace buy – by Corporate Procurement & Logistics

e-Logistics – by Corporate Logistics (EL)

Center of E-Excellence has a general approach regarding marketplaces (s-7)

- Complete scope and elements of transformation The different models of connectivity and information flow To achieve the benefits for the customers, BUs and regions collaborate in building cross divisional/cross regional marketplaces

Two regional / cross-divisional e-business related projects are running in MSE mandated by the MSE-board. e-MSE and e-utilities are the two lead projects to define the marketplace development process

e-MSE:

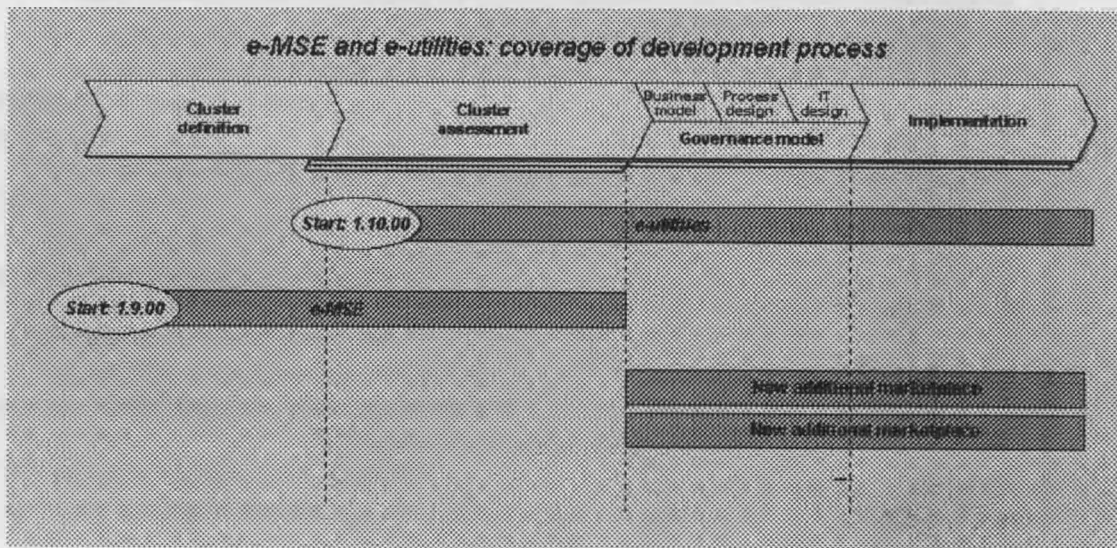
Definition of regional customer-clusters for private marketplaces (including e-readiness evaluation and e-business organization)

e-Utilities:

Cross-border and cross-divisional;

One face to our utilities customers

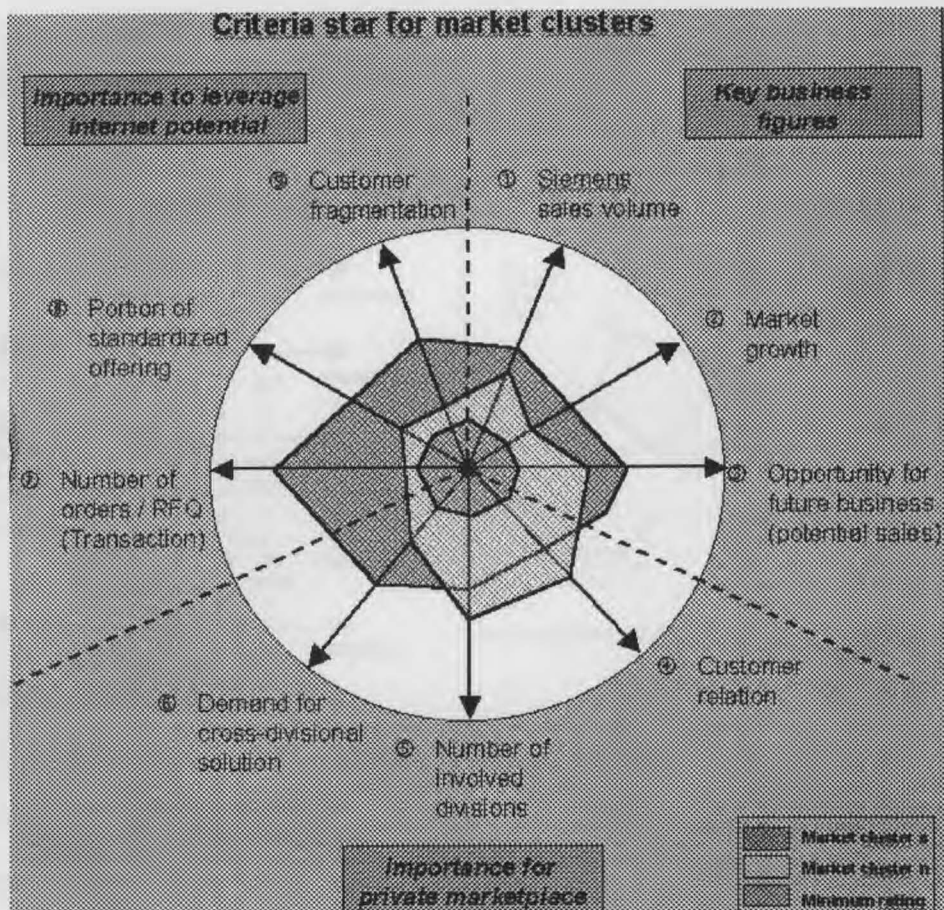
e-MSE and e-utilities are the two lead projects to define the marketplace development process.



Cluster Assessment began 1-10-2000

The process to decide about and implement cross divisional seller sites projects is divided into three phases;

- Definition
- Identification
- Implementation



Based on the country feedback a first set of market clusters are proposed for a more detailed investigation

Criteria star for market cluster:

Key business figures

- ① Siemens sales volume
- ② Market growth
- ③ Opportunity for future business (potential sales)

Importance for the private marketplace

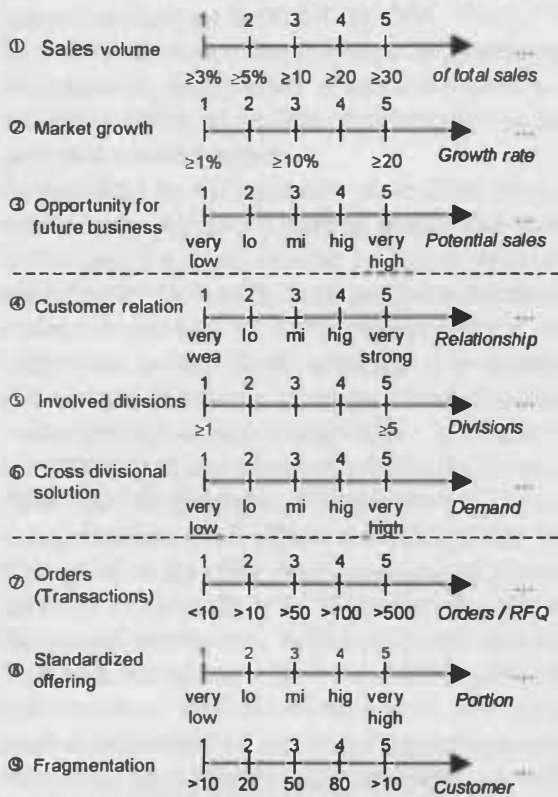
- ④ Customer relation
- ⑤ Number of involved divisions
- ⑥ Demand for cross-divisional solution

Importance to leverage the internet potential

- ⑦ **Number of orders / RFQ (Transaction)**
- ⑧ Portion of standardized offering
- ⑨ Customer fragmentation

For the given country Wholesale, Communication and Healthcare are the most attractive market clusters (Example).

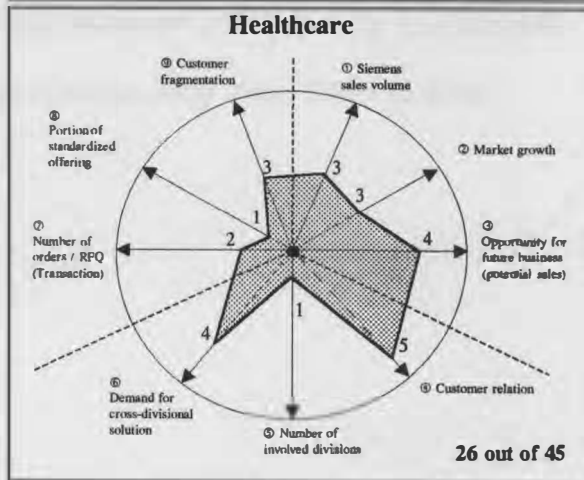
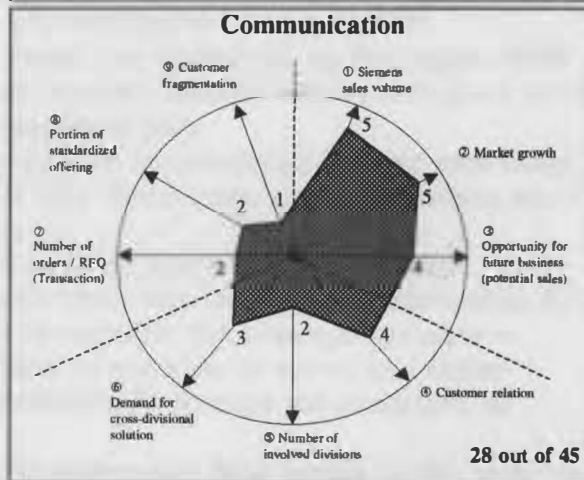
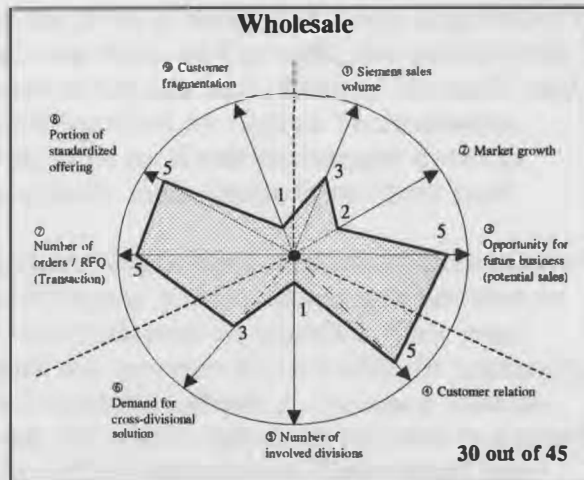
...Assessment / Rating



Total rating of market cluster out of

KEY:

- ① Siemens sales volume
- ② Market growth
- ③ Opportunity for future business (potential sales)
- ④ Customer relation
- ⑤ Number of involved divisions
- ⑥ Demand for cross-divisional solution
- ⑦ Number of orders / RFQ (transactions)
- ⑧ Portion of standardized offering
- ⑨ Customer fragmentation



Private marketplace for utilities

Implementing private marketplaces seems to be the right way to go ...

BUSINESS 2.0 DAILY INSIGHT

November 21, 2000The Power of Going Private

by Edward RobinsonFor most of the year the **B-to-B story** has been dominated by the birth of giant public **online marketplaces** such as Covisint, the automobile parts exchange formed by GM, Ford, DaimlerChrysler and Nissan/ Renault, and MyAircraft.com, the aerospace marketplace founded by United Technologies, Honeywell, and other avionics players. Yet, even as these exchanges develop, another tribe of online marketplaces has quietly made inroads on their turf: **private exchanges.**

According to eMarketer, so-called one-to-many exchanges controlled exclusively by one company are blowing away the many-to-many public exchanges devoted to establishing vast online bazaars with as many players as possible. This year, eMarketer projects that **private exchanges** will process \$172 billion in transaction revenue versus \$13 billion for public marketplaces.**e-flash / January 2001e-utilities is the first accepted leadproject for marketplaces**e-utilities is a cross-divisional Siemens private marketplace for utility companies. The project was initiated by utility companies in Austria who wanted to have a shared communication platform with Siemens; today it is supported by the region MSE (Mid South Europe, 17 countries). France has also committed to participate in this marketplace and other countries are preparing to join.

The goal is to offer our customers a personalized marketplace in their own language and corresponding to their needs. We will offer them news and information about Siemens products, solutions and services.

The marketplace will be a collaboration hub to let participants exchange information and discuss offers and projects while also acting as a discussion forum and a calender to arrange appointments. In addition the concept includes e-learning and travel management. It will also be possible to select and order products, solutions and services. Plans additionally foresee the inclusion of partners and local services.

Thanks to personalized login, requests and orders will flow nearly in the same sales organization as today. The Siemens internal business rules remain unchanged.

Version 1 of e-utilities is planned to be launched on May 30th, 2001 in MSE.

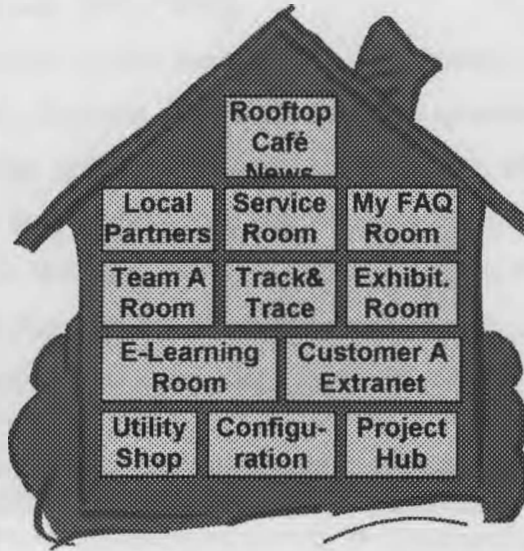
e-Utilities

is one approach to the Customer = B2C Cross divisional and cross regional.

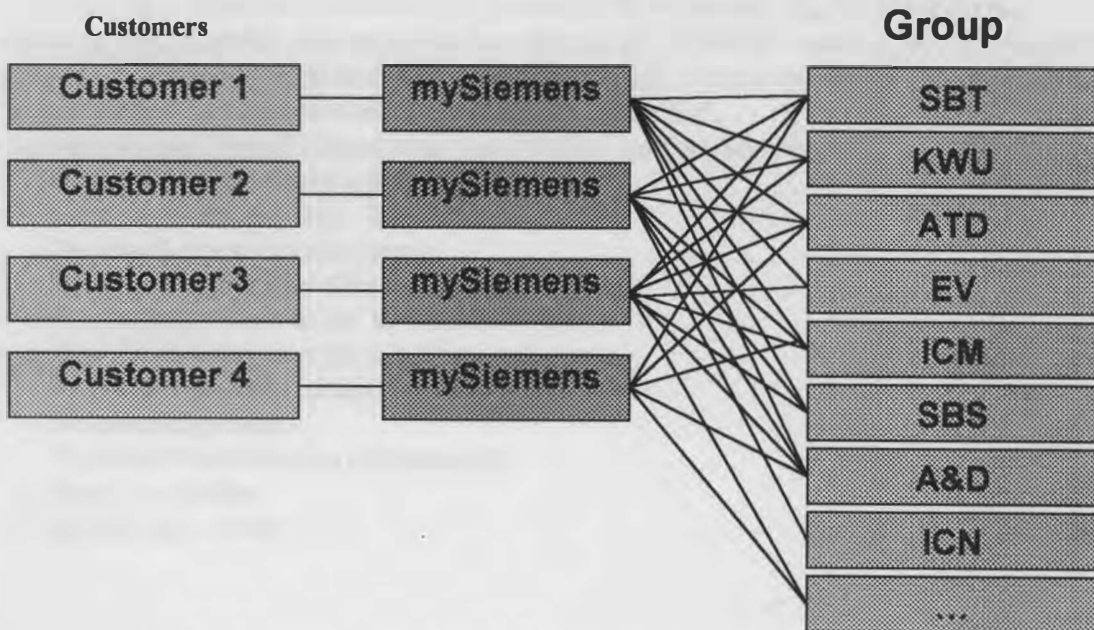
The business model/concept of e-utilities is shown in figure ??

The organization portal mySiemens is a B2B marketplace for the utilities business

mySiemens.com:



Fully personalized web site offers current business and more



The task is to pilot a private marketplace with cross-divisional offering for the customer cluster utilities in MSE.

The Tasks involve: Build a **cross divisional, cross border** private marketplace for **utilities** in MSE countries (bundling the diverse Siemens activities => one face to the customer)

- Improve and intensify the **business relationship** to utilities in Mid- / South Europe
- ·Optimize sales relevant **processes**·Pre Sales Process (information, product configuration, RFP / RFQ)
- ·Sales Process (order management, payment, logistics)
- ·After Sales Process (technical support, customer service, x-CRM)
- ·**Customize** the sales platform **for each client** and **add value** for the customer (e.g. Project hub for development processes, FAQ's, News-Services, Knowledge Management and Learning Tools, Best Practice Sharing Tool)
- ·Build up know how and summarize the major steps, implemented process and lessons learned within a **private marketplace guide** (coordinate with Center of E-Excellence)

Interviews with divisions, key account managers and customers were the basis for selecting standard functionalities **Core (standard) functionality**

Customers → mySiemens.com → Business Units



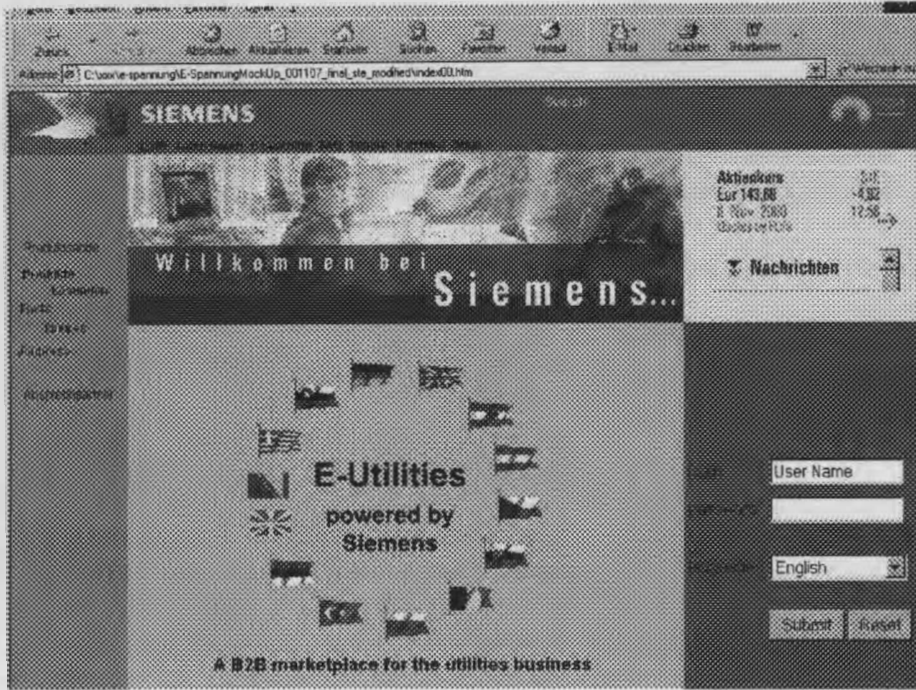
Shopping charts are

projects in a shared environment (possible framework: Agiliencie) Shared documents, Shared communication directory, Product catalog (local, central), Project calendar, Local service offering Through value added services the needed "stickiness" to the marketplace will be achieved.

Services and Portal functions and Value added services:

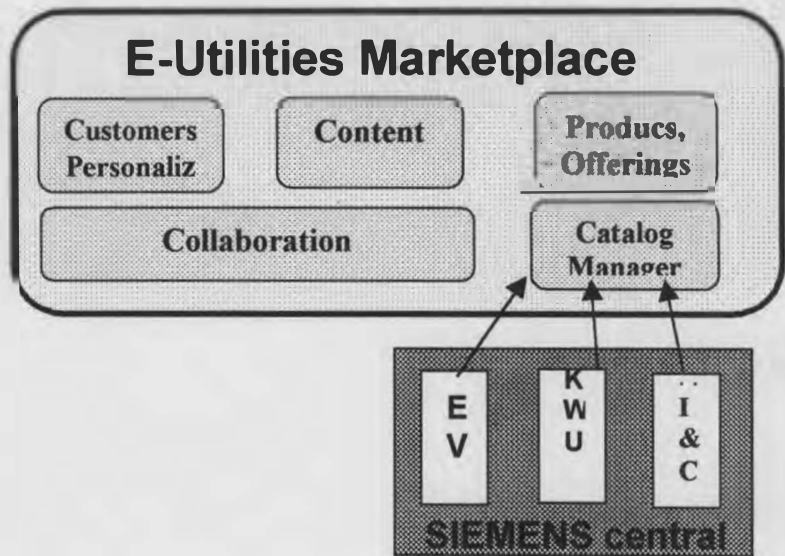
- Commodity product ordering
- Link to Siemens Buy Side Marketplace
- Regional press/news items
- Discussion boards Chatrooms
- Non-competitive links to other portals
- New from Siemens for Utilities column
- FAQs (e-related / utility related)
- E-Learning tools
- Personal bookmarks/comments
- Event calendar
- Exhibition room · ...

E-Utilities Model in Siemens Intranet: - well under way (additional languages are implemented now (Hungarian, French etc)
 - presentation on 11.12.2000 (e-business council)
 - will contain collaboration tool - launch in intranet - to be used as base for discussion and evaluation



e-Utilities: Actors and Interaction Lines

The top down potential of 0,5% cost improvement will be verified through real projects
 Potential targets for marketplaces
 Top down = 0.5% based on total business revenue
 Target estimation from e-Business:
 Buy side: 2%
 Supply chain: 2.5%
 Sell side: 0.5%
 Bottom up = Detailed calculation of potential on concrete project level



Verification through real Siemens business cases within the e-utility project

Project Organisation MSE

<p>Business Model Costs, Goals, EVA, Orgn layout, personel planning</p>	<p>Market/Customer Market analysis, customer requirements</p>	<p>Content Mgmt DBDesign, content creation, manipulation, content providers</p>	<p>IT Archit./Impl HW, SW Tools SW architecture based on standard software/customizing /implementation of web-site, user guide</p>
<p>Governance Model Responsibility, Ownership, Interfaces</p>	<p>Prototype Look & Feel Prototype</p>	<p>Process Design ERP interfacing, EAI, process model, process flow</p>	

“If I would have everything under control ... I would be too slow, ... but speed is nothing without control”

APPENDIX 9.1

Comments on 3rd Research Questions

Key questions answered by ERP consultants:

Q1. Does ERP (SAP) enable or hinder e-Business?

Q2. What facilitates and/or inhibits e-Business success with ERP?

Q3. Does e-Business with ERP fit the strategy of "virtual organising"?

Email : Anton Rossouw - of Solution 6

Telephone: Koos van Rensberg - of Solution 6

Subject: re: Help (Does ERP enable or hinder e-Business?)
To: Colin Ash <c.ash@ecu.edu.au>
Cc: koos.vanrensborg@solution6.com
X-Mailer: Lotus Notes Release 5.0.3 (Intl) 21 March 2000
From: Anton.Rossouw@solution6.com
Date: Fri, 8 Jun 2001 08:54:24 +1000
X-MIMETrack: Serialize by Router on mail/Solution6(Release 5.07a |May 14, 2001) at 08/06/2001 08:54:33

Hi Colin,

It is always my pleasure to try to assist you where I can, so my brief answers (borders on cynical) to your questions are commented below:

Kindest Regards and good luck with the paper!
Anton

Q1. Does ERP (SAP) enable or hinder e-Business?

SAP as an organisation hinders e-business - with reference to the Telstra lawsuit against SAP regarding Mysap.com and Commerce 1. They also have a reputation for being 10 times more expensive to develop a solution than common sense would suggest - trying to be an expert at everything catches up sooner or later. They are an ERP vendor, not an Internet e-business company. Fundamentally their core R/3 software supports supply chains and supports all the master data and transactions to enable e-Business, but other vendors are better at integration and Internet stuff than they are.

Q2. What facilitates and/or inhibits e-Business success with ERP?

The corporate e-Business strategy should be a productivity enhancement tool only, and not a way to pressure suppliers (they do not like that and will not support e-business initiatives under such pressures). The technology is still immature and very-very expensive. Too much time is spent in e-business technology issues as opposed to business policies, collaboration discussions and productivity forums. e-Business vendors ensure that they make huge profits even though the results/intent of their software products are never achieved (they can always blame others).

Q3. Does e-Business with ERP fit the strategy of "virtual organising"?

e-Business and ERP should not be considered as a revolutionary thing striving to change the world - rather just an incremental evolutionary step towards common sense business productivity and efficiency improvement.

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APPENDIX 9.2

O&GAS-MARKETPLACE

Key Findings [After interview with Peter Maier SAP Oil & Gas Industry Business Unit at SAP AG, 20-6-00]

A new cornerstone:

- Real-time collaboration across enterprise boundaries.
- Collaboration from the well head to the jump.
- Internet enabling of the entire supply chain.
- Enabling a collaborative environment through the marketplace.
- The challenge is in the opportunity. (Also, see Krista Bra on "Opportunities before requirements").

Media Release (Jan '00)

SAP AG [Press - Information Centre] Statoil and SAP Team Up to Create First Open Online Marketplace For Oil and Gas Industry Through mySAP.com;
WALLDORF, Germany - Jan. 18, 2000 - SAP AG (NYSE ADR: SAP), the leading provider of inter-enterprise software solutions, today announced that Statoil, the world's second-largest supplier of crude oil, and SAP will co-develop the first open global online marketplace for the oil and gas industry. SAP will provide the infrastructure through mySAP.com;an open collaborative business environment of personalised solutions on demand, and host the marketplace to enable leading oil and gas companies to collaborate and conduct commerce over the Internet. Statoil will include a select number of its suppliers to participate in the pilot of the marketplace. (* Out of date as of May 2000)

* This has now changed to where in May 2000 Statoil joined the first industry "c-Business Marketplace" as defined by Peter Maier (2000)

Company Profile

A group of major oil and gas providers lead by Shell, Chevron, Mobil and now includes Statoil

Interview Data:

1. Enterprise Data

Industry: Oil & Gas Marketplace
May 2000 Implemented: Oil & Gas Marketplace
Employees: sum of many large Oil companies
Customers: State and large companies, and other countries
Partners: Shell, joint ventures
Suppliers:

2. Use of web portal with R/3 signals expected future use - c-Business

Marketplace

A new cornerstone: Real-time collaboration across enterprise boundaries.

4. Effects of Integrating R/3 with the Internet

Benefits: Collaboration from the well head to the pump

Barriers: Some SAP issues - not enough content, what will become of R/3; move to industry portal. Why should we be a trailer of SAP developments. SAP is NOT doing enough.

Maximise benefits: Collaboration between O&G partnerships.

Minimise barriers: It is only with content that you gain a win-win, eg industry catalogues.

Significant IT Players:

SAP / CommerceOne/Ariba/Oracle 80+ e-business applications/quasi marketplace/workflow and B2B/

References:

Maier, P. (2000). Digital marketplaces: The dawning of a new era for the petroleum industry. *Petroleum Economist*. May 2000: www.petroleum-economist.com

APPENDIX 9.3

QUESTIONNAIRE FOR INTERVIEWING MANAGER OF A SAP SITE (2)

Organisation: O&G company

Project: Future of an e-Marketplace for O&G Industry - Upstream or Downstream

(For each *Construct*, circle the most appropriate *Category*)

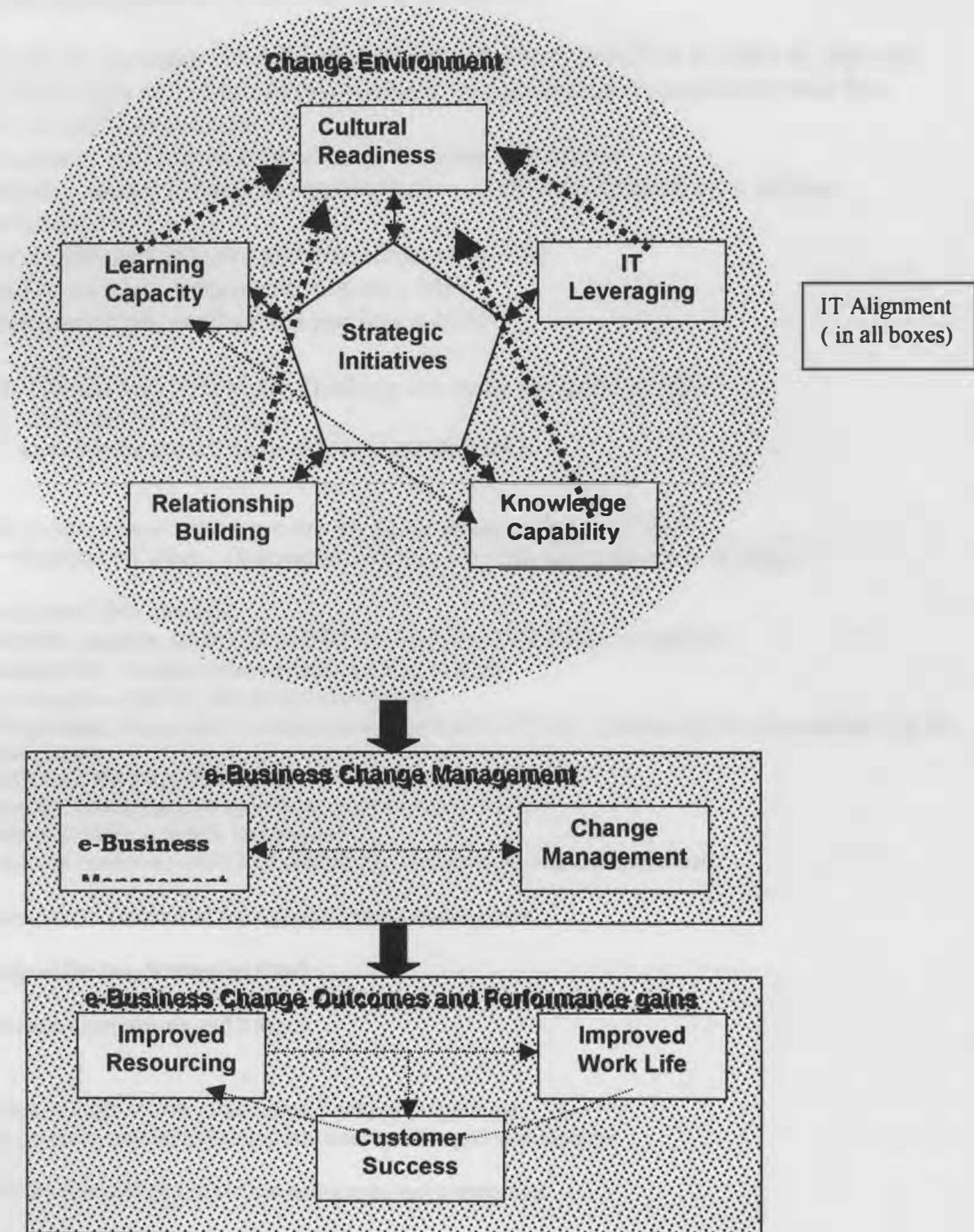


Figure 2: A Theoretical Framework of e-Business Change Management
Adapted from Guha et al, 1997

**Notes recorded at interview at company HQ Stavanger 30 June 2000: 12.15 pm
Mr Ove Tjelka comments 31.07.2000**

The mass market is segmented in a new way..

- They have Internet access
- How do we get them to buy?
- Have they the money/credit to buy?

3 models for marketplaces: – NOT like my 3 examples:

E-Marketplaces are under “invention”, content and structure will be as many as there are business types today and in future that business’ and government’s customers will find productive to establish and use.

The development will follow conventional business dimensions:

-Cross industry neutral products e-marketplaces.office equipment, cars, offices, IT infrastructure +++++

-Customer established industry and cross industry e-MPs

-Single and or multiple Vendor established e-MPs

-Single and or multiple product and services e-MPs

- Type 1. Oil and Gas, Chemical, Banking are really the same as type 1.
- Type 2. Structured B2B eg Siemens
- Type 3. Open buying and selling eg eBay (unstructured B2B)

In the midst of change there is the orgn/l strategy. Is this strategy aligned to CMgt?

B=COPS =>Business = Culture – Organisation – People – Systems alignment and integrasjon!

3 initiatives @ this O&G company:

- Infrastructure, support, process → with R/3 to benchmark across O&G companies.
- Methodology for – bad/good/best; process practice.(1 to 5)
- 8 common areas – describe best practice in a matrix

Best practice: If you don’t document you cannot effect Cultural readiness for the next change, and the next change

What is the BUSINESS FRAMEWORK???

Quality of data; Integration without quality of data is SHIT.

Are we ready (culturally to handle integration?)

Are CRn (cultural readiness) and KMgt (knowledge management) inextricably linked?

We (managers) don’t understand enough about orgn/l development.

Have we aligned the bus. Strategy to CRn?

Overlap between Learning org and KMgt.

CMgt

O&G.com has a CMgt team in place for each project/programme.

The change program must be integrated into the overall orgn/l development.

A reason for the Knowledge worker becoming even more important.

B2B is a driver to understand this (????) complexity of the NEW business world.

-IT has always been a dominant the driver for increased effectiveness and productivity.

-The fact that all off us has to apply to the same way of working...smarter ways of working will continue to come.....leads to progress. The challenge is the knowledge and skill level vs the solution at the time.

Wrong timing is the worst enemy for IT-projekt success...ALL B=COPS elements must be more and more aligned and up-front QA checked before new programs with higher use of IT emerges.

CMgt is now established at O&G.com

- Drivers
- Fundamentals in change
- Too much internal focus
- Too little driven from customer side.

BUSINESS

→ PROCESS

→ BUILD/IMPLEMENT

→ OPERATE/SUPPORT?

Waterfall or segmented activities approach v's concurrent activities approach.

Governance System

What is the orgn/l governance system?

Are we still budget driven/reward system.

Are we research focused?

Are we social/community focused? So life is work and work is life – working life satisfaction.

Further questions (My questions):

- Is B2B a driver for Knowledge Work?
B2B is a driver for new roles, automation, lessor lead time, high quality of information in the business world. What is Knowledge Work?
- Is B2B the domain of the knowledge worker? See above.
- Is B2B a foundation or a first step to ESS, CRM, SCM, and Industry Market Place? B2B is a concept for some, a product for others and to some not any new way of working at all.

APPENDIX 9.4

DATA EXTRACTED FROM CHAPTERS 5 - 8

Codes: I – Integration; D – Differentiation; VP – Value Proposition

1 – Technology; 2 – Products and services; 3 – Business Models

I1

Stage 1 little technology integration across the enterprise.

At stage 2, some two-way flow of information and cross-functional integration of the application portfolio begins.

At stage 3 Integration of technology across the enterprise is extensive.

To be at Stage 5 or above on the SOG-e model, by definition implies at the very least integration of “front-end” and “back-end” office applications and Internet technologies.

e-Commerce Model (KPMG, 1998):

- Integration across the entire organisation is the key to large efficiency gains;
- Perceived that integration with Internet technology can raise the “efficiency curve” (Figure 4.1)

B2C – business-to-consumer by the integration of business administrative processes with Internet mailings and Web orders

Internet integration of their SAP R/3 systems

This global integration strategy by networking the enterprise is viewed as “e-commerce survival”

I1 and I2 for Services

The integration of *Customer's* ERP (SAP R/3) system and (SAP B2B) procurement application to *PCsell's* Web catalogues, automates the e-procurement of all computer products from via the Internet (Dell, 2000).

I2

Integration of Group's products, materials, systems through intelligent links;

e-Mall is an multiple B2B^c Internet marketplace for a group of companies to sell their products and services to their corporate customers.

e-Mall represents a complex case with The Scitec' e-Mall is an Internet marketplace for Scitec' companies to sell their products and services to business customers. The system architecture has the capability to connect/interact with a range of *Buyer* companies SAP R/3 and R/2 systems, and other ERP systems. This demonstrates the integration of e-business applications across multiple ERP systems.

Integration of Scitec Group's materials systems.

I3

As more and more established organisations realise that they need to form alliances with their customers, partners and suppliers over the Internet, e-business integration with ERP systems becomes a critical issue (Gable, 1998; Markus, et al., 2000).

"B2B e-Commerce Integration"

Case 4 In 2000 Dell pioneered its first B2B "e-Commerce Integration" with an established customer company. This case demonstrates a comprehensive approach to inter-enterprise computing. This is example of an integration architecture is made possible through a variety of backend systems and procurement systems.

One of Dell's customers, *Customer.com*, leveraged its existing SAP backend system and SAP business Connector (powered webMethods technology) to communicate directly with Dell's e-business system. The integration between *Customer.com's* SAP ERP and SAP B2B procurement application to its customer Dell catalogue automated the procurement of Dell products via the Internet (Dell, 2000).

"We are beginning to recognise the potential benefits of leveraging our partners' SAP R/3 business processes and functionality through the e-Commerce integration."

Case 4a-b in Chapter 5 represents an exemplar of e-business integration between R/3 and non-R/3 systems.

4.5 Cases 10c and 11: "B2B e-Commerce Integration" demonstrates complementary benefits from the integration of dual e-business implementation model, B2B^C with B2B^S, where the integration of Customer and Supplier ERPs. This case illustrates a first stage system architecture to inter-enterprise computing. In this example, the integration of the system architecture is made possible through a variety of 'back-end', 'sell-side' and 'buy-side' systems.

A case of B2B e-business integration with a global computer supplier and a corporate customer, is used to demonstrate a more complex business interaction model through the networking of ERP systems.

Integration of B2B^C and B2B^S ERP to ERP plus non-ERP to ERP

=====

D1

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 e-commerce. 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.

D1 & I1

IT Affects Business Scope

For *O&Gas and Biotec*, the advantages of SAP B2B Procurement, included;

- realtime integration of the supplier in the external procurement process, freeing purchasing personnel capacity for selecting sources of supply and negotiating contracts freeing resources in the purchasing department for strategic tasks,
- a reduction of static purchasing costs as the procurement process is integrated in an Internet process flow.

D1

Process outsourcing

"Information intensive processes can be outsourced to external specialists" using the ASP computing model (A6.4.5).

In 1998, *Charity.com* Australia announced the first live "online donation facility" Web site. The technology infrastructure for this e-business strategy is made available from an application service provider (ASP). In response to the small and medium size Enterprise (SME) market a new approach to enterprise computing has emerged, the ASP. The solution uses a powerful application server to hosts a single instance of R/3 implemented as standard financials business processes module.

Asset utilisation

The emergence of external providers of standard business processes helps in utilising assets for *Charity.com* Under the ASP computing model, business applications are hosted under best business practice and state of the art ERP packages eg SAP R/3, at a convenient networked computing centre or bureau. The computing centre is operated and maintained by a team of skilled and experienced IT specialists. By allowing the ASP to provide the business applications and take charge for the management and maintenance of the infrastructure, the company can focus on core business competencies and utilizing assets.

Critical Issues

Cost of Ownership The ASP model is especially appropriate for the SME market. Organisations in this market are now able to access enterprise applications without the prohibitive cost, IT skills and management implications. Scarce monetary resources can be applied towards investments for developing core business. Furthermore, SMEs can be serviced by ASP hosted ERP software for a period rental that can be scaled to match business growth. Furthermore, development and training to date can be leveraged to great effect. One such ASP hosted ERP software solution was recently launched in Western Australia by Solution 6 (Figure A6.1).

Extra Issues

Bank.com reports that using external specialists to provide intensive information services without the loss of control, presents many problems for global companies.

IT Alignment for different components

D1 and D2

Distinguish between striving to win new markets or customers and achieving cost reductions (KPMG, 1998):

D2

CSF3: Use information management to differentiate your products and services

PCsell made its Web site more sophisticated to increase corporate usability further. While the masses want an open book to fill with the *PCsell* products of their choice, many repeat-buyer corporate customers can save time by linking quickly to specialized *Premier Pages* tailored specifically to their requirements. On these pages, they find pre-configured systems that fit their recurrent needs. The introduction of *PCsell's Premier Pages* greatly bolstered corporate customers' use of the Web for placing orders, and accelerated their use of *PCsell* products throughout their enterprises.

D3

B2B^c refers to a sub-set of B2B where corporate customers and distributors have access to the organisations order system. B2B^c is differentiated from B2C (business-to-consumer) where the latter infers 'direct' online selling to end-consumers, who have no internal business systems.

Dell differentiates between B2B^c and B2C by focusing its efforts in the B2B^c space that amounts to \$value that is well above the 14:1 (Chap 4).

Case 4 *PCsell's* rise to prominence was based on the Direct (Selling) Model. With no slow-moving indirect distribution channels to impede delivery, customers receive

the very latest technology in their *PCsell* systems. *PCsell* operates on six days of inventory, keeping related costs low. The *PCsell* Direct Model assures customers that no third party will dilute the quality of *PCsell*'s products and services, nor will anyone stand in the way of using modern technology to benefit the user. This has added to the company's brand integrity of reliability of sales and service response, with customerised information spontaneously given away, anytime, anywhere to *Customer.com* employees.

V1

An e-business implementation is from the outset aimed at integrating business processes with external business partners and is built on and supported by the ERP foundation. The main focus of the implementation will therefore be the integration of cross-company value chains using e-business tools (Kalakota 1999). As more and more established organisations realise that they need to form alliances with their customers, partners and suppliers over the Internet, e-business integration with ERP systems becomes a critical issue (Gable, 1998; Markus and Tanis, 2000).

V3

Case 4 In 2000 Dell pioneered its first B2B "e-Commerce Integration" with an established customer company. This case demonstrates a comprehensive approach to inter-enterprise computing. This is example of an integration architecture is made possible through a variety of backend systems and procurement systems.

Conclusions

Back-end and Front-end integration is essential for real savings, where real savings is viewed as the new competitive advantage.

Back-end and front-end integration requires a dual approach:

"inside-out" driven by efficiency gains and cost savings as pioneered by early adopters.

"outside-in" driven by CRM and CRM value propositions along the extended supply chain

Differentiation of products and services is driven by brand identity and integrity

Maximum savings arises from three sources of integration from:

- essential end-to-end integration of technologies, to enable
- exploitation of e-branding with products and services, to maximize
- value propositions along the extended supply chain, with partners

Concluding Remarks from Papers:

Back-end and Front-end integration essential for real efficiency gains

Customer and Supplier savings from 24x7 access to e-catalogues

Managing change is the most important part of successful e-Business implementation through ERP

1. Real Savings from end-to-end integration

Back-end and Front-end integration will require a dual approach:

“inside-out” as pioneered by early adopters

“outside-in” will be driven by CRM and CRM value positions along the extended supply chain

Shift to “private” rather than “open” e-Marketplaces

2. Outcomes and Performance Gains

Improved Customer Response

Reduced cycles from 2 weeks to 2 days

Expanded Customer Base

25% cost savings

Corporate sales increased by 45%

Extended system into e-Procurement

Rated highly on improved quality of work life

3. Change Management

Different approaches to change for different cultures

Different approaches to measurement for different stages of growth

Different approaches to partnership management that includes customer relationship management (CRM) and supplier relationship (SRM) for different private networks.

APPENDIX 9.5

Table A9.5: Target Organisations in Order of B2B Interaction

*#. Case Alias	B2B Sub-class	e-Business Example	No. of Users
1. Society.com	B2C to members	e-Sales for wines sales and services to registered members.	~60 staff
2. Charity.com	B2C to citizens & corporate.com	1 st Australian charity Web site for sales of greetings cards, gifts	~35 employees +30 volunteers
3. Engineer.com	B2B ^E professionals	HR reporting and tracking of skilled contractors	~1100 staff
4. Bank.com	B2B ^E employees	Networking of employees across very large bank	~45,000 bank employees
5. Media.com	B2B ^E employees	Networking of employees across a global media corp.	~33,000 media employees
6. Biotec.com	B2B ^S researchers	B2B procurement of bio-chemicals items as core business.	~240
7. Pharma.com	B2B ^S	B2B procurement of chemicals	~2,000
8. O&Gas.com	B2B ^S , B2B ^E ,	B2B Procurement, and updated by Intranet access to Personnel data	~18,000?
9. Employee.com	B2B ^S , B2B ^E	B2B Procurement with Intranet access to Personnel data	~14,000
10a Comptec.com (cross-divisional)	B2B ^C	e-Store across a global network of divisions, within a conglomerate	~11,000
10b Comptec.com business networks	B2B ^C	e-Mall of 3 e-Store divisions across a global network	~11,000
10c Comptec.com (linked to) SAP.com	B2B ^C with B2B ^S	Private e-marketplace- order request system integrated with SAP procurement system	~11,000 22,000
11. PCsell.com with Customer.com	B2B ^C with B2B ^S	Customised online sales integrated with customers MRO procurement	~27,000 ~14,000

*11 Cases representing 9 industries, ordered by increasing level of B2B interaction

All eleven cases are mapped against the project selection criteria updated from Guha, et al (1997) study of "business process change". The key criterion was changed from a 'cross-functional' to an 'inter-organisational' focus. Therefore the eleven cases are exhibited in Table 3, by ascending order of B2B interaction. This ranking is based on the findings developed in the second stage of the study.