

December 2002

E-Business Transformation through Effective Enterprise Resource Management

Janice Burn
Edith Cowan University

Colin Ash
Edith Cowan University

Follow this and additional works at: <http://aisel.aisnet.org/acis2002>

Recommended Citation

Burn, Janice and Ash, Colin, "E-Business Transformation through Effective Enterprise Resource Management" (2002). *ACIS 2002 Proceedings*. 25.
<http://aisel.aisnet.org/acis2002/25>

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

E-Business Transformation Through Effective Enterprise Resource Management

Janice M. Burn

Colin G. Ash

School of Management Information Systems
Edith Cowan University
Perth, Western Australia
j.burn@ecu.edu.au

Abstract

This paper reports on research carried out in 1999-2001 on the use of e-Business applications in ERP-based organisations. Multiple structured interviews were used to collect data on ten established organisations from a diverse range of industries. The findings are analysed according to the level of sophistication of e-Business models and their transformational impact on the organisation. Early adopters of e-Business show a trend towards cost reductions and administrative efficiencies from procurement and self-service applications used by customers and employees. More mature users focus on strategic advantage and generate this through an evolutionary model of organisational change. A complex case study of e-Business integration with a global supplier and their corporate customers is analysed to identify specific stages of benefits accrual through the e-Business transformation process. Collectively the set of case studies is used to demonstrate the increased benefits derived from an e-Business architecture based on a network of ERP enabled organisations.

Keywords

E-Business benefits, B2B interaction models, e-ERP implementation, Organisational transformation and change

INTRODUCTION

The early adopters of e-Business applications typically focused on improved efficiencies, realising the benefits from procurement, and self-service applications. As organisations mature in their use of e-Technologies so benefits arise from applications that focus on improved services internally and externally. Internet technologies offer an ERP based organisation the opportunity to build interactive relationships with its business partners, by improved efficiencies and extended reach, at a very low cost (Hesterbrink, 1999; Larsen, 2000). Organisations that fail to seize this opportunity become vulnerable as rivals establish themselves first in the electronic marketplace. They may eventually be forced to participate in e-Business by competitors, customers or consumers.

This paper reports on the findings from a longitudinal study of ERP enabled organisations that pioneered the use of e-Business applications. The research was carried out between 1999-2001 through semi-structured interviews. The objective was to identify the benefits and problems encountered by the early adopters of e-Business applications with ERP (e-ERP) according to a set of business-to-business (B2B) interaction models. The findings are analysed according to the level of sophistication of B2B interaction. A case study of B2B e-Business integration with a global company and their corporate customers is used to demonstrate a more complex business interaction model, supported by a network of ERP systems. Collectively the cases show that added benefits arise from an increased level of sophistication of B2B interaction, but are only fully realised when adequate attention is given to organisational transformation and the management of change.

E-ERP IMPLEMENTATIONS

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 and Robinson, 1999). An ERP implementation has a defined lifecycle, typically 12-24 months depending on the scope and other parameters (Blain, 1999). After the initial implementation, upgrade and functional enhancement projects follow in irregular intervals. E-Business implementations need to be significantly faster than initial ERP implementations (Hesterbrink, 1999). However it can be expected that these activities will continue on an ongoing basis to accommodate changing relationships with business partners and enhanced functional and technical scope of existing relationships.

The importance of combining ERP packages with the Internet has a two-way benefit and return on investment. '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' (Tellegen, 1996). The coupling 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).

Although these technologies have distinctly different functions, integrated they offer a sound infrastructure for doing e-Business (Venkatraman and Henderson, 1998). Here e-Business means "making the key business processes of an organisation available over the Internet" (Boey *et al.*, 1999:1). In general, it is about electronic interactions between organisations. Although simple, this definition nevertheless incorporates some subtle but key points about e-Business applications with ERP systems.

The study took place over a two year period and covered 10 organisations worldwide, with at least two face-to-face interviews with several interviewees from each organisation supported by document analysis, telephone calls, emails and web searches. All cases showed that a staged pattern of change was the preferred transition route to e-Business. The early adopters of e-Business applications show an initial trend towards realising the benefits from procurement, and self-service applications. Two case studies of B2B e-Business integration with global companies and their customers are used to demonstrate a more complex business interaction model, supported by a network of ERP systems. Collectively the cases show that added benefits arise from an increased level of sophistication of B2B interaction but may not be realised if sound change management principles and processes are not observed.

SELECTION OF CASES

"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, (2) the project team, (3) the project (Yin, 1989; Eisenhardt, 1989). 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 homogeneous set of projects (having similar initiatives) with variance across cases on the outcome measures – cost, responsiveness, flexibility, satisfaction, shareholder value, and other e-Business metrics – was required. This enabled 'theoretical' replication with contradictory results in order to examine any differences that might exist in antecedents (Yin, 1989). In each case a senior IT project manager was contacted for the purpose of conducting the initial interview. This also identified other managers, team members and users for interview.

The primary questions for the interview are summarised in Table 1. However, it should be noted that the researchers used a structured interview format based on an existing model of e-Business change management (Guha *et al.*, 1997).

Question	Data Collection Instrument	Data Analysis
a. How do organisations maximise the benefits from e-Business projects?	Semi-structured 1st interview questionnaire; used Nov-Dec 1999	Match case content of each e-Business project against B2B interaction.

Question	Data Collection Instrument	Data Analysis
b. What is the nature of Business models induced by e-Business?	Project correspondence with project managers and consultants	Content analysis of qualitative data. Cross-case analysis of benefits to determine the components.
c. Does the increase in B2B interaction deliver increased benefits from e-Business?	Public and private company documents; June 1999 - June 2001 2nd interview June/ July 2000	Rate the level of benefits against the increased level of B2B interaction

Table 1: Research Questions Matrix

Table 2 summarise the profiles of the case organisations that participated in the study. The findings are presented by the categories of the three interactive business models summarised as:

- Business-to-employee (B2E) – to harness the flow/ sharing of corporate information, via intranets.
- Business-to-consumer (B2C) – to access a 24x7 global consumer base, via the web.
- Business-to-Business (B2BS and B2BC) – to support supply chain management between partner organisations. B2BS and B2BC refer to a sub-set of B2B where suppliers and corporate customers and distributors respectively have access to the organisations system.

Within each classification the case findings are presented in order of increasing e-Business application sophistication.

**Case Alias	B2E Interaction	Employees	e-Business Project Title	No. of Users
1. Engineer.com	Intranet access to	Managers & engineers	"Employee Tracking Intranet"	~1100 staff
2. Bank.com	ERP	All employees	"Employee Networking"	~40,000 bank employees
	B2C Interaction	Consumers		
3. Society.com	Internet access to ERP	Members	Online Ordering by Members	~60 staff
4. Charity.com	Internet access to ERP by ASP	Citizens & corporate	1st Charity website	~35 employees + 30 volunteers
	B2B Interaction	B2B models		
5. Biotec.com	ERP to supplier catalogues	B2B ^S	Staff research procurement	~240 researchers
6. Pharma.com		B2B ^S	Sales Order and Rapid Delivery	~22,000
7. Media.com		B2E, B2B ^S	Simple Ordering e-Catalogue	~28,000
8. O&Gas.com	And some Intranet access to ERP data	B2E, B2B ^S	Staff travel procurement	~18,000
9. Employee.gov		B2B ^S , B2E	Simple Ordering e-Catalogue	~14,000
10. Comptec.com (cross-divisional)	ERP to customers	B2B ^C	Order Request System extended to an e-Mall of 3 companies	~11,000

Table 2: Profile of Business-to- Cases

CASE FINDINGS

Findings for B2E Cases

The cases profiled in Table 3 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 employee to corporate data 24x7. Typically, it represents the earliest stage of e-ERP implementations. Motivation for these developments is cost and efficiency based offering significant benefits from networking employees. The cases are presented in order of increasing e-ERP sophistication but decreasing information management and reporting.

B2E Interaction (level)	*Case Alias	B2E	E-Business example	No. of Users
Intranet access	1. Engineer.com	Managers, engineers	Mgt reporting and tracking of skilled contractors	~1 100 staff
to ERP	2. Bank.com	All employees	Networking of employees across very large bank	~40,000 bank employees

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

Table 3: Business-to-employees (B2E) Cases

B2E Employee Self Service for an improved quality of work life:

Two large established organisations in different industries implemented organisational intranets that combined with their SAP R/3 business processes. These solutions were easy to deploy while offering significant benefits from networking employees and the management of corporate information.

Bank.com implemented the SAP Internet solution for internal address management. It covers all organisational information within the bank and is the most-used web application, available for all 45,000 employees, with 300,000 transaction calls per day. It implemented its own Intranet integrated with R/3 to facilitate the networking of the staff in preparation of e-Business. 'This is a generic office management solution, not a Banking industry solution, to save time and paper for the distribution of staff information'. It offers transparent access to important policy manuals and procedure documents across all departments. 'It also offers collective use of many functions' (Perez *et al.*, 1999:49).

Engineer.com staff developed an in-house web initiative that allows 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 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. It has been expanded to include a computer hardware tracking system.

To maximise the benefits:

- A recognition that the inspiration of employee self-service applications comes from key users.
- This requires concerted corporate focus.
- A recognition to create the Intranet system as a 'learning system'.
- Managers and IT staff must learn together (fast) to seek new business models.

To minimise the barriers:

- The design of an intranet interface has to accommodate the least trained employees.
- The design of the web interface must enable users to be more efficient than by other means.

In summary by allowing employees appropriate access to core systems:

- (i) The managers in the *Engineer.com* case were able to reduce costs.
- (ii) The employees in the *Bank.com* case were able to benefit from efficient service.
- (iii) In both cases the e-Business applications offers collective use of many functions or "shared services" across certain groups (Perez *et al.*, 1999:49).

Finally, in maximising the benefits and minimising the barriers, stimulating employee self-service is critical.

Findings from B2C Cases

The cases profiled in Table 4 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-Business 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.

B2c Interaction	*Case Alias	Consumers	e-Business example	No. of Users
Internet access to ERP	3. Society.com	Members	e-Shopfront for wines sales and services to registered members.	~60 staff
Internet access to ERP by ASP	4. Charity.com	Citizens & corporate	1 st Australian charity website for sales of greetings cards etc.	~35 employees + 30 volunteers

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

Table 4: Business-to-consumer (B2C) Cases

B2C Online Store for improved access to customised products and services

Using SAP's suite of e-Business applications, *Society.com* 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. From the 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.

During 1999-2000 *Charity.org* an Australian division of a global organisation pioneered a B2C 'Online Donations Facility'. This was achieved by outsourcing its total IT support, to an "application service provider" (ASP). This infrastructure provided a fully integrated business administrative solution for the organisation's existing website, for the online sales of gift cards. It allowed for an improved product range (online), and a new business image. However problems still remained such as 'how do we let people know we have a web presence?' Some technical issues also affect the matching of business processes with ERP.

To maximise benefits:

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

To minimise barriers:

- Tackle all unresolved basic business issues (inefficient and ineffective processes within the e-Business system); for example, 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.
- Communication between branches is an issue and must be addressed.
- Empower staff in customer care.

In summary by allowing consumers appropriate access to core systems:

- (i) *Charity.com* was able to reduce costs in its business administration 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 *Charity.com* case were able to benefit from efficient service.
- (iv) In both cases the e-Business applications offers collective use of many functions or “shared services” across certain groups (Perez *et al.*, 1999:49).

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

Findings for B2B (B2B^s and B2B^c) Cases

The cases profiled in Table 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’. Typically it represents a second stage of an e-Business implementation. The motivation for these developments or business driver is cost reductions and efficiency gains but also improved service and product image, from B2B^s interaction. The cases are presented in order of increasing e-Business sophistication and integration with B2E.

B2B Interaction (level)	*Case Alias	B2B models	e-Business example	No. of Users
ERP to supplier catalogues, access through	5. Biotec.com,	B2B ^s	e-Procurement of bio-chemicals and pharmaceutical items for core business	~240 researchers
	6. Pharma.com	B2B ^s		~22,000
Intranet to ERP	7. O&Gas.com	B2E, B2B ^s	e-Procurement as first stage of B2Bs and e-Marketplace	~18,000
	8. Media.com	B2B ^s , B2E	e-Procurement as first stage of global e-Business	~28,000
	9. Employee.gov	B2B ^s , B2E	e-Procurement + HR timesheets	~14,000

* 5 Cases representing 4 industries, ordered by increasing level of B2B^s interaction with B2E

Table 5: Business-to-Supplier B2B^s

B2B^s e-Procurement for Shorter lead times and Lower costs: The cases in Table 5 are implementations of desktop procurement system designed for the non-professional procurement staff (Segev and Gebauer, 2001). The focus is an indirect procurement function that includes maintenance, repair, and operating supplies. It brings into play the issue of employee self service that includes retraining for this change in roles.

With a B2B Procurement e-Business solution, *Biotec* reported that ‘lead times to fill an order were shaved down from four to just one day – from the point in time when an employee identifies an order, to actual delivery.’ Having achieved shorter lead times, *Biotec* no longer needs to keep large stocks of materials, so expenditures are down and cash flow is healthier. Indeed, the company expects to save between 10% and 15% on the cost of purchasing materials.

Another goal of the business-to-business project was to build more long-term links with preferred vendors. So far, *Biotec* has identified three such vendors. Their Internet sites were linked into the e-Procurement system, allowing *Biotec* staff 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.

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 a further five percent (15% overall). But the benefits are by no means all one-sided. B2B Procurement gives vendors plenty of opportunities, such as direct ordering. All three companies believe future benefits will come from industry portals, e.g. Chemicals, Oil and Gas marketplaces.

The B2B procurement software enabled *O&Gas.com* the world's largest supplier of crude oil to reduce its purchasing costs and gain an important competitive advantage. *O&Gas* 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. The system will allow approximately 18,000 *O&Gas* employees direct access to Internet catalogues from which they can select material as they require it, freeing resources in the oil concern's purchasing department for more strategic tasks.

A leader in media sales and services world wide, *Media.com* implemented e-Business Internet solutions to enable it to further leverage its investment in its ERP system by extending the functionality of the system to casual users. This global integration strategy by networking the enterprise is viewed as 'e-Business 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 user communities.

A major recruitment and employee services company, *Employee.com* implemented a full e-Business 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 purchasing solution, 'expect to realise considerable cost savings in our purchasing and human resources organisations over the next several years.' It aimed to reduce administration tasks and paper flows (e.g., filling in forms, distribution of management information). While this functionality was provided employee distrust of the system severely limited the benefits.

To maximise the benefits:

- Roll-out of the e-Business solutions needs to be achieved very quickly for ROI.
- There needs to be full cooperation between industry partners. Increase the availability of supplier catalogues and improve collaboration between suppliers, to standardise item numbers in catalogues. 'It is only with content that you gain a win-win', e.g. industry catalogues. This implies the importance of the B2B value chain.

Finally, to make use of B2B industry portal requires 'organisational culture readiness'.

To minimise the barriers:

- The procurement applications need to be much more user friendly. Easier linking of ERP data to Internet with a greater variety of BAPIs. 'We need to understand the environmental factors including IT infrastructure.'
- Corporate paranoia is in the minds of managers and consultants. Change management needs to be addressed and practiced; for example, employee resistance to change was scarcely mentioned. Most suggestions were concerned with technical or practical issues.

In the future, all four organisations believe their ERP technology will play an integral part in helping these established enterprises build and operate online business-to-business models. In particular, the B2B e-Procurement developments could lead to industry specific or private e-Marketplaces. This appears to have been provoked by an IT driven project mindset.

In summary by allowing employees appropriate access to purchasing systems:

- (i) Biotec and O&Gas were able to reduce costs in purchasing and lower inventory through; standardised catalogues, standardised vendor interfaces, open catalogue interface will enable sharing of profits between companies and their preferred vendors.
- (ii) O&Gas procuremet solutions enabled the organisations to benefit from revenue generation.
- (iii) In all cases the e-ERP solutions enabled the organisations to benefit from process improvement.
- (iv) The employees in all cases were able to benefit from efficient service.

- (v) In all cases the e-Procurement applications offered collective use of many functions or “shared services” across groups.

Finally, the cases represent a new approach towards cost reductions for all partners. In maximising the benefits and minimising the barriers, the focus has moved beyond harnessing employee self-service issues to major change in the quality of work life.

Findings for B2B^C Cases

The cases profiled in Table 6 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 website, eg SAP’s Online Store. It represents a second or third stage of an e-Business implementation. The motivation for these developments or business driver is optimisation of order processes, cost reductions and customisation of products and services.

B2B Interaction (level)	*Case Alias	B2B Sub-class	e-Business example	No. of Users
ERP to customers	10a. Comptec.com (cross-divisional)	B2B ^C	e-Sales across a global network of divisions, within a conglomerate	~11000
Multiple ERP to customers	10b. Comptec.com plus 2 Divisions	B2B ^C	e-Mall of 3 e-Sales divisions across a global network	~11000

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

Table 6: Business-to-Customers B2B^C

Comptec has its own ERP solutions for sell-side systems: The Order and Request System (ORS) was developed by the parent company’s Business Services group (SBS), and has been deployed in eight European countries. The system was developed to optimise processes between *Comptec* and other divisions and institutional customers.

Comptec’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 ERP system. To make ordering faster and more secure, partners now submit their orders to *Comptec* electronically via the Internet. During the main periods of access from 11 am to 4 pm, an average of one sales order with 6.5 items is received every 30 seconds and an average of 600 order tracking requests. In parallel to its release at *Comptec* in Germany, the ORS was rolled out on an international scale. Initially it was deployed in England, France, and Italy, and in 2000 Austria, Belgium, Spain and Switzerland followed.

B2B^C Interaction divisional for improved sales efficiency and reliability, and customer services For *Comptec.com*, the effect of integrating ERP systems with the Internet greatly improved efficiency aspects of B2Bc sales side. 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 the data.

IT was the main driver in this “sell-side” B2B implementation. 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; 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 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.
- News channel; Notification of events, as chosen by the customer.

A summary of complementary benefits for Comptec and a partner company is shown in Table 7.

Comptec Benefits	Partner Benefits
Presentation of configurable products on the Internet Ordering times optimised through online connection Incorrect orders reduced to minimum Shorter and therefore faster ordering times Customer information management	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

Table 7: Integrated Enterprise Systems Benefits Scorecard

E-Mall as B2C Interaction of a Seller Group with Customers

‘e-Mall’ is an Internet marketplace for a group of companies to sell their products and services to their business customers. The system architecture has the capability to connect and interact with a range of *Buyer* companies’ ERP systems. By June 2000, the company’s e-Mall had progressed to version 2 with three companies; *Comptec*, *AutoParts*, *Medical*. The intended 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.
- “One face” to the customer.
- Sales presence 24x7 worldwide.
- Empower customers when ordering from efficiency to effectiveness using visual power of computer graphics and the power of the web.
- Empowering customers (members) through the development of an e-Community.

In maximising the benefits and minimising the barriers, the focus has moved beyond customer self-service issues to customer care.

Findings for B2B^s and B2B^c Integration between a Supplier and Customer’s ERP

The cases profiled in Table 8 demonstrate the integration of two e-Business applications. This category of application links a supplier’s ‘sell-side’ application and customer’s ‘buy-side’ application with ERP via the Internet, e.g. SAP ‘Online Store’ with SAP ‘B2B Procurement’. It represents a mature stage of an e-Business implementation. The motivation for these developments or business driver is cost reductions and customised products from B2Bc interaction. The case represents a simple form of a private e-Marketplace.

Case Alias	Size	Country	B2B Sub-class	Project Title	Users
10c. Comptec.com (linked to) SAP.com	Global Large	Netherlands Germany	B2B ^s with B2S	Order Request System integration with ERP B2B Procurement	~40,000

Key: Small < 100, Medium < 1000, Large (national), Global (multi-national)

Table 8: A Case Study of B2Bs with B2Bc

B2B Integration of ERP between two Organisations for Complementary Benefits

SAP and *Comptec* have been conducting e-Business since December 1999 in a point-to-point Internet buying and selling solution. They have implemented an all-SAP sell-side system called Order & Request System (ORS) that is based on the SAP ‘Online Store’ Internet application components (IAC) with extensions. The solution links the SAP B2B Procurement solution to *Comptec*’s ORS via the Internet; the implementation of the Order and Request System is realised through *Comptec*’s Business Services.

The performance gains for e-Procurement were achieved from two sources; 25% cost savings, and reduced cycle time from 2 weeks to 2 days, and access to (real-time) customer

data via ERP technology. The project enabled efficiency gains from minimising of delays in customer orders, and effectiveness gains from optimising employee/ staff time. For example; fewer complaints, improved management of the customer, increase to 50% with online orders (sales), and a growth in corporate sale of 45%. Also, online access to real-time data for deciding on the optimal employee orders. The cost savings through operational efficiencies of all equipment resourcing, compare favourably to those cost savings (efficiencies) in other e-Procurement case studies. In the *Biotec* case study, the gains appear to be less; 20% cost savings, and reduced cycle time from 2 weeks to 4 days. However, improvements for staff 'quality of work life' appear the same.

In maximising the benefits and minimising the barriers, the focus has move 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.

SUMMARY 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 increased level of e-Business interaction as shown in Table 9. The table is used to identify only those cases that were observed to have realised some benefit. For example, within the B2B^S model, employees of *Biotec* (5) and *O&Gas* (6) reported an improvement in the quality of work life, where as employees of *Employee.com* (1) were frustrated by their new systems. In this example, the power of complementary benefits is easily demonstrated. While both companies (5) 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 1, 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 *Employee.com*. Similar complementary benefits were found to exist in all classes of B2B models.

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

Table 9: B2B Benefits Scorecard with e-Business Integration

To realise the greatest benefits the following critical factors were found to apply. Maximise the quality of the web interface from the end-user's perspective, formalise an agreement with partners on a common IT platform, standardise purchasing agreements with suppliers, and communicate the business strategy to employees.

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

- Empower customers with more effective and efficient ordering processes using the more visual and immediate power of the web.
- Empower customers through the development of an e-Community.
- Empower employees with decision-making skills.

Figure 1 is developed as a conceptual model to bring together the key elements and their relationships of this study into e-Business transformation. This model illustrates how change in industry practices and e-ERP developments relate to B2E, B2C and the B2B models. 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.

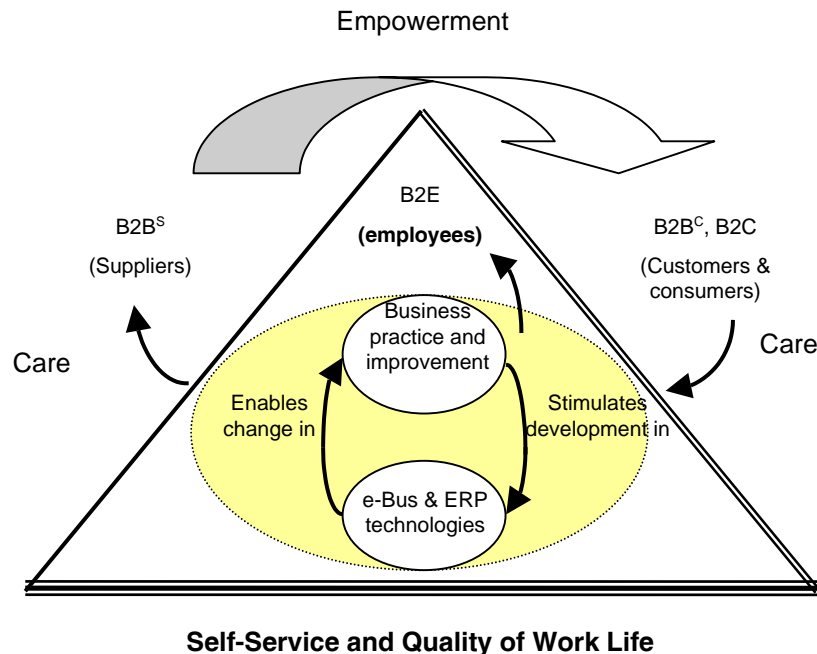


Figure 1: The Benefits Cycle from Staged Growth of e-Business

CONCLUSIONS

The early adopters of e-Business applications show a trend towards realising benefits from e-Procurement and self-service applications, for customers and employees. To maximise the benefits from these types of applications, employee involvement is essential. Combined, these applications offer use of many functions and shared services across operational and administrative groups. All this relies heavily on employee self-service and leads towards new work roles.

Standardisation of both business processes and vendor catalogues is a way to drive cost reductions in supply chain management. This in turn improves services and leads to more effective customer and supplier relationships. 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 emphasise the synergistic benefit stream from B2B e-Business integration of the B2B interaction models. The study is used to emphasise the synergistic benefit stream from B2B integration and the interaction of inter-organisation e-Business solutions. Collectively the cases demonstrate that greater benefits flow from increased levels of e-Business interaction.

Many organisations have begun to undertake e-Business initiatives to meet strategic goals. They recognise, however, that they will only accomplish their objectives through people. This emphasises the need to place increasing 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. A candidate model for future research on e-Business implementations with ERP is proposed as a B2B

interaction model (Figure 1). In this model, the realisation of complementary benefits for all business partners is viewed as necessary and sufficient measure of success.

The overall findings from the set of e-Business cases demonstrate that three stages of the business interaction model (B2E, B2C 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). Managing the transformation process through several stages of e-Business process change is critical for success.

REFERENCES

- Blain, J. (1999) Special Edition: Using SAP R/3 (2nd/3rd Edition). ASAP World Consultancy, Que Corporation. Chapter 23 : 502-527
- Boey, P. Grasso, M. Sabatino, G. Sayeed, I. (1999). Architecting e-Business Solutions. Vol II No 7 <http://www.cutter.com/consortium/freestuff/dcar9907.html>
- Eisenhardt, K. (1989) Building Theories from Case Study Research. *Academy of Management Review*, 14, 4, 532-550.
- Fan, M. Stallaert, J. Whinston, A.B. (2000) The adoption and design methodologies of component-based enterprise systems. *European Journal of Information Systems* No 9; 25-35
- Guha, S. Grover, V. Kettinger, W.J. Eng, J.T.C. (1997) Business Process Change and Organisational Performance: Exploring an Antecedent Model. *Journal of Management Information Systems*, Vol. 14, 1, 119-154.
- Hesterbrink, C. (1999) e-Business and ERP: Bringing two Paradigms together. PriceWaterhouse Coopers, September, 1999. <http://www.pwc.au/>
- Kalakota, R. Robinson, M. (1999) e-Business: Roadmap for Success Addison-Wesley Longman, USA
- Larsen, C. (2000) Fusing of e-Business and ERP. SAP America. <http://www.sap.com/>
- Manville, B. (1997) in Malhotra, Y. "Knowledge Management for the New World of Business". <http://www.brint.com/km/whatis.htm>
- Markus, M. L., Axline, S., Petrie, D. and Tanis, C. (2000) Learning from Adopters' Experiences with ERP: problems encountered and success achieved. *Journal of Information Technology*, 15, 4, 245-265.
- Perez M, Hantusch T, Matzke B, (1999) The Sap R/3 System on the Internet, Addison-Wesley, Reading, MA
- Segev, A. Gebauer, J. (2001) B2B Procurement and Market Transformation. *Information Technology and Management*, Kluwer Academic, Netherlands, 2; 242-260
- Telleen, S.L., (1996) Intranets and Adaptive Innovation. <http://www.amdahl.com/doc/products/bsg/intra/adapt.html>
- Venkatraman, N. and Henderson, J.C. (1998) Real strategies for Virtual Organising. *Sloan Management Review*, Fall '98; 33-48
- Yin, R. K. (1989) *Case Study Research: Design and Methods*, 2nd Edn. Newbury Park, CA: Sage Publications.

COPYRIGHT

Burn, J.M. Ash, C.G. © 2002. The authors assign to ACIS and educational and non-profit institutions a non-exclusive licence to use this document for personal use and in courses of instruction provided that the article is used in full and this copyright statement is reproduced. The authors also grant a non-exclusive licence to ACIS to publish this document in full in the Conference Papers and Proceedings. Those documents may be published on the World

Wide Web, CD-ROM, in printed form, and on mirror sites on the World Wide Web. Any other usage is prohibited without the express permission of the authors.