



A Dynamic Planning Model for e-Business Implementation

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ABSTRACT

This paper presents a dynamic model for e-business planning derived from the results of a longitudinal analysis of e-business implementations. This involved a study of eleven international organisations over a four-year period using multiple interviews and extensive secondary data collection. Three separate research models were used to analyze different stages of e-business growth and the results of this multi-stage analysis consolidated into a staged model of e-business implementation. The dynamic planning model demonstrates to senior managers what they need to consider during the various stages of e-business transformation and appropriate planning and evaluation approaches. In particular, the model identifies the 'critical' areas when new approaches to planning and change management need to be adopted throughout the organization.

INTRODUCTION

Much has been written about e-business and how this concept will transform industries into virtual networks of customers and suppliers working together to create value-added processes (Fahey et al, 2001). Typically, successful organisations will have embraced Enterprise Resource Planning (ERP) systems to integrate e-business processes within the organisation and to underpin the creation of integrated interorganisational systems. This frequently results in new business processes, organisational structures, human resource skill requirements, management roles and knowledge management systems (Robey et al, 2002). To be successful in this new climate, however, organisations have to learn new approaches to planning for collaborative systems and to manage e-business enabled cycles of innovation (Wheeler, 2002; Zahra and George, 2002). Few studies have explored the dynamics of e-business strategic planning and little information is available on how to implement new paradigms successfully and how to ensure more effective e-business performance as a result (Damanpour, 2001; Kallio et al, 2002).

This paper reports on the findings from multiple case studies of e-business projects in ERP enabled organisations. Each organisation was investigated in a three stage study over four years, using three theoretical models of e-business implementations to assess success. The key findings from each case study were captured into a staged model for e-business transformation and related to a dynamic planning model that can be applied across all stages of growth of the extended enterprise.

PLANNING FOR E-BUSINESS

Fahey et al (2001) state:

"e-business embodies the most pervasive, disruptive, and disconcerting form of change: it leaves no aspect of managing organisations untouched, it challenges long-accepted business models, and organisation leaders have little to draw on from their past experience to manage its effects. In particular, its capacity to transform business processes is no longer in dispute. - - Senior executives - thus confront a central challenge: How should they endeavour to capture, analyse, and project the transformational impact of e-business on their organisation's most critical or core processes?" (p.890).

Planning for such systems has to encompass capabilities for managing, measuring and evaluating organisational abilities to create value across the network of alliances and hence requires evolutionary approaches which can be tailored to organisational needs at different stages of e-business growth (Wheeler, 2002; Ash and Burn, 2003). This whole process is sometimes described as IT governance, including strategic planning processes, change management processes and accountability and return on investment (Patel, 2002; Kallio et al, 2002). Planning cannot take place in isolation and must encompass all aspects of the emergent learning organisation in virtual networks of value alliances.

In order to study this environment in detail the authors embarked on a longitudinal study of organisations implementing large scale e-business applications over a four year period. The eleven organisations were visited three times during this period and a minimum of three interviewees participated on each visit. The structured interviews were focused on three separate models of business change to investigate different aspects of e-business governance and the results from these investigations brought together into a dynamic planning model for e-business transformation. The use of three research models was specifically intended to give breadth to the study and allow the incorporation of a variety of strategic views which informed the planning process.

THEORETICAL FRAMEWORK

Figure 1 illustrates e-business implementations from the perspective of three strategic theories: *Virtual Organising, e-Business Change, and Benefits of B2B*, where:

- (i) Virtual Organising is illustrated by a three dimensional model (1) 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 and Henderson, 1998, p.34).
- (ii) e-Business Change is illustrated by a flat model (2), in which progress is across eleven interrelated components within three broad sections based on relevant research in the areas of; "organisational change, strategic management innovation, and information systems evaluation" (Guha et al, 1997, p.121).
- (iii) Benefits of B2B is illustrated by a two dimensional model (3) in which greater e-business activity occurs within a set of B2B models (Carlson, 1995).

Figure 1 illustrates the top-level components of the three research models used in the study. Each model reflects a different business focus: organisational strategy, change management, and e-business work practices. The final conceptual framework is described in terms of a dynamic planning model for e-business implementation. The dynamic planning approach is a strategic collaborative process between alliances where there is a continual review of alignment of the e-business transformation against business objectives. This is quite distinct from the 'one size fits all' approach of centralized planning and allows strategy to evolve with

Figure 1: Three Views of e-business Implementations

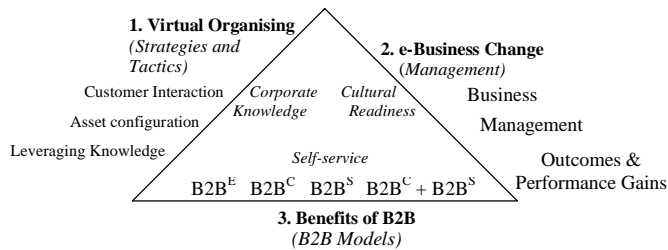


Table 1: Participating Organisations

| Case Organisation | Industry | B2E Interaction | e-Business Project Title | No. of Users |
|------------------------------------|------------------|--|---|------------------------------|
| 1. Halliburton | Engineering | Intranet access to ERP | "Employee Tracking Intranet" | ~1100 staff |
| 2. UBS | Banking | ERP | "Employee Networking" | ~40,000 emps |
| | | B2C Interaction | | |
| 3. Wine Society | Retailing | Internet access to ERP | Online Ordering by Members | ~60 staff |
| 4. UNICEF Aust. | National Charity | Internet access to ERP by ASP | 1 st Australian Charity Web site | ~35 employees +30 volunteers |
| | | B2B Interaction | (B2B ^S and B2B ^C) | |
| 5. Biotech | Biotechnology | ERP to supplier catalogues and Intranet access to ERP data | Staff research procurement | ~240 staff |
| 6. Novartis | Chemical | | Sales Order and Rapid Delivery | ~22,000 |
| 7. Bertelsmann | Media | | Simple Ordering e-catalogue | ~28,000 |
| 8. Statoil | Oil and Gas | | Staff travel procurement | ~18,000 |
| 9. Employee-Nat | Employment | | Simple Ordering e-catalogue | ~14,000 |
| 10. FSC - Fujitsu Siemens computer | Computer | ERP to corporate customers | Order Request System extended to an e-Mall of 3 companies | ~11,000 |
| 11. Dell corp | Computer | non-ERP with ERP | Customised online sales | ~27,000 |
| LSI Logic corp | Electronics | | Integrated with customers MRO procurement | ~14,000 |

changing market conditions. This approach provides the means to explicitly define and manage relationships between supply network partners and to monitor trends and trigger a revisiting of strategic decisions across the network (Oliver et al, 2003).

Methodology

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

- Primary data – from semi-structured interviews conducted November 1999, June 2000, and June 2001. Three separate interviewees were identified within each organisation and revisited across the study.
- Secondary data – from company documents collected or sent via emails.
- Tertiary data – from case research papers written by third party specialists.

The case material collected was used to verify all the strategic characteristics of e-business transformation and to develop the dynamic planning model.

e-Business planning model

Figure 2 illustrates the interrelatedness of the three stages of the Dynamic Planning Model.

The model shows the focus for strategic planning shifting through three stages of development with outcomes and performance gains realized through greater progression towards extended enterprise resource planning (eERP):

Stage 1 - Integration of technologies is critical for cost reductions and operating efficiencies along the supply chain;

Figure 2: Three Stages of Dynamic Planning Model

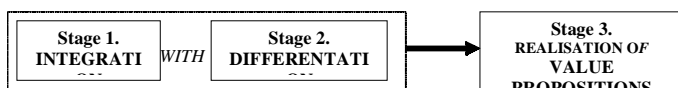


Table 2: Stages of e-Business Planning

| Business Dimensions | Stages of e-Business Planning | | |
|--|--|---|---|
| | (1999 -) | (2000 -) | (2001 -) |
| | Stage 1: Integration | Stage 2: Differentiation | Stage 3: Realisation 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 |
| Dynamic planning focus across stages of organisational transformation | | | |
| Strategic focus | Self-service | Empowerment | Relationship building |
| Planning focus | Internal SCM | External SCM | Community Networks of SCM |
| Outcomes and Performance Gains | Improved operating efficiency (ROI) | Effective resourcing (QWL) | Virtual and economic value added (EVA) |

* The diagonal cells(shaded) represent the critical stages of eBP and the arrows represent real organisational transformation with e-business

Stage 2 - Differentiation of products and services is critical for e-business market positioning through effective resourcing across multiple supply chains;

Stage 3 - Demonstration of value propositions within an inter-organisational network to design and leverage multiple interdependent communities to create superior economic value across the virtual supply chain (Singh & Thomson, 2002; Venkatraman & Henderson, 1998).

Table 2 represents a map of the issues distilled from the findings of this longitudinal three-stage study. The results of the analysis can be mapped along the e-business stages of growth as: integration of e-business technologies for e-malls and B2B commerce, differentiation of products and services for e-business positioning, and the realization of value propositions of the e-partnerships. In Table 2, the three shaded cells in the eBP model (3x3) indicate the 'critical' elements that require a cultural shift for a real organizational transformation and so represent distinct shifts in the federated planning approach. The other elements contribute to the organization's competitive advantage.

CASE ANALYSIS FOR E-BUSINESS PLANNING MODEL

Stage 1: Integration

Technologies: e-ERP

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 groups' online sales systems.

Business Models: e-Commerce B2B Integration

The integration of e-business models, B2B^c with B2B^s is essential to maximize 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 with non-ERP systems using Web-based technologies to provide the infrastructure required to optimize the overall B2B value chain. Also, the study emphasizes the synergistic benefit stream from B2B integration and the interaction of inter-organization 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

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 customized 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 their 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 realize 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

A pilot approach demonstrating a value proposition is shown in the One2One relationship formed by Dell and LSI. Also, the case emphasizes the synergistic benefit stream from B2B integration and the interaction of inter-organization 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.

DYNAMIC PLANNING MODEL

The changing strategic focus across the stages of the dynamic planning model are classified in Table 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. Value includes complementary benefits realized for all network partners across the virtual supply chain. The interplay between strategy, e-business, change management and evaluation is crucial to the creation of dynamic capabilities and will enable organisations to gain sustainable competitive advantage (Zahra and George, 2002).

At stage one of the extended enterprise, the focus is very much internal with top-down planning and an emphasis on training employees to become proficient in self-service to improve operating efficiencies and increase returns on investment. The first shift comes when the enterprise extends its relationships across the full supply chain for products or services. At this stage, the focus is on empowerment and self-learning through bottom up planning within the organization. There is also a realignment of business objectives to include external alliances across the supply chain. Finally, the focus will be directed towards re-engineering the supply chain through collaborative planning to gain value enhancement throughout the networked community. This occurs with a shift of business model towards the e-enterprise.

By taking a more holistic approach, executives can turn these stages of a company's transformation into the drivers of e-business excellence. So the central task for senior managers lies in understanding what drives operational excellence in the e-business realm, and then committing the necessary resources (structures, training, planning 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. The complete model for e-business planning can act as a comprehensive tool, for assisting managers in diagnosing the key facilitators and inhibitors of successful stages of e-business development. It is not seen as a prognostic tool. The case analyses confirmed that the more successful projects were found to have facilitators in all components of the eBP framework. Barua et al, (2001) specifically refer to the success of a company's e-business initiatives coming from 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.

Table 3: Stages of Dynamic Planning Model

| | Stage 1 | Stage 2 | Stage 3 |
|---------------------------------------|-------------------------------------|--|---|
| Strategic focus | Self-service | Empowerment | Relationship building |
| Planning focus | Top-down Training Internal | Bottom-up Self-learning External | Collaborative 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)

Vering & Matthias (2002, p.159) argue that in the 'learning organization' 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.

However, change still requires that resources be matched to the business objects and tasks and, further, that planning systems are appropriate to drive organizational change through workplace implementation (van Hoof and Stegwee, 2001; Coltman et al, 2001). In the new business environment organizational business models are more complex, supply chain networks more flexible and agile, training is shifting to self-directed learning, and collaborative planning approaches are needed to achieve greater added value to the community network (Fahey et al, 2001).

CONCLUSIONS

This study of e-business planning approaches was based around a triangulation of three independent research models: virtual organizing, 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 planning and implementation. The proposed model of e-business planning (eBP) can be used as a detailed criterion to direct and evaluate the progress in the virtual space for traditional organisations or new entrants. The model offers a foundational perspective of strategies, planning tactics and performance objectives for e-business implementations. These together form the basis for a Federated Planning System.

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