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CONSIDERATION OF OPTIONS FROM AN ENTREPRENEURIAL, TECHNICAL AND OPERATIONAL PERSPECTIVE — AN E-BUSINESS DESIGN FRAMEWORK APPROACH

With the growing move towards e-business, managers must understand its effect on their strategic investment decisions and possible business models. We draw upon the emergent knowledge of e-business, together with traditional strategy theory, and provide a simple framework for the evaluation of business models for e-business. Central to this work is the use of the modelling technique of systems dynamics to evaluate an e-business model using a triple-pair approach. This provides a method to capture and understand the causal relationships and rationalise the organisation's resources, capabilities, enabling technology, and the environment in which it competes.

At the heart of any organisation is its strategy for doing business. Managers and chief executives are faced with the task of steering their organisations through constantly changing economic conditions. In a dynamic and often tumultuous environment, managers must take inputs from a wide range of internal and external sources and process these into actions to best use their current resources and their current stream of revenue (or value). Managers can call on many approaches, tools and methodologies to elucidate possible strategies that enable them to gain new insights. However, these are generally static in nature and do not take into account the dynamic nature of an organisation and its relationship with its external environment, and the dynamics within the organisation. Nor do they provide effective means to assess and evaluate the strategies and implementations that are possible in a particular industry segment. Researchers and practitioners are often unable to draw logical boundaries around the current strategy and the perceived environment that they are attempting to understand. A common challenge in using any form of model-based or model-supported thinking is in the surfacing and communication of different actors' mental models; incorporating these into a strategy capable of being communicated effectively is extremely difficult. In thinking about the building of an electronically based business, there are at least three simultaneous views of what it is expected to achieve and how this can be made to happen:

- entrepreneurs have ideas for successful businesses;
- technologists envisage ways to implement new complex technological or information systems to achieve business value; and
- operational managers have ideas about how business processes could be enhanced and extended to benefit from new opportunities.

Each of these views could form the basis for a business model for e-business. However, these originating ideas are typically retained in peoples' minds and not made explicit. Any unifying framework must provide a

way by which the entrepreneurial mental models can be surfaced and articulated, and then shared in such a way that other actors can see the underlying business processes and technological infrastructures. From this we assert that strategy can be distilled into a business model capable of describing to a manager what an organisation is attempting to achieve in a particular market.

STRATEGY CREATION

Strategy theory development by organisations has been of considerable interest to academics and practitioners and there is a wide diversity of approaches. Importantly, a central theme of strategy is the interplay between the environment in which the organisation competes, the resources of the organisation and how these are arranged by management to gain advantage and value. We examine the development of a suitable strategy by considering the firm's resources (Barney 1991) and its capabilities (Teece *et al* 1997), the organisation's role and its current value chain (Porter 1985) and the possible use of a well implemented generic strategy (Mintzberg 1978, Porter 1980).

Emergent strategy formulation

In the evolution of strategy there is an emphasis on how an organisation can influence its competitive environment and how that environment influences the organisation. Mintzberg (1978) argues that strategy formulation in most organisations is the interplay of three basic forces:

- the dynamic environment that changes continuously but at irregular intervals with frequent discontinuities and wide swings in the rate of change;
- attempts by management or bureaucracy to stabilise the organisation while operating within this dynamic environment; and
- leadership mediation between the two forces aimed at maintaining stability while adapting to the many environmental changes.

Mintzberg's model argues that there is interplay between the intended strategy and realised strategy. Moreover, the time required for an intended strategy to manifest itself can be quite long — in some cases longer than the time it takes for an environment to change. As a consequence, the intended strategy could be at best irrelevant or, at worst, actually detrimental to the organisation.

Environmental models of competitive advantage

Porter (1980), with his five-forces model, extends the interrelationship of the three forces defined by Mintzberg by arguing that external factors affect the work of managers in developing strategies. Porter's approach enables managers to describe their environment by isolating the threats and opportunities in the relevant industry; it can determine the strategy choice of the organisation and the possible outcome in the competitive environment. Importantly, it shows managers that they form a part of the environment; their attempted strategy is influenced by the environment and they will influence the environment. The generic strategies of "low cost" and "differentiation" are often used to develop a level of strategic or sustainable advantage within a market segment. An extension to this work was the development of the value-chain model (Porter 1985).

Porter's value-chain model focuses on the activities and functions of the organisation and its relationships with suppliers and customers. It enables organisations to identify the underlying factors that drive cost and potential differentiation. An organisation can exploit cost potentials by creating economies of scale or achieve product differentiation by developing innovative products and services. However, these generic approaches do not capture the dynamic and complex nature of the numerous value chains, complementary or competitive, that are present in an organisation's competitive environment.

However, Porter's value-chain model and five-forces model can assist managers to understand the external environment and the key resources that can provide advantage and value. The value-chain model contains two underlying simplifications. First, organisations within an industry are assumed to have control of the same strategically relevant resources and to compete with a similar strategy. Second, should an industry participant gain specialised resources (resource heterogeneity) capable of providing a competitive advantage, that advantage will be short-lived as competitors can also easily obtain these resources.

Resource-based view

Barney (1991) introduces the concept of the resource-based view (RBV) to address the limitations of environmental models of competitive advantage. RBV attempts to provide a link between heterogenous resources internally controlled by an organisation, mobility of the resources within the particular industry and the strategic or competitive advantage enjoyed by an organisation. A firm's internal resources are used to establish wide-ranging strategies to improve the overall efficiency and performance of the organisation. The competitive position of the firm is its "bundle" of diverse assets and resources, rather than a particular product-market combination (Dierickx and Cool 1989). Barney classifies these resources into three categories:

- Physical capital resources include the physical resources of the organisation such as plant and equipment, technology, location and access to raw materials.
- Human capital resources include the training, experience, judgment, intelligence and insight from managers and workers in the organisation.
- Organisation capital resources include the formal structure of the organisation, planning, controlling and coordinating systems, formal and infor-

mal reporting and planning systems, as well as informal relationships among groups within the organisation and between external organisations in the competitive environment.

The resources that an organisation controls can be examined in terms of their heterogeneity (uniqueness) and immobility (obtainability by other competing firms). In the context of these attributes, if two organisations have the same resources and conceive the same strategy, they will both improve their efficiency and effectiveness in the same way and to the same extent. For an organisation to have the potential for sustainable advantage, each of its critical resources should be valuable, rare, inimitable and non-substitutable (Barney 1991). If a firm is capable of obtaining and maintaining these resources, it can achieve a sustainable competitive advantage by implementing strategies that cannot be easily duplicated by competing firms. However, the RBV model has a number of limitations. For example, under what mechanism does the firm's bundle of resources provide a competitive advantage? And how does the bundle of resources confer sustainable advantage in industries where the pace of change is rapid?

Dynamic capabilities

Dynamic capabilities are an extension of RBV, turning on the ability of a firm to deploy combinations of resources that confer a strategic advantage. The resources can be defined as stocks of factors owned and controlled by the firm that are converted into the final product or service. A firm with a large stock of valuable physical, organisational and human resources may fail to develop useful capabilities. Capabilities are information-based, tangible and intangible processes that are firm-specific and are developed over time using the resources of the firm. They are based on developing, carrying and exchanging information through the firm's human capital and in some cases its information systems, and are often derived by combining physical, human and organisational resources at a corporate level.

Eisenhardt and Martin (2000) define dynamic capabilities as "the firm's processes that use resources — specifically the process to integrate, reconfigure, gain and release resources — to match or create market change. Dynamic capabilities thus are the organisational and strategic routines by which a firm achieves new resource configurations as markets emerge, collide, split, evolve, and die." Importantly, dynamic capabilities attempt to exploit both internal and external firm competencies in their use of resources. The term "dynamic" refers to the ability to renew and reconfigure competencies to add value in the changing business environment. An extension of dynamic capabilities is the "core competencies" thesis, where a firm develops and maintains a portfolio of core competencies and skills to enable it to respond to shifts in the external environment (Prahalad and Bettis 1986).

CAPABILITIES ARE INFORMATION-BASED, TANGIBLE AND INTANGIBLE PROCESSES THAT ARE FIRM-SPECIFIC AND ARE DEVELOPED OVER TIME USING THE RESOURCES OF THE FIRM.

In discussing strategy creation we have outlined two domains: the industry analysis framework and the resources view of the firm. Industry analysis framework attempts to link the strategy with the external environment, using competitive strategies to alter the firm's competitive position, *eg*, between competitors and suppliers. It relies on engaging strategic investments that may deter entry and raise prices above the long-term costs. In contrast, resources-based approaches see firms being profitable by offering low costs or markedly higher quality or product performance. Competitive advantage lies in the firm's idiosyncratic and difficult-to-imitate resources. However, a central element of strategy creation is the development of an approach that links the industry-level analysis framework and the resource view of the organisation.

BUSINESS MODELS FOR E-BUSINESS

The term "business model" is one that prompts considerable debate in both academia and practice (Alt and Zimmermann 2001, Applegate 2001, Chandra *et al* 2002, Chesbrough and Rosenbloom 2002, Hedman and Kalling 2003, Oliva *et al* 2003, Rappa 2003, Timmers 1998, Weill and Vitale 2001). The driving force behind the re-evaluation of the traditional business model has been the development of e-based business. The focus of the re-evaluation has been on how new technologies, especially the Internet, alter the competitive environment.

Analysis of the business model concept shows that there is a diversity of views and understanding of the business models for e-business. This results in a confusing and incomplete picture of the dimensions, core issues and components of these models (Alt and

Zimmermann 2001). Indeed, the empirical use of the concept has been criticised for being unclear, superficial and not theoretically grounded (Porter 2001). We will use the more widely cited business models for e-business to provide a clearer picture of the concept and demonstrate their value to the practitioner and researcher.

Components of the business model for e-business

Consider three well known definitions of the e-business models:

- Timmers (1998) defines an e-business model as "an architecture for the product, service, information flows, including a description of potential benefits for the various actors, and a description of the sources of revenue".
- Weill and Vitale (2001) propose a similar definition: "A business model is a description of the roles and relationships among a firm's consumers, customers, allies and suppliers that identifies the major flows of product, information and money and the major benefits to participants."
- Afuah (2001) defines an e-business model as "how a firm plans to make money long term using the Internet".

All identify the basic components of a business model: business strategy, organisation form and structure, business process, value chain, core competencies and financial structure. Interestingly, the list of components is applicable to both e-business models and traditional business models. Moreover, we associate these components with strategy theory. Afuah (2001) outlines a framework of components including customer value (low cost or innovative), scope (products/service), price, revenue sources, connected activities, implementation (required resources), capabilities (organisation skills) and sustainability. The framework provides a structure in which to develop, organise and assess candidate business models for e-business.

Applegate (2001) provides a business model framework consisting of three basic components: concept, value and capabilities. It addresses the role of the change process and the relationship between the components of the model. Concept describes the products and services offered, evolutionary business strategy, competitive dynamics, market opportunities and strategy to gain dominant market share. The value of the business model is measured in terms of revenue to the stakeholders, return to the organisation, market share, brand and reputation, and financial performance. Capabilities are delivered by the organisation's marketing and sales model, management model, development model and infrastructure model and built by people and partners, organisational structure and culture. Among components described in the business model are interdependent and traditional strategic framework tools (*eg*, value-chain analysis, RBV), which can be used to evaluate the suitability of the business model. The major difference between the traditional business models and e-business models are the underlying assumptions and rules of how business will be undertaken in the particular industry. However, the causality between the components, processes and change are not addressed in any of these models.

Description of the business models for e-business

Business models for e-business describe scenarios and situations that explain how businesses use the Internet to interact and how value is created for customers and the other stakeholders (Applegate 2001). An early example was Timmers (1998) who identified 11 e-business models: e-shop, e-mall, e-procurement, third-party marketplace, e-auction, virtual community, collaborative platform, value-chain service provider, value-chain integration, information brokerage and trust service. Rappa (2003) extended this and classified nine categories for e-business models: brokerage, advertising, "infomediary", merchant, manufacturer, affiliate, community, subscription and utility. Rappa's nine categories contain 36 models. Interestingly, both Timmers and Rappa point out that there is no single comprehensive taxonomy for classifying e-business models, yet they provide taxonomies of e-business models. Applegate (2001) outlines a taxonomy of business models for e-business by using generic market role (producers, consumers, distributors and customers), digital business (if dependant on the Internet) and platform (infrastructure provider for third-party e-business). Applegate provides general categories — focused distributor, portals, producers and infrastructure producers — in which 22 individual e-business models fit within the classification.

Weill and Vitale (2001) define eight e-business models: direct customer, full service provider, intermediary, whole of enterprise, shared infrastructure, virtual community, value net integrator and content provider. Derived from analysis of several case studies, the eight basic structures are described as "atomic" models. The structures form the "atoms" which firms may adopt singly or in more complex arrangements ("molecules") to construct their business model. The models are defined in terms of the actors in the structure of: the firm, "complementors", customers and suppliers, and the linkages between them. This includes the movement of product, money and information.

These atomic models may be described as an "analysis agenda" for managers attempting to interpret the complexity of an e-business model in terms of the resources required for its implementation. Moreover, unlike other e-business models, these provide a structure that allows the discovery of the relationship between the components of the model and also the possible strategies (*eg*, resource, capabilities, industry analysis) that a firm could undertake in a given industry.

A proposed strategic conceptual framework for an e-business

Figure 1 provides a simple strategic conceptual framework to highlight the relationships between business strategy, business models, process enablement model (business process models) and the underlying business processes that are capable of utilising the enabling technology (*ie*, information technology and information systems).

By establishing a framework, managers are able to identify each of these components in order to return value to the organisation and to consider how to satisfy the stakeholders' needs. Central to this approach is the ability to satisfy the customer requirements while understanding the impact on suppliers, competitors and other stakeholders.

At the centre of the framework is the business model. It provides a method to create an e-business model by examining the industry-organisational environment. Moreover, the framework is designed to aid the strategy-creation process by using industry-level analysis, understanding the environment in which the organisation is competing and discussing the resources and capabilities of the firm in support of its desired strategy. The conceptual framework allows entrepreneurs, managers and technologists to bring their thinking together for a common understanding of the issues specific to e-business within the organisation. Hence, a business model is capable of describing what an organisation is attempting to achieve in a particular market to generate value and confer advantage.

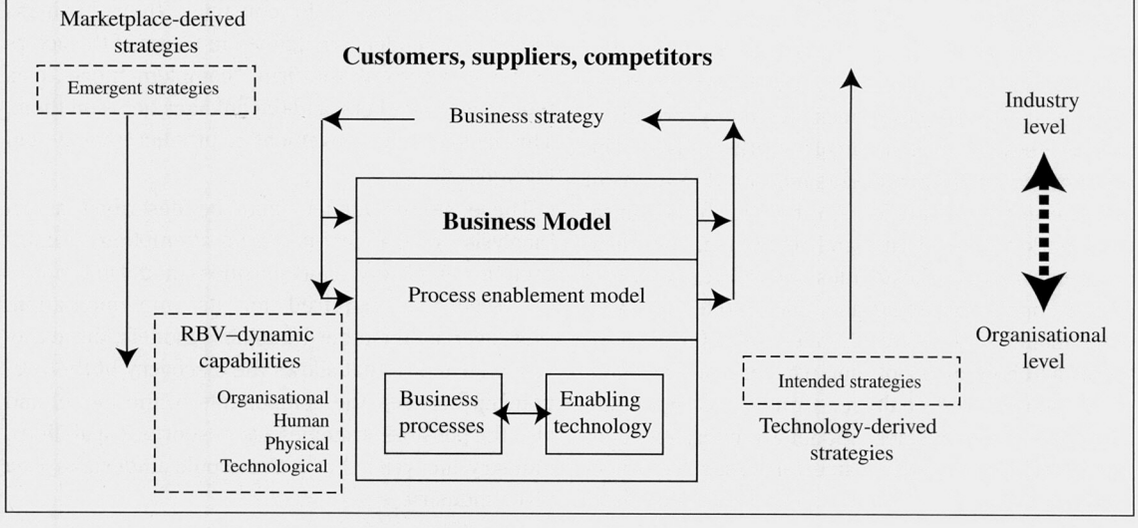
At the base layer of the model are the business processes and enabling technology. These elements are the central components of most e-businesses. The organisation must identify and understand these if they are to be considered viable methods of delivering the firm's services and/or goods. The next layer, the process enablement model, provides an overview of the processes supporting the delivery of the products and services and also the internal processes of the organisation (*eg*, accounts department processes that support electronic payment over the Internet). We can use value chain analysis to identify the value system or business process model that is in place, highlighting its important business processes, or that could be developed as an innovative approach.

The next layer is the business model under development. This model will bring together the underlying processes, resources and capabilities of the firm to support the strategy that is being attempted by the business model. At the business strategy level, managers are able to examine the external environment in which the organisation is attempting to compete, and analyse how the actors (customers, suppliers, competitors, *etc.*) interact with the business model under consideration. The analysis will need to consider the value propositions for the customer and the organisation.

Central to this framework are the resource-based view and dynamic capabilities. Through RBV we can identify and classify the firm's resources, appraise the strengths and weaknesses relative to competitors and identify better uses of resources (Grant 1991). Similarly, we can attempt to identify the capabilities of the firm with an emphasis on what the firm can do more effectively than its rivals. We have extended RBV in the framework to include technology capital resources. Technology can be seen not only as a rare and valuable source of competitive advantage, as experienced by early adopters of Web-based e-commerce (*eg*, Amazon.com), but also as an enabler of business in a new and innovative way that supports an organisation within a particular market.

The conceptual framework identifies marketplace-based strategies and technology-based strategies, shown at each side of Figure 1. Marketplace strategies are derived from the market itself and are considered to be the emergent strategies. Knowledge-based entrepreneurs fall into this category. In contrast, technology-delivered strategies originated within the organisation, often from research and development or a specific resource.

FIGURE 1: BUSINESS MODEL STRATEGIC CONCEPTUAL FRAMEWORK



A major criticism of business models for e-business has been the lack of assessment and evaluation techniques. Many of these models are anecdotal or retrospective in nature. Moreover, there has been no evaluation of the taxonomies. Kaplan and Norton (2004) state that "objectives and targets will not be achieved simply because they have been identified; the organisation must launch a set of action programs to enable the targets for all measures to be achieved". Therefore, the activities that form the basis for many of these models must be re-examined. This can only be achieved by using innovative modelling approaches to gain a greater insight into the complexity of business models for e-business.

A GENERIC FRAMEWORK FOR E-BUSINESS MODELLING

All business transactions are part of a supply chain fulfilment system. Orders for goods or services are fulfilled (*ie,* satisfied) by goods or services being delivered and a payment being received in exchange. The chain itself could be viewed as a single aggregate-level fulfilment system or a cascade of individual fulfilments, each representing a stage in the chain. There are three flow processes in all such systems:

- information flows, primarily the orders;
- money flows (payment for goods or services); and
- delivery of goods or services to fulfil the customer's orders.

These are the primary flows — goods may flow through distributors, and money flows may be by way of credit cards. These may be seen as refinements, alternatives or extensions of the primary flows. However, an important consideration is that each of these flows can be two-way:

- reverse information flows might include order acknowledgements, delivery notices, invoices, out-of-stock notifications, *etc.*, or information not directly related to individual order fulfilments, for example stock position advisories;
- reverse money flows might be refunds, cash-back, commissions, *etc.*; and
- reverse goods flows might be returns, trade-ins, *etc.*

It would seem therefore that any supply-chain or distribution can be reduced to six main flows: two-way information, two-way goods and services and two-way money flows, as shown in Figure 2. This is known as the "triple pair flow construct".

If all the flows relating to a particular supply chain structure could be represented within this construct, then the configuration of the six flows can be mapped on to any business model that a company has in place or wishes to adopt. If the business model is based on e-business processes, then the information flows are carried out mainly or totally by electronic processes, and the goods or services and money flows may need some modification to make them coherent with the information processes.

The systems dynamics (Forrester 1961) approach has always explicitly reflected industrial and business structures as a complex inter-related set of flows of money, materials and information (although in some contexts the list may be expanded to included people, and "materials" could include, for example, livestock

FIGURE 2: THE "TRIPLE PAIR" PROCESS FLOW CONSTRUCT FOR SUPPLY CHAIN FULFILMENT

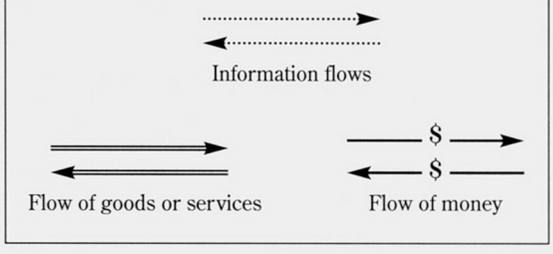


FIGURE 3: A REDRAFTED DEPICTION OF CHANDRA *ET AL*'S MODEL

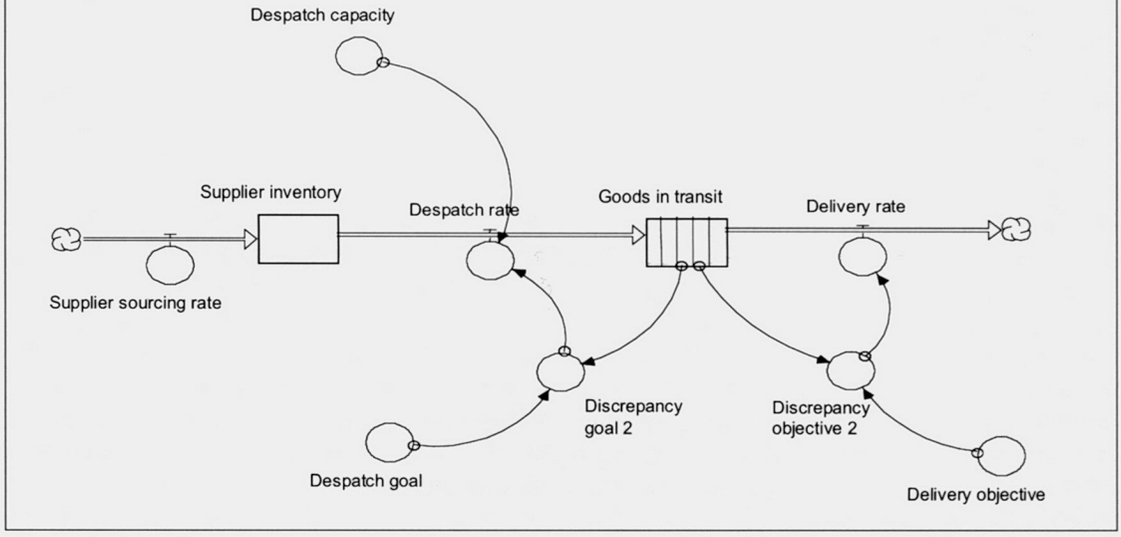
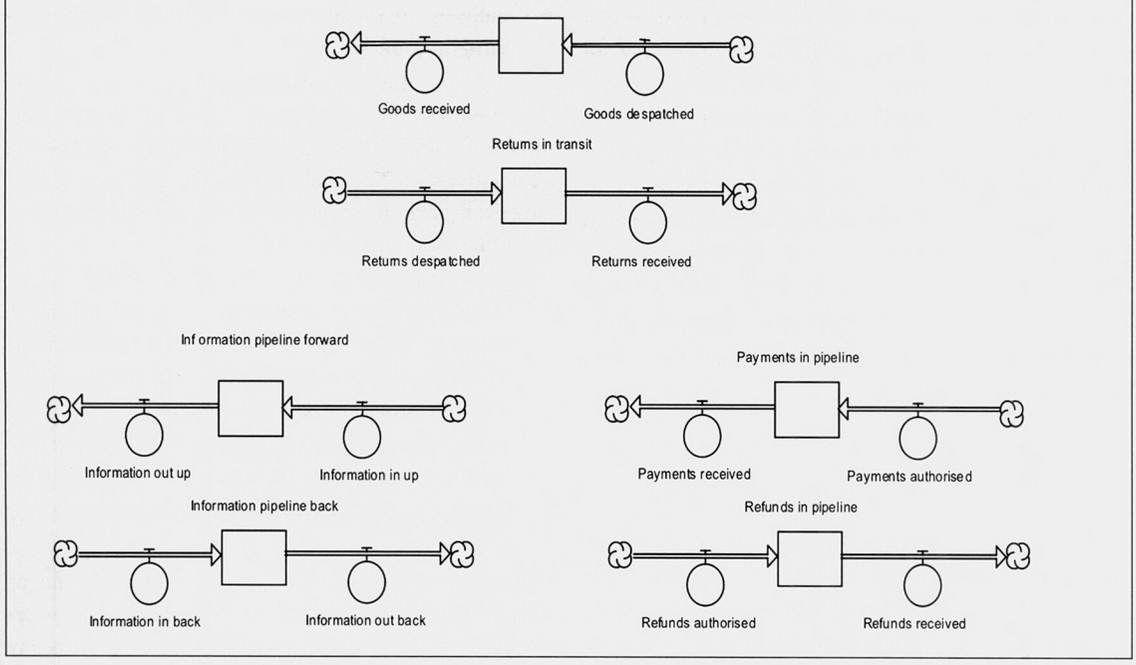


FIGURE 4: TRIPLE-PAIR MODEL WITH MINIMAL DETAIL FOR EACH FLOW PROCESS



and services). In this sense it was always concerned with the structural relationships that make up business processes (as well as the softer processes) and has been used explicitly to study business processes (see for example Powell *et al* 2001). It has also been used to study supply chain systems within the business process concept; Sterman (2000) discusses the role of systems dynamics in manufacturing supply chain management, and presents two case study applications: the semiconductor and component manufacturer Symbios and its downstream distribution through OEMs and Fast Growth Electronics' (a pseudonym) upstream and downstream channels (Sterman 2000, pp. 449–62).

Systems dynamics has also been used effectively to study issues relating to IS system management (Abdel-Hamid and Madnick 1991), IS outsourcing (McCray and Clark 1999) and e-commerce company strategy (Oliva *et al* 2003). Chandra and his co-authors also include reference to the potential of systems dynamics in their discussion of a generic development methodology for e-management and conceptual modelling of supply chains (Chandra *et al* 2002). They include what they describe as an illustration of a supply chain network dynamic process flow model. This model reflects explicitly the stock-flow structure of the process, with goods being despatched, delaying at a level (stock) while they are in transhipment, and then being delivered.

This structure can be redrafted using more usual systems dynamics nomenclature and the range of icons available in specialist systems dynamics modelling software. This is presented as Figure 3. These are either systems delivering services in their own right or the delivery of services that are bundled with physical items to constitute a product package, for example product training, insurance, warranties, etc. Once again, this dynamic process model represents only a very simple process.

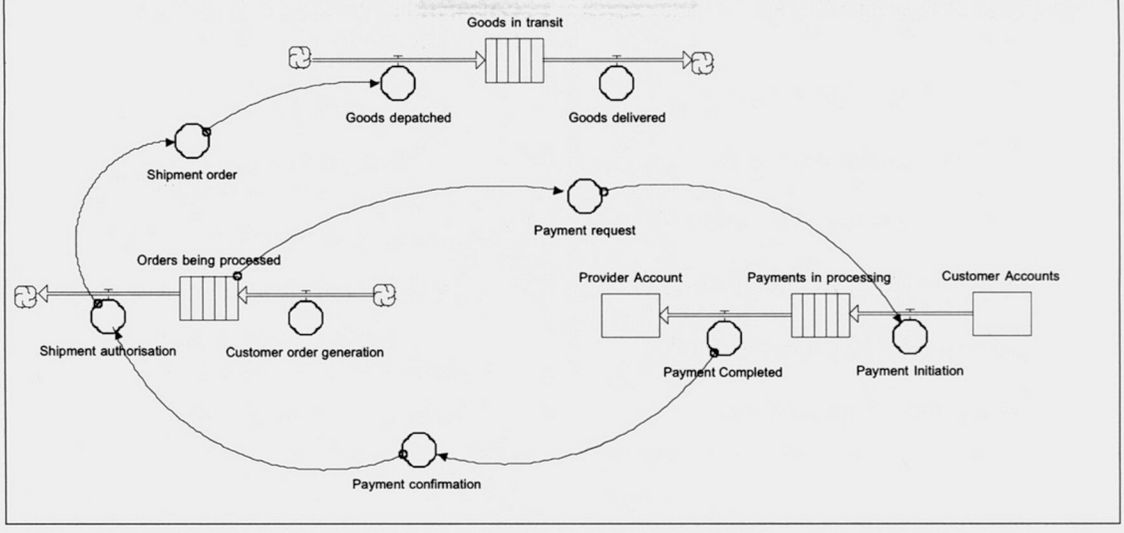
However, the chain could be readily extended if further stocks or stages are observed or required, and parallel processes could be added to reflect more complex business processes. Using this micro representation of the supply chain network process model leads to the presentation of the triple pair model as in Figure 4. This now reflects that there is structure and complexity in each of the six flows, although at a very rudimentary level at this point.

A TRIPLE PAIR INTERPRETATION OF SPECIFIC WEILL AND VITALE'S SERVICE BUSINESS MODELS

Weill and Vitale (2001) suggested a set of eight models that classified e-business propositions. The triple pair flow model approach offers a practical way to represent various business models. The Weill and Vitale models have been chosen because of their good fit with the triple pair flow model, although any business model, such as the Rappa, Timmers, or Applegate models, could be represented in this manner. This modelling approach of Weill and Vitale can equally represent product-based or service-based e-business propositions visualised in business process terms (Joyce and Winch 2003, 2004, 2005).

The direct-to-customer model is arguably the simplest of the business models, and is characterised by the originators as providing "goods or services directly to customers, often surpassing traditional channel players". In this model the primary relationship is directly between the customer and the direct-to-consumer provider (examples are Dell and Home

FIGURE 5: BASIC TRIPLE-PAIR FLOW STRUCTURE OF DIRECT-TO-CUSTOMER MODEL



Depot), with money flowing to the provider and products and information flowing to the customer. In the Weill and Vitale format this business model is represented as in Figure 5.

In this case a customer places an order "customer order generation" (flow) which is then placed in the "orders being processed" queue. This triggers a payment request that causes "payment initiation" (flow) from the customer's account (stock) to the provider's account (stock) through the "payments in processing" queue. Once "payment completed" has been achieved, "payment confirmation" is initiated with the order being removed from the "orders being processed" queue and moved to "shipment order" and "goods dispatched". The goods are "goods in transit" and at some later time "goods delivered" completes the sequence.

This illustration shows the major relationship as being directly between the customer and provider and this is sufficient to serve the managerial needs. However, this model says little about the business processes that would have to be created to enable transaction fulfilment, and is a significant simplification; for example, there is no representation reflecting returns. This would require a flow of product in the reverse direction, possibly, if a refund is given, a reverse money flow, and also information flows in the reverse direction.

The triple flow model would represent this model in a supply chain perspective and show all the necessary flows. With a good, as distinct from service, product, the representation of basic flows and linkages would appear as in Figure 5. In this version the money flow is represented generically, but would be modified to include further or fewer stages dependent upon the forms of payment the provider chooses to accept — cheques, electronic payment authorisation by debit card, or payment through an intermediary by credit card. The model is also simplified in terms of the product fulfilment process, where the exact representation would depend on whether the product is made to order or delivered from stock, for example.

For a fuller representation with two-way flows, the model could incorporate further mechanisms to reflect a requirement for customers to provide a detailed specification. The model could also accommodate goods returns. This could be further expanded to model the detail of the actual business processes that a company would wish to adopt and implement, including the evaluation of alternatives and the creation of more complex multiple business model structures. The model could also link to further business processes not related to the original supply mechanisms; these might include, for example, maintenance/service and product guarantee or warranty procedures, customer satisfaction and/or product enhancement suggestion surveys, and marketing for upgrade and/or repeat sales generation, all of which would relate to the installed customer base.

ASSESSMENT AND EVALUATION OF E-BUSINESS MODELS

A central purpose of the business model is to identify not only the objectives that the organisation wishes to achieve but also the impact on the customers and other stakeholders. Similarly, it requires the firm to identify resources and capabilities to enable targets for all measures to be achieved. The framework and modelling approach allows participants in the business model building process to understand how individual targets can be met, including value to the organisation and customer, and how different process in the developed model interact so that the achievement of one target does not prejudice the achievement of others. Importantly, it helps to identify gaps in resources, capabilities, processes and enabling technology that exist in the firm. This framework offers two distinct approaches to the conceptualisation, design and implementation of a new electronic business.

FIGURE 6: AN ENTREPRENEURIAL PROCESS FOR E-BUSINESS DEVELOPMENT

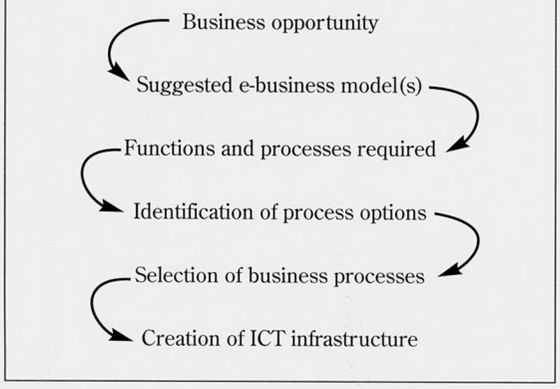
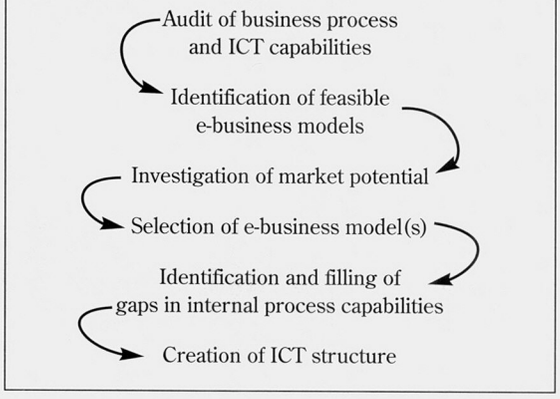


FIGURE 7: A BOTTOM-UP OR TECHNICAL CAPABILITY BASED E-BUSINESS DEVELOPMENT STRATEGY



Entrepreneurial process for e-business development

A top-down perspective reflects an entrepreneurial view, which starts with an identified market need or business opportunity that could be exploited. In this case it can be the identification of potential resources and capabilities to exploit an external opportunity. Business design then works down to identify the processes and the information and communication technology (ICT) infrastructures that would be needed to deliver that service. The design process first requires the specification of various features and functions of the delivery mechanism, and then configuration of the precise business processes necessary to deliver the product or services. In some features and functions alternative options may have to be evaluated. The phases in this process are shown in Figure 6. Consider an e-business opportunity such as the creation of an electronic auction site. An entrepreneur would start with this opportunity and work through the identification and selection of the necessary business processes, resources and capabilities to create the necessary ICT infrastructure to support the business model.

Technical capability based e-business development

The second approach is a bottom-up, or technology capability, view. Here, the process starts with an organisation identifying its strengths, capabilities and resources, and exploiting these to build new business opportunities. The phases in this process are more complex, as the identification of exploitable capabilities is likely to suggest a number of possible e-business opportunities. However, not all of these would become viable or valuable business propositions. There must therefore be a cycle of opportunity identification and evaluation before the target business opportunity is settled. The process must then confirm that all necessary capabilities are in place, and ensure that any gaps between the needs and existing capabilities identified in the audit are bridged (Figure 7). This approach is more likely to be adopted where an organisation already has business process or ICT capabilities and wishes to investigate diversification into new e-businesses based on these existing capabilities.

Options analysis in the assessment and evaluation of e-business models

Within these strategy development sequences, mechanisms are required that can structure the functional processes in a form that permits the development of the delivery system. The morphological matrix used in engineering product and process configuration (Twiss 1992) could support this process. The morphological matrix requires that all the necessary key functionalities of the proposed system are listed on the vertical axis of the two-dimensional matrix. On the other axis, all feasible means for providing each of the required functionality are listed. An example of this approach is shown in Table 1. In this example, we suggest the functionality that might be required for the development of a simple direct-to-customer business model (as identified by (Weill and Vitale 2001 and others). The development of the possible options is an extremely important. By using the framework we are able to identify the resources that are required to support the options.

The assessment process then comprises the elimination of inappropriate delivery options and putting together feasible combinations to create the business. This is not an easy task if there are multiple possible process options. From the organisational value proposition, it can be based on possible revenue growth and productivity strategies. Similarly, the customer value proposition has to be considered; that is, what product or service attribute (price, quality, availability, selection), relationship (service, partnership) or image (brand) the customer wishes to pay for, in enough volume to provide a profit for the organisation. Typically, these delivery options can be categorised into three key two-way flow structures: information, goods and services, and money. In breaking each of the possible options out in this manner and describing the business model in terms of the triple model, we can identify the organisational value and customer value.

TABLE 1: MORPHOLOGICAL MATRIX FOR DIRECT-TO-CUSTOMER E-BUSINESS MODEL (WEILL AND VITALE 2001)							
Business processes needed	**Process delivery options**						
Delivery of goods	Courier	National mail/package service	Company's own transport	Contract carrier	Customers collection	Clearing house service	Etc. . .
Return of goods	Courier	National mail/package service	Company's own transport	Contract carrier	Customers return to store/depot	Clearing house service	
Payment	Cheque	Credit card	Mail/postal order	Third party collection	Direct funds transfer		
Refunds	Cheque	Credit card	Mail/postal order	Third party collection	Direct funds transfer	Credit note/ allowance	
Customer order mechanism	E-mail	Company website	E-mail	Distributor's website	E-auction		
Etc. . . .							

Evaluation of the possible e-business model can be undertaken in two areas: modelling and accounting techniques. The process delivery items in Table 1 and the direct-to-customer model outlined in Figure 5 demonstrate flows of money, goods and information. From this we can identify the resources and capabilities required to support the model under consideration. It allows the identification of processes needed to support the option, possible enabling technology and the possible value it may add. It can also reveal any gap between the resources and capabilities of the firm and those of competitors. Importantly, the competitive advantage lies in the firm's idiosyncratic and difficult-to-imitate resources configurations. As a modelling technique it is possible to simulate possible e-business models by providing data to the model using commercially available tools (Stella/iThink). This gives managers a greater understanding of the interdependence of the resources, capabilities, enabling technology and processes.

From the accounting techniques perspective, the balanced scorecard approach could be used to evaluate each of the possible options under consideration (Kaplan and Norton 1996). This framework and modelling techniques allow the identification of tangible and intangible assets that will contribute to generating value for the customer and organisation. Similarly, as the flow of money is clearly defined, it is possible to use this as an input to the accounting techniques (*eg*, NPV, BSC, IIR).

CONCLUSION

It is critical that all players, especially information systems specialists, involved in the process of developing new business ideas, understand the thinking underlying general strategy formulation if they are to work together to build new e-business which fully exploits opportunities to create value. We offer as a starting point the merging of the notion of the business model, especially the e-business model, with an integrating framework of classical strategic thinking. This work can serve as the basis for further academic research into design philosophies and integrating models, and also for the development of practice.

By bringing together the business model strategic conceptual framework, e-business model and the morphological matrix to help identify possible options, we provide an approach to developing an e-business model capable of describing what an organisation is attempting to achieve in a particular market to generate value and confer advantage.

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