

AN INTEGRATING FRAMEWORK FOR INTERNET-BASED E-BUSINESS VENTURES IN SERVICE-BASED AND PRODUCT SUPPLY CHAINS

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Abstract

For many organisation going on line in an eBusiness venture is often fraught with difficulties in discerning the strategy and value in such a venture and the possible outcomes. Organisations are revisiting their service and/or product and developing eBusiness systems that are capable of exploiting the organisations business supply chains. Central to any development of this nature is the manager's understanding of the implications of an Internet eBusiness venture to the organisation and industry they wish to compete in. This paper outlines an insight into a framework for mapping business process models onto service and product business models.

1. Introduction

Managers are faced with developing value from the available scarce resources of the organisation. Understanding the dynamic complexity of the industry that they are competing in is vitally important. Moreover, managers must not only be aware of this rapidly changing environment but also the impact new technologies will have on their industry and the effect it will have on their organisation. eBusiness has seen the revitalisation of industries and the development of new industries. Managers and entrepreneurs are attempting to enter these segments of the market by offering products and/or services over the Internet in an eBusiness venture. Indeed, the successful development of an eBusiness venture utilising a product based supply chain electronic services, such as Amazon and Dell, has focused the imagination of any sceptic of the eBusiness approach. Similarly, the development of eBusiness ventures utilising service based supply chain service has seen the development of virtual communities that bring together a wide range of possible customers into a forum focused on a particular shared interest. Managers perceive this homogeneous group as target market to sell goods and services to. Many eBusiness strategies have been able to capture either the product based approach or the service based approach but very few have been successful at both. In contrast, many traditional organisations have been successful in developing strategies and systems to providing both services effectively.

Whether relating to eBusiness or business in general, the field of strategy and strategy formulation is rather fragmented with no one real unifying theory that is capable of drawing together all the array of possibilities that have been expounded in theory or practice, either in terms of underlying theoretical bases, top-down or bottom-up perspectives, or level of detail or granularity. As a consequence strategy is subjectively derived with a diverse and differing range of underpinning theories: industry lifecycle, value chain position, geographical market(s) of interest, customers or suppliers perspective, industry culture and/or structure, etc. This tends to encourage researchers and practitioners to draw logical boundaries around the current strategy

and the perceived environment that they are attempting to understand (Sterman, 2000).

In this paper we firstly consider briefly the notion of how distilling strategy into an integrative business model framework that is capable of describing to a manager what an organisation is currently attempting to achieve in a particular market, taking into account the characteristics of the industry that is being discussed, the resources of the organisation, their current business processes and enabling technology. This framework offers, concurrently, a top-down approach in the development of a business model and a bottom-up approach utilising business process modelling approach. Importantly, in the paper we provide an insight into approaches in evaluating physical product based supply chains in an eBusiness proposition and the delivery of service-type products as an eBusiness proposition. In this we draw heavily on the e-Business categorisation by Weill and Vitale (2001). They provide schemas for different e-Business propositions based on key actors in the system and the flows of *Products*, *Information* and *Money* between them. This view of systems as interlinked flow subsystems provides a natural link to SD.

Often organisations attempt to intermix the delivery of service and product within their eBusiness implementation in an attempt to acquire a level of strategic advantage and often with poor outcomes. This paper provides an insight into a framework this is based on the use of the stock-flow diagramming convention of System Dynamics to map *business process models* onto *business models*.

2. A Strategy Perspective in the Development of eBusiness Models

In this paper, the starting point for a strategic view of an eBusiness proposition is the consideration of the firm's resources (Barney, 1991), the organisations role and the current value chain the organisation is involved in (Porter, 1985) and the possible utilisation of a well implemented generic strategy (Porter, 1980, Mintzberg, 1978). A full account of this perspective of development of strategic appears elsewhere (Joyce and Winch 2003, 2005) but is based on these three basic original platforms and the enhancements and extensions:

- *Emergent Strategy Formulation*

In the evolution of strategy there is a strong emphasis on how an organisation can influence their competitive environment as well how the competitive environment influences their organisation. Mintzberg, (1978) outlines strategy formulation in most organisations as the interplay of three basic forces revolving around the dynamic environment that changes continuously, organisational management or bureaucracy that attempts to stabilise the actions of the organisations whilst operating in the dynamic environment; and leadership of the organisations whose role is to mediate between the two forces.

- *Environmental models of competitive advantage*

The works of Porter (1980, 1985) strongly influence thinking here with the Five Forces model providing a succinct framework to identify the broad external environment within which an organisation operates, and the *value-chain model* which focuses on the activities and functions of the organisation and their relationship with their suppliers and customers.

- *A Resource Based View*

The concept of the resource based view of the firm was introduced by Barney, (1991), RBV, to address the limitations of environmental models of competitive advantage and attempts to provide a link between heterogenous resources 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 resources are used to enable firms to establish strategies to improve the overall efficiency and performance of the organisation and comprise: physical capital resources, human capital resources, and organisation capital resources. Form these resources we offer a single integrating strategic perspective offering a concurrent top-down Environment/market place view with a bottom-up view based around the potential exploitation of internal competencies and resources form which viable business models can be derived. This is shown in figure 1.

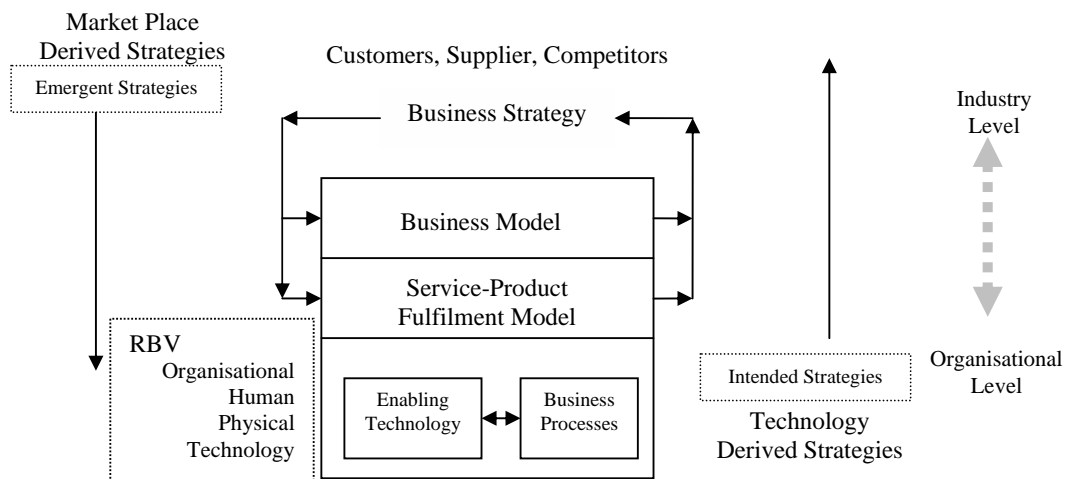


Figure 1: Business Model and Strategy Conceptual Framework

The term *'business model'* is widely used, and in the fields of eBusiness is a hot debate with many interpretations and classifications (Alt and Zimmermann, 2001, Applegate, 2001, Chandra et al., 2002, Chesbrough and Rosenbloom, 2001, Hedman and Kalling, 2003, Oliva et al., 2003, Timmers, 1998, Rappa, 2003, Weill and Vitale, 2001) and this provides a confusing and incomplete picture of the dimensions, and core issues of these business models (Alt and Zimmermann, 2001). The empirical use of the concept has been criticised for being unclear, superficial and not theoretically grounded (Porter, 2001). For example, Timmers, (1998) defines an eBusiness 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 of: *"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 and Tucci (2001) however, take a more direct view: an eBusiness model is defined as *"how a firm plans to make money long term using the Internet,"* while Applegate, (2001) provides a considered business model framework consisting of three basic components: concept, value and capabilities. These authors and others also propose various classifications of eBusiness model (see Joyce and Winch 2004).

A major criticism of business models for eBusiness has been the lack of evaluation techniques for the models that have been generated. Many of these models are anecdotal or retrospective in nature. The basis of the work described here is the re-examination of the activities that are the basis for many of these models. To achieve this some innovative and use novel modelling approaches are used to gain a greater insight into the complexity of eBusiness models. These models may be described as an ‘analysis agenda’ for managers attempting to interpret the complexity of an eBusiness model in terms of the resources required to implement each or a specific business model.

3. A Generic Framework for e-Business Modelling

All business transactions are in one way or another are a part of a supply chain fulfilment system. Orders for goods or services are fulfilled (i.e. satisfied) by the good or service 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 effectively, therefore, three flow processes comprising all such systems:

- Information flows, primarily the orders
- Money flows, payment for goods or service
- The delivery of goods or services to fulfil the customer’s orders

These are just the primary flows, goods may flow via distributors, and similarly money flows may be via credit cards. These may be seen as refinements, alternatives or extensions of these 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. It might also include information not directly related to individual order fulfilments, for example, stock position advisories and so on
- Reverse money flows might be refunds, cash-back, commissions, etc.
- Reverse goods flows might be returns, trade-ins, etc.

Leaving aside for a moment the complexity of these flows, 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, two-way money flows, as shown in figure 2. This is what might be called the “triple pair” flow construct.

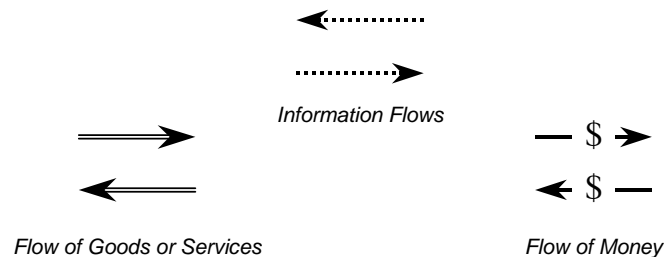


Figure 2: The ‘triple pair’ process flow construct for supply chain fulfilment

If all the relevant flows relating to a particular supply chain structure could be represented within *this construct*, then the configuration of the six flows can be mapped onto any business model that a company has in place, or wishes to adopt. If the business model is based on eBusiness processes then this is only a further variant – the information flows are carried out mainly or totally by electronic processes, and the good or service and money flows may need some modification to make them coherent with the information processes. System Dynamics is well suited to representation of information flow. From its earliest day of development (Forrester, 1961), it has always explicitly reflected industrial and business structures as a complex inter-related set of flows of money, materials and information, though in some contexts the list may be expanded to include people, and ‘materials’ could include for example livestock, 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 (Sterman 2000, Powell et al., 2001). System dynamics has also been used effectively to study issues relating to IS system management (Abdel-Hamid and Madnick, 1991, Abdel-Hamid and Madnick, 1989), IS outsourcing (McCray and Clark, 1999) and e-commerce company strategy (Oliva et al., 2003). Chandra (et al., 2002) view of the supply chain relates explicitly to delivery of physical products, but many supply chains relate to the delivery of services. 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. In contrast, Quinn (2004) bemoans the lack of attention to service supply chains, citing one ‘persuasive explanation’ simply being that ‘ ... service supply chain management has not evolved as a business discipline to the same extent as new-product oriented supply chain management.’ Self evidently, in the context of this paper, the Internet offers at least as many opportunities for new business propositions based on the delivery of services as for the delivery of products, in both B2C and B2B contexts.

It will be expected that service-based supply chains share many similarities with product supply chains; for example, Akkermans and Vos (2003) have reported similar tendencies for amplification effects. They do, however, report that while some causes are common, others like interactions of high workloads and reduced process quality that starts reinforcing each other are uniquely present in service systems. Scott (2000) also argues that while supply chains are quite easy to define for manufacturing organizations where each participant in the chain receives inputs from a set of suppliers, processes those inputs, and delivers them to a distinct set of customers, in service organizations, one of the primary suppliers of process inputs is customers themselves, who provide their bodies, minds, belongings, or information as inputs to the service processes

4. A Triple Pair Interpretation of Specific Weill and Vitale’s Business Models

Weill and Vitale (2001) suggested a set of eight models that classified eBusiness propositions. They characterised these as ‘atomic models’ in the sense that each is the smallest type of proposition, but that many firms will actually offer or be involved in a number of different propositions and will therefore be molecular or hybrid in nature. Their eight models are:

1. Content provider - provides information, digital products
2. Direct-to-consumer – provides goods or services directly to customers

3. Full-service provider – offers full range of products/services, including its own direct sales and bundled complementary products/services from other companies
4. Intermediary – brings together buyers/sellers, eg. Electronic auction
5. Shared infrastructure – brings together multiple competitors to cooperate by sharing IT infrastructure
6. Value net integrator – Coordinates value net (or chain) activities through information management
7. Virtual community – an online community of people with a common interest, facilitates information sharing
8. Single point of contact – provides organisation-wide single point of contact

These business models are based on a systematic and practical analysis of several case studies. The models are defined in terms of the actors in the structure of: the firm, complementors, customers, and suppliers and the inter-linkages between them. This includes the movement of product, money and information. It has already been shown that the ‘triple pair’ flow model approach offers a practical way by which various business models, including those put forward by Weill and Vitale which represent product-based eBusiness propositions, can be visualised in business process terms (Joyce and Winch 2003, 2004). This then provides a way for specifying the model structure in sufficient detail for information flow models to be envisaged to provide the necessary IT services. Detailed analysis raises a number of critical issues in terms of four internal elements or levels - IT Components, Human IT Infrastructure, Shared IT Services, and Shared and Standard Applications – which are in turn linked with public infrastructures, such as the Internet and communications networks, and to external industry-based infrastructures like bank payment systems, reservation systems and supply chain networks. This approach can enable managers to focus their critical attention on the IT infrastructures needed, can guide them in IT investments and, Weill and Vitale (Weill and Vitale 2000) assert, point to situations where the infrastructure gap might be so large as to require major rethinking on their e-business plans.

To demonstrate this process three of the Weill and Vitale models are re-presented in terms of the ‘triple double’ flows. Importantly, two are product oriented business models: Direct to Customer and Full Service Provider, while the third being service oriented business model: Virtual Community. The expansion is indicative only, as there is likely to be a wide range of detailed processes possible within this and each of the business models. However, they provide a method to discuss the strategic implications of each model.

4.1 A Triple pair representation of the *Direct to Customer* model

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 given are Dell and Home 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 visually as in Figure 3.

This characterisation emphasises the major relationship as being directly between the customer and provider and indicates the basic flows between them. This is sufficient to serve the managerial needs identified earlier. However, this model says very little about the actual business processes that would have to be created to enable transaction fulfilment, and is a significant simplification in the sense, for example, that there is no representation reflecting returns. These would require a flow of product in the reverse direction, possibly, if a refund is given, a reverse money flow, and of course

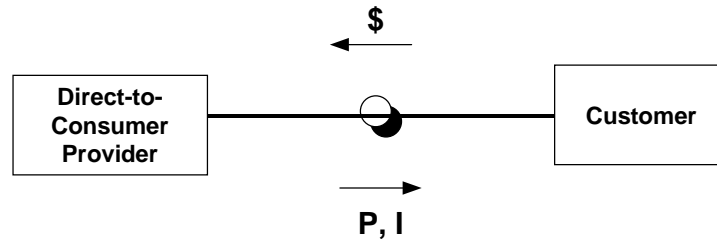


Figure 3: Weill and Vitale's Direct to Customer business model (Weill & Vitale 2001 p. 246)

information flows in the reverse direction also.

The triple flow model would represent this model in a supply chain perspective and highlight all the necessary flows. Focussing at this point on a good, as opposed to service, type product, the representation of basic flows and some inter-linkages would appear as Figure 4. This captures the primary flows and indicates the action links between the flows. 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 via debit card, or payment via 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, and so on.

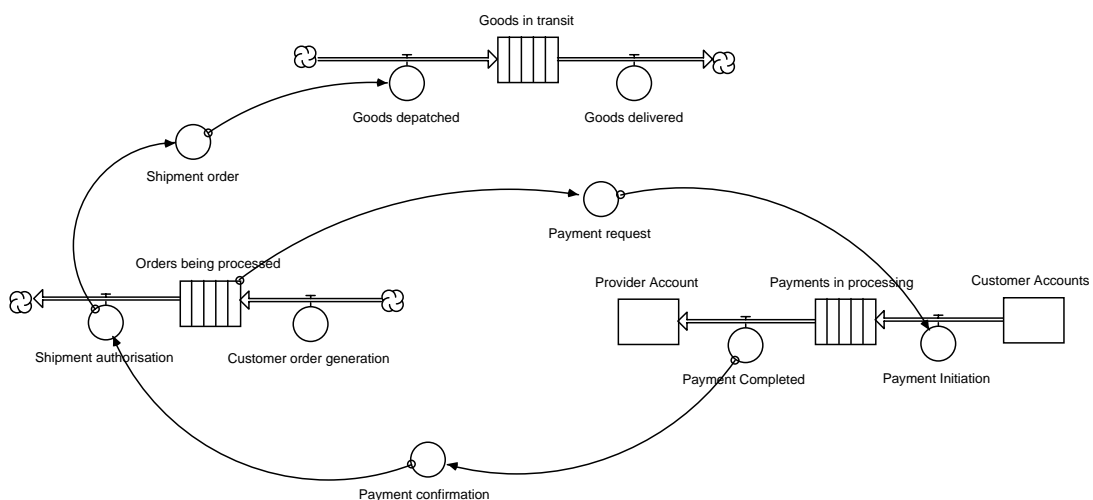


Figure 4: Basic 'triple pair' flow structure of Direct to Customer model

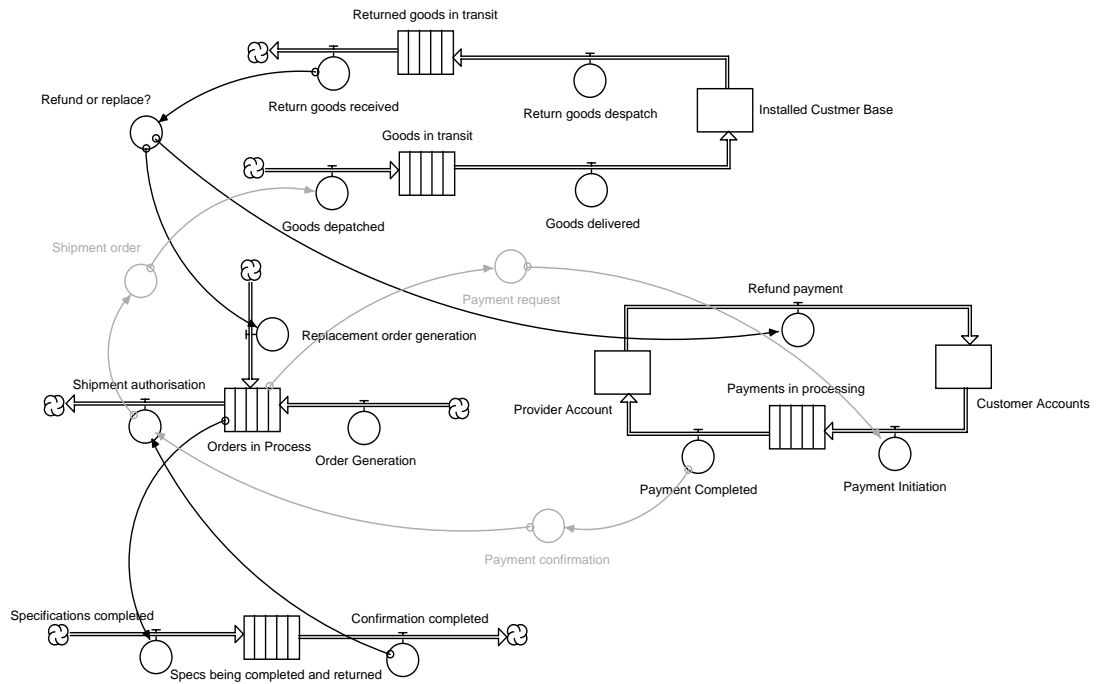


Figure 5: Fuller Direct to Customer model with specification confirmation and goods returns

For a fuller representation with two way flows, the model could incorporate further mechanisms to reflect a possible need for customers to be requested to provide a detailed specification, which might be the case for products such as Dell computers, though this might also be accomplished interactively for web orders. The model could also accommodate goods returns. The expanded model is shown in figure 5, where earlier inter-linkages are muted to grey to highlight new additions. 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 up-grade and/or repeat sales generation, all of which would relate to the installed customer base.

4.2 A Triple pair representation of the *Full-Service-Provider* model

A second of Weill and Vitale's atomic models is the Full Service (FS) Provider. This business model reflects the situation where access to a range products or services is provided through a primary provider who might not only supply its own products or services, but also promote and facilitate the purchase of related products and services from partner firms. Examples might include a direct to customer product supplier, which offers related insurance, training, accessories and so on. Weill and Vitale characterise this model graphical as Figure 6.

Again the primary relationship in this system is between the provider and the customer, but there are additional relationships involving flows of money, product/services, and/or information between the provider and its second-level supply

network partners – which Weill and Vitale consider could be suppliers or complementors (resellers) – and between the second-level suppliers and customers.

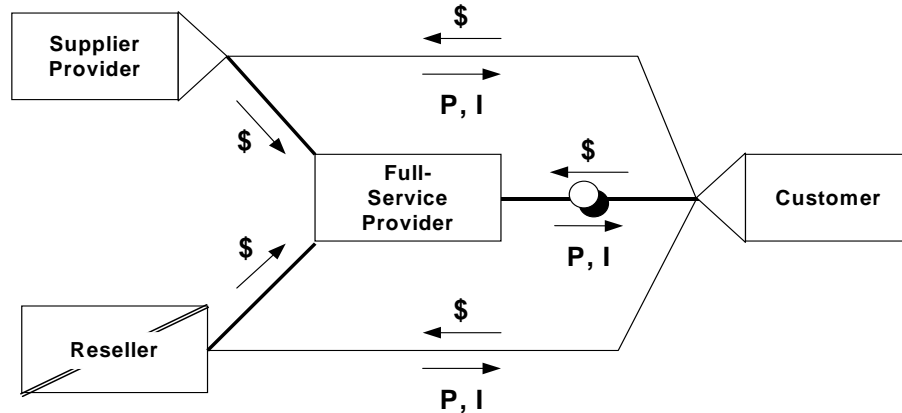


Figure 6: Weill and Vitale's Characterisation of their Full Service Provider Model

As this model is essentially an extension of the direct-to-customer model, structures similar to those developed for that model will exist at the core of this model also. For this reason, those common structures will not be included in this model. This model involves the primary purchase with the full service provider being triggering additional supply fulfilment, money transactions, and information flow processes. Figure 7 suggests that this might typically involve the sending to the customer of information concerning services or products related to their purchase and provided by the FS provider's partner companies. In this version, it is assumed that the

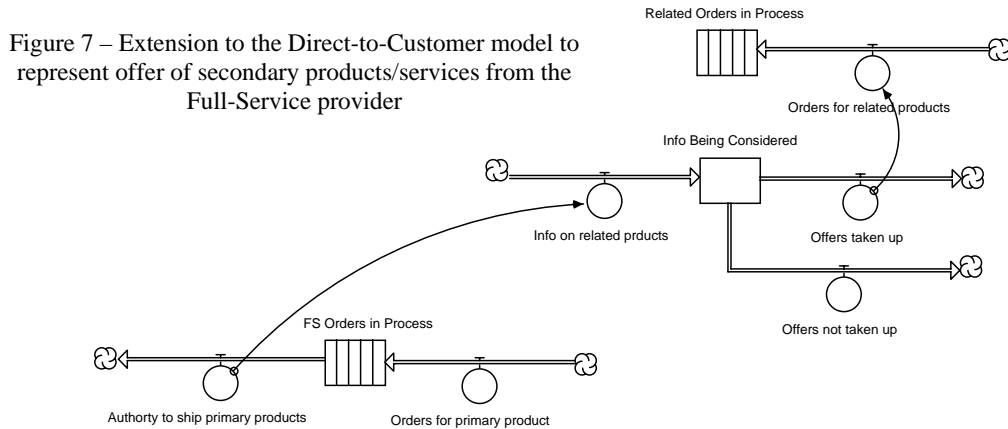


Figure 7 – Extension to the Direct-to-Customer model to represent offer of secondary products/services from the Full-Service provider

communication with the customer is triggered as the initial product despatch is authorised, but this could equally be triggered by the initial order or during the order processing. The main net impact of the trigger point would be timing, though if a despatch were not authorised and the initial sale lost, then with the latter versions the customer might still be contacted concerning the secondary products/services.

The trigger impacts upon an information flow pair. Initially information in the form of the offer for secondary products is communicated to the customer who may or may not accept the offers after consideration (for example there might be a 14-day window after initial sale for the purchase of a linked insurance from a partner firm). If an offer

is accepted, then information in the form of an order or confirmation is returned to the partner.

Customers must also pay for the related secondary product, and so a money flow is also initiated transferring money from customer's funds to the secondary supplier's. Once the order process for the related secondary products is complete, then a delivery process for those products or services is also initiated and, after the delivery process delay, they are delivered to customers. At some point, typically when the order process is complete, a transfer of funds from the secondary supplier to the full cost provider, by way of commission or introduction fee, is also transacted. These further

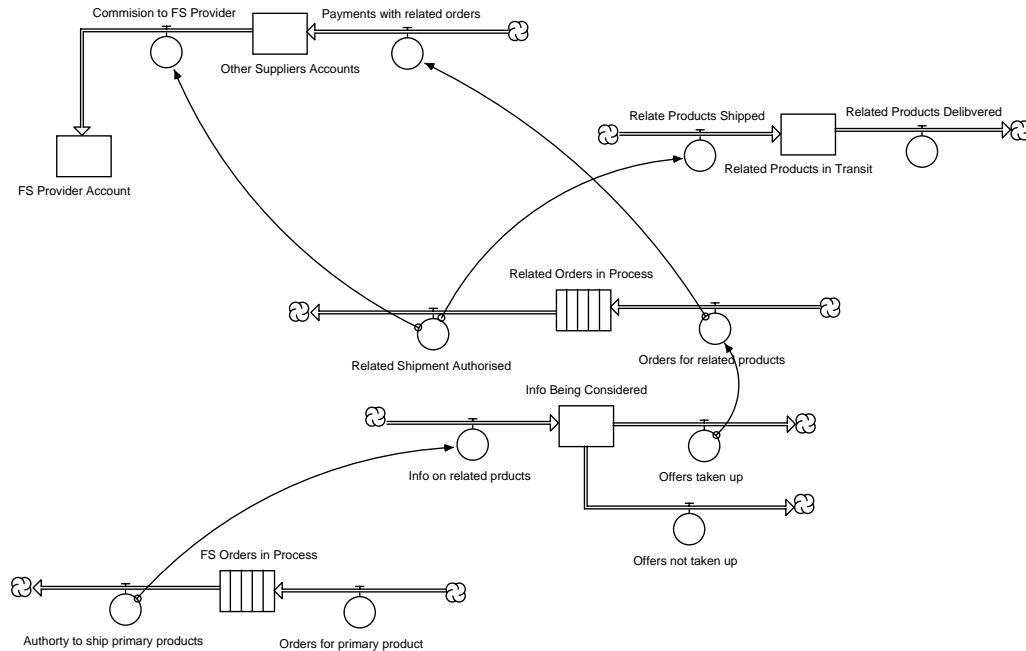


Figure 8: Product Delivery and fund transfer mechanisms added

flows are shown in Figure 8. Similar structures would have to be completed for all secondary suppliers or other complementary resellers, along with reverse processes for returns, refunds and so on.

As before, these are only typical or possible structures, and other configurations are feasible. For example, orders for the secondary products could be returned to the full service provider with payment. Orders would be passed on to the secondary suppliers for order fulfilment, and payments would also be transferred to the secondary supplier, minus the commission element retained by the FS provider. The process model for this would be slightly different of course, while the net result is similar, and could be considered along with other alternatives. In this way entrepreneurs, process managers and system analysts can review the different alternatives, ensuring that the systems they are each envisaging are consistent and evaluating how well the different alternatives would achieve the business model objectives.

4.3 Virtual Communities

The Virtual Community model specify communities that capitalise on the shared interest of groups of Internet users Weill and Vitale (2001, p 256). The community is

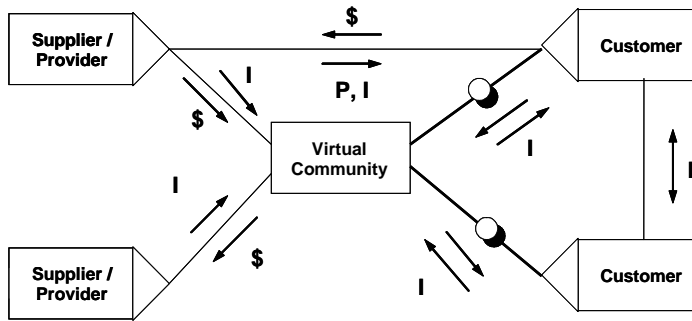


Figure 9: Weill and Vitale's Virtual Community (Weill and Vitale 2000, pg 256)

centred on an interest such as motor sports fans, anglers, or travel. In such situations the community may be coordinated by individuals or a small core group, or by a club or organisation, or could be an appendage of one of the suppliers operating in the field. The community acts as a central information or

knowledge repository that members can access to support their activities and related purchases. The community garners information directly from suppliers (which may or may not incur charges) and from its members. Members might also share information directly with other members though chat rooms or message boards. The community might also receive commissions or referral fees from the suppliers in respect of purchasers by members. The Weill and Vitale schematic for this system are shown in figure 9.

This proposition will share many of the features of the direct-to-customer model in that members make purchases from suppliers of products and services related to the community shared interest. Associated with the community will therefore be a set of

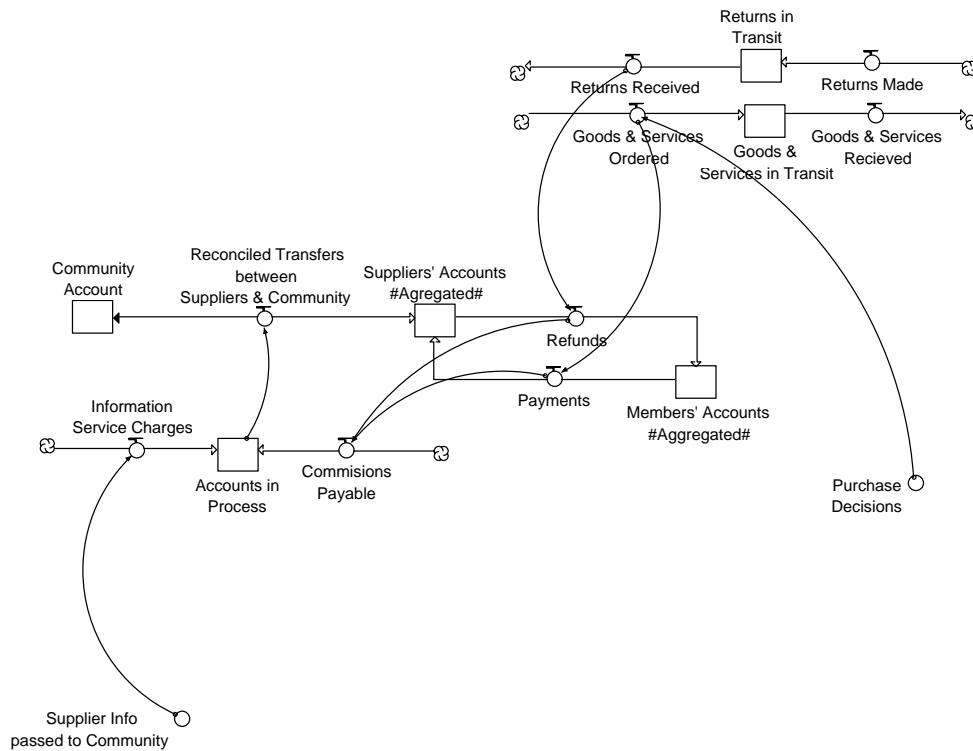


Figure 10: The Virtual Community Model – Goods / Services fulfillment and money flows sectors

direct-to-customer (or full-service provider) supply chains. The funds transfer system

will similarly incorporate money movements between members and suppliers, but will additionally include mechanisms whereby the community receives commissions or referral fees, and any service charges by the suppliers for making information available to the community. These mechanisms are shown in figure 10, though the delivery of goods and services representation includes only the minimum detail for clarity. Note also that the stocks representing members and suppliers accounts are aggregates, and that there will, of course, be other in- and out-flows not related to the operations of the virtual community. The representation here assumes purchase decisions are transmitted directly to suppliers, though the community could act as an intermediary or consolidator, and again that payments are made directly between

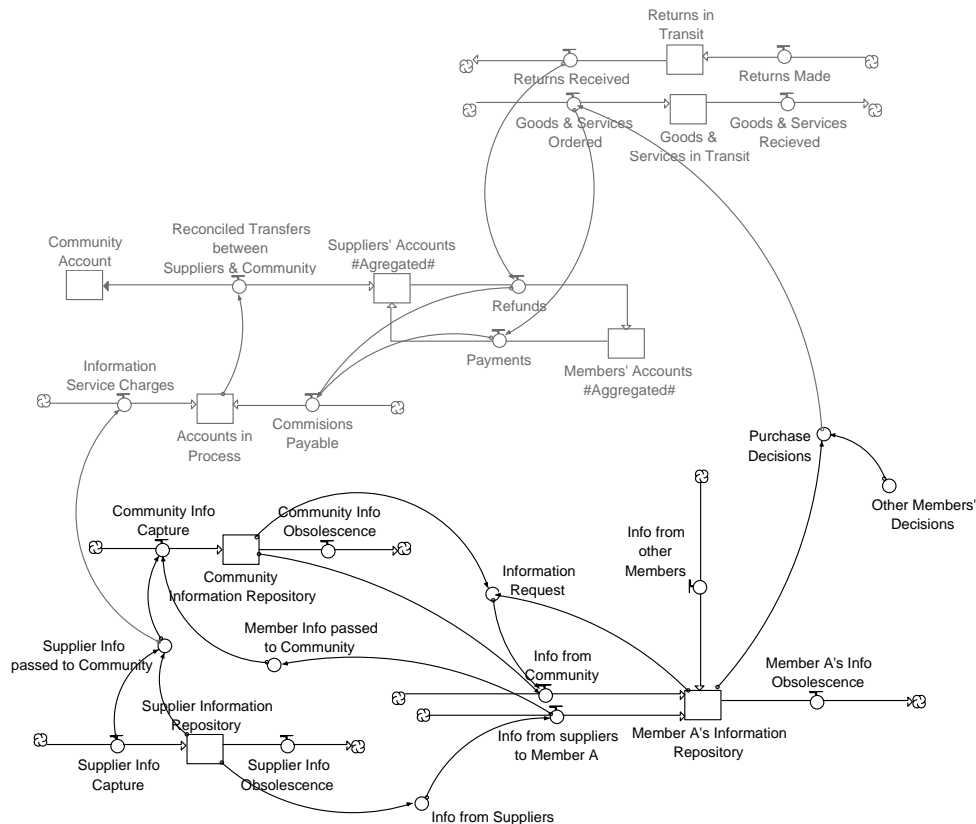


Figure 11: Fuller representation of the Virtual Community model (with focus on the information management/sharing aspects)

members as customers and supplier. Also, while it might be assumed that normally when accounts are reconciled there will be a net flow of funds towards the community, technically the flow could be in the opposite direction so the pipe is shown as a bidirectional flow. Alternative configurations could be considered on the basis of modified stock-flow structures.

However, the heart of this eBusiness proposition is the information flow system that the virtual community provides. A basic representation of this appears as Figure 10. In figure 11 the mechanisms above are greyed to focus attention of these new structures. A critical feature in the management of information or knowledge repositories is that if information is supplied from the repository to another party there will be an inflow into the other party's repository, but there will not be an outflow from the information provider's – the information will not be depleted but will still be

there for future use. This is in clear contrast to the situation of shipment of physical items where the shipment depletes the supplier's inventory when increasing the receivers. (Indeed, if there is any kind of access recording system, then the fact of supplying information creates new information in terms of the frequency or use or data of the 'other members requesting this information also looked at....' type.)

5. Comparison of Service and Product based eBusiness Ventures

Often managers of organisations are often attempting utilise eBusiness as a simple adjunct to the current business processes of the organisation. Often an eBusiness venture attempts to replicate the supply chain that performs the product business processes of the organisation to gain access to the customer and hopefully gain greater market share. Indeed, from an entrepreneur's vision the ability to offer a product in this manner has considerable advantage. Similarly, the technical manager is able to vision the development of technology to support the process of purchasing products from the portal. However, this approach mainly focuses on gaining customer requirements and managing the delivery of the product to the customer. Once the customer has purchased from the service they now form the installed customer base. In this sense the approach focuses on the "purchase" interaction with the customer. It does not utilise the newly acquired installed customer base resource. In the full service model approach it is possible to extend this interaction with the customer by offering secondary services that may or may not be taken up at the time of purchase. Entrepreneurs and managers are attempting to develop strategies that turn this installed customer based into a group to sell to and provide a value proposition.

If we consider the service based eBusiness venture of a virtual community it does have many of the attributes that are found within the direct to customer and full service provider. By re examining figure 10 we can extend this model by including the stock of "installed customer based" between the two flows of goods and services received and returns made making it the same as in figure 5 of the direct to customer.

If we consider the salient points of the two business models we find the following.

- In the both cases there is a focus on the process.
- The product models clearly have a focus on purchase transaction consummation.
- Whilst the service model clearly has a pre and post information transfer in the service provision process.
- Each must gain characteristics of each of the Weil and Vitale model enable a greater level of success.

If we consider the two examples of eBay and Amazon which have these traits in which it is combination of both service and product. For example, Amazon not only provides access to the product in the direct to consumer model but also provides information on what other people have bought from the community of book purchasers in the virtual community.

6. Conclusion

Weill and Vitale often refer to the concept of taking the atomic business models and developing more complex (molecules) business from the constitute parts. This work

highlights that by examining the basic process it is possible understand the basic short coming of a particular atomic business model and how a manager can surface these in an effort to develop more consistent strategies for not only the eBusiness but the organisation approach to new and innovation business ventures.

Earlier work on physical good supply chains extended with 'triple flow' applied to service-based situations. The Weill & Vitale's simple 'D-to-C' proposition developed to represent another e-phenomenon – the 'Virtual Community'. Representation captures information repositories held by suppliers, the community, and individual members; portrays information exchange and ancillary processes.

Triple Pair Flow construct adds depth to Weill and Vitale's basic schematics, by additionally offering: Visualisation to support sharing of mental models between domain specialists, codifying models and building consensus; and Simultaneous representation of the core strategic model with business processes and ICT infrastructure that can be refined and tailored to the emerging business entity.

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