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Working on the Chain Gang - Adopting a SCM Approach to eBusiness Strategy

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Abstract

This paper proposes a new approach to strategic planning for e-commerce systems which incorporates a three stage "chain" analysis using value, supply and demand chain models. The resulting analysis can define the strategy and structure for an e-business enterprise with a robust approach to evolutionary e-business development and the management of change.

Introduction

There is a pervasive and continued interest in the fundamentals of formulating a strategic plan for information systems and technology (IS/IT). One specific classification of IS/IT is recognised in the form of electronic commerce (e-commerce) which organisations are using to revolutionalise their business models (Burn and Barnett, 1999; Dutta & Evrard 1999; Turban et al, 1999). This paper defines and analyses such systems through their relationships and potential influence on the value chain from both a supply and demand perspective. This can provide the organisation with an effective strategy and supporting business structure which can be leveraged to improve business performance (Hackney et al. 1999). The paper reviews the concepts of Supply Chain Management (SCM) in the context of electronically networked organisations and then relates these to the evolution of a virtual value chain. The value chain is used as a basis for the development of an effective structure and illustrated by a case study in the e-grocery business.

Supply Chain Management

Supply Chain Management (SCM) is a well accepted concept in logistics and operations management theory and aims to improve coordination and competitiveness beyond the enterprise level to include interorganisational relationships (Strader et al, 1999). Supply chains exist in virtually every industry and generally involve the procurement processes, transformation of raw materials into finished products and delivery of the product to customers through a distribution system. The supply chain of a packaged consumer goods manufacturer, for instance, comprises manufacturing, packaging, distribution, warehousing and retailing. Managing this involves the coordination of the materials inventory and production capacity availability across several organisations to produce products that can satisfy forecasted demand in an environment with a high level of uncertainty. While often regarded as a manufacturing concept (IT systems for Bill of Materials Processing BOMP have been around in the manufacturing sector since the late 60s) it can equally well apply in a University or any other service industry and may specifically relate to the management of information rather than materials.

Suddenly, however, SCM has become a "hot" topic for a number of different reasons. These include the trend towards multi-site operations with several independent entities involved in the production and delivery process, new and increasingly cut-throat marketing channels and the electronic marketplace. Traditional supply chains and trading partner relationships are exploding into intricate and dynamic virtual networks of trading partners and service providers. The emphasis in these relationships is to derive significant value through increased revenues and decreased costs as shown in Table 1. Achieving this in any organisation directly depends on the performance of all the others in the network and their willingness and ability to coordinate (Swaminathan et al, 1998). The question facing organisations today is not if they should join these new electronic networks, but how.

Table 1. Value from Networked Processes along the Supply Chain (adapted from Benchmarking Partners, Inc., 1999)

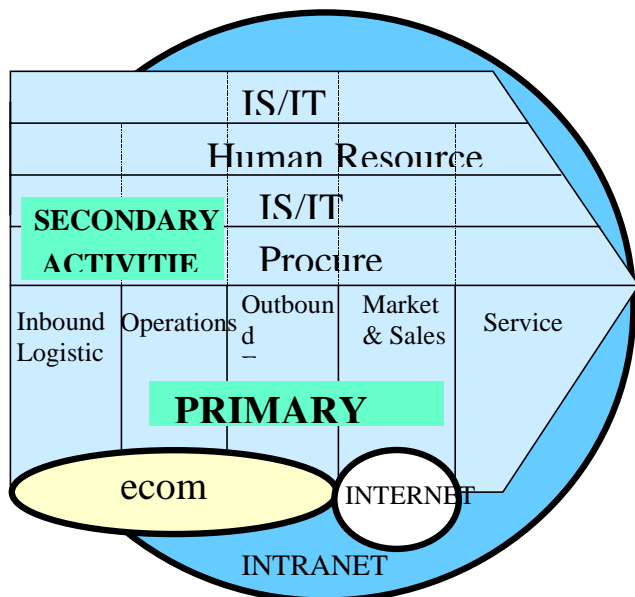| Networked Processes	Value
Design and product management	● Competitive advantage through faster time-to-marke ● Reduced R and D expenses ●Lower unit costs
Order management, planning, forecasting and replenishment	● Competitive advantage and higher revenues from reduced stock outs ● Lower costs through reduced inventory ● Lower costs through reduced return rates
Distribution	● Lower costs through optimised shipping and fulfillment
Sourcing	● Competitive advantage and increased revenue through faster product introductions ● Decreased costs through and increased revenue from higher quality
Customer relationship management	● Increased revenue through improved customer segmenting and targeting ● Increased revenue through improved customer servi ● Decreased costs from efficient salesforce automatio
Merchandising/ Category management	● Competitive advantage and increased revenue through the proper product assortment, pricing and promotional strategies, and shelf placement

Porter (1980) considered these concepts when he derived his classic internal value chain showing primary activities which a business must do to exist and the secondary activities required to control and develop the business and which are common across the primary activities. An organisation today must consider the effect of internet enabled commerce on their distribution channels and the value chain. Figure 1 illustrates the inter-connections.

Fig. 1 Internet Enabled Commerce and the Value Chain (adapted from Porter (1980))

Demand Chains

Traditionally, suppliers reengineered only their end of the supply chain by reducing obsolete inventory and cutting down cost and time of goods to market. However, a much more powerful concept lies in the Demand Chain where for example, a retailer's demand chain would consist of assortment planning (deciding what to sell) inventory management (deciding the quantity of supplies needed) and the actual purchase. Together with SCM we have the Demand-Supply Chain and these are linked and managed in two places - the Order Penetration Point (OPP)and the Value Offering Point (VOP) - see Figure 2. (Holmstrom et al, 2000).

The OPP is the place in the supply chain where the supplier allocates the goods ordered by the customer. Goods might be produced after orders come in (make to order) or allocated from a warehouse once the orders have been received (package to order) or from distribution (ship to order). Each order penetration point has different costs and benefits for the supplier and its customer - for example rapid delivery (a benefit for the customer) depends on holding a large inventory (a cost for the supplier).

The further back in the supply chain the supplier moves the OPP, the more steps there are to

Figure2.TheOPPs

The three main order penetration points

Ship to order
Retailer's demand chain
Inventory management — Purchasing
Manufacturer's supply chain
Distribution — Packaging — Manufacturing

Pack to order
Retailer's demand chain
Inventory management — Purchasing
Manufacturer's supply chain
Distribution — Packaging — Manufacturing

Make to order
Retailer's demand chain
Inventory management — Purchasing
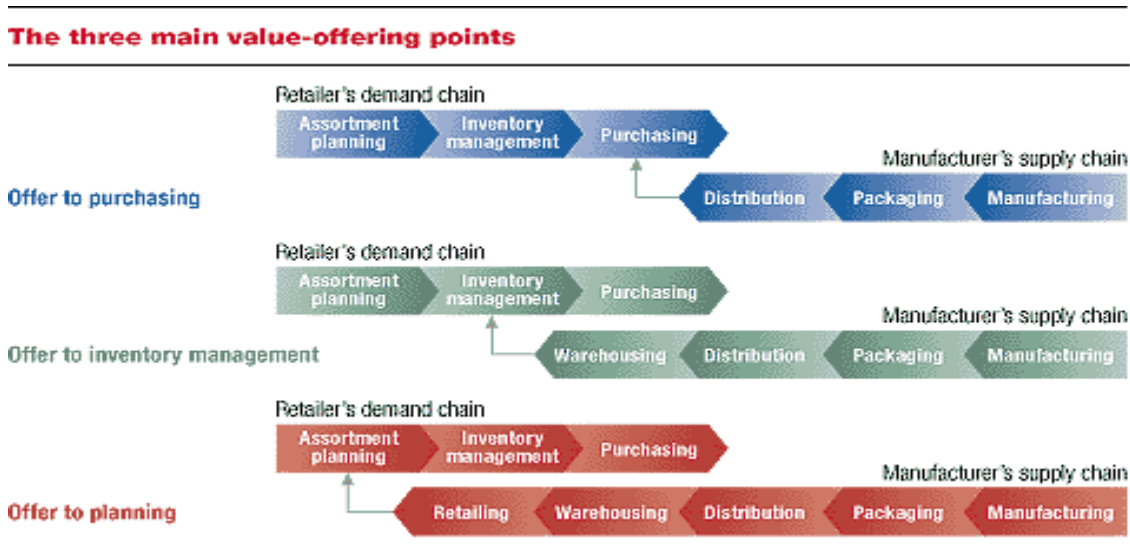Manufacturer's supply chain
Distribution — Packaging — Manufacturing

complete without disruption and the more difficult it becomes to fulfill orders promptly. The advantage to the supplier of this approach depends on the amount of cost savings it can achieve from lower inventory, on the one hand, compared with the reduction in sales that may be brought about by longer delivery times and higher total costs for customers, on the other. Customers and suppliers never benefit equally.

The value-offering point (VOP)—the second place where the demand and supply chains meet—is where the supplier fulfills demand in the customer's demand chain. Moving the VOP back in the demand chain largely benefits the customer, requiring more work from the supplier. There are three principal VOPs (Figure 3). In the conventional buyer-seller relationship, the VOP is the purchasing department, which accepts an "offer to purchasing" by choosing the supplier and deciding when goods are needed. An "offer to inventory management" moves the VOP further back in the demand chain: by carefully monitoring the customer's inventory levels, a supplier can cut down on stock that is unlikely to sell and ensure that the customer never runs out of fast moving goods. An "offer to planning" moves the VOP back to merchandising or production. As the VOP is moved back so this means more work for suppliers and greater benefits for retailers or even end users. The fourth VOP is the "offer to end user," such as Dell Computer's direct-sales model for business clients. Rather than fulfill orders from

Figure 3. The VOPs

The three main value-offering points

Offer to purchasing
Retailer's demand chain
Assortment planning — Inventory management — Purchasing
Manufacturer's supply chain
Distribution — Packaging — Manufacturing

Offer to inventory management
Retailer's demand chain
Assortment planning — Inventory management — Purchasing
Manufacturer's supply chain
Warehousing — Distribution — Packaging — Manufacturing

Offer to planning
Retailer's demand chain
Assortment planning — Inventory management — Purchasing
Manufacturer's supply chain
Retailing — Warehousing — Distribution — Packaging — Manufacturing

wholesalers (an offer to purchasing), Dell went all the way back in the demand chain to the end consumer by fulfilling orders for customized PCs complete with software and network configuration.

By coordinating changes in both the supply and demand chains a supplier can raise its customers' efficiency, as well as its own, i.e. simultaneous movements of the OPP and VOP will be of mutual benefit to customer and supplier. Effectively, this can result in the development of a virtual value chain.

Virtual Value Chains

Mougyar (1998) suggests an e-business must then consider the following two questions:

- Can you increase the number of electronic connections, simplify interorganisational processes and at the same time discover ways to shrink, speed up, or virtualise the value chain
- What is likely to happen with your wholesalers, distributors, or retailers? Are they going to be disintermediated or are they likely to survive by transforming their businesses into new types of intermediaries operating in a neutral market (Berryman et al, 1998).

One obvious scenario is that the old value chain gets smaller and so more efficient as you bypass some of the steps in the supply chain (for example on-line delivery of soft products). In some cases as you disintermediate

previous links in your supply chain new intermediaries will arise (for example you may change to selling through a portal or vortal to reach a larger market). This dynamic reconstruction of intermediaries can also lead to dynamic allocation of intermediaries where the channels become invisible or even non-existent and so creating the virtual value chain. (Rayport and and Sviokola, 1995). Figure 4.

The value chain of the firm does not exist in isolation but exists as part on an industry value system and the whole value system will consist of the value chains of suppliers, customers and competitors. This can become the model for the virtual organisation as it links electronically into value networks.

The Value Network Alliance

Value alliances combine a range of products, services and facilities in one package and are based on the value or supply chain model. Participants may come together on a project by project basis but generally the general contractor provides coordination. Where longer term relationships have developed the value alliance often adopts the form of value constellations where firms supply each of the companies in the value chain and a complex and enduring communications structure is embedded within the alliance (Burn and Barnett, 2000). Substitutability has traditionally been a function of efficiency and transaction costs: searching for, evaluating, and commencing operations with potential partners has been a costly and slow business procedure, relying as it

Figure 4. The Evolving Virtual Value Chain

Old value chain

Shrunk value chain

New intermediaries value chain

Virtual value chain
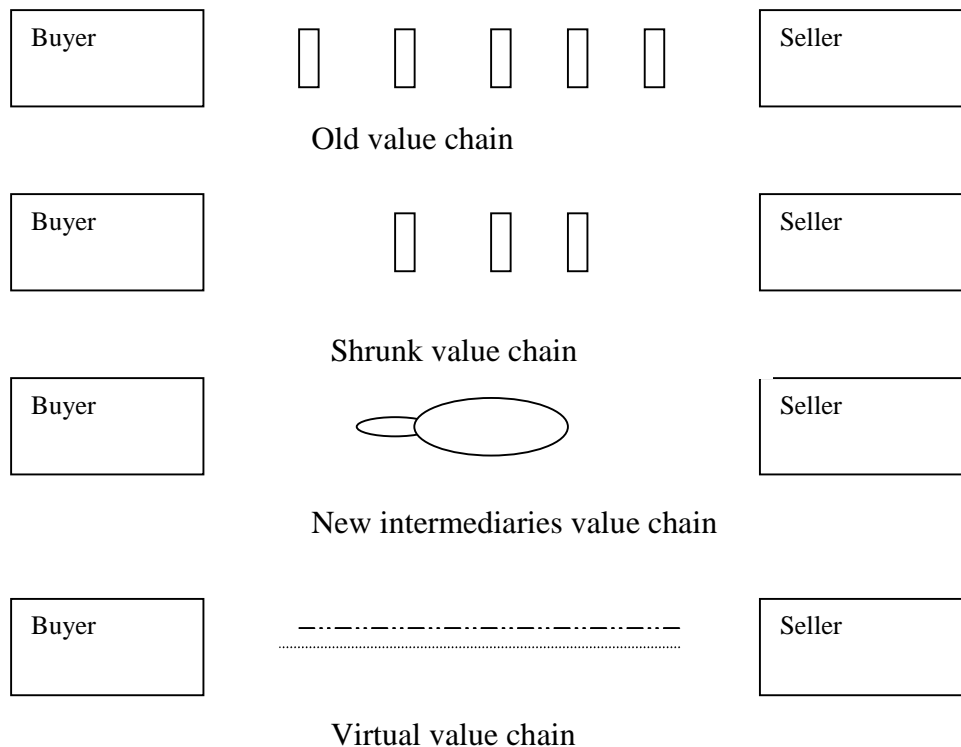
does on information transfer, the establishment of trust and business rules across time zones, culture, currency and legal frameworks. These have determined the relative positioning of partners on the chain and the reciprocity of the relationship.

Figure 5 summarises the current and potential supply chain structures for electronic channels in retailing. Model 1 and 2 represent the current structures for e-tailers and model 3 and 4 represents potential structures for IAHS (Interactive Home Shopping Systems).

Figure 6 summarises how manufacturers in model three and four have applied the Supply-Demand chain to cut out retailers and sell direct to the consumer.

The savings for consumers are clearly significant and from a manufacturing perspective the increased profit margins will undoubtedly accelerate the process. This model is particularly suited to taking advantage of communications efficiencies not previously available and therefore changing components extremely rapidly in response to evanescent market forces and opportunities.

Fig. 5: Supply Chain Structures for Retailers (Adapted from Younger 1999)
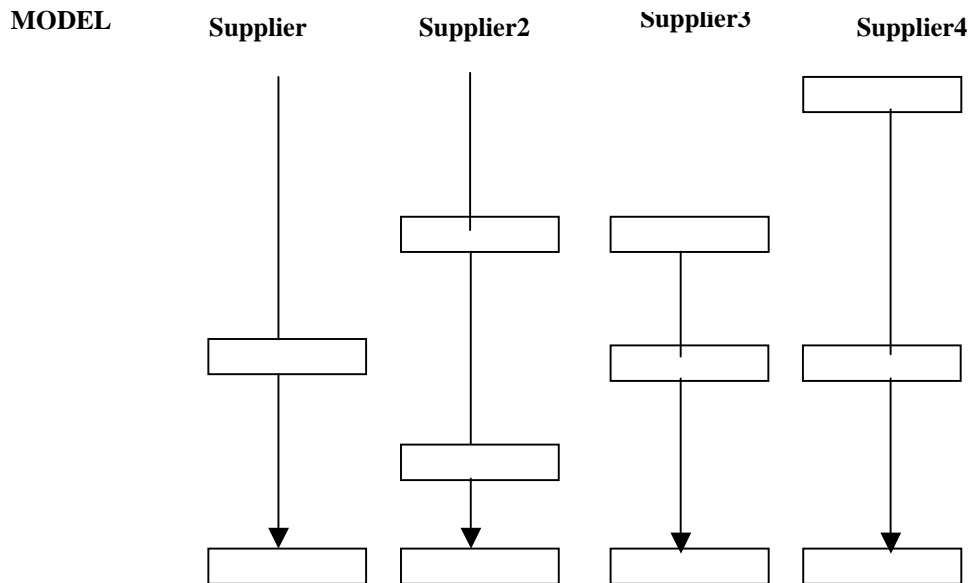
**Figure 6: Supplier Chain Structure for Non FMCG (Younger 1999)**
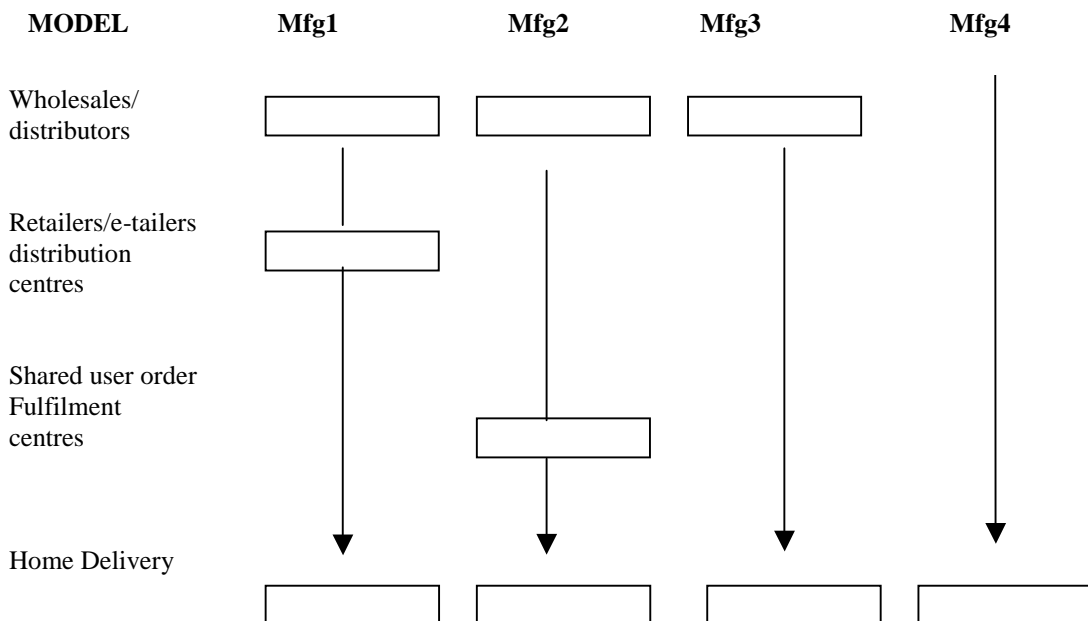
An example of a value network alliance is Peapod.com, described below in Figure 7 within the context of its virtual market.

Peapod.com operates in eight major US conurbations (at end of 1999) supplying grocery and pharmacy items using interactive home shopping through Web ordering, credit card processing and home/office delivery. They offer a range of items selected from partner stores in each area. [Only three are displayed for clarity.] The company

Coles Online, the virtual face of its Coles retail grocery chain, with an introduction in Sydney.

Coles Online is the virtual face of a large retail grocery chain operating across much of Australia under the name of Coles. This company has no links to other companies or services on its site as yet and operates by selecting goods from existing Coles grocery stores and operating a home delivery service, despite the fact that Coles Myer owns and operates other large chains with non-competing

Figure 7. Virtual Network Model
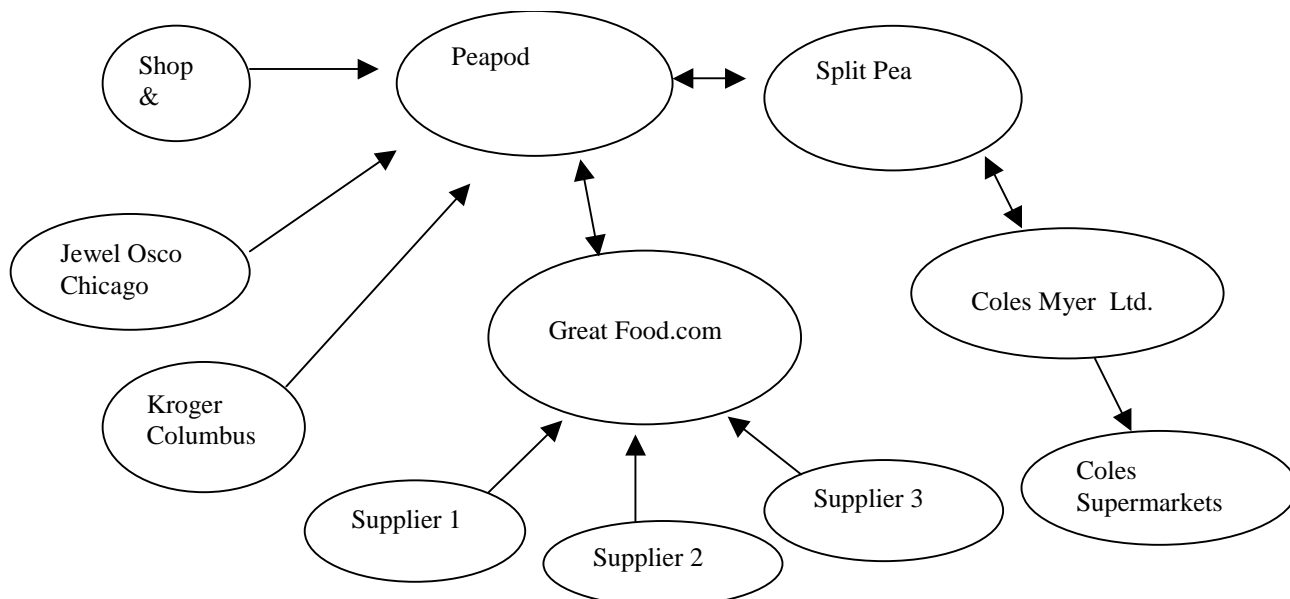
solicits active Web recruitment partners by offering a reward program to owners of web sites who accept links on their sites – rewards are provided in the form of set payments for each referred customer's first and third purchase. The company developed proprietary software and logistics to support its operations and then spun these away from the core grocery delivery business.

Split Pea Software was formed in December 1998 to act as an independent licensing arm for the IAHS shopping and delivery systems and technology. These systems include the server-based shopping application together with business applications such as fulfillment management, product database administration, customer support and Peapod's one-to-one targeting engine. Peapod is only a minority interest in Split Pea which is majority owned by senior management.

Split Pea, was formed upon the successful conclusion of negotiations leading to a licensing agreement with the large Australian Retail chain operator, Coles Myer Ltd.. Coles Myer has exclusive use of the Split Pea technology within Australia and New Zealand, but Split Pea is seeking to license its software and delivery services elsewhere. Coles Myer is currently testing the system for

interests, such as the Target clothing stores and the Officeworks office supply and stationery chain.

One of the most interesting aspects of these networks is the speed at which companies are focusing on core competencies and outsourcing non-core functions to other service providers in the value network. With virtual relationships, companies can more easily outsource but still integrate these outsourced functions into their virtual organisation. A manufacturing company with superior strengths in branding and selling could transform their organisation to focus on these and outsource the manufacturing into its virtual value chain. Many organisations have moved towards this model (particularly the new dot.com companies) and are becoming virtually integrated rather than vertically integrated. These companies can now focus specifically on their customer communities who act as information gathering and information dissemination conduits (Venkatraman and Henderson, 1998). This will involve increased personalisation and customisation of product offerings and the aggregation and disaggregation of information-based product components to match customer needs and to support new pricing strategies (Bakos, 1998).

Conclusions.

Value, Supply and Demand chain analysis are methodologies which have been applied to IT strategies for the last two decades but these tend to imply linear relationships. Using them in a comprehensive framework they can effectively model the value network of a complex e-business environment. As organisations form and reform these value-network alliances they also have to develop capabilities to cope with strategic, technical, cultural and operational change (Wigand and Benjamin, 1995). Logistics, manufacturing and customer interfacing functions will become prime areas for outsourcing or incorporation into the virtual value chain and the ability to form and manage these is of critical importance. Continual re-evaluation of the "chain gang" will become an essential toll for developing strategies for e-business and managing the on-going change processes.

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