

# A New Transaction Cost Analysis of Disintermediation and Illustrative Case

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## Abstract

*Disintermediation, as an electronic commerce strategy that threatens to disrupt traditional supply chains, has been widely discussed and analysed using transaction cost analysis. This paper presents a new transaction cost analysis tool to evaluate disintermediation business models, which for the first time explicitly separates transaction costs in three ways: the stage of the transaction where they occur, which party they affect, and whether they relate to information processing or physical product handling. Separating information processing and physical product handling aspects of transactions throws new light on the difficulty of disintermediation since the new technologies of electronic commerce can effectively reduce only information processing costs. The argument is illustrated by an analysis of a case study of a novel disintermediation business model.*

## Keywords

Business Strategy, Case Study, Disintermediation, Electronic Commerce, Supply Chains, Transaction Cost Analysis.

## INTRODUCTION

Following the advent of new information technologies, such as wide-area, transparent communication through the Internet, shared database infrastructures, and Internet search and document display capabilities, there has been wide-spread speculation that many traditional businesses would be wiped out by e-businesses pursuing disintermediation strategies (Benjamin and Wigand 1995). The notion of disintermediation originated in the finance sector where it referred to the bypassing of banking and financial processes (Napoli and Baer 1991). Applied to electronic commerce, disintermediation refers to the potential of businesses using the new Internet technologies to by-pass traditional middle-men in supply chains by selling products directly to the ultimate consumer. However, partly as a result of the failure of many Internet start-ups to turn a profit (Peet 2000) a number of authors have recently acknowledged that disintermediation is more difficult than first thought (Bakos 1998, Chircu and Kauffman 1999, Giaglis et al. 1999).

A number of authors have chosen transaction cost analysis as a framework to discuss the changes in market and supply chain structure caused by the introduction of new technologies (Bakos 1998, Fraser et al. 2000, Malone et al. 1987). Transaction cost analysis can be traced to Coase's (1937) paper "The nature of the firm". Coase explained that the existence of "the firm" was closely tied with the lowering of costs associated in carrying out a market transaction (Coase 1937). Since then, Williamson and others have expanded upon Coase's work by extending the scope of transaction cost analysis (Hobbs 1996, Williamson 1998), for instance, to include searching and information costs, bargaining and decision costs, and policing and enforcement costs (Pitelis 1993). Although transaction costs are difficult to

measure in practice (Hobbs 1996) and transaction cost analysis neglects some relevant aspects of business dealings such as timeliness, risk, and continuity, it is nevertheless useful in the analysis of e-business models. From this perspective, intermediation can be seen as a competitive strategy based on reducing transaction costs (Casson 1996).

In the course of completing a transaction both informational and physical product handling processes occur, although this is not always apparent because physical strategies (such as holding stock or displaying product) are often used to deal with these two aspects simultaneously. On the other hand electronic commerce technologies have an unequal impact on these two aspects. While Internet technologies can significantly reduce transaction costs that are information processing in nature, they have little impact on reducing physical product handling transactions costs. Therefore, a careful accounting of information processing and physical handling transactions costs is an important step in evaluating the potential of Internet-enabled business models.

The aim of this paper, therefore, is to present a new transaction cost analysis tool with which to examine Internet business models concerned with manufacturing and selling physical products, including disintermediation strategies. This new tool extends traditional transaction cost analysis by explicitly classifying transaction costs according to: at which stage of the transaction they occur, whether the buyer or seller incurs them, and whether they are information processing or physical product handling costs. A precise evaluation of the role of Internet technology and the likely success of the business model is then possible.

In particular, the analysis reveals the following new insight. Business models that require an organisation to use electronic commerce technology simply to compete with existing intermediaries have a favourable evaluation because the new technologies will most likely allow them to perform *some* of the traditional intermediary functions more effectively. On the other hand, an organisation wishing to pursue a disintermediation business model needs to be more efficient in *all* the functions, including physical product handling, which were originally provided by the intermediaries that it wishes to displace. To illustrate our arguments we use our new analysis tool to evaluate some existing disintermediation business models and one novel business model that we are currently studying.

The paper is organised as follows. In the next section, the process of completing a transaction is described as making use of number of interactions between seller and buyer, relating to different stages of a transaction, which are either information processing or physical product handling in nature. The transaction costs associated with each stage are then defined and again classified as either relating to information processing or physical product handling. We then discuss the opportunities for intermediation arising from these transaction costs. We analyse how traditional intermediaries deal with transaction costs paying particular attention to the way they solve informational processing and product handling problems. We then turn to organisations using new information technologies. We distinguish two types of cyber-competitors, cyber-intermediaries and cyber-disintermediators, and show why the cyber-disintermediator strategy is the more difficult. In section 4 we examine some existing business models to show that our analysis explains their success and failure. In sections 5 and 6 a case study of a novel disintermediation business model is presented and analysed using our framework to show how it neatly deals with these transaction cost issues.

## **SELLER AND BUYER INTERACTIONS**

Seller and buyer interactions have a number of characteristics in common wherever they appear along a supply chain. A supplier, wholesaler, or retailer may be a seller or a buyer

depending on where they sit in the supply chain, and from which direction they are viewed. At each stage of the supply chain their goals are the same:

- 1) Buyers want the product with greatest utility for the least price and cost.
- 2) Sellers want to exchange their added value (which includes intellectual property) for the highest price and the least cost.

Given that each party has a different goal, when a buyer and seller act out a transaction, there are many interactions between these two parties. In each interaction, each party is trying to minimise costs while trying to achieve their own goal. The complex interactions can be viewed as occurring at distinct “stages” in completion of a transaction (see Figure 1). Within each stage are problems that the seller or buyer need to resolve to make a successful transaction.

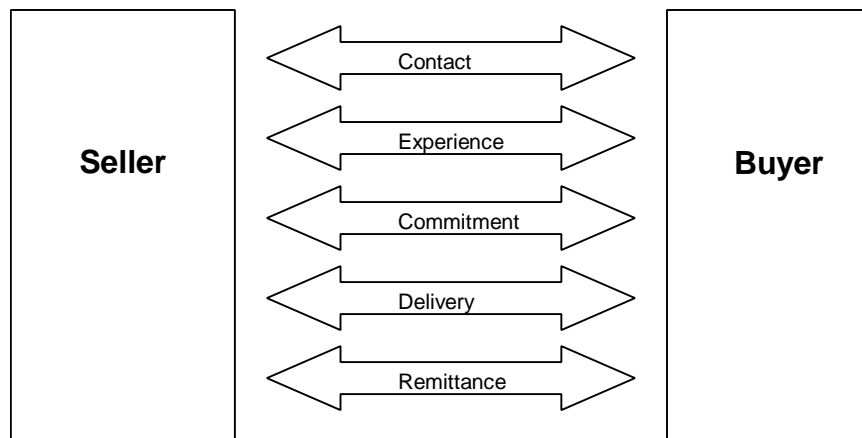


Figure 1: Stages within a transaction.

For a seller, the *Contact* stage problem is how to promote their products and gain access to the maximum number of buyers: for the buyer, the problem is searching for the right product and discovering the true product price.

For a seller, the *Experience* stage problem is how to entice the buyer to make a purchase: for the buyer, the problem is how to test and trial the product before deciding on a purchase.

For a seller, the *Commitment* stage problem is how to process an order: for the buyer, the problem is how to place an order.

For a seller, the *Delivery* stage problem is to dispatch and deliver the products to the buyer: for a buyer, the problem is to retrieve and receive their products within an acceptable time period.

For the seller, the *Remittance* stage problem is to ensure payment from buyers, and for the buyer, the problem is how to ensure payment gets through to the seller. However, remittance is a problem that is already efficiently solved by credit arrangements and tokenised forms of money. Also, in the area we discuss, it is unlikely that an organisation will seek out a market niche by focusing on the remittance problem. Hence, we will largely ignore this stage for the rest of our discussion.

These transaction stages and their associated problems can be categorised as either dealing with information processing concerns or with physical product handling concerns. The problems associated with the *Contact* stage are to do with information processing because they concern customer information dissemination and searching. The *Experience* stage deals with the physical nature of products when product evaluation requires physical handling of products (so called “high touch” products (Peet 2000)). For some products whose nature is well captured by a simple description (so-called “low touch” or “commodified” products), the

*Experience* stage can be considered informational. However, reducing the experience of typical physical products to information processing is problematic for electronic commerce, so here we view the *Experience* stage as a physical stage. Within the *Commitment* stage the problem of order placement deals with information processing since order commitment can easily be achieved by telephone, for example. The *Delivery* stage problem deals entirely with the physical distribution of products, and finally, the *Remittance* stage presents an information processing problem since all forms of money are now so tokenised that they can be viewed as essentially information.

In Table 1, the costs associated with completing a transaction from start to finish are broken up according to the stage in which they occur, which party incurs them, and whether they are associated with an information process or a product handling process.

Stage	Seller's Cost	Buyer's Cost
Contact	(I) Costs associated with displaying products to entice buyers, discovering a customer base, and discovering the maximum price one can charge a buyer.	(I) Costs associated with searching for the product with the greatest utility, and discovering the right price.
Experience	(P) Costs associated with making products available for buyer's inspection.	(P) Cost associated with testing and trying out products to ensure they meet buyer requirements.
Commitment	(I) Costs associated with placing and processing a buyer's order.	(I) Costs associated with placing an order.
Delivery	(P) Costs associated with dispatching and distributing products sold.	(P) Costs associated with retrieving and receiving products purchased.

Table 1: Transaction cost associated with the transaction stages. (I) indicates an information processing cost, (P) indicates a product handling cost.

## INTERMEDIARIES

An intermediary is a business that interposes between the ultimate supplier and the ultimate customer. Examples of intermediaries are parts producers, assemblers, wholesalers, and retailers (see Figure 2). In some supply chains a manufacturer may be both the parts producer and the assembler. In other supply chains other intermediaries are included such as parts brokers and distributors. Intermediaries are both a seller or a buyer depending on from which direction they are viewed.

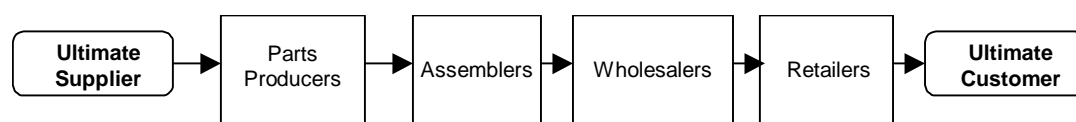


Figure 2: Traditional Supply Chain.

According to transaction cost analysis all intermediaries exist because they reduce transaction costs for both buyers and sellers. Intermediaries increase the price to the ultimate customer and reduce the return to the ultimate supplier as expressed in their margin. Therefore, to exist they must reduce transaction costs to the extent that their marked up price is less than the price if the product were sourced directly between the ultimate supplier and ultimate customer.

Intermediaries, such as wholesalers, reduce transaction costs by solving the problems associated with the various transaction stages, traditionally through strategies relating to product and market consolidation, inventory, infrastructure, shop-fronts, and proximity. We now consider typical strategies used by traditional intermediaries to reduce transaction costs in the various transaction stages.

The approach used by a traditional retailer is typical. The retailer's seller is a wholesaler and its buyer is the ultimate customer. A retailer's strategy focuses on proximity of their organisation to customers and supplying floor and shelf space for wholesalers. The retailer's shop-front and inventory reduce costs both to the wholesaler and ultimate customer by reducing the information processing and product handling transaction costs associated with each stage of a transaction.

Customers walking into the shop reduce the wholesaler's costs of searching for customers and market preferences (customer consolidation). Having products from various suppliers displayed on the shop floor reduces search costs for the customer and provides an adequate solution to price discovery. The shop-front reduces the costs associated with the trial and testing of a product for both the wholesaler and the ultimate customer. By bulk purchasing from the wholesaler, costs to the wholesaler in order placement, order processing, and inventory are reduced. The shop front provides a central location for customers to purchase a variety of products and reduces the customers' order placement costs. By purchase consolidation and retailer proximity to the customer, wholesaler's delivery costs are reduced because the wholesaler only has to distribute to one location in order to reach a wide range of customers. The shop front reduces customers' delivery costs by providing a central pick-up location.

Each of the other intermediaries in the supply chain, the part producer, the assembler, and the wholesaler, use very similar approaches to that of the retailer for reducing transaction costs. However, the focus for each type of intermediary is different. While the retailer focuses on proximity to the customer and display, the wholesaler focuses on infrastructure for distribution, and both the assembler and parts producers focus on economies of scale, to reduce transaction costs.

Intermediaries solve the various transaction stage problems by reducing the transaction costs involved for the seller and buyer between whom they interpose. Given that the transaction stage problems can either be information processing or physical product handling in nature (as shown in Table 1), it is interesting to note that most of the traditional solutions provided by the intermediaries are physical solutions. For example, the shop-front (a physical solution) of a retailer provides a way of recording market preference when buyers enter the store (an information processing problem), a means for the buyer to perform product search and price discovery (an information processing problem), a means for the buyer to order and to retrieve products from a central location (a physical product handling problem), and means for the seller to reduce distribution costs (a physical product handling problem).

Evans and Wurster have referred to the conflation of informational and physical aspects of business transactions as "bundling" (Evans and Wurster 2000). The reason that information processing and product handling elements are bundled in traditional solutions to the transaction stage problems is that information is inherently embedded in the physical product. Traditional intermediaries have always been forced to make a compromise between the economic value of the information processing and physical product handling aspects of the products to be sold. For example, a storeowner has to decide how many products should be displayed, showing a range of features and prices, on the shop floor or on the shelves to give the customer enough information to make a purchase in order to reduce the customer's search costs. However, at the same time the storeowner must minimise inventory costs associated with the number of

products to be kept physically in the store. Because both information processing and physical product handling aspects within a physical product are bundled, the storeowner has to trade-off between maximising product display and minimising inventory costs.

## NEW INTERMEDIARY OPPORTUNITIES PROVIDED BY THE INTERNET

Organisations are finding ways to disrupt the traditional structure of the supply chain through the new technical possibilities created by the commercialisation of the Internet and associated information technology. Technologies such as wide-area, transparent communications of the Internet, Internet display capabilities, database infrastructures, on-line user communities, internet auctions, and search engines, have provided new kinds of intermediaries in the supply chain new ways to solve the problems associated with each stage within a transaction. These new tools and capabilities allow organisations to reduce transaction costs, and therefore, according to transaction cost analysis, they provide a way for these organisations to compete with traditional intermediaries at various points along the supply chain. A **cyber-competitor** (an organisation using Internet and new technologies) can compete in one of two ways:

- 1) **Cyber-intermediaries** compete as an *alternative* to an existing intermediary in a supply chain (Figure 3).
- 2) **Cyber-disintermediators** completely by-pass one or more existing intermediaries, in addition to competing as an alternative to another existing intermediary within a supply chain (Figures 4 and 5).

### Cyber-Intermediaries

The key idea of a cyber-intermediary strategy is to compete with an existing intermediary by using the new capabilities of the Internet and other information technology. The advantage of this form of competition with existing intermediaries is that cyber-intermediaries only need to reduce *some* kinds of transaction costs for both parties to be competitive. However, the disadvantage is that they have to work within the traditional mark-up for that position in the supply chain.

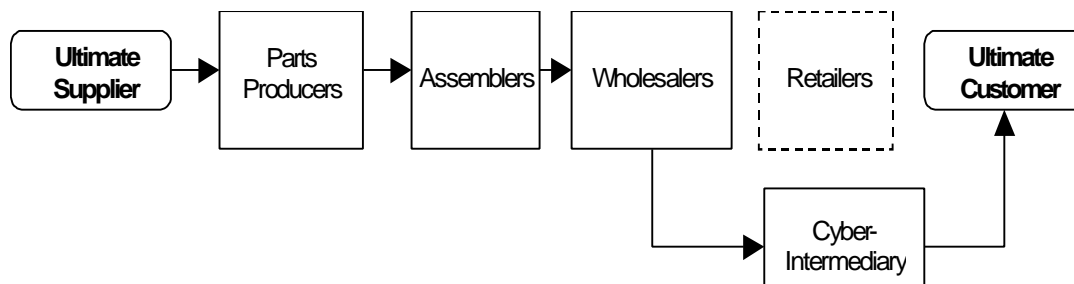


Figure 3: Cyber-intermediary in the supply chain.

### Cyber-Disintermediators

The cyber-disintermediator competes by combining the functions of more than one traditional intermediary in its business model thereby threatening to disintermediate or eliminate the niche for some traditional intermediaries. The advantage of this disintermediation strategy is that cyber-competitors using it have the cost advantage over their competition of being able to increase their margin by up to the additional margin of each intermediary they replace. However, the disadvantage is that in addition to using their new capabilities to reduce *some* transactions costs, they now must be able to provide *all* the functions of the intermediary they eliminate at an added cost not exceeding the margin of the eliminated traditional intermediary.

This means that their new technology must allow them to perform all functions of the eliminated intermediary at a lower total cost.

Thus, although the rewards are potentially greater, the task of the cyber-disintermediator is considerably more difficult than that of the cyber-intermediary: it is a more difficult task to equal or reduce the sum of *all* the transaction costs of the eliminated traditional intermediary than to simply use the new technology to reduce *some* information processing transaction costs. A cyber-competitor contemplating a disintermediation strategy must therefore carefully evaluate whether it can solve the transaction stage problems more effectively than the intermediaries it is trying to replace.

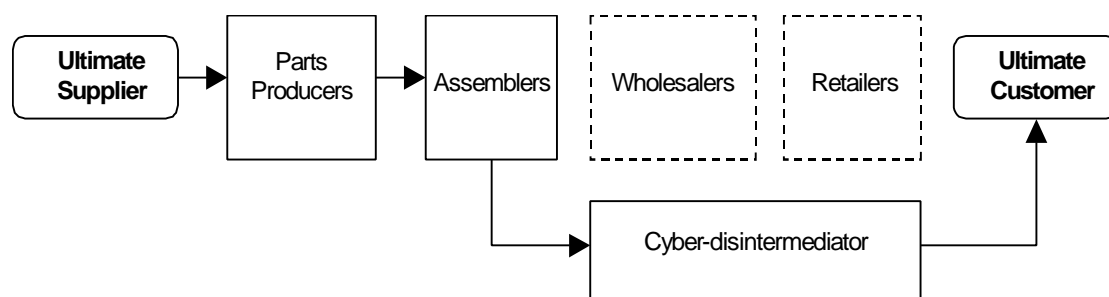


Figure 4: Cyber-disintermediator in a supply chain, disintermediating one traditional intermediary.

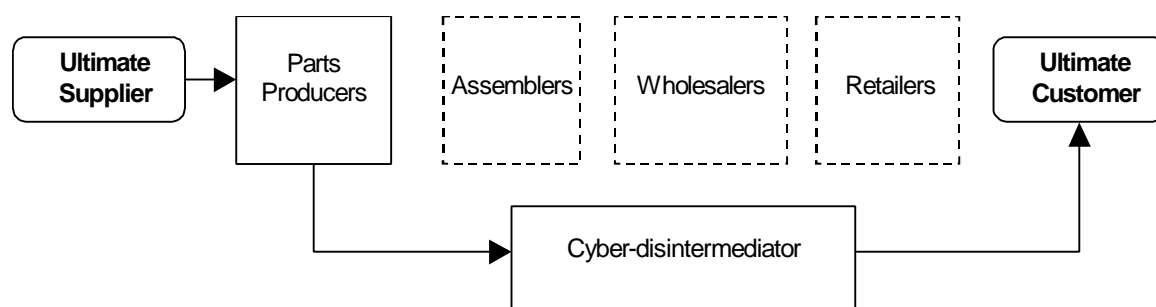


Figure 5: Cyber-disintermediator in a supply chain, disintermediating two traditional intermediaries.

We argue here that failure in past discussions of disintermediation to distinguish between information processing and physical handling transactions costs, has led to an overestimation of the capabilities of these new technologies to enable profound changes to supply chain structures. Except under exceptional circumstances, it is unlikely that the new technologies have enough scope to allow a cyber-competitor to successfully duplicate all the functions of two intermediary levels at comparable cost, because physical product handling transaction costs abound along the supply chain, particularly at the up-stream stages. At the same time the Cyber-disintermediator is likely to be less competitive with physical handling than the more specialised traditional intermediaries. Hence, new models that propose disintermediation must look closely at how to avoid the new physical product handling transaction cost structure overwhelming the information process cost reduction potential provided by new information technologies.

## CURRENT INTERNET COMMERCE DISINTERMEDIATION STRATEGIES

In this section we discuss several existing business models that attempt disintermediation, in order to illustrate how a proper accounting of information processing and physical product handling transaction costs helps to explain success or failure of disintermediation strategies.

We define business model, following Timmers (Timmers 2000), as an architecture for product, service and information flows that includes a description of market strategy, sources of revenue and potential benefits.

### **Amazon.com**

One of the best known Internet commerce business models is that of Amazon.com, which started out as on-line retailer of books around 1995 (Hof et al. 1998). It has since offered other products such as CDs, and videos. As an information broker, Amazon.com provides a very strong on-line presence with customised services and a continuously expanding product catalogue, reducing customers' product searching, price discovery, and price value costs. They also reduce the suppliers' search costs by providing access to a large number of potential buyers while saving on shop-front and inventory costs.

Amazon.com's model was originally touted as *the* model for electronic commerce disintermediation, eliminating distributors and (similar to the supply chain model depicted in Figure 4). However, both distributors and wholesalers substantially deal with physical product handling transaction costs, and to a lesser degree information processing ones. Amazon.com falls short when it comes to distribution problems. It has attempted to deal with the problem by outsourcing most of its operations and initially held a small amount of inventory (Hof et al. 1998, Peet 2000). Because in the publishing industry physical product handling transaction costs are a major component of total costs, there is little room to offset increased distribution costs against new kinds of cost savings, in this case the information processing transaction costs. Except for extremely specialised products and market niches, Amazon.com's direct on-line approach is not likely to succeed at disintermediation. Amazon.com is beginning to realise this problem, as indicated by their new focus on extra product ranges and their recent large investments in automated warehousing and distribution centres (Hof et al. 1998, Peet 2000).

### **Dell Computer Corporation**

Dell has received a lot of attention because of the large of sales it has achieved through its website, [www.dell.com](http://www.dell.com). However, before it moved into the Internet commerce environment its supply chain had already gone through strategic changes such as manufacturing just-in-time, direct channelling, and manufacturing largely to order (Evans and Wurster 2000).

When Dell started conducting its business through the Internet in 1996, the customers were given the option of having a computer configured to their own requirements, the ability to see price implications of their configurations, and the ability to monitor the status of their orders using Dell's tracking system (Evans and Wurster 2000, Symonds 1999). Dell assembles the computer according to the customer's requirement, packs the product and then distributes the product to the customer. Therefore, Dell has achieved true disintermediation, by bypassing the assembler, the wholesaler, and the retailer (similar to the supply chain model depicted in Figure 5). In addition, they have reduced the customer's search costs, order placement costs, and retrieval costs. Thus, Dell's business model deals effectively with the relative importance of information processing and physical product handling transaction costs.

Traditional businesses usually have great difficulty carrying the physical range that would give adequate product search to customers, especially if a lot of options are desired. However, Dell has managed to compete by providing mass customisation, which is extremely difficult to achieve in a traditional physical supply chain. Hence, they can afford to charge customers higher prices than other computer businesses. Their business model thus recognises the essentially information processing nature of product search and exploits the informational possibilities for product display and experience transaction costs for a highly commodified



product such as computers. At the same time, the effect of their business model on physical distribution transaction costs is reduced in importance by the high value of their product.

### **The Traditional Franchise Model**

Unlike the models previously reviewed, the franchise model has not yet been transformed into an Internet commerce business model. Although there may be web sites relating to franchises, there is not yet a web site that distributes an actual franchise system or “know-how” using the Internet. We include this business model in our discussion for the purpose of highlighting elements that are similar to the novel business model in our case study.

Briefly, a franchise business is a licensing system where an owner of a particular product or service offers a license to others to market his/her product or service. In terms of disintermediation, a franchisor successfully disintermediates at least three intermediaries, the assembler, the wholesaler, and the retailer (see Figure 5). In some cases, for example, fast food franchisees, by making their own French fries directly from a supplier’s crop of potatoes, may even be able to disintermediate the parts producer as well.

The attraction of the franchise is that by licensing out the “know-how” or system, the franchise is able to avoid most of the physical product handling components of the transaction costs, leaving remaining transaction problems virtually all information process related. Most of the information processing transaction costs of a franchise such as product searching, and price discovery are taken care of by successful branding. For example, when you enter a Macdonalds’ outlet you know exactly what to order and at what price, solving product search and price discovery problems, because of the common knowledge and success of the Macdonalds brand. In addition, the distribution problem, normally a physical product handling issue, is now an information distribution problem. A franchise solves this problem by marketing the system or “know-how” to franchisees that can resource supplies and raw materials in their own locality.

### **CASE STUDY: A NEW NOVEL DISINTERMEDIATION STRATEGY**

Formed in 1985, Cash Engineering Research Pty. Ltd (CER) is a small private research and development company, located in Richmond, Victoria, Australia, which develops and sells licenses to innovations relating to air compressors. Since 1985 the company has invented, developed, and licensed more than thirty innovations to the design of the double screw air compressor. Some of the licensees include the world’s largest compressor manufacturers: Ingersoll-Rand in the US, the MAN Corporation in Germany, and Daewoo in Korea.

Compressors are used frequently in industry, powering a wide range of devices and controlling a range of processes. CER produce compressed air that can be used in applications from inflating a bicycle tyre to controlling nuclear power stations. CER specifically deals with heavy industry compressors rated at 15 - 100 horsepower.

Briefly, a screw air compressor is a machine in which the volume of air occupying a space is mechanically reduced through the actions of a rotary system. The trapped air is thus compressed and pressurised air is discharged. While double-screw compressors are more efficient than traditional piston compressors, their regime of operation is more critical and a number of components, some quite complex, are required in addition to the compression element to maintain correct operation. Innovations to several of these components as well as simplifications to the system as a whole have provided CER’s intellectual property. Increasingly, CER is also seeing the system of manufacture of screw compressors as a saleable innovation and a means of distributing intellectual property.

To sell innovations within the framework of the traditional compressor supply chain, CER must sell a licence to the large up-stream assemblers. This means travelling to the licensee's overseas premises to exchange drawings and technical data with engineering personnel, and protracted discussions with management to close the deal. Thus, while such licence agreements can be quite lucrative there are large costs and risks associated with them and the intellectual property residing in each innovation is only sold once.

CER is currently evaluating a proposal for a new approach to selling their intellectual property through a manufacturer franchising system, distributed via the Internet. The idea is to distribute the "know-how" for manufacturing a limited range of industrial air compressors from CER directly to small compressor retailers who have existing servicing facilities. Some high value components of the system, in which much of the intellectual property resides, will be supplied by CER, while the remaining components will be sourced locally by retailers. The manufacturing system know-how and tools to effectively manage the assembly business under local cost conditions, such as parts costing and replenishment decision-making tools, will be provided to retailers over a wide geographic area using the Internet. This is a necessary part of the proposal because distribution of know-how and decision-making skills by proximal contact with a large number of small manufacturers would incur high transaction costs, similar to those in the traditional licence-selling scenario.

## **ANALYSIS OF THE PROPOSED BUSINESS MODEL**

The Cash Engineering Research (CER) proposed system is a hybrid business model of a cyber-disintermediator (such as Dell) and a traditional franchisor. However, unlike Dell, CER will only disintermediate two intermediaries, the assembler, and the wholesaler. CER's prime customer is the small retailer with workshop facilities. CER has two roles in this hybrid model:

- 1) As an assembler and distributor of the high value components of its screw air compressor systems that embody high intellectual property content.
- 2) As a franchisor of its "know-how" and manufacturing system.

In the role of assembler and distributor, CER will assemble the complex components that embody high intellectual property and distribute these directly to the retailer. This role focuses on reducing the impact of the transaction costs in both the commitment and delivery transaction stages. Within the commitment stage, order processing can be handled effectively by electronic commerce technology. Within the delivery stage, the impact of distribution transaction costs of these components are minimised by the high value of the complex components. Thus, this part of the business model is similar to that of a seller of highly differentiated products to a niche, even captive, market, which is exactly where the direct disintermediation strategy is most likely to work.

In the role of a franchisor, CER distributes its "know-how" and manufacturing system using Internet technology to bypass both assembler and wholesaler. Normally within the contact and experience transaction stages, a traditional franchise deals with search, price discovery, and experience costs by way of product branding. However, in CER's business model branding is not as important. For compressor retailers, the overwhelming operational advantages of just-in-time compressor sourcing make the CER product incomparable to that obtained through the traditional supply chain, essentially negating the product search problem.

Traditionally, the aggregating and economy-of-scale approaches used by traditional intermediaries effectively deal with the delivery transaction costs of low valued items. However, by franchising out the "know-how" of assembling the product, the retailers can now locally source the low valued items. Thus, this part of the business model works as a disintermediation strategy because through franchising the "know-how" and manufacturing

system the product sold is essentially pure information. We can expect further Internet business models to exploit this aspect of franchising.

Overall, the hybrid business model for CER provides a vehicle for selling their intellectual property, in the form of the high-value-added components, on a repeat basis further upstream in the supply chain with less cost and risk. However, the CER business model has yet to be implemented and several problems need to be overcome. The major problem is to develop an electronic infrastructure that will allow the transfer of “know-how” and the means to make business decisions within constraints derived from local conditions of particular retailers. These decisions will include compressor range, component replenishment policies, such as whether to choose JIT or large lot replenishment methods, component substitutions decisions, and other management decisions such as material and capital availability and market competition.

## CONCLUSION

This paper has presented a new analysis tool to apply to the topical notion of disintermediation as an e-business strategy, and has illustrated the analysis by applying it to a case study of a novel Internet-enabled business model. The contribution of the paper has been to explicitly divide the costs of a transaction according to at which stage of the transaction they occur, whether the buyer or seller incurs them, and whether they are information process or physical product handling costs. The new insight is that, although the new Internet-based information technologies have threatened to disrupt the traditional structure of supply chains, disintermediation has proven difficult because organisations have overestimated the capabilities of these new technologies. The Internet can only significantly reduce information processing transaction costs. Thus, proposed new disintermediation models must be carefully analysed to check that they adequately deal with both information processing and physical product handling aspects of transaction costs.

The paper has also presented, through a case study, a new proposed business model for Internet-enabled distributed manufacturing. This new disintermediation strategy is a hybrid of a traditional franchise business model and a cyber-disintermediator business model, which deals effectively with both information processing and physical product handling issues. Through action research we will study this proposal through implementation.

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