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FOUR MODELS OF INTERNET-ENABLED DISTRIBUTION STRUCTURES

C. Sophie Lee and Wesley Shu

The pervasive and ubiquitous nature of electronic commerce and internet technology has redefined the cost formula in distribution and led to organizational restructuring. This article identifies four models of distribution structures — functional decomposition, cloning, forward integration, and strategic industry alliance — that are enabled by electronic commerce. The advantages and challenges of each model are also examined.

Despite the burst of Internet Bubbles, the Internet remains a revolutionary technology to connect and to communicate. It has already made a profound and lasting impact on businesses and industry structures. For existing businesses, perhaps the biggest impact has been on distribution structures — that is, the web of intertwined distribution channels that move product or services from the upstream suppliers to downstream customers (Stern and El-Ansary, 1988).

Traditional distribution channels include direct sale, wholesale, distributor, retailer, mail order, and telemarketing. To distribute products and services to the desired customers, channel functions must be performed, such as matching buyers and sellers, negotiating price, maintaining inventory, making transactions, and managing after-sales services. According to the classic topology by Davidson (1961), these channel functions can be roughly grouped into three categories:

1. Transactional related
2. Service related
3. Physical distribution

Channel members are the parties involved in performing these functions, such as suppliers, wholesalers, distributors, and the like.

Two key issues of particular importance for managing a firm’s distribution structure are (1) forward integration decisions and (2) optimal channel assignments. The forward integration decision addresses the question:

Should the supplier hire outside parties (the distributors) to perform distribution functions, or should the supplier forward integrate and be the owner of its distribution?

This decision of ownership, or the boundary of the firm, impacts almost all other decision variables, including incentives and management.

A firm chooses forward integration for reasons of cost and control. According to transaction cost theory (Coase, 1952; Williamson, 1975; Williamson, 1985), a firm should integrate distribution to the level that minimizes the total distribution cost. By owning its own distribution, a firm can bypass outside distribution charges and become more profitable. The supplier can also exercise more control over
Traditionally, each channel is responsible for all of its channel tasks. The distribution, such as specialized skills and knowledge, tailored promotions, and full attention to the products or services, which is difficult to achieve through a mass distributor who handles products from hundreds of suppliers (Majumdar and Ramaswamy, 1995). The supplier can even differentiate its products through its own distribution channels to serve a specialized market to the point that it may become a strategic weapon to deter competitors from entering the market (Milgrom and Roberts, 1992; Porter, 1980). However, forming a new distribution channel requires significant upfront investment and continuing management; distribution is a totally different function than production and requires know-how and experience that may not be easily acquired.

The second key issue regards the optimal channel task assignment, which answers the question:

Which channel members should perform which channel tasks?

Traditionally, each channel is responsible for all of its channel tasks; that is, the tasks are assigned based on channel. For example, a direct sales channel is responsible for reaching out to customers, negotiating price, delivery, and after-sales service for customers within the direct sales channel, while the wholesale channel carries out pretty much the same functions within its channel. More recently, the functional decomposition perspective (Anderson et al., 1997) suggests task assignment by function. For instance, the after-sales function for all channels is handled together by a single after-sales department. This functional approach takes advantage of the economy of scale and the expertise of specialized departments.

Moriarty and Moran (1990) proposed a hybrid grid for mapping distribution functions to channels by considering the best “fit” between the two, where “fit” is defined by channel cost and buying behavior. Others have proposed criteria for successful hybrid arrangement (Anderson et al., 1997; Cespedes and Corey, 1990). Optimal channel task assignments enable the distribution functions to be completed with minimum cost and the best potential to stimulate sales.

Electronic commerce, unlike traditional technologies used in business for data storage and computation, has a pervasive nature that reaches every ordinary customer and their household around the clock, around the globe. The distribution landscape has therefore been repainted by electronic commerce and Internet technologies. Certain channel functions can now be automated by technology, which is less costly and potentially of an even higher quality. For example, matching buyers and sellers used to be a costly undertaking. Retailers build gigantic buildings and print costly advertisements to attract buyers; expensive shelf space is needed for merchandise display. With an Internet store, the retailer can change the look and feel of the Web site quickly. Changes to price or product can be made with very little cost. There is virtually no limit to how many items can be displayed. The items can come with a detailed description that is often unavailable in physical stores due to cost and space limitations. Customer service and transactions can also be automated. Human cashiers and sales agents who work 12-hour shifts can be replaced by electronic shopping carts that are online 24 hours a day. Search engines enable customers to search products with specific criteria, which is more efficient than walking around a physical store and chasing store clerks for answers.

These technology automations have led to a redefinition of distribution cost. Internet technologies have lowered the price tag of many distribution functions. What used to be expensive or infeasible to do is now a real possibility. The Internet has relaxed traditional constraints for both the supplier and the distributor. As a result, all parties are reevaluating their distribution structures and trying to take full advantage of the new technologies.

Almost all channel members are affected by the new technologies, whether they are directly or indirectly involved in the electronic commerce initiative. Some members might introduce electronic commerce for various distribution functions to lower cost and achieve higher efficiency. Others might aggressively utilize electronic commerce to alter their current distribution structures and to expand their markets. Their actions will affect the incentives and management of their up and downstream members. Understanding and managing the challenges these changes bring are important to every manager. The impact of electronic commerce on distribution channels is much more than disintermediation (Zwass, 1996; Chircu and Kaufman, 2000; Jallat and Capek, 2001; Gallagher, 2002). Instead, online intermediation has evolved to many diverse forms. The new intermediaries can be clones of a physical agent, or develop entirely new business models (The Economist, 2002). In addition, electronic commerce adoption is not an “all or nothing”
approach; it involves decisions for different degrees of adoption, functions, and players. Each adoption choice has its own pros and cons, including internal management challenges, power balance issues, and addressing reactions from other channel members.

This article identifies four models of Internet-enabled changes in distribution structures: functional decomposition, cloning, forward integration, and strategic industry alliance. For each model, we first discuss what the model is and how it is applied to real companies, and its pros and cons. Depending on preexisting factors such as channel experience, structure ownership of channels, and incentives, each model presents a unique option for a change in structure.

FOUR MODELS
Figure 1 illustrates the four models of distribution structures enabled by electronic commerce. The center of the figure shows a basic distribution structure that includes the traditional channel members: the supplier, the distributor, and the customer. Using the aforementioned terminology of Davidson (1961), the transactional-related functions are in boxes labeled “t” and the service-related functions are in boxes labeled “s.” Solid lines represent the original physical channel, while
the dotted lines are Internet-enabled channels. Each member — the supplier or the distributor — can introduce electronic commerce to automate all or only some of their distribution tasks.

The four types of distribution structures are discussed individually below. The pros and cons of each model are summarized in Table 1.

### Model 1: Functional Decomposition

Functional decomposition occurs when the “supplier” performs the service function using electronic commerce, while maintaining its traditional distribution channel. Customers can browse product information, search by different criteria, and be assisted by the channel, but the purchase transaction is carried out through a traditional distributor. This model works best when it is difficult or infeasible to complete transactions on the Internet. Many channel functions are too complex or personal to be replaced by automation. This model makes customers (and distributors) better informed and thus can indirectly generate more sales. The Internet channel is not a substitute for existing distributors, but rather a complement to their tasks. A transition to this model should not eliminate traditional distributors because it does not intend to take business away; the intent is to encourage more sales through the original distributor’s channel and increase profitability.

**Examples.** Sauder Furniture is North America’s largest maker of ready-to-assemble (RTA) furniture. It produced nearly 25 percent of all RTA furniture sold in the United States in 2002 (Sauder Company Fact Sheet, 2003). Sauder has distributed through major office outlets and home centers such as Staples and Lowe’s. Because some furniture is heavy and requires costly delivery, the current distribution structure offers the best arrangement in terms of economy of scale; transacting and shipping to each individual customer is not cost effective for this producer. Instead, Sauder utilizes the Internet by providing a Web site with product information customers can search and view pictures and dimensions by furniture type. The site also includes a video clip on how to assemble the company’s modular furniture system. For each furniture item, there is a link to dealers that carry it. This site thus promotes Sauder’s products and also directs customers to their local dealers.

Some transactions require intense human intermediation that is difficult to bypass. When the Internet first became a sales channel, many were pessimistic about the future of intermediation for industries such as real estate (Baen and Guttery, 1997). However, because it is difficult to bypass human agents in the real estate buying and selling process, the National Association of Realtors (NAR, 1999) chose to create an official Web site (www.realtor.com) that would help to make the process more efficient by providing online real estate data. The Web site offers up-to-date property data for potential buyers to browse and search. The new channel is not intended to replace real estate agents, but to complement their work. This model has helped buyers reduce search time and house-hunting trips; at the same time, real estate agents are freed up for other sales-generation activities.

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**TABLE 1 The Pros and Cons of Four Models**

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Pros and Cons. This model offers many advantages:

- **Complementary channel.** This model actually utilizes the Internet as a complementary channel to the existing channels. The information and communication provided on the Web site promote the products and encourage consumption 24 hours a day. This helps generate sales and enhance customer satisfaction.

- **Avoid costs of new distribution channel.** When creating a new distribution channel is too costly or infeasible to manage by the manufacturer alone, creating an information Web site to help generate sales may be the only feasible option.

- **Less channel conflict.** Because this new channel does not replace existing channels, less channel conflict and resistance are expected. It also shares the burden of customer service from existing channel members.

Two related disadvantages were identified for this model:

- **Cost center.** Under this model, the Internet site behaves as a cost center for the supplier. No direct sales transactions or revenues would come from this investment.

- **Difficult to measure outcome.** Because it indirectly generates sales and customer satisfaction, it may be difficult to measure the impact of the supplier’s Web site.

**Model 2: Cloning**

Cloning is when the supplier or the distributor clones or duplicates, its existing channel functions on the Internet. For example, a retailer can open an Internet store to sell similar products. A hotel chain can duplicate its reservation system on the Internet for customers to book hotel rooms online. Cloning is a logical expansion of a firm’s distribution structure because the firm can utilize existing processes and experience. By running dual channels, this “bricks-and-clicks” approach is believed to attract customers from both online and physical marketplaces. This approach can also have complementary effects on both markets: customers can freely use the channel that works best for them at a given time. In addition, technology innovations have made it easier to support Web customers with live customer service agents (Fram, 2002).

This dual-channel approach has been adopted by many retailers, such as Wal-Mart (www.walmart.com); direct sales manufacturers, such as Dell Computer (www.dell.com); and bookstores, such as Barnes and Noble (www.barnesandnoble.com), to name a few. The cloned site sells similar products as in the physical stores. The online stores offer search engines so customers can find products by entering keywords or a price range. Customers can also view the product by images that can be enlarged or viewed at different angles. The product is accompanied by a detailed product description — often not available in physical stores — for customers to view and download. Some Web sites allow customers who have purchased and used the product to submit product reviews and rankings, which can then be viewed by other potential customers. Some retailers offer local store pickups or returns for purchases made online. This approach is also well used by the service industries, such as for travel reservations and banking. The cloning approach thus offers even more transaction and service options than physical stores alone, with potentially lower operating costs.

**Pros and Cons.** The benefits of the cloning model include:

- **Experience leveraging.** Suppliers or distributors can transfer the experience and knowledge they have from the physical distribution to the Internet channel, such as prior sourcing relationships, pricing, inventory, and channel management.

- **Economy of scale.** By running dual channels for selling similar products, the supplier or distributor can fully utilize the economy of scale of its current operations.

- **Brand name recognition.** Unlike newcomers that must invest in expensive advertisements to establish a brand name, well-known companies, such as Wal-Mart and Dell, can have instant name recognition and trust online through their established brand name.

- **Market expansion.** The channel member is able to grow markets and profits from both physical and cyberspace channels.

However, cloning also introduces new challenges:

- **Cross-channel coordination.** Many issues remain unresolved with the new dual-channel approach. For example, should the two channels charge the same price? Do they compete for the same market and thus cannibalize each other (Viswanathan, 2000)? Are preexisting channel members threatened by
the new channel, which may lead to resistance and conflict? Can a product bought at one channel be picked up or returned via another channel?

- **New online distribution challenges.** The new Internet stores present many new distribution challenges. Distribution behavior is different in cyberspace versus physical space. Internet shopping can be more goal-oriented, while customers in physical stores may be more likely to buy on impulse. Also, mass distribution to virtual customers can require different logistics, such as packaging and shipping individual items (Totry, 2003).

- **New online markets and competitors.** Although the initial intention is to sell similar products to a similar market, the addition of an online channel still introduces the distributor to new markets and competitive environments. Yet many products do not sell well via an Internet channel. Based on early E-commerce experiences, Kiang and Chi (2001) have identified that products that are tangible (versus digital), have low differentiation (from a competitor's offerings), and require frequent purchase (such as shampoo) have a higher failure rate for selling on the Internet. Therefore, not every product can be successfully distributed via a cloning approach, even if it has been successfully distributed via a physical channel. For example, Wal-Mart has stopped selling small-ticket items such as toothpaste on its online store, but started selling digitizable goods such as videos (Totry, 2003). This has put Wal-Mart in direct competition with other media stores such as Barnes and Noble. However, Wal-Mart's online channel is also in direct competition with Amazon.com, a dot.com survivor with a strong on-line brand that has spent $2 billion to build six high-tech warehouses of its own (Vogelstein, 2003) to support its expansion into retailing physical products beyond traditional bookstore products.

**Model 3: Forward Integration**

Forward integration is when the supplier bypasses its previous downstream distribution channel — that is, skips the outside intermediary (middleman) — and now goes directly to the market. In the past, middlemen were needed to make the process more efficient, such as presenting and promoting products and services, matching buyers and sellers, negotiating prices, delivering products and services, and performing after-sales services. With the Internet now being a trusted channel for business worldwide, many steps and middlemen can be replaced with technology. That is, electronic commerce has altered the channel's cost and profit structure to the point that direct sales have become possible for some existing firms. The forward integration option is triggered by the technological advances of electronic commerce.

For example, entertainment companies have been exploring ways to forward integrate into their distribution channels. These companies used to rely on big retailers to distribute their physical products. With electronic commerce, it is now feasible for these companies to start their own Web stores and sell products directly to customers, bypassing the retailers. Warner Bros. has launched its own Internet site (www.dvdwb.com) to sell video products (VHS and DVDs) directly to customers. On its Web site, Warner Bros. has full control of how it wants to promote its products: each movie has a special page detailing its history and cast. Customers can also buy classic movies that are often unavailable in physical stores. By creating a direct-sales channel, Warner Bros. is in a better position to stay in touch with the customer and effectively promote its products. Similarly, the Walt Disney Company (http://disneyvideos.disney.go.com) and Universal Studios (http://homevideo.universalstudios.com/) have each launched their own Web sites to sell products directly.

**Pros and Cons.** Forward integration offers many benefits to the established supplier:

- **Cost savings.** The major advantage of forward integration is that the supplier can avoid paying fees charged by the distributors and achieve cost savings. This is the primary motive for most suppliers to seek forward integration.

- **Better control of distribution.** By integrating its distribution functions, the suppliers can better control the distribution functions. The supplier has the sole power to decide which products should be for sale, and how they should be promoted.

However, this model is not without potential disadvantages:

- **Initial channel setup costs.** Although it is relatively easy and inexpensive to create a cyber storefront with today's technologies, the initial setup of the logistics, inventory, and
delivery channels can still be very costly and require heavy setup costs.

- **Inexperience with distribution functions.** Distribution is a totally different function from production. It requires capital and experience. Manufacturers that have never been exposed to retail distribution would find it a daunting task to run their own distribution.

- **Limited name recognition.** For some products, most customers recognize the retailer (such as Wal-Mart) but not the manufacturer. Manufacturers that go directly to the market need to consider the potential for associated advertising and promotion costs in order to gain name recognition.

- **Lack of volume and variety.** Depending on particular market conditions, the supplier that decides to go directly to the market may face another problem: volume. Although the technology is available for the supplier to go directly to the market, it may not generate enough sales to be profitable. This problem is particularly true when the market demands variety. The company’s distributor may carry products from many suppliers, while the supplier’s site only offers the supplier’s products. The supplier can differentiate by offering very low price or by selling exclusive products or services; but for a market that demands variety, the supplier’s site may be much less likely to attract customers than a distributor’s site.

### Model 4: Strategic Industry Alliance

Although technology has made it possible for a supplier to open its own Web store and sell directly to the customer, this may prove to be unattractive due to some of the disadvantages highlighted for the above models. For example, unlike a distributor that carries products from hundreds of sources, a supplier whose customers want a variety of products to choose from may not be able to develop a Web site that is attractive enough to generate the sales volume needed. Such examples can be found in the airline industry. Many individual airlines have established their own Web sites, while Travelocity.com, Priceline.com, and other travel industry Web sites help the customer locate the best price from a variety of airlines.

To compete with such distributors, major suppliers can form an alliance and offer a single e-channel to provide variety to customers and compete with other distributors. This model to date has been particularly successful for an oligopoly market where a number of big suppliers dominate the majority of the market. That is, the alliance of these big suppliers may provide enough variety similar to that of an independent distributor.

One such example is the airline industry. An airline’s major transaction channels in the past included travel agents, in-house reservation agents, and corporate accounts. Where travel agents were its largest channel and accounted for close to 70 percent of its bookings. In the recent past, only travel agents could book tickets through an online reservation system (the GDS), which charged fees to the airline companies and agents. For example, United Airlines alone paid nearly $300 million in such fees during 2001. As a result, the five largest airlines in the United States (Delta, American, Continental, United, and Northwest) came together and formed a strategic alliance to develop a Web booking site, www.orbitz.com, with the objective of establishing direct connections to each airline’s internal systems, avoiding the expensive fees charged by the GDS (Power and Lieber, 2002; McDonald, 2003). Orbitz recently developed the Supplier Link system that directly connects to each of seven airlines’ internal databases, bypassing the GDS completely (Silva, 2004). This has reduced the average ticket processing fee from $12.50 to $14 to a flat fee of $4 (http://pressroom.orbitz.com/ReleaseDetail.cfm?ReleaseID=144435).

Another example of a strategic industry alliance is in the rental market for home videos. The “rental” channel for videos for in-home consumption initially was owned by such companies as Blockbuster. Entertainment companies sell videos to Blockbuster, and Blockbuster rents videos to customers. In an effort to bypass the rental distributors, five major studios — MGM, Sony, Paramount, Universal, and Warner Bros. — formed an alliance and launched an online DVD rental site (www.movielink.com) in November 2002 (King, 2002; Kontzer, 2001). The site offers competitive rental prices ($1.99 to $4.99 per movie) and a large selection of movies. Customers can browse movie selections and download movies directly to their computers. According to a Movielink press release, Movielink.com reached its milestone of one million downloads on November 8, 2004.

**Pros and Cons.** By developing a strategic alliance with key players in the same industry, firms can potentially gain the following advantages:
Cost savings. By skipping the distributors and selling directly to customers in alliance with other suppliers, the supplier can minimize distribution costs. This is the key reason that has driven the airline industry and the entertainment companies to form alliances.

Volume and variety. Unlike forward integration of a single firm where volume and variety can be an issue, a strategic alliance of major players—especially in an oligopoly market—can potentially control the majority of the market supply. The alliance has enough volume and variety to quickly become a major competitor of preexisting distributors.

However, the strategic industry alliance model does not work for all companies and products or services:

Oligopoly markets. This model works best for an oligopoly market where a few large players dominate the market. In a market where suppliers are dispersed, an alliance may not be powerful enough to compete with distributors; it involves so many suppliers that the coordination/distribution cost makes it an infeasible arrangement.

Alliance coordination costs. Unlike forward integration, a strategic alliance requires multi-company coordination among companies that are also competitors. This dynamic adds to the complexity of decision making and administrative costs of distribution, especially in more regulated industries.

Industry-Level Trends
As companies start to deploy various models of electronic commerce, an industry can evolve into a hybrid structure where multiple models coexist. For example, in the entertainment industry, we witness a hybrid of cloning, forward integration, and strategic industry alliance models. The supplier, such as Warner Bros., has forward integrated its distribution channel and started a direct-sale Internet store to sell DVDs directly to customers. Its various distributors, such as Wal-Mart and Target, have cloned their distribution channels online, such as walmart.com and target.com. Finally, Warner Bros. has formed alliances with other entertainment companies to distribute products to customers via a direct download format.

Another example is the travel industry. Various airlines have cloned their ticket-by-phone sales channel with online sales, as well as formed an alliance with other airline companies to launch www.orbitz.com to provide variety for the customer and bypass expensive agency fees. Many travel agencies have also cloned their existing distribution channels via their own individual Web sites, and pure-Internet players such as travelocity.com were early online players.

In addition, some strategic industry alliances of large suppliers have attracted smaller suppliers. In an effort to keep control, the major players typically maintain the composition of the alliance and simply “distribute” goods and services for them. Ultimately, the distribution costs of these quasi-distributor arrangements could become a burden to the suppliers, due to the added management and coordination needs and the lack of economies of scale in distribution. We predict that companies that specialize in distribution will then emerge to take over the distribution tasks, and once again the market will settle into a more traditional supplier-distributor-customer model for that industry.

Due to the economies of scale in distribution, we would also predict that such a model would likely prevail.

CONCLUSIONS
The Internet has transformed the market structure and made a lasting impact on the world of distribution. The pervasive and ubiquitous nature of Internet technology has redefined the cost formula in distribution, which has led to restructurings of traditional distribution structures and ownership models. Four models were proposed, and their advantages and challenges were discussed.

1. The functional decomposition model is where E-commerce supports a portion of the distribution functions, namely the service function. The intent is to complement, instead of substitute for, existing channels.
2. Cloning is where a supplier or distributor automates its existing channels on the Internet in the hope of expanding to both physical and cyber markets.
3. Forward integration is where the supplier bypasses distributors and transacts directly with customers. It expands the boundary of the firm into distribution, thanks to a relaxed distribution cost constraint.
4. The strategic industry alliance model is typically within an oligopoly market where dominant suppliers form an alliance and bypass distributors.
Managers also need to be aware of trends at the industry level and their potential impacts on a company's restructuring opportunities. ▲

**References**


