

## Chapter 11: The Changing Nature of Firms

**“Companies that are successful will have cultures that thrive on change...In the end, you might just have speed, talent, and branding....There will be nothing in the 10-year window except e-companies...click-and-mortar will become the only means to survival.”**

John Chambers, CEO, Cisco Systems, *Business Week*, August 28, 2000, p. 210.

**“Yes, there are changes in the ways corporations will organize among each other and how they will organize inside, how supply chains are managed...But these have been gradual changes. They may accelerate some, but I don’t think we’re seeing a phase transition like ice turning to water.”**

Andrew Grove, Chairman, Intel, *Business Week*, August 28, 2000, p. 214.<sup>1</sup>

### Prologue

John Chambers and Andy Grove are two of the most well-known business leaders of the information revolution. Chambers sees rapid and dramatic change coming in the nature of the firm, Grove an ongoing, more evolutionary process of change. Perhaps their differences are ones of degree. More outsourcing, greater importance of knowledge workers, better and faster information flows that lead to quicker, more decentralized decision-making: all these are standard predictions. The two men agree that competition will be fiercer: “what [customers will pay a premium for will commoditize ...rapidly” (Chambers) and “farming out ...of work diminishes competitive advantages. It leads to rapidly spreading commoditization of everything.” (Grove)

However, Chambers and Grove differ on other points. Chambers says, “Quicker decision-making at lower levels will translate into higher profit margins.” Grove, on the other hand, stresses that “the Web makes the buyer increasingly knowledgeable across the board...What remains your competitive differentiator or your source of value...?”

In the conclusion to Chapter 5, we said, “The firm is a collection of assets and a sequence of value-creating activities. The term ‘assets’ in this case refers to human capital and intellectual property as much as, if not more than physical assets. The unique or special assets of the firm not only create value, but help the firm capture that value.” Perhaps that is the basis of reconciling the views of Chambers and Grove. What will commoditize and what will not? Where will value be created and where will it be captured, not just for pure e-commerce firms, but for every firm that turns to ‘click-and-mortar’ to survive? Can virtual firms achieve winning combinations of “speed, talent, and branding? Read on, for some possible answers!

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<sup>1</sup> Both quotes are from interviews that make up part of a survey entitled “The 21st Century Corporation: Back to the Future”. The interviews were conducted by senior *Business Week* writer John Byrne.

## 11.1 Introduction

If knowledge is the fuel, then firms are the engine of the economy. Are those engines becoming more efficient, smaller, more versatile? Certainly e-commerce presents new situations for firms to tackle. Information technology had already reached into the bowels of most firms, whether in the form of simple computer inventory tracking for corner stores, or complex Enterprise Resource Planning (ERP) software that attempted to link all aspects of a large firm's internal operations. Now it has moved outside the walls of the firm, potentially linking every firm electronically with its customers, suppliers and partners.

What are the implications of the new pervasiveness of information technology? We explore dimensions of the answer in this chapter. In Section 11.2, we examine the differences between products and services, and the growing importance of the latter. We explain why the growing importance of information products enhances the trend toward the growth of services in the economy. In Section 11.3, we examine how information technology in general, and its reach to customers in particular, changes the way in which firms' value chains are configured. In particular, the order in which information and product flows occur is changed. We compare the effects for physical and for digital products.

In Section 11.4, we face head-on the questions raised by the contrasting opinions of John Chambers and Andy Grove. We examine the possibility of virtual corporations, and the functioning of various kinds of economic networks. Some of these networks fulfill a clear economic role, and thrive. Others may be attempting organizational innovations that do not have sufficient economic value to survive. In Section 11.5, we review our earlier discussions of intermediary roles, and summarize how intermediary firms are changing as e-commerce becomes more important. Finally, in Section 11.6, we examine how operating online may affect economies of scale and scope, and therefore the size of firms and the nature of what they do.

## 11.2 Products versus Services

The US economy derives almost three quarters of its annual Gross Domestic Product (GDP) from services, rather than manufacturing and agriculture. Other industrialized countries are not far behind. The growth of services in an advanced economy reflects two basic economic forces. The first is economies of scale that make it possible to deliver standardized products at low cost and large scale. Retailing and restaurant chains, as well as transportation companies, illustrate this aspect of the services sector. The second force is the increased importance of complex activities in an advanced economy, which requires greater numbers of skilled professionals. Doctors, lawyers, accountants and financial advisors are traditional examples of "knowledge workers". Computer engineers, systems analysts, and all kinds of information technology (IT) consultants and support people represent the knowledge workers of the "new economy".

Manufacturing is certainly not irrelevant for the information economy. For example, Intel's success has been built significantly on its ability to manufacture

increasingly microprocessors at large scale and low cost, even when competitors could match its designs. The need for all kinds of computer chips will continue to grow dramatically as they find their way into more and more products that we use: telephones, televisions, cars and kitchen appliances. However, making this complex hardware work, maintaining it, and designing the instructions that send the weightless bits zooming around its circuits or through the air, is where the greatest growth in demand for services will lie.

The boundaries between products and services in GDP accounting can be somewhat arbitrary. Knowledge applied within a firm to designing hardware that is then built in-house gets counted as part of manufacturing. Knowledge applied in designing software counts in the services sector, even though the software may be sold or licensed as a product. Money spent on renting a car shows up in the services sector, while the services provided by the car I own do not. These examples illustrate the general point that accounting typically takes place at the point where a market transaction takes place. Renting and leasing therefore show up as ‘market’ services, while a transfer of ownership of a new product does not, except for the retailer’s net margin, or value-added.<sup>2</sup>

If we put aside accounting issues, and treat the distinction between products and services as determined by the nature of the transaction and the user experience, then we can characterize the economy of e-commerce as essentially a service economy. Except for the makers of equipment that forms the ultimate foundation of the Internet and all the activity that it supports, all the types of firms we described in Chapter 10 are service firms, providing different kinds and combinations of information and time services, possibly bundled with physical products, but often independent of them. Part of the change embodied in the movement to e-commerce precisely reflects the broader shift from firms producing products to firms producing services.

At the same time, the economic nature of information products provides an extra impetus and reason for this shift. High fixed costs and low marginal costs for information products (recall Figure 9.2) make economic viability under competition hard to achieve. Pricing at or near marginal cost can not lead to nonnegative profits. Product differentiation and other sources of market power help to counteract this problem. Selling software services on an ongoing basis is another solution to this problem.<sup>3</sup> The product is bundled with services (upgrades, information, support, maintenance), and the bundle is offered on a subscription basis. The bundling also assists product differentiation, since it creates more potential dimensions of difference from competitors.

In some cases, apparently increased provision of services may reflect an unbundling of services from products. Since some information products (those that are bundles of executable programs, rather than static content or simple files) are complex,

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<sup>2</sup> The exception is housing, where the value of the services of owner-occupied housing is so great that it is calculated as an imputed value for GDP accounting.

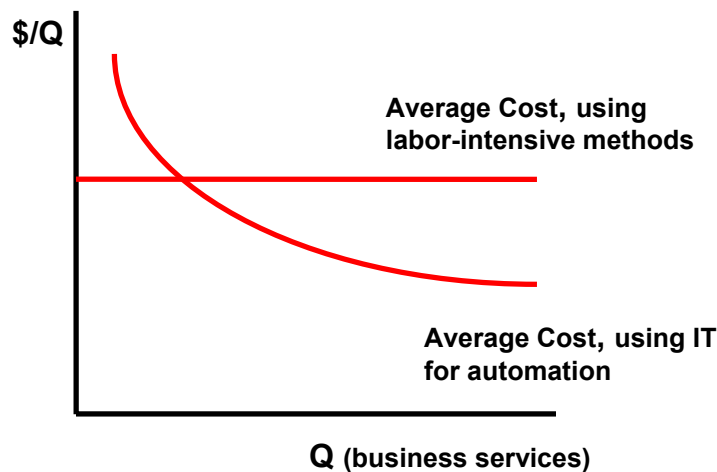
<sup>3</sup> Providing software as a service rather than as a product also counteracts yet another problem when firms have market power. There will be an incentive to reduce the sales price of a durable product over time, and renting rather than selling helps the firm remove this incentive. See Chapter 14.

and must work in combination with other complex components, the nature of after-sales support is quite different. Everyone who buys a car knows how to operate all its basic functions, and can master its controls fairly simply. A car also works smoothly with the rest of the transportation infrastructure: roads, traffic controls, and fueling stations. Problems in use that arise are therefore very likely to be as a result of manufacturing defects in the car itself, and manufacturers typically bundle extensive service warranty coverage with the product.

In the case of software, a problem may well be the result of user ignorance or conflicts with other components of the system within which the software works.<sup>4</sup> After-sales support services which have a zero marginal cost will result in the manufacturer bearing the costs of problems that are not of its making. Software makers may impose costs by making users wait, but increasingly they offer the option of paying separately for such services. Note that after-sales technical support services are different from the use services of the software itself.

The expenditure on IT services by businesses (several hundred billion dollars' worth) is really a sophisticated version of the household user's technical support service needs. Just as complexity in the legal and financial systems creates demand for lawyers and financial specialists, the complexities of information technology throughout business – and not just for e-commerce firms – increase the demand for IT services.

**Figure 11.1: Information Technology and Economies of Scale**



Some of the demand for IT services also reflects a shift away from more traditional services. The fixed costs of designing and installing software that automates routine tasks substitutes for the high ongoing costs of traditional, more labor-intensive

<sup>4</sup> A partial exception is a computer manufacturer that builds an entire self-contained system of hardware and software. Even in such cases, user ignorance may be an issue.

approaches. This is illustrated in Figure 11.1, where it is assumed for simplicity that the traditional approach has only variable costs. Human resource management, accounting, procurement and sales, and even customer support are subject to this kind of effect. Since the shift provides greater opportunities to exploit economies of scale, the benefits from outsourcing of these kinds of specialized services increases: the outsourcer is able to exploit economies of scale more effectively than the small or medium-sized firm. The specialized knowledge required for IT maintenance reinforces this effect of making outsourcing relatively more efficient.

Thus information technology has an important impact on all firms, not just those engaged in e-commerce. Services that were internalized as general components of the firm's value creation process, and therefore counted as manufacturing expenditures for manufacturing sector firms, are now market transactions that show up in accounting categories as IT services. Note that the economies of scale in the case of Figure 11.1 are enjoyed by the firm that provides the outsourced service, not by the producer of the final product. Thus the output in Figure 11.1 is these support services, while in Figure 9.2 it is the output of an information product. How much of the cost savings from economies of scale in automating business services are passed on to the firm that outsources depends on the degree of competition in the provision of these services. If a firm automates but continues to do the activities in-house, it will enjoy cost savings if its own scale of production is large enough. We will return to these issues in the next section.

We noted above that the e-commerce economy is a service economy. The broad implication of this perspective is that a major source of value creation in e-commerce is through providing services. We can push this idea further, and argue that speed in making new or customized products available, and in supporting them after they are sold, is a crucial capability that blurs the distinction between products and services in general. This is just a recasting of our discussion of new types of products, services and firms in terms of different combinations of information services, time services, and physical products and services (Chapters 9 and 10). Whether we are looking at Cisco or Amazon, Yahoo! or eBay, perhaps 'speed, talent and branding' do become the basis of providing services effectively, and thus of creating ultimate value.

### **11.3 Reconfiguring Value Chains**

Economies of specialization and economies of scale resulting from standardization unbundle some value chain functions without reconfiguring the value chain. This possibility exists for manufacturing components and whole products as well as services. Thus Dell purchases computer components from a variety of suppliers, while Nike can subcontract out much of its shoe production. The suppliers' incentives are governed by the desire for repeat business.

Information technology certainly supports this kind of manufacturing outsourcing, by improving communications between Dell or Nike and their suppliers. Electronic Data Interchange (EDI), which uses dedicated point-to-point connections for electronic transfers of information, has been a long-time precursor of the Internet in enabling long

distance business-to-business information exchange. As we noted in Chapter 5, improved information flows improve the efficiency of internal firm processes as well as transactions with suppliers and customers, so they do not automatically provide an economic rationale for outsourcing (see Illustration Box). In the production process itself, information technology may enhance the possibility of standardization and automation, through the use of computer-controlled machines. What is notable about current innovations is that they are bringing about similar changes in many business service and support tasks that had resisted automation till now. This was the particular theme of the previous section.

<b>Illustration Box</b>			
<b>Squeezing Value from the Value Chain</b>			
<b>Company</b>	<b>Task</b>	<b>Traditional method unit cost</b>	<b>Internet-based unit cost</b>
Typical Bank	Typical transaction by teller	\$1.25	\$0.02
Corning (glass)	Procuring parts and supplies for a product	\$140	\$7
Humana (healthcare)	Handling a job application	\$128	\$0.06

Source: Byrne, John A., "Management by Web", *Business Week*, August 28, 2000, pp. 88-89 .

How and why does the Internet increase the possibilities for reconfiguring value chains, beyond the kinds of outsourcing we have reviewed so far? To answer this question, we have to remind ourselves what makes the Internet and World Wide Web different from all previous long-distance communications, including EDI, telephones, faxes and so on. First, the Internet connects everyone to everyone, in ways that EDI could not economically do. Business-consumer interactions can not be handled by EDI. Second, the Internet integrates with internal business information systems in ways that telephony can achieve to only a very limited extent – for example the bank transaction in the Illustration Box costs \$0.54 if done over the telephone; less than with a teller, but still over 25 times the Internet transaction. Third, and perhaps most important, the World Wide Web provides a visual interface of unparalleled power for presenting and exchanging information among all participants.

We can illustrate how these differences play out in practice, with examples from popular computer seller Dell. Dell has not dispensed with a sales force for corporate customers: personal relationships and personalized information exchange can still be important there. Nor has Dell eliminated mail catalogues and telephone orders and support. However, its value chain has never included distributors and retailers, and the

World Wide Web has enabled it to take its direct sales model to levels far beyond what would be possible with just the mail and telephone, or with EDI with large customers.

**Figure 11.2: Customizing and Ordering a Computer**

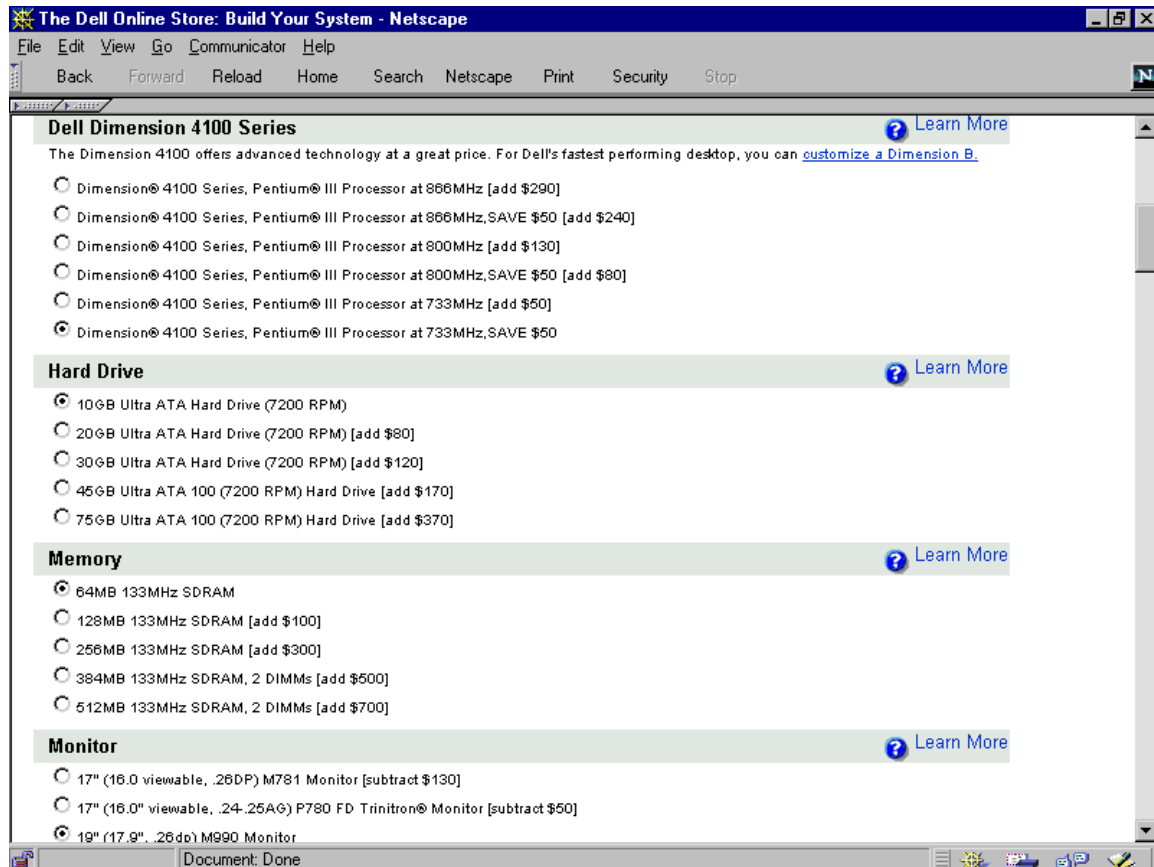


Figure 11.2 provides an example of Dell’s ‘visual configurator’. This page is reached from the Dell home page with just a couple of clicks, first selecting a market segment (in this case, home and home office) and then requesting the customization page. Each of a dozen or more components (only the processor, hard drive, RAM and monitor show in Figure 11.2) of the computer system can be specified, choosing from two or more options in each case. Prices are posted, one can click to ‘learn more’ about any component, warnings are displayed if there are incompatibilities across components, prices of reconfigured systems can be updated with a mouse click. Information on choices by the customer are conveyed almost instantly to Dell’s computers, where information processing takes place, and results are communicated just as rapidly back to the customer’s desktop. We have come to take this kind of information flow for granted, but it was impossible just a few years ago.

Once the choice is settled, the order can be placed by filling out a Web form, and payment and delivery options can be chosen. An electronic confirmation is sent to the customer, and the information on the order then enters Dell’s internal information systems for manufacturing, inventory, financial data, and so on. Wherever possible,

information flows are routinized and automated. The savings in time and in payments for that time are what is behind the dramatic reduction in transaction costs shown in the Illustration Box above. Furthermore, by building to order, Dell saves enormously on **inventory** costs, both the direct costs of storage, and the cost of **working capital** that would otherwise be tied up in computers sitting around waiting to be sold, either with the manufacturer or with the distributor or retailer in a conventional value chain. In this case, Dell ships the order directly (by UPS) to the home or business to complete the value chain.

We can summarize how the value chain is reconfigured in this example:

- Traditional intermediaries (the distributor and retailer) are replaced by in-house customization and information provision, and by a point-to-point delivery company.
- The timing, direction, speed and richness of information exchange is fundamentally different from the traditional value chain.

The first point is relatively obvious, and easy to represent visually (refer back to Figure 8.2), while the second point is perhaps more subtle, and certainly harder to depict in a simple picture. Yet the second point is a crucial component of making the reconfiguration such a powerful alternative, and it is the central answer to why the Internet makes such reconfiguration a more widespread possibility. Information exchange takes on a life of its own, and closely drives product manufacture and movement, rather than following manufacture and movement in a restricted manner. Furthermore, the customer plays a more important and active role in this information exchange than would be possible without the Web-based interaction.

As another example of how information is presented, Figure 11.3 shows another Dell Web page. This one lists the inventory of factory refurbished computers that the company has available. Even Dell is not perfect, and these are presumably computers that were returned because of some defect, and have been repaired and perhaps upgraded. Dealing with such singular items would otherwise be quite costly, but Dell is able to open up its inventory of these items for the whole world to inspect and buy. The inventory is classified by product line, and all features are listed making buyer search quite simple. Furthermore, the listing can be update daily at low cost, as items are sold or new ones are added. This kind of listing can obviously be used for any products that are in inventory, not just refurbished items.

Dell is a familiar example because it sells widely to households as well as to businesses. Its sales to other firms are actually very important, and probably more profitable (because firms' price sensitivity is lower, and because they order larger quantities at one time). While the examples we have given are Web sites accessible by anyone, Dell also has sites accessible only by corporate customers, partners, or suppliers. Each of these classes of firms can have its own customized site, with information that is tailored for that class. Customization of information can even be at the level of an individual firm. In such cases, retail sales are not an alternative, so the value chain is not reconfigured in such a dramatic way, but sales and after-sales support to firms are still



organized differently, with routine information exchange and tasks automated as much as possible.

**Figure 11.3: Opening up Inventory Lists**

**Inventory changes daily! Click [here](#) for important information about inventory availability.**  
 You can reach a sales representative by calling 1-877-471-3355.  
 Click on the column headers to sort.

Quantity In Stock	Model	Chassis	Processor	Memory (MB)	HD Capacity (GB) <sup>1</sup>	Video	Sound	CD	Modem <sup>2</sup>	Network	Extras	Price
1	GX100	Small Form Factor	Celeron-566mhz	128	7.50	Integrated				Integrated		\$584
1	GX100	Small Form Factor	Celeron-466mhz	128	6.40	Integrated	SB 64	CD 24X	56K DataFax	Integrated		\$659
1	GX100	Small Form Factor	Celeron-466mhz	128	6.40	nVidia m64 (16MB)	SB 64	CD 24X		Integrated		\$684
1	GX1	MiniTower	P3-550mhz	64	10	+4MB Upgrade		CD 48X	56K DataFax	Integrated		\$819
1	GX1	MiniTower	P3-550mhz	64	10	+4MB Upgrade		CD 48X	56K DataFax	Integrated		\$819
1	GX1	MiniTower	P3-550mhz	64	10	+4MB Upgrade		CD 48X	56K DataFax	Integrated		\$819
1	GX1	MiniTower	P3-550mhz	64	10	+4MB Upgrade		CD 48X	56K DataFax	Integrated		\$819
1	GX110	Desktop	P3-667mhz	128	10	Integrated		CD 48X		Integrated		\$899
1	GX110	Desktop	P3-500mhz	128	20	Integrated	SB Live	CD 48X	56K 3Com	Integrated		\$914
1	GX1	Desktop	P3-550mhz	128	20	+4MB Upgrade		CD 40X		Integrated	100MB Zip Drive	\$924

More and more consumer products are likely to follow the Dell model. Another example of customization comes from toy maker Mattel, which lets Barbie™ doll fans choose complexion, eye and hair color, and hairstyle to custom-build a friend for her, and buy it directly. Online cosmetics firm reflect.com, a spin-off from Proctor & Gamble, allows shoppers to design their own make-up and perfumes. Amazon's model of online book sales reconfigures the value chain in its industry, but rich information is not relevant for customizing the products sold. Instead, Amazon endeavors to maintain customized profiles of information to offer to book buyers, as we discussed in Chapters 9 and 10. Online grocers also are trying to change value chains by offering different combinations of value (information and time services) directly to consumers, bypassing traditional grocery stores. As long as household buyers do not value the additional information or the time saved very highly, such e-tailers may have a difficult time overcoming the lack of economies of scale in the delivery or fulfillment part of the value chain.

When firms are the buyers, the value of information and of time is typically much higher than it is for household shoppers. Savings in employee costs directly impact the firm's bottom line, and reducing time spent in making decisions or fulfilling orders can be an important source of competitive advantage. Thus business-to-business transactions have seen the most impact of the Internet. Not surprisingly, given CEO John Chambers' vision summarized at the beginning of this chapter, Cisco Systems is an exemplar in using the Internet for supplying its customers, which are all other firms. Cisco owns just two of the 34 plants where its products are made, about 90% of orders it receives are sent electronically, and half of its orders are fulfilled without a Cisco employee being directly involved.<sup>5</sup> Like in the case of Dell's configurator, Cisco's customers can use its Web site to precisely specify exactly what communications equipment they need, in what combinations.

Does all this automatic information flow and processing mean a reconfigured value chain? Certainly manual tasks are automated, and in-house functions are outsourced. Hence the value chain is streamlined, especially at its joints, and it is also unbundled. Information also flows more freely into and out of the firm. However, in one respect all of this change does not represent a reconfiguration of the value chain: the sequence and nature of the physical tasks that make up the value chain is unaffected. Business-to-business e-commerce does not aim to replace an existing infrastructure, in the same way that e-tailing challenges the existing brick-and-mortar world of traditional retailing for B2C e-commerce.

Our examples so far have focused on physical products. In the case of digital products, the potential for reconfiguration of the value chain is much greater, because the last step of delivery of a physical product, still requiring transportation and logistical management, is unnecessary for digital products. The Internet can be the vehicle for product delivery as well as for search, product specification, ordering, tracking and payment. Many software programs aimed at consumers are available for download upon payment. For example, 'deluxe' versions of RealPlayer, a popular streaming audio and video product, can be purchased (basic versions are free) and downloaded in this way. Packaging, saving in an intermediate physical form (a CD ROM), and printed instruction material are all eliminated with pure digital delivery, and the distributor and retailer are certainly reconfigured out of this value chain. In many cases, this avenue may take time to be established. Colorful boxes, printed manuals, and the comfortable solidity of a CD ROM may make marketing easier or more effective, even for digital consumer products. Resistance from traditional publishers, distributors and retailers also matters: the music industry is a good example.

In the case of information products for businesses, there is no such resistance. Digital delivery of digital products such as software and content is replacing packaged versions. Firms such as Tivoli (an IBM subsidiary) and Marimba are able to install ('deploy') business software over the Internet, on to multiple corporate desktop computers. The online version of the *Wall Street Journal*, which is aimed at business

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<sup>5</sup> These particular facts are taken from Byrne, John A., "Management by Web", *Business Week*, August 28, 2000, p. 94. Cisco is probably one of the most written-about companies in this respect.

people, has tens of thousands of paid subscribers, and is one of the few online content providers to make money. In these and other such cases, the savings in cost and time – and additional content in the case of digital media – drive the change in the value chain.

#### **11.4 Virtual Corporations and Other Networks**

In Section 5.4, we briefly mentioned the concept of a firm as the “center of a network of relationships, rather than...owners of a clearly defined set of capital assets.” This description by a pair of leading economic theorists is similar to management writers’ ideas of network organizations and virtual corporations. The term “network organization” was originally used to describe long-term relationships among Japanese firms and their suppliers. These relationships provided much of the benefit of vertical integration (or a wider presence in the value chain), without actual merger. Implicitly, the reasoning is that the incentives of a small group of such suppliers are stronger than if they were part of the firm. Such suppliers may also be able to avail of economies in production that the larger firm could not. The Cisco and Dell models certainly have features of this characterization of the networked organization, but this relationship model is not something that relies strongly, if at all, on electronic flows of information, or even perhaps on information technology, though these certainly help.

The virtual corporation model generalizes the network organization, allowing for shorter term relationships and explicitly for geographic separation. In this case, electronic information flows, and information technology in general, become more important, for monitoring and tracking are of much greater concern. In some definitions, the virtual corporation may still be a network of firms:

“The Virtual Corporation is a temporary network of independent companies linked by information technology. The Virtual Corporation shares skills, costs, and market access and involves suppliers, customers and maybe even rivals.”<sup>6</sup>

In other conceptions, the virtual corporation is a single legal entity, but one that dispenses with a physical location and its own permanent employees. Thus physical proximity and long-term association are both removed as characteristics of components of the firm. Constituents of the virtual corporation may still be firms, or they may be individuals. The virtual corporation concept begins to shade into more mundane partnership or strategic alliance.

While Cisco is able to use information technology and the Internet to create a dispersed network of suppliers, and to use that network to increase its own sales per employee, and deliver products more quickly, it is far from being a virtual corporation in the broad sense. Ultimately, firms are about value creation and value capture. E-commerce extends the reach and response speed of firms. It allows firms to outsource more activities, because information flows are richer and faster, and market transaction costs are thereby reduced. However, creating value still requires complementary inputs.

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<sup>6</sup> Richard Brandt, John A. Byrne and Otis Port, “The Virtual Corporation”, *Business Week*, February 9, 1993.

These inputs may all be different types of knowledge assets, different sets of skills, but they need to be combined together effectively. Effectiveness requires incentive provision, and it is hard to imagine incentives working adequately in loose, temporary affiliations. Even the best talent has to be motivated.

Incentive issues are most important when there is a great deal of uncertainty, as is the case for innovative products. Innovation can not be outsourced. Furthermore, linked complexities of design and manufacture may require these activities to be performed within the same organization for maximum value creation. One of the best examples of this is Intel, which has certainly established its dominance of a large class of microprocessors through ‘speed, talent, and branding’. However, it also made a conscious decision in the 1980s to develop its manufacturing expertise for microprocessors along with design leadership. Subsequently, other firms have sometimes been able to match Intel’s designs in performance, but have lacked the manufacturing capabilities to take advantage of this potential. Intel has continued to create and capture most of the value in its segment of the industry. We may express this lesson in terms of management thinking: design and manufacturing are *both* **core competencies** for Intel, and together they provide it with **competitive advantage**. This competitive advantage, in turn, is what allows Intel to capture the lion’s share of value in its industry.

One can see why Andy Grove is somewhat unenthusiastic about the ‘virtual corporation’. In fact, Clayton Christensen, a Harvard Business School Professor, argues<sup>7</sup> that Cisco is moving down the same path. As it enters the area of optical networks, it can no longer rely on modular architectures and outsourced components, but has to coordinate the requisite product design and manufacturing activities internally. The creation of unique assets through innovation itself requires combinations of unique assets. This is the ultimate source of value creation and capture, and the ultimate limit to virtualization or dismantling of corporations, no matter how much information can be exchanged, or how complex the transactions that can be conducted, over the Internet and the Web.

One twist on the concept of the network organization is the **business incubator**. At one extreme, business incubators are transformations of the classic **venture capital** (VC) model, where start-up capital is supplemented with the provision of contacts, advice, and perhaps some ‘adult supervision’. Perhaps the foremost VC exponent of this approach is Kleiner Perkins Caulfield & Byers, which has funded successes such as Juniper Networks, Drugstore.com, @Home (now Excite@Home), and Healtheon (now Healtheon/WebMD). Incubators may provide some combination or subset of office space, technological help, and assistance in specific areas such as marketing, legal services, and accounting, as well as the classic combination of capital and business advice. An example of such an incubator is Idealab, which hatched such companies as eToys, Netzero, and GoTo.com.

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<sup>7</sup> Clayton Christensen, “The Limits of the New Corporation”, *Business Week*, August 28, 2000, pp. 180-181.

While VCs are private partnerships, some new incubators operate as public companies, allowing small investors the opportunity to provide the capital for start-ups. CMGI and Internet Capital Group (ICG) have followed this model. In other respects, they are not that different from old-style VC incubators. ICG specializes in B2B e-commerce companies including Commerx, Onvia.com, Arbinet, VerticalNet, and ClearCommerce. One of the most extreme examples of this model is Divine InterVentures, which “aspires to build nothing less than the Great Mall of Incubation, with everything an entrepreneur could want under one roof.”<sup>8</sup> (see Illustration Box). Other versions of incubators are those created by towns and cities to attract new firms, but in these cases there is no shared ownership. Large firms like IBM and Xerox have also tried their hand at incubating, with limited success. It is unclear how incubators can consistently add value, unless they can do more than simply throw together a pool of resources for start-ups to draw on.

### Illustration Box EcoNets and Conglomerates

‘Conglomerate’ was the term applied in the fifties and sixties to large diversified corporations. The best-known and most successful of these has been General Electric (GE). As incubators such as Divine InterVentures create permanent ‘full-service’ startup factories, they are holding on to stakes in the companies that they hatch, trying to create permanent economic networks of value. These networks, or EcoNets for short, begin to look like those old conglomerates, or looser holding companies, or even the Japanese *keiretsu* (networks of firms with common or cross-ownership). While these super-incubators were riding high at the beginning of the year 2000, it is now unclear where they are going, as some of the dot.com mania has subsided. Suddenly, the need for super speed and a standardized approach to launching firms looks less like a winning formula. It remains to be seen if Habitat Divine, a space that will also hold Buzz Divine for PR, Web Divine for Web design, and Sales Divine for sales and marketing strategies, will provide enough value to justify start-ups giving up half their equity right away. If Divine Inter Ventures founder Andrew “Flip” Filipowski wants to “create a structure where \$1 invested in one of our companies travels around and makes 50 stops with the network before leaving our doors,” he may only end up with lemons (Section 7.5). We must be counted among the many skeptics where EcoNets are concerned.

Source: And Now for EcoNets, *Red Herring*, February 2000, <http://www.redherring.com/mag/issue75/mag-econets-75.html>

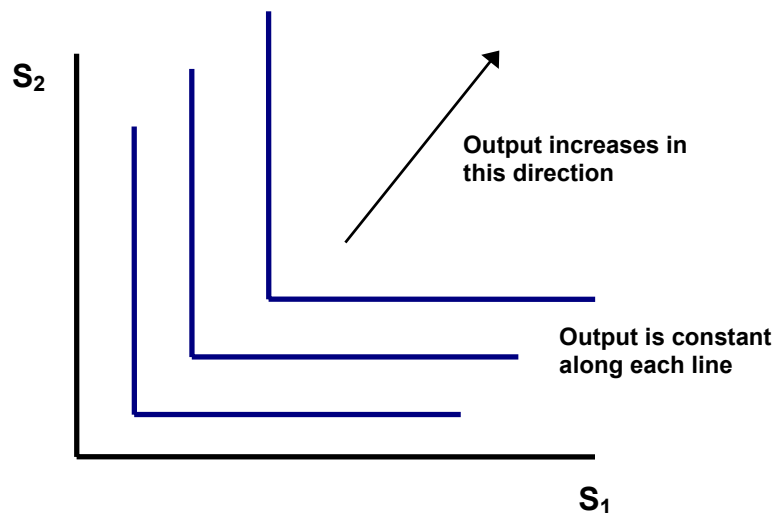
A final aspect of economic networks is **strategic alliances**. Earlier in this section, we expressed skepticism about loose, temporary affiliations, and strategic alliances can fall in this category. Certainly, there are many examples of alliances that have not succeeded. However, there have also been cases where formal or informal alliances have been long-lasting and important. Why is this? The answer lies in two fundamental characteristics of the modern economy in general, and ‘high-tech’ products in particular.

<sup>8</sup> Incubator Profile: The Great Mall of Incubators, <http://www.redherring.com/insider/2000/0119/resources/vc-fea-incubator-div.html>.

The first characteristic is that products work in systems: hardware with software, applications software with operating systems software, and so on. Thus all the products in the system are necessary to fully create value: they are complementary inputs. The second characteristic is the complexity of individual products.

Earlier, we quoted Clayton Christensen's argument that firms must own key complementary inputs in producing innovative products. This places a limit on the virtualization of the corporation. If the products are themselves complementary inputs in a larger product, the question is why this argument does not always apply. For example, Microsoft and Intel provide products (operating systems and microprocessors, respectively) that are complementary inputs into computers. Why do they not merge? This goes back to our discussion of the boundaries of firms in Sections 5.3 and 5.4. The short answer is that the benefits of coordination are not great enough to make a merger worthwhile. Intel keeps its design and manufacturing of microprocessors in-house, and Microsoft develops its operating systems and key applications in-house – often blurring the boundary between them, as with its browser. However, they coordinate their product development by sharing information, so that Intel's hardware works well with Microsoft's software, and vice versa. They gain the benefits of information-sharing without the problem of coordinating all activities and their entire organizations. These alliance relationships are completely pervasive in information technology, and therefore this kind of 'economic network', rather than the incubator version described above, is what flourishes.

**Figure 11.4: A Production Function with Fixed Input Proportions**

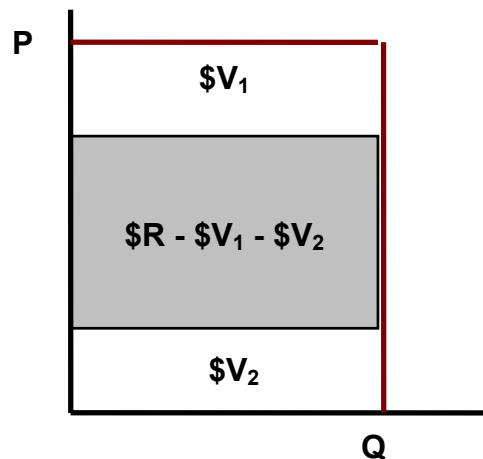


Microsoft and Intel do not have a formal strategic alliance. Such alliances are more often devised to deliver complete products or systems, whereas Microsoft and Intel sell their components separately to computer manufacturers such as Dell. Therefore, to illustrate the issues in an alliance, consider a hypothetical case where two firms have key skills and knowledge assets, which can be combined into a product and sold. Each

knowledge component is required for the output to be produced, so the production function is  $Q = F(S_1, S_2) = \min\{aS_1, bS_2\}$ . The second formula says that to produce  $Q$  units of the product, one needs *at least*  $aS_1$  units of the first firm's knowledge assets *and*  $bS_2$  units of the second firm's knowledge assets. This production function can be illustrated in two dimensions, as in Figure 11.4. It is called, naturally, a production function with fixed input proportions, and it represents a situation of extreme or perfect input complementarity.

Now consider the organizational approaches available to the two firms. Suppose that the knowledge assets of both firms, and the product produced are unique. Suppose that a given quantity  $Q$  can be produced and sold at price  $\$P$  per unit, so that revenue is  $\$R = \$PQ$ . It is possible for either firm to buy the other's input, and be in charge of production. However, this may allow that firm to capture the lion's share of the value created, because it has a stronger bargaining position after the production takes place (*ex post*). A strategic alliance or joint venture may be preferred because it equalizes the firms' *ex post* bargaining power.

Figure 11.5



In this example, suppose that the firms can capture value of  $\$V_1$  and  $\$V_2$  respectively, if they use their assets in their best alternative applications. Then the surplus to be divided here is  $\$(R - V_1 - V_2)$ . In a strategic alliance, the firms may set up the organization to split these gains equally, and they are partners in achieving and monitoring the outcome. Note that the abstract value sharing situation here is the same as that facing the buyer and seller in Section 5.4 or in Section 8.5. Here two sellers combine to create value through production, whereas in the earlier case, value was created through exchange. In either case, how the value that is created is divided depends on alternative opportunities and on the bargaining power in the bilateral interaction.

### 11.5 New and Old Intermediaries

We have discussed the economic roles of intermediaries at length in Chapter 8. Many of the new types of firms involved in e-commerce fulfill one or more of those intermediary roles. Information request services, e-tailers and content providers,

exchange service providers and brokers, community creators, portals, infomediaries, and even many infrastructure providers are, by their very nature, intermediaries of various kinds. We will examine online exchanges and related intermediaries in the next chapter. Here we discuss how the general role of intermediaries changes with e-commerce.

In Chapter 8, we listed the following functions of intermediaries:

- Transforming products (manufacturing, assembling, bundling, packaging)
- Being physically closer to the final buyer than the producer
- Smoothing the market by carrying inventory
- Providing expert actions or information
- Being long-term players with reputations (for quality assurance)
- Economizing on search costs for consumers
- Matching buyers and sellers (in willingness to pay as well as what is bought and sold)
- Economizing on costs of completing and implementing the transaction

Being physically closer to the final buyer than the producer, and smoothing the market by carrying inventory both become less important with e-commerce. Physical products can be visually presented on the Web, and digital products such as content, music and video can be sampled. Digital products can even be directly delivered over the Internet. The use of information technology in production makes carrying inventory less important: manufacturers can produce just-in-time; matching buyers and sellers is more efficient; and for digital products, reproduction is cheap and quick, so inventory is irrelevant.

Transforming products by assembling, bundling, and packaging becomes more feasible, especially for digital products, which are highly customizable. While producers of digital products may themselves take on this role, it is possible that intermediaries that serve other functions are in a better position to do this, or to allow consumers to do it themselves. Thus portals such as Yahoo! are in an ideal position to allow their users to customize the news, entertainment and other content that appears on their personalized sites. Individual generators of this content can not achieve this, because the portal aggregates content from many producers, and because the portal is the point of contact.

The last point illustrates a more general conclusion. Being closer to the final consumer has other dimensions besides physical proximity. Being most effective in providing consumers (or buyers in general) what they want earns any firm greater 'mindshare', and makes the firm closer to the buyer in that sense. The possibilities for customization not only of products and services, but also of the information that surrounds them, and that defines the relationship with the customer, are so great with e-commerce that intermediaries have a naturally expanded role.

Brands are carriers of reputation. The value of brands continues to grow as markets become global, or expand and become integrated in general. E-commerce is just



the latest, particular driver of this trend, following broader reductions in transportation costs, communications costs, and trade barriers. The intermediary role of being long-term players with reputations that provide quality assurance thus becomes more important. Manufacturers that outsource everything and just apply their brand (including firms as diverse as Sony and Calvin Klein) are therefore also taking on this intermediary role. We noted in Chapter 8 that the perceived value of e-commerce companies such as Amazon and Yahoo largely reflects the estimated value of their brand reputations. The importance of brand and reputation also helps explain why relatively new e-commerce companies of all kinds have sometimes spent huge sums up front on marketing expenditures. Unfortunately reputation-building is not necessarily closely correlated with marketing expenditures, especially if there is no customer base or solid source of competitive differentiation.

However, what is striking about the Internet and the World Wide Web is that global brands have been built more quickly than ever before in business history. This reflects the nature of the communications medium. A company building physical stores, or offering a service non-electronically, does not reach customers in the same way as an online firm. For example, Wal-Mart was already one of the largest retailers in the US before it started building stores in California. As a result, many people in California were relatively unaware of the firm a dozen years ago. National TV advertising can overcome this problem, but represents a high fixed cost. On the other hand, an online firm is theoretically just ‘one click away’ from every Internet user on the planet. While manufacturers can also build online brands quickly, for a new firm, being an intermediary has the advantage that it can focus on services that build reputation, relying as much as possible on outsourcing for the manufacturing or distribution capabilities it needs. In other words, an intermediary concentrates on those parts of the value chain that contribute most to reputation building.

**Table 11.1: New and Old Intermediaries’ Brands**

Firm name	1999 Annual Sales (\$ millions)
Wal-Mart	165, 013
Amazon	1, 639
News Corporation	14, 271
Yahoo!	589

Source: Company Annual Reports, Edgar Database, www.sec.gov, and Hoover’s Online for News Corp.

To get some idea of the difference between online and traditional brands, Table 11.1 gives sales figures for four intermediaries, two of them traditional firms, and two of

them pure online firms. Wal-Mart is certainly well-known, as befits the largest retailer in the world. Yet Amazon has a global brand with annual sales that are one-hundredth of Wal-Mart's. News Corporation is the fourth largest media conglomerate in the world, with the Fox network as its best-known brand. Yet Yahoo! is already a global brand, though it has less than five per cent of News Corp.'s sales.

Reputation matters in the case of intermediaries directly using their expertise to provide information on quality. This kind of information can make it easier to overcome lemons problems (Section 7.5). Expertise is also an information product, and economies of scale and specialization can be important. Being able to apply expertise to a larger market allows these economies to be more fully realized. Electronic markets extend the reach of expert intermediaries to achieve these economies of scale. In Chapter 8, we illustrated this possibility with the case of AUCNET, which both inspects and arranges auctions for used cars.

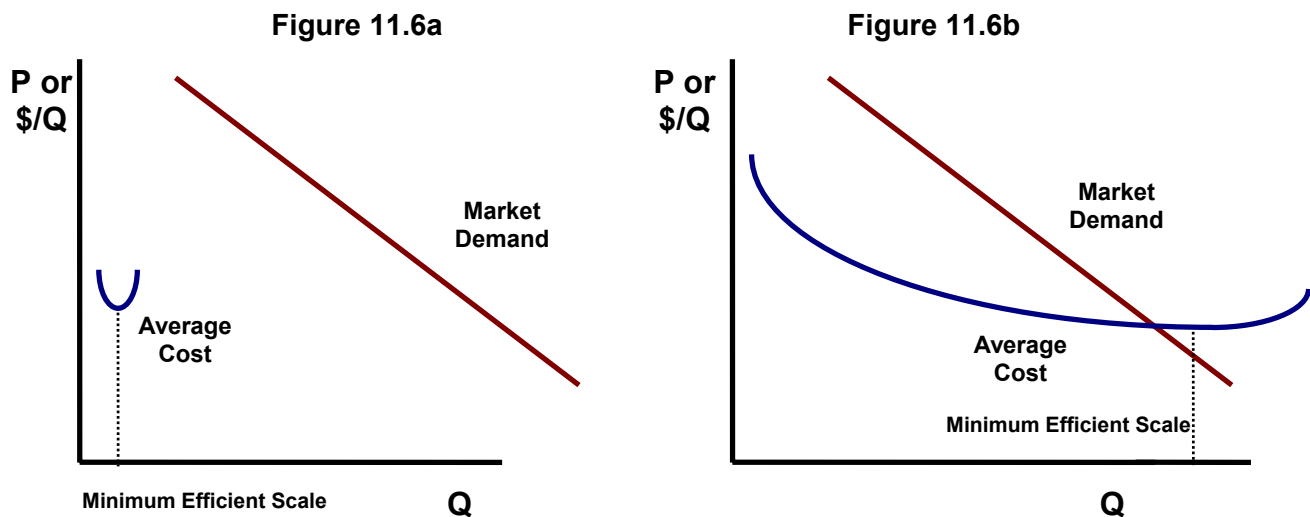
Perhaps the most important expanded role for intermediaries is in communicating and managing market-related information. Intermediaries provide price comparisons and product information for Web shopping, match buyers and sellers, and enable transactions to be completed and settled more efficiently. Information posted by sellers is collected and organized in cases where a seller would have no incentive to perform that task. Sellers that themselves may be intermediaries, such as car-buying sites that act between the dealer and the buyer, are rated by yet other intermediaries. We have noted the example of Gomez Advisors (gomez.com), which ranks car-buying and other shopping Web sites along different dimensions, according to surveys of user experiences. The Internet provides the first large-scale economical method of collecting and processing information from many widely dispersed sources, and information that enables creation of greater value in market transactions is a natural focus for intermediaries. We discuss many of these issues in further detail in the next chapter.

To summarize our central point, e-commerce shifts the focus of intermediation from physical tasks such as assembling and transporting to the management of information. The physical tasks are still important, but they are driven more closely by buyer information. Sellers may actually do better in collecting buyer information directly. However, producer information still faces two problems: there is too much of it, and its reliability may be uncertain. New intermediaries in e-commerce play a major and increasing role in filtering, packaging and validating market-related information. They can also collect buyer information and share it with other buyers in ways that producers would not want to. Where information is itself the product (news, entertainment, and other content), intermediaries again have a major role in aggregating and filtering the content for consumers. While managing information within firms has helped to make them more efficient within traditional brick-and-mortar commerce (e.g., Wal-Mart and its information systems), the level of information on the Internet opens up a role for information specialists as intermediaries.

## **11.6 Changes in Scale and Scope**

How does the Internet affect the size of firms and the scope of what they do? Consider size first. On the one hand, the fixed costs of operation are relatively low for firms in cyberspace. This is because the costs of space, administration and so on are lower for firms that operate only online. Thus economies of scale matter over a smaller range of output, barriers to entry are lower, and industries where online firms exist will be more competitive, with more and smaller firms. Thus online grocers can enter and compete with chains such as Safeway, while retailers such as Amazon can go head-to-head against giants such as Wal-Mart.

On the other hand, if online firms have to spend heavily on brand-building through advertising and marketing expenses, at least initially, these fixed costs will need to be spread over higher volumes to realize the full extent of economies of scale. Furthermore, if online firms are sellers of information products, these have high fixed costs and low marginal costs, as discussed in Section 9.4. These factors therefore work in favor of large firms and barriers to entry. The question we are asking is whether the situation for online firms is as in Figure 11.6a or 11.6b (these reproduce Figure 4.5).



While we can not give a definitive answer, we can get a feel for possibilities by considering some of the firms we have looked at throughout this book. Amazon's gross margin (gross profit as a percentage of sales) was 17.1% in 1999.<sup>9</sup> We can roughly equate this figure with revenues minus variable costs, though some variable costs are clearly not included in 'cost of sales'. Marketing and sales costs alone, at 25.2%, ate up this gross margin and more. Technology and content expenses were another 9.7%. Wal-Mart's gross margin was 21.4% in the same year, and its selling, administrative and general expenses were only 16%. Wal-Mart makes a profit, Amazon does not. The real issue, though, is what will happen as Amazon increases in size. Its current sales are 1% of Wal-Mart's (Table 11.1). How will its cost structure change as it grows? If the marketing and technology costs expand at the same rate as sales, clearly Amazon's model

<sup>9</sup> All figures following are calculated from company annual reports in the Edgar database.

is not sustainable. How much of them are fixed costs (staying constant as sales increase) will determine the outcome.

Yahoo did a little better in 1999 than Amazon: it made a profit (at least in accounting terms). As much more of a pure information business than Amazon, its gross profit margin was 82.7%, while other expenses were 72.4% of sales, leaving it with net income of 10.3% of sales. This did not include some other accounting costs related to acquisitions and R&D, but these were presumably one-time costs. The New York Times is a more traditional information business, with its flagship newspaper and several TV stations. Its sales in 1999 were about \$3.1 billion, and its operating profit was 18.2% of that, much more like Wal-Mart's or Amazon's than Yahoo's. Its net income was, however, comparable to Yahoo's at 10.2% of sales.

Online and traditional businesses are not quite comparable, in terms of what they offer, and the biggest online brands are still small in terms of sales, compared to the brick-and-mortar giants. However, one can see some of the effects of being digital in the cost structure of Yahoo. If Yahoo can keep down the growth of its 'other' expenses as its revenues grow, that is, if there is a strong fixed cost component in them, then its long profitability is clearly assured. Can other firms enter? Certainly, if their fixed costs are also low, entry is easier. Amazon faces the same problem. The entry barrier that these firms may be counting on is customer switching costs, which we discussed in Chapter 6. Another factor that information firms such as Yahoo will have to face is the cost of the infrastructure that they will need. We have emphasized the very solid infrastructure of atoms that supports the movement of bits. How the costs of this infrastructure increase as the number of visitors goes up will also matter in determining the extent of economies of scale.

Our discussion of economies of scale must therefore be inconclusive. It is not clear yet what the '**minimum efficient scale**', where average costs are lowest (see Figure 11.6) of operation is for online firms. Some fixed costs are eliminated in going online, but new ones are introduced. A complication in making predictions at the firm level is that firms will increasingly operate both models simultaneously. Wal-Mart is moving online, somewhat ponderously, no doubt, but with an already established brand, and the ability to **cross-subsidize** as much as it wants. That is, it can use profits from its brick-and-mortar operations to cover set-up and other costs of going online.

Turning to economies of scope, recall that this concept refers to a situation where the cost of doing two activities or producing two products together is less than the cost of doing it separately. This may be because of savings in set-up costs within the production line itself, or because other value chain activities can be shared. In Chapter 5, we gave the hypothetical example of Ekin, a maker of sports shoes, that could also produce sports shirts, and use the same resources and channels for marketing and distributing both products, even though production might be independent.

Information technology in general has two effects that increase economies of scope. First, it allows more customization and variation within product lines, reducing

set-up and switching costs. Second, it allows for better coordination across activities and product lines. Of course the latter effect also has benefits for coordination across firm boundaries. Thus it makes strategic alliances and partnerships easier to implement, so that economies of scope might be realized without both activities taking place within the boundaries of a single firm.

From the cost perspective, it is easier for firms such as Yahoo!, Amazon, and AOL to expand the scope of their offerings, than it would be in the brick-and-mortar world. Thus Amazon and Yahoo! have added online auctions to their original offerings, in rapid imitation of eBay. Offering the auctions has its own separate costs, of setting-up and maintaining additional servers and storage facilities, but other fixed costs are spread over this activity as well as previous ones, without necessarily rising: marketing and 'distribution' (the latter from the company's Web sites), in particular, are shared. While we can not necessarily assert that economies of scope will lead to greater diversification for online firms (traditional firms such as Proctor & Gamble and General Electric are very diversified), it is clear that diversification among e-commerce firms is feasible from the perspective of economies of scope. This fact alone suggests that the one should not overstate the prediction of the dismantling of firms that has surfaced in some of the business books we have mentioned.

There are additional factors that work in favor of some diversification. We can use Microsoft as an example. Microsoft benefits from economies of scope in developing different types of software. The cost of developing applications is lower because it also develops the operating systems that they run on. There are also economies of scope in shared distribution and branding. On top of these cost advantages, Microsoft also benefits from its broader scope because it can customize and price much more flexibly. Diversification gives Microsoft more strategic weapons, and a greater ability to exploit any market power that it has, as well as enhancing its market power. All of these factors show up in net income that is over 30% of sales.

Note that Microsoft's broadened scope was built on top of established economies of scale in its operating system, and so economies of scale and scope have not conflicted. AOL, too, has established an enormous customer base from which it has diversified. Amazon and Yahoo have attempted this diversification from smaller bases, but this has been in part driven by competitive necessity, as in the introduction of online auctions. Thus strategic considerations as well as economies of scope may drive diversification among online firms, as much as among traditional ones.

## **11.7 Conclusion**

In this chapter, we have provided a rather sweeping overview of the changing nature of firms in the new economy. Some of this change is driven by information technology being adopted within the boundaries of the firm. Other developments are the result of e-commerce itself, altering the information flows between firms and their customers, suppliers and alliance partners. Finally, both the pervasiveness and the increased sophistication of information technology enable many new kinds of information products, and digital products in general, to be created and offered. Firms that deal primarily in information may have to operate differently, be more agile and

more innovative than traditional firms. However, the basic economic criteria of scale and scope, and complementarities in activities, are substantially unchanged in the 'new' economy, and that suggests that firms will continue to exist in forms that are not too different from the recent past.

### **Summary**

- Services become a greater proportion of the economy as it develops, and information technology accentuates this trend. More and more e-commerce firms will try to be service firms, because this is economically more viable for information products.
- The Internet allows the nature and timing of information flows to be changed, especially relative to the flows of physical products and services. This can result in reconfiguring value chains, or simply in changing the points in the value chain where value is created and captured.
- An extreme concept of a virtual corporation is as a temporary network of independent companies linked by information technology, sharing skills, costs, and market access and involving suppliers, customers and maybe even rivals.
- Between the traditional hierarchical corporation and the totally virtual corporation, a variety of models of networks of individuals and firms are being tried. These include incubators for start-ups, and strategic alliances for innovative, technology-intensive products where combining knowledge assets of different firms is important.
- New kinds of intermediaries focus on transformation of information products, reputation building, and providing expertise, as well as reducing search costs and costs of completing transactions in markets. Physical transportation and inventory smoothing become less salient tasks for general-purpose intermediaries.
- Economies of scale and scope still are important in the new economy in general, and in e-commerce in particular. There is not clear prediction on this basis of changes in the size and breadth of firms.

### **Questions**

1. Try to list all the products and services provided by each of the following firms: Amazon, AOL, Microsoft, Yahoo!
2. From the SEC's EDGAR database, examine these four companies' annual reports (10K forms) and compare their cost structures to the extent you can.
3. Go to the Web sites of the four companies, and see if you can identify the major partners and suppliers of each company. Try to categorize or describe these partnerships.