

CHAPTER

# Chapter 1

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## THE MIGRATION FROM TRADITIONAL TO 'NET'- ENABLED ORGANIZA- TIONS AND SYSTEMS

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### MANAGING NET-ENABLED ORGANIZATIONS OF TODAY AND TOMORROW

Why do managers need to understand the profound changes that are occurring in electronic interconnections between organizations? Isn't this something that the technical and IS people can and should be handling? Networking, the Internet, HTML, browsers...aren't these technical matters that the general manager does not need to learn about or be informed about? Why is it valuable to be versed on how these technologies are changing the underlying business processes?

### LEARNING OBJECTIVES FOR THIS CHAPTER

#### **c** *CASE STUDY 1-1*

#### LONELY PLANET

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# 1 INTRODUCTION

## 1.1 Fads and Fashions

Business studies are plagued with "fads" and "fashions" that occupy our attention (and academic courses) for a while, and then they seem to quietly fade from view.<sup>1</sup> TQM (Total Quality Management) was the trumpet call during the late 1980's when it seemed that Japanese strategies and management practices has conquered the world. Before that MBO (Management-By-Objectives) had its heyday. Lately, it has been BPR (Business Process Reengineering) and ERP (Enterprise Resource Planning) systems.

What is the problem with management practices being constantly altered according to fashion? Organizations make tremendous investments in both financial and human terms when one of these "principles" becomes popular and companies begin to imitate the behavior of other firms without necessarily thinking through the consequences of the change.<sup>2</sup> Moreover, if elaborate restructuring of the organization occurs and the anticipated benefits do not materialize, then the losses in both micro- and macro-terms is gigantic.

Will 'Net'-Enablement, that is, commercial activity via electronic (computerized), networked connections, be one of these soon-forgotten fads? Will the Internet not become the transforming and revolutionary phenomenon as widely predicted? There are legitimate concerns that need to be addressed before we devote our energies to learning how to deploy and infuse 'Net'-Enablement into our organizations.

The argument made below is that 'Net'-Enablement (NE) is not just another "fad" or "fashion," will become one of the central transforming innovations of the 21st century, and is worthy of our serious consideration.

## 1.2 'Net'-Enablement, e-Business and Other e-Terms

Before discussing the influential social and organizational drivers that suggest that 'Net'-Enablement is an inevitable technological revolution (or evolution), it is important to discuss terms that are being used to describe the main subject of this text. One widely used term is e-Commerce. Another is the most viable contenders to represent the phenomenon is e-Business. Proponents of this term argue that e-Commerce is limited to transactions and external exchanges between businesses and e-Business is a broader and more inclusive term.

<sup>1</sup>Abrahamson (1996); Abrahamson (1991)

<sup>2</sup>Ang (1997)

e-Business is a proprietary term originally promulgated by IBM. Clearly, it has now moved beyond IBM consulting practice and has moved into the mainstream. But it is important to recognize that the term has no *inherently* larger meaning than e-Commerce. It is, after all, just a word. A Webster's dictionary definition of "commerce" is buying and selling, but that implies that there would be activities that support that buying and selling, otherwise how could one ever buy and sell? So it can easily cover an Intranet. Also B2B, and other terms like Extranets that describe forms of electronically-facilitated commerce.

The term, in my mind, is suspect as a representation of commercial activity enhanced/supported by the Internet and other networks precisely because it is a company-invented term. Computer services and consulting firms have a proprietary interest in promulgating the use of the term "e-Business" rather than other terms like "e-Commerce" or 'Net'-Enablement. At some point, there may be complete consensus in the English language on what these terms mean. For the moment, though, such is not the case.

Nevertheless, the term e-Business has some currency, to be sure. There would no seem to be universal concurrence on the meaning of this or any of the terms being bandied about. It is a matter of usage.

Solutions?? We could employ the term "e-Everything" if we were interested in how governments, non-governmental organizations, and non-profits use networks and the Internet in their lives. And if we extended our topic to individual usage, an unusual term like e-Everything still would be appropriate.

In fact, there are virtues to using the term "e-Commerce" to stand for the entire phenomenon of supporting businesses through networked connections. As it is used in one of the early works describing the phenomenon of interest, Kalakota and Whinston's *Frontiers of e-Commerce*, there is no such limitation. In this seminal book, e-Commerce covers the range of online activity, including customer service, B2B, and internal activities of the firm in support of Internet business.

A simple extension of the argument offered by proponents of the term e-Business points out the deficiencies of both e-Commerce and e-Business. Surely, there are many parallels between the uses of the Internet to serve business customers and government clients, for example. But the term e-Business is clearly not broad enough to cover e-Government activities nor those of non-profits or NGOs.<sup>3</sup> If these activities are of interest, and they certainly are of interest in this textbook, then we may be forced immediately to a term like e-Organization. Moreover, if proprietorships are buying and selling over the Internet, in venues like e-Bay, one would be tempted to call this C2C activity something broader than e-Organization. What would that be? E-World?

Let's review the terms we have intimated may be at the heart of the revolution thus far:

<sup>3</sup>The term 'Net'-Enabled Organizations (NEOs) is employed in this book in order to broaden the concept to all organizations, not just profit-making organizations. 'Net'-Enablement applies to all types and sizes of organization.

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- \* 'Net'-Enablement
- \* e-Commerce
- \* e-Business
- \* e-Organization
- \* e-World

The solution we have adopted in this book is to adopt the coined, hyphenated word 'Net'-Enablement.<sup>4</sup> The components of the term convey the exchanges over open networks that we are focusing on in this text. The term is not company-invented, and does not have the taint of a proprietary connotation. So, for the sake of simplicity, this text has been named *Foundations of 'Net'-Enablement*.

## 2 ORGANIZATIONAL/ ENVIRONMENTAL DRIVERS OF 'NET'-ENABLEMENT

Keeping in mind a temporary, working definition of 'Net'-Enablement as “commercial activity via electronic, networked connections,” we now need to explore the possibility that 'Net'-Enablement was inevitable, once certain organizational and environmental conditions were in place, and, moreover, that it represents a permanent change in the way commerce will transpire on planet earth.<sup>5</sup>

First, what are these drivers? There are at least seven that need to be recognized (see Table 1) and they need to be carefully thought-out.

<sup>4</sup>See the arguments for this term in Straub & Watson (2001).

<sup>5</sup>I owe the reasoning and enumeration of most of the drivers in this section to Dr. Richard Welke, Director of the Electronic Commerce Institute at Georgia State University.

#	Source	Driver
1	Environment	Digitalization of media
2		Inexpensive telecommunications
3		Widespread diffusion of computers
4	Organization	Increasing pressure on costs and margins, including globalization and commoditization
5		Changing organizational models, including empowerment of workers, informing of key business activities, outsourcing and downsizing of many firms, partnering, cross-functional business processes, virtual teams
6		Rapidly shrinking cycle times
7		Intelligent products and services
8		Demand for customized products and services

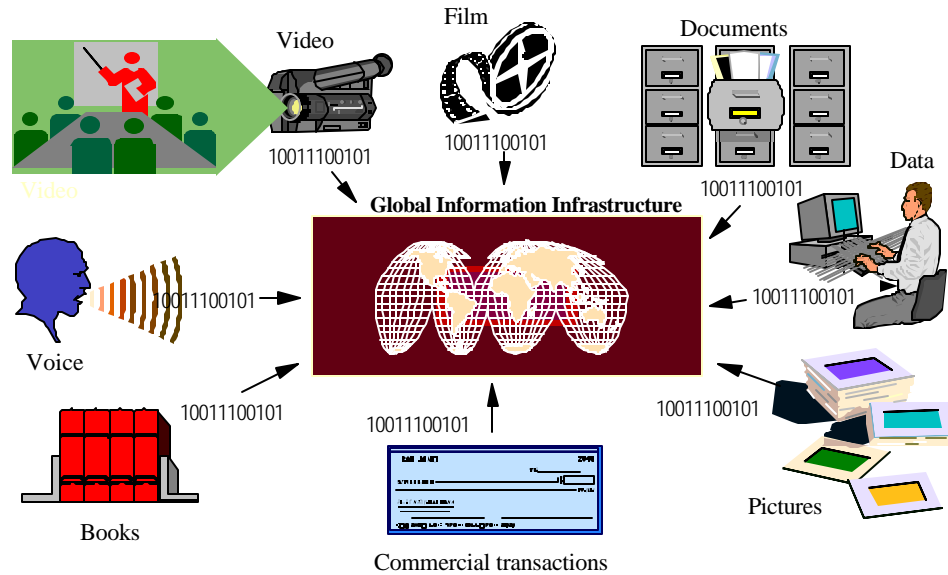
**Table 1. Drivers of 'Net'-Enabled Organizations**

Changing organizational models, including empowerment of workers, informing of key business activities, outsourcing and downsizing of many firms, partnering, cross-functional business processes, virtual teams

### 2.1 Driver #1: Digitization

Media are generally thought of as the means by which people (and computers) communicate. "Content" is generally thought of as the information, art, or evaluations that are the value-added component of media exchanges. Digitalization is a process of capturing content in bits rather than in a physical form in a particular medium. Sounds coming across a telephonic medium, for example, can be captured as analogue signals on a tape, as in many home voice mail/answering systems, or they can be rendered as bits and stored on any medium whatever for later reproduction. With digitalization, the medium for storing the content is not important. Only the accurate storage of the bits, as shown in Figure 1.1.

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**Figure 1.1 Digital Convergence of Media into Bits**

The movement away from media content embedded in physical forms to digits makes a huge difference in our future capability for technological innovation, as Negroponte argues in his book *Being Digital*.<sup>6</sup> It means that the use and reuse of that content is not dependent on the limitations of a given medium. Negroponte points out that atoms restrict the number of ways that content can be expressed, transferred, and altered. Digits do not.

Some concrete example may help to make this clearer. Traditional photography allows a negative to be produced, or a slide, or a plate, but all of them have the content of the picture embedded in the physical form. To change the form involves an expensive, time-consuming, and imperfect conversion. If you have an old print of your great-great-grandmother (and that is all you have), for example, I would, using traditional media, have to have another picture taken of the print, and from there chose a medium in which to re-embed the content. Once that choice of a new medium was made, let's say a slide, I would be restricted to that format until I went through another conversion, to, for example, a larger print. Another conversion at this point from the print-of-a-print would result in loss of detail and coloration. And all of these efforts call for specialized equipment. In other words, in traditional media, the content and the medium are not now and never were independent of each other.

Now let us imagine a high resolution digital photo that has been taken of your great-great-grandmother by a time traveler. The content of the photo is represented as digits, and not embedded in atoms, except as a readily changeable storage medium. The medium of choice at this point is completely dependent on the equipment you have available. If you

<sup>6</sup>Negroponte (1995)

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want a print, you can create that easily. If you want a slide, one would usually send the digits representing the photo to a service that will return a slide to you. The point is that the content of the photo, your great-great-grandmother's dress, her hair, her old-fashioned swing, are not restricted to a particular medium. The digits themselves are medium-free and can be readily moved into any medium you choose.

This transference of atoms into digits is proceeding at a pace few would have predicted years ago. The large film studios will likely stop shooting film in the very near future, if they have not already done so. The granularity that can be captured in digital motion picture cameras exceeds or certainly matches that of celluloid film. And digitizing in the original shooting allows special effects to be integrated into the final product easily and with no medium degradation.

Libraries are another case where organizations are moving toward digital formats very quickly today. Storing digital information as extensive as the entire text of the Judeo-Christian Bible on a storage medium the size of the head of a pin is not an unreachable goal. Moreover, storage media for gigabytes and terabytes of data are becoming very affordable for many individuals, let alone major institutions. So moving diverse physical sources such as books, articles, maps, blueprints, music, and poetry to a digital form allows them to be re-configured and expressed in a mind-boggling variety of formats. Books can be read on e-Book devices. Maps can be visualized on computer screens, and zoomed in to any level of meaningful detail. Poetry can be retrieved in written form or as spoken by the poetess or poet him- or herself.

Other examples might include the Chicago Board of Trade, where a late conversion from the physical "open outcry" system, depicted in the climatic moments of the film "Trading Places," with Dan Akroyd and Eddie Murphy, may be endangering the future of the board.<sup>7</sup> Selling futures, or future contracts for commodities, has been a highly physical process where sellers vocally "cry out" their offers, and bidders "cry out" their bids in what is known as an open pit. The digitizing of these contracts allows another form of electronic "outcry" take place where computers can engage in the by-play. The medium the computer sell- and bid-ranges is stored on is irrelevant, as it is with digital photos. The digits themselves are all.

Atoms are bound. Digits are free to "morph."

What does this have to do with 'Net'-Enablement? For one, networks can readily move content for organizations if it is in digital form. And, when received, the digits can be used immediately, or kept waiting until they take on a new form. The choice is granted to the receiver, rather than dictated by a physical medium.

The digitizing of most new media content (and a lot of the old content, viz. American Movie Classics digitizing of old films) has led to an environment where content is fluid and can be readily remade for new uses. This characteristic makes digitalization such an important pre-condition for 'Net'-Enablement.

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### 2.2 Driver #2: Inexpensive Telecommunications

It is no secret that the cost of using the telecommunications networks worldwide has fallen dramatically over the last decade. In the US, the critical event spurring this was the deregulation of the telecommunications industry, which was dominated by the AT&T government-sanctioned monopoly. The same tendency to privatize the PT&Ts (Post, Telegraph, and Telephone Systems) in Europe and around the globe is beginning to yield more competitive markets where prices are falling precipitously.

In Egypt, for example, the number of ISPs (Internet Service Providers) rose from 26 to 50 to 76 in a three-year period. Fixed monthly rates of USD \$20 were available by the spring of 2000, rates which had been available in the US for several years prior to this.

The cost of making telephone calls has also dropped over the decade of the 90s. Long distance calls in the US can be made for as little as USD \$.05 per minute, for domestic connections.<sup>9</sup>

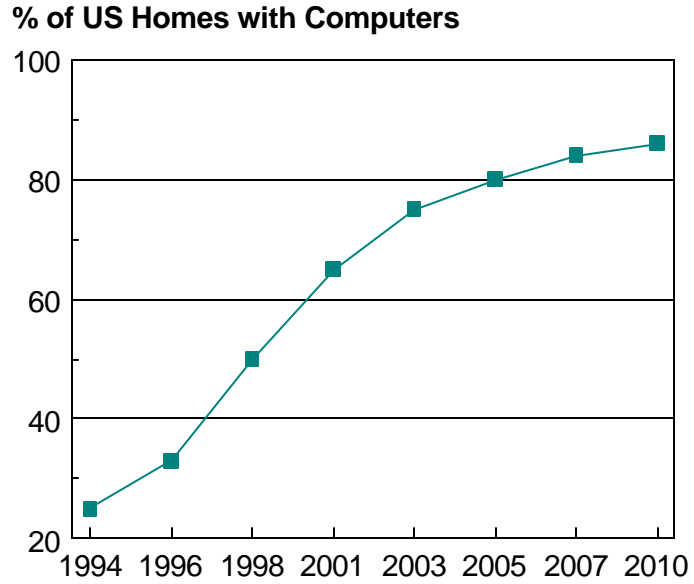
Still, consistently low rates for most telecommunications services are not yet available worldwide. The barriers to affordable telecommunications are primarily the huge costs to replace outmoded telecommunications infrastructures and the inefficient, government-run monopolies that still operate in many countries throughout the world. Deregulation of this industry should create a competitive marketplace where low cost provider economics will eventually play out. And a solution to the outdated and/or insufficient infrastructure may be to leapfrog to wireless for even the basic services. Wireless services are extremely popular in Europe, to the point where one in two Finns now carry a cellular phone device.

In any case, enough economies can afford Internet connections to make it a truly worldwide phenomenon, indicating that the cost of telecommunications has not been not a disabling factor everywhere.

The effect of low cost, widely available telecommunications connections on 'Net'-Enablement is obvious. As long as connecting to a network was prohibitively expensive and not readily available, relatively little traffic passed over networks. Once it was simple, easy, and of low cost, the possibilities for usage of the network mushroomed, especially after the development of the Internet and the Worldwide Web, topics which will be discussed in a later chapter.

### 2.3 Driver #3: Widespread Diffusion of Computers

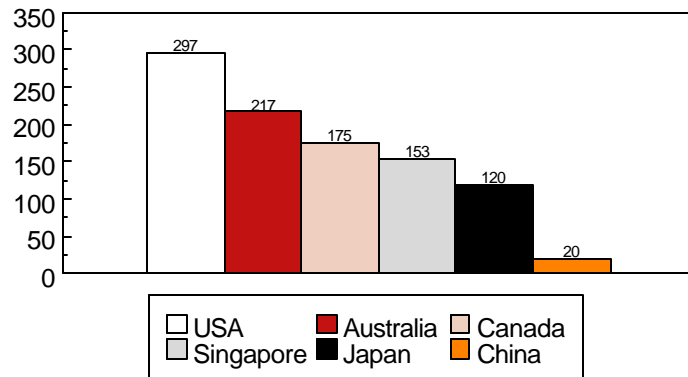
Computers, both personal computers and those used for enterprise-level computing by organizations, have become omnipresent in our post-millennium world. The growth of use of personal computers in the US has been exponential, from 25% of homes in 1995, to 33% in 1998, to 50% in the year 2000, as Figure 1 illustrates. There is no reason to believe that this growth will stop anywhere short of the 90%+ level, which is a reasonable approximation of the penetration of televisions in the US.



**Figure 1.2 Real and Projected Growth of Home Computing in the USA**

Rates of growth in other parts of the world have been equally impressive in industrialized and developed countries in Europe and Asia, although they do tend to lag the US by a few years. Because of the cost of computers and the tariffs placed on imports by governments, the diffusion of computing in many developing countries (DCs) has been much slower. Figure 3 shows the penetration of computing in industrialized countries like the US, Singapore, and Canada, and developing countries like China.

### Computers in Use Per 1000 People in 1994



-Source: The ITU World Telecommunication Indicators Database

**Figure 1.2 International Diffusion of Computing**

[This figure needs to be updated, naturally]

Clearly, 'Net'-Enablement cannot reach consumers without penetration of the population at large. But there is no reason why businesses cannot communicate with other businesses, even in countries with a largely illiterate population, like Egypt. So the argument is straight-forward in that 'Net'-Enablement depends on the availability of both transmission capabilities (driver #2, inexpensive telecommunications) and the machines to send and receive transmissions (driver #3, widespread diffusion of computing).

Without a critical mass of users, no communications technical advance can succeed,<sup>10</sup> but it appears that the critical mass is now present as a result of drivers 2 and 3.

#### **2.4 Driver #4: Increasing Pressures on Costs and Margins: Globalization and Commoditization**

Costs and margins are under pressure because of two factors: (1) globalization and (2) commoditization. Globalization means that businesses operate freely and with minimal restraints across national borders. The ability of firms to do this has increased dramatically over the last decade and is as potent a phenomenon as computerization in all of its forms. Giant trading blocks like NAFTA in the Americas and the European Common Union in Europe have reduced or eliminated custom procedures, taxes, tariffs, and other constraints on free trade. Trading agreements between nations, such as designations like "Favored Trading Status," have also opened up markets and allowed multi-national corporations (MNCs) to set up operations in foreign countries.

Because of globalization, firms find today that they must pay attention to their margins when they are conducting business on a global basis. The firms against which they are competing may have the advantage of scale economies (Bartlett and Ghoshal???) and the only way they can compete is to be more effective at 'Net'-Enablement.

Commoditization, on the other hand, is the standardization of products and services such that differences between them are not perceived as differentiating characteristics by customers. At one point in the personal computer (PC) revolution, for example, it became clear that there was little difference between manufacturers of products with the same configuration. As a result, prices plummeted and the producers with excellent economies of scale, like Dell Computers, began to dominate the industry. The movement of products and services from being differentiated to being commoditized is important because it opens up markets.

Why are these significant as environmental factors that encourage the development of electronic commerce? In brief, if firms felt that they could not readily buy and sell abroad, they would be less inclined to use the Internet and 'Net'-Enablement. The Internet, in particular, has international reach. URLs express locations for virtually any spot on the globe. Governmental regulations are the only impediment to being able to access Websites globally. So the trend in globalization is nicely matched by the capabilities of the Internet to transact business anywhere on the planet.

Commoditization, by the same token, spurs economic growth and opens up more opportunities for international sales. It allows new firms, many of them off-shore, to enter a market because products and services have become standardized. The outsourcing of software component building and assembly to India is a case in point. If it were not for the international connectivity afforded by the Internet, it is difficult to see how the high level of activity in India could be sustained. The Indian software factories are supplying a great deal of the world's application components and 'Net'-Enablement is a critical link in the efficiency of this operation.

### 2.5 Driver #5: Changing Organizational Models

Organizations are changing and, by happenstance, or, in dynamic interaction with the capabilities of 'Net'-Enablement itself, the ways in which they are changing are readily supportable by 'Net'-Enablement. These new models include: (a) empowerment of workers, (b) informing of key business activities, (c) delayering, i.e., downsizing and outsourcing, (d) partnering, (e) tele-work, and (f) virtual teams.

**Empowerment:** As greater decision-making authority is vested in workers on the "front lines," the need for increased exchange of information among workers within and across work groups also increases.<sup>11</sup> Hence, the need for closer attention to appropriate choices of networked communication media, such as email, voice-over-IP, or video-conferencing, becomes paramount.

**Informing:** Automated processes spin off data that can be reshaped as information for managerial decision-making.<sup>12</sup> The amount of information that can be produced from a clickstream of data exchanges between a firm and its customers in cyberspace is enormous. It is clear that managers will need to find new ways of managing this data flow, tools like data mining coming instantly to mind.

**Delayering:** As organizational layers are removed (often by eliminating supervisory or middle-manager ranks), spans of control increase.<sup>13</sup> This means that managers must communicate with more subordinates, creating greater pressure for communication efficiency as well as more potential stress due to more potential incidences of incomplete communication sequences. Delayering leads naturally to outsourcing since the work must still be done.

**Partnering:** Strategic alliances are the rule today, rather than the exception. Firms are partnering with those who can complement their internal core competencies. Sometimes this is via an arm's length transaction or a long term contract, and other times it is through a loose cooperative arrangement.<sup>14, 15</sup> Coordinating these numerous tasks is greatly facilitated by networked connections and the applications that run on the Internet.

**Tele-work:** More and more, knowledge workers are performing their work in locations remote from a central office.<sup>16</sup> This change in organizational form is, in fact, only made possible with the advent of high bandwidth communications.

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**Virtual teams:** In order to achieve rapid-cycle product design and get to the root causes of nettlesome quality problems, reconfigure business processes, etc., many organizations are turning to ad hoc task forces, teams and committees, whose membership are often virtual, comprised of workers in different functions and different locations.<sup>17</sup> Provision of appropriate communications tools to support these temporary organizational structures is now and is going to continue to be a key to successful organizations.

### 2.6 Driver #6: Rapidly Shrinking Cycle Times

There is a nearly universal need in business to reduce cycle times for production and fulfillment processes. The improvements in cycle time that companies like UPS and FedEx were able to accomplish with their delivery schedules is as impressive as those in the design of automobiles or chips. In all cases, the amount of time it took to complete certain cycles were halved, and then halved again. Each time the cycle time improved, customers were more satisfied and costs went down.

Decreasing cycle times requires a tight integration between tasks in the critical path, and 'Net'-Enablement applications are being used to create that seamlessness. As we shall see next, this has been accomplished through EDI, but lately this coordination is being worked through XML. Because the Internet is a time- and space-free medium, coordination can place on a 24x7 basis.

### 2.7 Driver #7: Intelligent Products and Services

Miniaturization of computers is a benefice of the space age. Computers needed to be both powerful and small to be carried into space, and the chip was the result. Today, chips are found in everything from automobile dashboards to cereal boxes. Chips can be used to identify pets like dogs and cats, and they can be used to record the time of a runner in a footrace.

The intelligence of products goes far beyond identification. GPS systems are being installed in rental cars so that renters can be given detailed directions to find their way to any part of visited destinations. Cellular phones are evolving into hand-held computers and being amenable to Web surfing. E-book devices can now only display large numbers of electronic books, but they can bookmark pages, and serve as an amanuensis for information that you wish to highlight and store.

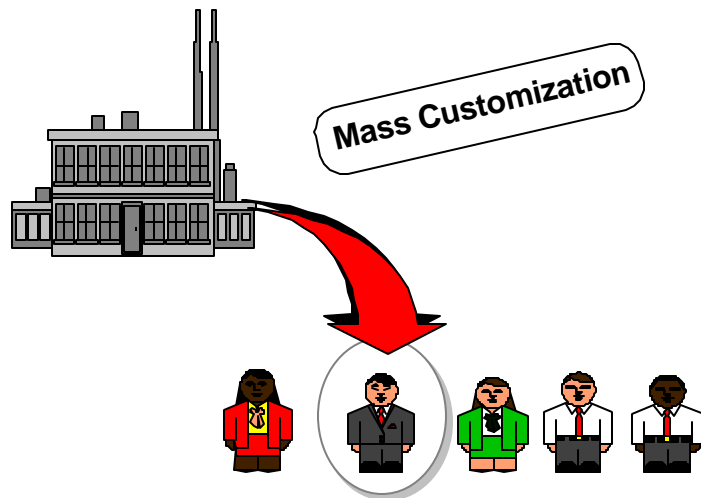
Sometimes the intelligence is not embedded in the products and services themselves but is so closely associated with them that it seems as if the products and services are, indeed, more intelligent. Don Tapscott, who comments on the ability of the producers of goods to track consumer buying patterns,<sup>18</sup> refers to bread as being "smart." And bread can, indeed, be smart, if the firm's databases and tracking applications know that a customer typically buys certain kinds of bread and with a regular frequency. The firm can induce sales if and when consumers break out of these buying patterns. Email is an excellent conduit to help to induce such sales. The process of sending the emails can be easily auto-

mated, and the customer given "bail-out" options, should they not wish to receive such "friendly" reminders.

Intelligent products and services of the future will increase the capabilities of 'Net'-Enablement and extend its penetration into our daily lives. Cell phones are just one example of intelligent devices that will be 'Net'-Enablement-ready. Palm Pilots can be linked through wireless connections into the Internet, as well as to LANs in the office. Flows of information from client to producer to customer to provider will be taking place in the next few years as if it were the most natural process we have ever known.

### 2.8 Driver #8: Demand for Customized Products and Services

Customers have had their appetite whetted by the ability of manufacturers and service providers to tailor their offerings to the specifications of the customer. In physical products, the examples are legion. Dell Computer offers a configurator on its online Web-site that allows one to precisely specify the computer or peripherals one wishes to purchase and have delivered. This is known as working with mass customization or markets-of-one, as illustrated in Figure 1.3. In other situations, more and more often, it is possible for customers to indicate their exact requirements and have an automobile, or example, delivered rapidly, and built to their specs.



**Figure 1.3 Dell Computer Manufacturing for Individual Consumers through its Configurator Engine** [Creates feedback from customer via Web page screen]

In the services arena, Andersen Consulting has an online service for small businesses that uses an expert system interface to Andersen's Best Practices Knowledge Management System.<sup>7</sup> Because small business customers cannot afford the full, premium prices of

<sup>7</sup>Jaworski (1998)

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Ernest and Young's consultants, they are able to gain access to tailor-make consulting advice via this service. This is an interesting solution, in that E&Y have turned their differentiated product, their knowledge base, into a commodity to be delivered via an intelligent computerized system.

The fact that the examples in this section are already 'Net'-Enablement-enabled products and services is an indication of the extent to which 'Net'-Enablement is required to personalize the response to the client and to build-to-order. It is possible to do this with physically-driven processes, but the costs/prices are much higher and the market is not likely to be a mass market, but a niche market. The days of the Rolls-Royce hand-made automobile are gone. But with 'Net'-Enablement, we are truly seeing the markets-of-one that Gilmore and Pine speak of.<sup>8</sup> The cyberspace markets of the future will be targeted to anyone, anytime, and anyplace.

### Always Up



A world dominated by 'Net'-Enablement will mean that systems will always be available to process orders and that firms will no longer have the luxury of natural "breaks" in their corporate rhythms. Day and night, weekends, holidays, festivals, and

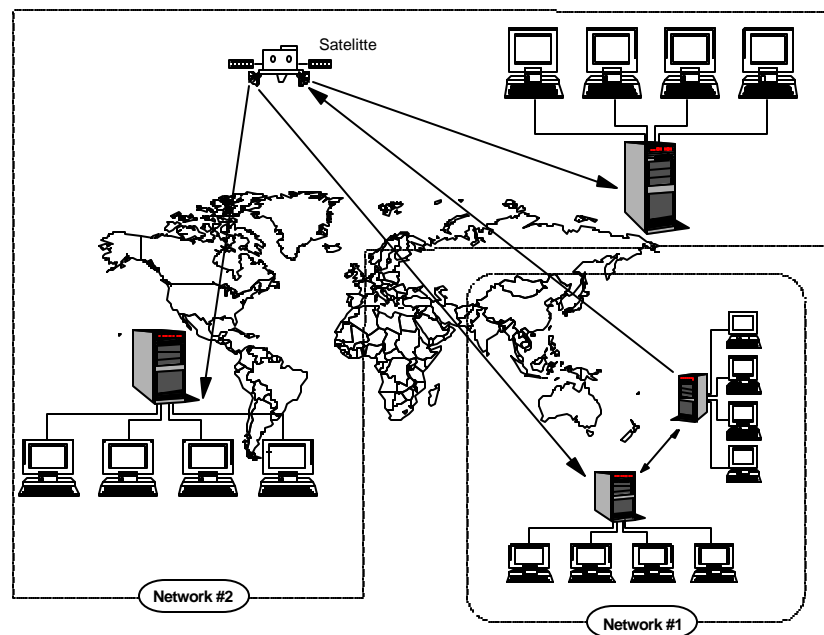
vacations will no longer be wedded to a particular locale or culture because the clientele for all firms will be global. New organizational designs will be required to adapt to this new environment, designs like virtual organizations, tele-commuting, global work teams, and flexible working hours.

## 3 WHAT IS 'NET'-ENABLEMENT?

We have defined 'Net'-Enablement as commercial activity via electronic (computerized), networked connections, a definition which will serve well enough to get us started, but will not be sufficient for the long term. By placing 'Net'-Enablement in an historical context, though, we can begin to see some of the characteristics of the current phenomenon that set it apart from computing and networking revolutions of the past.

<sup>8</sup>Gilmore and Pine (2000); Pine and Gilmore (1993)

Before we discuss this evolution, we need to be sure that the concept of a network itself is well understood. Networks were first conceived in the late 1940's as the simple exchange of information between a sender- and a receiver-computer. Information theory, first formulated in 1948,<sup>21</sup> articulated the idea of minimal bit exchange in order to perfectly complete a transaction. With this concept, the essential intellectual groundwork for networking was in place. Once three additional features are added to this model, the features of: (1) remoteness of senders and receivers, (2) the possibility of multiple senders and/or receivers, and (3) the possibility of multiple networks, the vision of a modern-day telecommunications network was present. These essential linkages and exchanges are shown in Figure 1.4, "Generic International Telecommunications Network."



**Figure 1.4 Generic International Telecommunications Network**

How did computing systems and networking finally converge in 'Net'-Enablement? In one sense, there were certainly elements of 'Net'-Enablement in the unveiling of the first IBM computer dedicated to business processing in 1964. Commercial activities were never the same after that event in that many business manual processes, especially those associated with traditional accounting and bookkeeping systems, could now be electrified. The original large firms who invested in computers, moreover, soon began connecting their home bases, with the mainframe computers, to remote job locations, which typically held printing devices for reports and other transaction processing. These connections were created via networks.

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Why would this not this set of technological configurations and business processes be considered 'Net'-Enablement? As we shall see shortly, 'Net'-Enablement is unique in the intelligence of its network(s) -- that is, the ability of networks to operate by making dynamic, local decisions about the routing and re-routing of information, and the ability of end-points to have complete information processing capabilities in their own right. These capabilities were simply not present in the early days of computing.

As the concept developed during the 1990's, electronic commerce came to be strongly associated with distributed computing intelligence, such that both processing and data storage could be dispersed across the network. This makes these networks "robust," or capable of continuing to operate even when sections of the network fail. As we shall see later in this chapter, there are also differences in organizational goals that can be cited for why we had not arrived at the era of 'Net'-Enablement by the year 1964.

For all intents and purposes, the development of smart networks grow out of personal computer (PC) advances, in the early 1980's. PCs were typically stand alone, at first, and it was not until later in the 1980's that PCs were being heavily used as smart input-processing-and-output devices not located at the same physical location as the mainframe computers. Distinctions between different forms of mainframe computers, mini-computers, and high-end workstations started to blur in this period as well.

Intelligence in networks, thus, began to be associated with the smarter and smarter machines of many varieties that are placed at various strategic points around the networks. By the end of the 1990's, the technical landscape was ready for 'Net'-Enablement. But the organizational and inter-organizational landscape still was not. Organizations had to be able to see that the exchange of information with other business entities was not only desirable for creating efficiencies in accounting for and producing goods/services, and assisting in decision-making, but could also be instrumental in creating new strategic capabilities and networked linkages for the firm.

Harvard's Jim Cash discusses these three stages of the evolution of organizational needs (see Figure 1.5). In the first era of computing, organizations use system to run their transaction processing systems (TRS) and the standard reports that were generated off of these, their soc-called management information systems (MIS). Seeing that more sophisticated analysis of this internally-generated information was possible, firms began to produce decision support systems (DSS) and rule-based decision aids in the form of expert systems (ES). By the early 1980's, firms like airlines were using information systems as competitive weapons.<sup>9</sup> The first customer airline reservation systems (CRSs) connected travel agencies with certain airlines, notably United and American, and these systems allowed these firms to grow larger and faster than their rivals. It is critical to note at this juncture that these systems were not available on publicly accessible networks. The networks and the network protocols were proprietary. Although the computers that were used to access information, moreover, were more than sending and receiving devices (i.e., they were "smart" terminals), their intelligence was limited to interface control and a few other functions.

<sup>9</sup>Ives and Learmonth (1984)

<b>Era</b>	<b>IT Focus</b>	<b>Generic Systems</b>	<b>Purpose</b>	<b>Primary IT Technologies</b>
I: (1950s-1960s)	Organization	TPS, MIS	Efficiency	Mainframes
II. (1970s-early 1980s)	Individual	DSS, ES	Effectiveness	Minicomputers
III. (early 1980s-1990s)	Intra-industry	Customer Ordering Systems (CRS)	Strategic/Competitiveness	Proprietary network connections; smarter terminals

**Table 1.1 The Three Eras of Computing**

(based on Jim Cash's Harvard lecture series on IT, 1988)

From the standpoint of reaching beyond the boundaries of the firm to industry agents, like travel agents, these early airline computer reservation systems partake of some of the characteristics of later full-fledged 'Net'-Enablement applications, in principle. In being proprietary in nature, though, they failed to break-away from the traditional internal, and closed focus of systems in eras I-III.

How does 'Net'-Enablement differ from the first three eras of computing and networking with respect to organizational purposes? The argument in this text is that 'Net'-Enablement breaks out of the strait-jacket of the first three eras by finally leaving firm boundaries behind. As Figure x, "The 'Net'-Enablement Era vis-à-vis Traditional Computing/Networking," shows, Era IV refocuses the organizational targets from intra-industry systems (such as the airlines and travel agents communicating amongst themselves) to truly inter-industry and consumer-oriented systems. As we shall see later in this book, firms are stretching far beyond their traditional partners to include new suppliers and intermediaries in their domain of contacts, not to mention, of course, the end-consumers. The purposes of Era IV systems are varied, but they are intended not for simple internal efficiencies, but to give the firm overall competitive advantages in all respects, including opening the doors for the firm to enter entirely new lines of business. These systems are increasingly being based on a network hand-shaking protocol (sender-receiver standardized format) known as TCP/IP. The exact nature of this protocol must wait for a later elucidation in a chapter dealing with technical issues. For the moment, it is sufficient to point out that TCP/IP is the open systems protocol universally used by the Internet and the World Wide Web.

<b>Era</b>	<b>IT Focus</b>	<b>Generic Systems</b>	<b>Purpose</b>	<b>Primary IT Technologies</b>
I: (1950s-1960s)	Organization	TPS, MIS	Efficiency	Mainframes
II. (1970s-early 1980s)	Individual	DSS, ES	Effectiveness	Minicomputers
III. (early 1980s-1990s)	Intra-industry	Customer Ordering Systems (CRS)	Strategic/ Competitiveness	Proprietary network connections; smarter terminals
IV. (1990s-2000s)	Inter-Industry; consumers	Browsers and WWW	Economies of scale, market penetration, and new business directions	Client-server networks based on TCP/IP

**Table 1.2 The 'Net'-Enablement Era vis-à-vis the First Three Traditional Eras of Computing**

#### 4 DEFINITIONS OF 'NET-ENABLEMENT

We have placed 'Net'-Enablement in an historical context, which gives a lot of clues as to how one might ultimately define it. But to derive a single, comprehensive definition, there are definitional perspectives that stress the technical evolution of the phenomenon and others that look to its symbols, i.e., the information-substitution principle that will be highlighted over and over again in this book. Finally, the organization itself will need to be redesigned to accommodate 'Net'-Enablement and this transformation is another definition that must be weighed.

##### 4.1 Technology-Based Definition of 'Net'-Enablement

It is appropriate to inaugurate a fuller definition of 'Net'-Enablement with a definition that hinges on the technology itself. The (r)evolution that has led to 'Net'-Enablement grew out of certain technical advances, and, as we just saw, these advances to a large extent defined the boundaries of the phenomenon. 'Net'-Enablement involves exchanges of information that are governed by the rules of the TCP/IP protocol. Although certain EDI and EFT exchanges have, and will continue to take place using protocols that are not TCP/IP, these largely proprietary protocols will be replaced, over time, by TCP/IP. The universality of TCP/IP is what makes it so attractive as a network exchange language. No single firm or country owns it.

## 4.2 Information-Based Definition of 'Net'-Enablement

To flesh out our inclusive definition of 'Net'-Enablement, we need to consider additional aspects of what happened when computer systems evolved from Era III to Era IV. As firms extended their boundaries, they found that they were replacing informational processes for physical processes. This, it turns out, is a critical reason for why these systems were so dramatically different from traditional computing and networking. An example may help to illustrate what is meant there.

Dell Computers<sup>23</sup> went online with their consumer sales in 1996. Whereas they manufactured many of the components themselves to fill these online orders, they outsourced the making of monitors to Sony. The Dell 'Net'-Enablement system not only allows the firm to interact directly with consumers, but it also allowed them to tightly coordinate the orders so that monitors arriving from the Sony factory could be combined by Fedex with the rest of the customer's hardware and software order and delivered as a single unit. There are two significant informational substitutions for physical processes that Dell employed. First, the need for a physical storefront where the hardware and software are displayed and from which the customer chooses has been eliminated. Instead, customers rely on the Dell configurator system to assist them in choosing a set of components that work well together. Item specifications and pictures substitute for the physical elements.

Information can also enhance traditional products and services in ways that suggest that we are moving into radically-different ways of thinking about where the real value of a customer connection lies. If, for example, the product that one sells is only a preliminary to a long-term relationship, where customer loyalty and belief in the firm and its brands are sustained, then the information that allows the firm to track the use of a product through its life-cycle could be more valuable than the original sale. Ives' customer resource life-cycle [need cite for this] suggests that product-ownership pass through stages and that firm can manage this relationship, as depicted in Figure 1.6 below.

Customer Stage	Name	Description
1	Search	Helping customers find your product
2	Selection	Assisting customers to choose your product
3	Acquisition	Making it easy and convenient for customers to acquire your product
4	Stewardship	Aiding customers to track the state of your product
5	Salvage	Helping customers dispose of your product

**Table 1.3 Ives' Customer Resources Life Cycle (Ives and Learmonth, 1983)**

HP sells printers, but large profits to the firm do not materialize from the initial sale, which is not a high margin proposition. The ability to track the product from its initial sale to later customer needs, such as printer toner and repair, allows HP to retain a competitive

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advantage. Online registration of the product during software installation is one way the firm develops a database of customer information.

The electronic connection between an Otis elevator and a monitoring station allows the organization to take advantage of the "smart" product and to ensure that facilities run smoothly. This ability to remotely monitor the product, and help the customers act in the role of "stewards" of the product, serves both parties. Otis retains customer loyalty. The customers receive rapid servicing and proactive repairing of their elevators.

"Smart" products can be much simpler, however, and exploit connectivity even further. Digital products and services downloaded from the Internet, for instance, are, perhaps, inherently "smart" in that the organization can readily track the installation and registration of these products. A simple online registration (which also can gather highly useful customer information) accompanies most such programs and, in operational mode, the products can "report" back to the vendor when they are in need of updating or new versioning. AOL is a good example of a service that maintains the latest version of its products. When a customer is online, the software communicates with the AOL node and if enhancements are needed, the software informs the client that the service is being maintained. Of course, a dialogue box informs the client that no online charges are involved while the downloading of the upgrade and the installation is taking place.

Finally, "smart" products can be thought of as an extension of the information substitution principle discussed earlier. If AOL did not have "smart" software that knows to inquire about updates, updates would require a physical process. Customers would need to be sent CDs or disks in the mail. Or, even if the capabilities of the Internet were used, the customer would have to initiate the upgrade and its installation. "Smart" products and services "fix" themselves, and substitute for physical actions on the part of customers.

Tracking information as an information enhancement in the package delivery business is another example. UPS customers, for example, did not realize that they wanted this kind of information until they were presented with it. That is why the provision of new information to a customer is an experimental process in 'Net'-Enablement. Focus groups often focus on what the customer thinks he/she needs, but are not useful in extracting information about their potential needs. 'Net'-Enablement systems can be built rapidly and beta-tested in the target population with lower risks and a greater return of information about the usefulness of the product or service.

To the firm, the substitution produces enormous cost advantages. In many cases, it can substitute for physical processes, which will be discussed at greater length in Chapter 2, "Principles of New Economy Business."

What is the overall definition of 'Net'-Enablement that combines the various perspectives we have been exploring? We have reached a point in the discussion where a definition can be advanced.

***'Net'-Enablement is commercial activity utilizing open network protocols like TCP/IP, in which information is typically substituted for physical processes.***

Although it is likely that TCP/IP will decline and possibly disappear as the underlying network protocol for internal LANS and the Internet, the important point emphasized in this definition is that the protocol be standardized and not proprietary. We shall see later in Chapter 4, "Basic Infrastructure," that there are major advantages to the world economy if the Internet remains "open" from a technical standpoint. In Chapter x, "'Net'-Enablement and Social Change," the same issue will be investigated from a governance perspective.

### 4.3 Organization Structure-Based Definition of 'Net'-Enablement

A third definition of 'Net'-Enablement focuses on how firms organize to do business. With respect to the structure of 'Net'-Enablement organizations, there is an obvious tie-in to the physical-informational dichotomy that we have been working with. 'Net'-Enablement firms are predisposed to focusing on informational core competencies and to outsourcing noncore physical assets and capabilities. Clearly, some firms are by their very nature heavily involved with the physical movement of goods and their transformations. Manufacturers like auto companies and logistics firms like overnight delivery services are inherently more labor- and equipment-intensive than firms like Yahoo. But this simple distinction misses the point.

Auto manufacturers are increasingly altering their internal business processes by making processes more information-intensive.<sup>10</sup> Such a firm that is not moving rapidly toward robotics and automated warehouses is simply not going to be competitive by the second decade of the 21st century. Toyota has successfully experimented with entire factories that have substituted machines for most of the processes involved in the assembling of autos. Their Kyoto plant was reputed to have only 8 employees, most of whom were robotics maintenance engineers.

Leading edge thinking in firms like UPS and Fed-Ex has also led to advances in the use of information. Package tracking systems are legion in this industry, but the ability of these firms to coordinate orders from different sources and to deliver them as though they were a single purchase are just other small pieces of evidence about how quickly this industry is moving toward 'Net'-Enablement.

A definition that synthesizes all of the concepts we have been discussing thus far would be:

'Net'-Enablement is commercial activity utilizing open network protocols like TCP/IP, in which information is typically substituted for physical processes, a transformation that leads to firms that are more and more virtual in their organizational structures.

<sup>10</sup>Autonomous (1999)

#### 4.4 Other Distinguishing Characteristics of 'Net'-Enablement

A firm that intends to adopt 'Net'-Enablement needs to consider the following "ideal type"<sup>11</sup> of a firm that has dedicated itself to a full-blown 'Net'-Enablement deployment. 'Net'-Enablement in such a firm will:

1. Adopt a global focus, both in terms of sourcing/supplying and selling
2. Closely tie its IT to organization's strategic positioning
3. Avoid proprietary solutions and technologies whenever possible
4. Examine the concept of full information visibility and selectively deploy it
5. Create strong links to its customers through its proprietary data, which will be its main competitive advantage

Many of these concepts will be discussed throughout the book. They are briefly mentioned here to give the reader a preview of coming attractions and to encourage thinking along these lines.

### 5 SCENARIO: ELECTRONICALLY WRINGING OUT COSTS IN AN AIRPORT VEHICLE RENTAL BUSINESS

To illustrate the ideas we have been discussing so far, let us imagine a typical firm operating worldwide and, assuming that top management and Board of Directors were committed to the firm transforming itself, see how this firm would begin to evolve into an 'Net'-Enablement firm.

Many airports internationally have vehicle rental companies. These firms often operate off-site, requiring customers to check in at a location on the airport grounds and then to shuttle to an off-site station where they are directed to their rental vehicle and given the keys. To ensure that thieves do not "shrink" the inventory of rentable vehicles, security guards are frequently posted at exits to check credentials and proper paper work. This may be backup security in the case where keys are issued to the customer at check-in, but especially necessary when keys are left in vehicle that are inventoried in fence-enclosed lots.

There are many aspects of this business that are physical. The provision of vehicles, their cleaning and regular maintenance, the locales for check-in and pick-up, emergency road services, and ancillary products and services such as cell phone rental. Physical processes in many or most cases require human agents, so the more physical processes there are, the larger the personnel cost. For instance, check-in counters require check-in clerks. Provision of vehicles requires security guards at exits, for backup security, at least.

<sup>11</sup>"Ideal types" are Weberian descriptions of a "most like" form of a concept. Not all firms will demonstrate all characteristics of an "ideal type," but the more of these characteristics they do demonstrate, the closer they are to a true embodiment of the concept of NE.

## 5 Scenario: Electronically Wringing Out Costs in an Airport Vehicle Rental Business b 23

How can the firm take advantage of 'Net'-Enablement and its tendency to completely invert business models? If the top management understands principles of information substitution, they will begin to look for ways to replace physical processes with information that can be made available system-wide through the Web, for example. Disregarding their supply chain for the moment, a set of processes where they could extract minimal prices in 'Net'-Enablement trading for new automobiles or maximal prices for salvage autos,<sup>27</sup> the interaction with the customer is a process that is already heavily laden with information. What is not efficient, though, is that this information is typically being gathered and regathered, confirmed and reconfirmed, all through labor-intensive processes and human intervention at particular physical locations.

Check-in is an information-gathering and confirmation process that does not have to be tied to a physical site or to a human assistant. Once customers have arrived at the airport, they are increasingly capable of communicating themselves with the rental car firm either through kiosks distributed around the terminals or through the wireless Web. The firm's Web site must have a simple interface so that customers can navigate quickly to the page that relates to the reservation they have placed, or lacking a reservation, to the available vehicles at that location. But this is eminently doable.

What is being replaced is the check-in counter at the airport and the staffing of that counter. Ultimately, the number of check-in clerks at the off-site location will also be severely reduced. The information that clerks typically gather in person can either be entered by the customer via the Web, or preferably, simply be transferred over from the customer's reservation and part history of transactions with the firm.

Once customers has reviewed an order online and confirmed choices such as make and size of vehicle, options for gasoline purchase, extra insurance, cell phone and the like, the order may be accepted via the digital signature issued by the customer's client software or via a light pen at a kiosk.

Kiosks that are currently in service in many US airports now issue a physical key to the customer. One can envision a day not far off when no physical keys or key cards are issued, but car entry devices read finger- or voice-prints to authenticate customer identities. Or, alternatively, communicate via infrared signals with the customer's client machine which would unlock the automobile as the customer was making his or her final approach to the vehicle.

Readable chips placed in scannable locations on each car in the fleet would allow firms to track when specific cars were leaving the lot and when they were arriving back in the lot. This kind of automated inventory control would greatly reduce the risk of in-lot security, for one, but more to the point, it would allow the firm to utilize the fleet to its maximal capacity. The exact positioning of the vehicle in the cleaning and maintenance process and computer estimates as to its availability for renewed service (given the staffing on particular days, for example) should open up the inventory and allow management to derive maximal advantage for the fleet.

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Competitive advantage would derive from more than customer-perceptions of quicker and faster service, although this would certainly be a tangible benefit. And it would come from more than lower costs in overhead and personnel. The real benefit of 'Net'-Enablement is the new business models that emerge for interacting with customers and in binding customers to the firm. Web-based systems can deal with customers on a 24x7 basis and respond to them in a more "personal" way than human agents. If a good customer (a fact which a firm's computer systems can know and use in its interactions) wishes to change an order, and the new vehicle choice is not available, the system can be programmed to upgrade the vehicle based on available stock. Whereas human clerks can also be empowered to make such decisions, it is unlikely that they would still be physically present in the airport terminal at the moment of late arrival of Flight 542 from Stockholm at 3 am. A kiosk that simply dispenses keys or key cards would be available, however, and, what's more, it would be able to print out exact directions for retrieving the vehicle from a shared after-hours lot maintained by the consortium of rental companies in the terminal itself, for example.

It is obvious in such a scenario how a move toward removing physicality from the process could carry the firm into new competitive territory. Suppose that a group of cars cleaned were available at 6pm, but that the keys could only be rushed to the kiosk for deposit at 6:20pm. A good customer arriving at the kiosk at 11:01pm could have been assigned or upgraded to the vehicle of his/her choice, but the physical key was not present, so the request had to be denied.

Vehicles entered and operated by unique identifying characteristics of the driver, such as finger- or voice-prints, would require neither check-in nor kiosk. The authenticating code would be directly beamed to the assigned vehicle via the wireless Web after the customer confirmed the order. This could be carried out during deplaning or the walk down the halls of the terminal. Exact directions for picking up the vehicle could be forwarded directly to the customer's Web communicator.

The Star Trek feel of this extended scenario may not be as far fetched as one might believe, as we shall see later. The important point at this stage in learning about 'Net'-Enablement is that top management needs to think in terms of giving customers direct access to information that will both improve quality of the service they are getting and, at the same time, represent this new plateau of customer relationship. Customer needs should be foremost so that rapid response systems that are Web-based and computer-orchestrated must be available to global customers at all hours and in all places. Access through the firm's Web-site will allow customers to adjust their own orders or, if needed, contact and speak, in either online text or online voice, with call center associates. These call center associates can assist by redirecting or pushing relevant pages to the customer or explaining these in a one-on-one chat session tied to particular pages. Call centers will be 24x7 for global firms, and will be labor-intensive, but the result will be heightened customer loyalty and new business.

What is the business model of this reengineered firm? The business model focuses on a direct-to-consumer model that puts resources in place to ensure that customers can move

directly from the door of their airplane to the door of the rental vehicle with a bare minimum of physical steps or stages in between. We would argue that that is the 'Net'-Enablement vision that should drive change in avant-garde firms in this industry.

## 6 KEY TRENDS

There are a number of a number of trends in the development of 'Net'-Enablement that will place the scenario we have just discussed in its proper perspective. These trends change so rapidly and forecasts are so unreliable that only fundamental or long-term trends make sense to discuss in a textbook such as this.

### 7.1 Resistance to Change

There is little doubt, for example, that resistance to new information systems will continue to characterize adoption decisions in the future as they have in the past. There is an inherent conservatism in people's psycho-social makeup that makes resistance to change feel natural.

Clearly, if top managers are reluctant to adopt new procedures and the accompanying information systems that radically reform and reshape their businesses, the 'Net'-Enablement revolution will be retarded.<sup>12</sup> Likewise, knowledge workers must warm to using the Web for gathering information and for interacting with other firms and customers. In the study that we will be reporting on in Chapter 3, resistance to use of Web-based systems characterized both managers and knowledge workers. They were willing to admit that 'Net'-Enablement was a dominant trend and that it would inevitably change their industries, but they were clear in their feelings that they did not approve of nor like this change. Moreover, they were adamant that their organizations were not changing quickly into virtual organizations, which they admitted were necessary to foster the move to 'Net'-Enablement.

One of the undeniable consequences of resistance to change is that transitions take much longer than expected. The migration from traditional business models to 'Net'-Enablement models is going to take a great deal longer than most people predict. Even when resistance is minimal, the conversion of legacy systems is nontrivial. As we shall see in Chapter 12, the meshing of systems geared to traditional physical processes and those geared to informational processes is not always easy.

Is being ready to embrace change necessarily or always a good thing? There are reasons to believe that some changes are not useful and can actually lead to harmful outcomes in an organization.<sup>13</sup> The concept of Internet speed will be discussed at greater length in a later chapter. What we can say at this point is that Internet "speed" is a concept that innovations on the Internet occur more rapidly than in traditional business environments. This may be true, but it also means that many traditional organizations are not going to be

<sup>12</sup>Straub and Klein (2001)

<sup>13</sup>Straub and Karahanna (1998)

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caught up in fads and fashions that will burn brightly and then fade as their inability to produce value becomes clear. An example of such a fad is "push" technologies. These technologies send unsolicited Web pages to users. The pages may be in response to a general user profile of desired information, but the specific pages themselves are not called for by the user.

While some inventions fail once and for all, other innovations find a second life. The timing for their introduction was initially not right, and the critical need they fulfilled only became obvious later. FAX is a good example of this. Fed-Ex spent over USD \$100 million promoting their FAX service only to find that it took another 3 years after they shut down this line of business that FAX machines became a rage. For these reasons, push technologies are discussed in the last chapter in this book as a promising technology, even though they have already been tried once and failed.

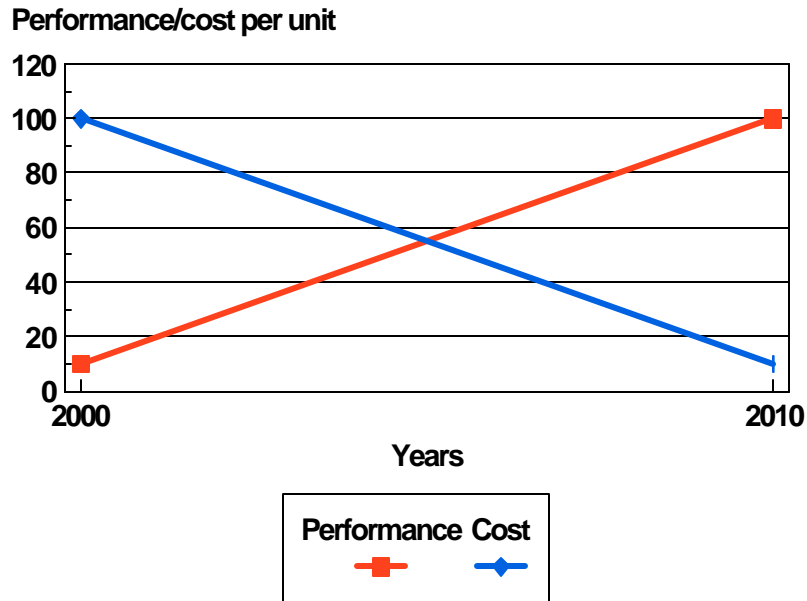
The real downside to resistance to change is that resisters to change are typically late in adopting innovations. The mean time to consider a new approach to doing business. However, there are reasons to believe that "late adopters" of technological innovations will. Therefore, the ability to innovate quickly requires firms to accept failure as part of the process of doing business. Organizations that are not able to accept a truly R&D mentality that expects a certain percentage of failures will ultimately not succeed in the Internet Age.

### 6.1 Moore's Law

Over the last few decades, computer systems have demonstrated a relationship between price and performance that has become known as Moore's Law.<sup>14</sup> Figure 1.5 demonstrates a logical extension of this relationship.

Over any given ten year period, the capabilities of computers appear to increase tenfold while the pricing for those capabilities decreases tenfold. If this law had applied to automobile manufacturing and sales, a Cadillac in the year 2000 would cost about \$5. With the exception of quantum limitations, which are still not in the immediate future, we can expect that this relationship will continue to persist through at least the first half of the 21st century.

<sup>14</sup>Schaller (1997)



**Figure 1.5 Cost-Performance Relationships in Computing Power**

What are the implications of this trend for 'Net'-Enablement? Network routers and servers, fiber optic transmission lines, clients and servers equipped with wireless functionality, and 'Net'-Enablement software, including application software, should all be subject to this same law. This means that bandwidths will increase at the same time that prices for these services will fall. There can be little doubt that the pricing of international calls over the Internet, for example, are just a fraction of what they were several years ago. This trend is also revealed in the extremely low cost of email in the present era.

How does Moore's Law impact the definitions of 'Net'-Enablement that we have developed? The ability of firms to substitute information for physical processes with greater and greater power for less and less money means that this element of 'Net'-Enablement will continue to be viable for years to come. TCP/IP is the transmission protocol that is dominant and a great deal of research and development in this protocol will result in incremental and large scale improvements that will drive progress in 'Net'-Enablement. Finally, the ability of firms to use advances in technology (at lower absolute costs of investment) will permit them to use Web-based systems switch rapidly between suppliers and to coordinate large scale projects. This will heighten the desirability of making the firm more virtual.

## 6.2 Growth in 'Net'-Enablement Sectors

There is little doubt that all sectors of 'Net'-Enablement activity are growing. The only issue is whether B2B will remain the source of the greatest investment or if B2C will even-

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usually overtake it.<sup>33</sup> The growth rates have, in all likelihood, tapered off to mere double digit growth rates, but these still healthy rates indicate continuing strength.

The growth of the Internet, for example, has been primarily in the more industrialized societies, but at some point in time there will be a large scale infusion of this technology in the developing world. Double digit rates have characterized the phenomenon for the last several years, and forecasts are that this represents sustainable growth. By the same token, sales of PCs and servers vary over the years, but were steadily rising even in downturns of the industry as a whole. In the year 2001, PC sales may have actually declined, but the long term prospects of computing are still strong.

What are the ramifications of this growth for 'Net'-Enablement? On the one hand, there is an indication that a first mover advantage cannot be maintained long term in the New Economy, partly because of the wide availability of basic infrastructure technologies implied by these across-the-board growth rates. If technology is cheap, robust, and widely available, the competitive advantage conferred by technology alone is not significant. This subject will be explored in much greater detail in Chapter 6, "e-Strategies for Competition." For the moment, it sufficient to note that there is certainly a critical mass of equipment and software<sup>15</sup> to enable 'Net'-Enablement and that these growth rates will insure its long term diffusion through the world.

## 7 SECOND OR CONSOLIDATING WAVE OF 'NET'- ENABLEMENT (2000-??)

One trend that needs to be dealt with separately is the fall-off in dot.coms in the worldwide stock markets in the year 2000. The list of major and minor failures is too long to enumerate. Some of these firms were well capitalized, like Boo.com. Others were well connected in a marketplace that was surely not saturated. The US NASDAQ index, which is heavily-laden with technology sticks, declined 40% from the turn of the year to the Fall of that year.

It is tempting to over-interpret short term stock market variability as meaningful. Nevertheless, there is probably enough evidence about this fall-off to picture this as an indication of the larger phenomenon of stages of growth of technological innovations. In the early days of computer mainframes, Dick Nolan at Harvard offered an explanation for the S-curve of growth that had been noticed in the technology infusion rates into corporations.<sup>16</sup> As Figure 1.6 shows, an initial exponential growth period is followed by an era of consolidation and control, where investments are more carefully scrutinized and rationalized. A second spurt of growth is followed thereafter by another period of reflection and caution, and so on.

<sup>15</sup>Markus (1987)

<sup>16</sup>Nolan (1973)

The initial phase of technology innovation in 'Net'-Enablement could be characterized as a period of "Contagion," as dot.coms were springing up all over the world and IPOs for nearly any Internet stock were inevitably oversubscribed.

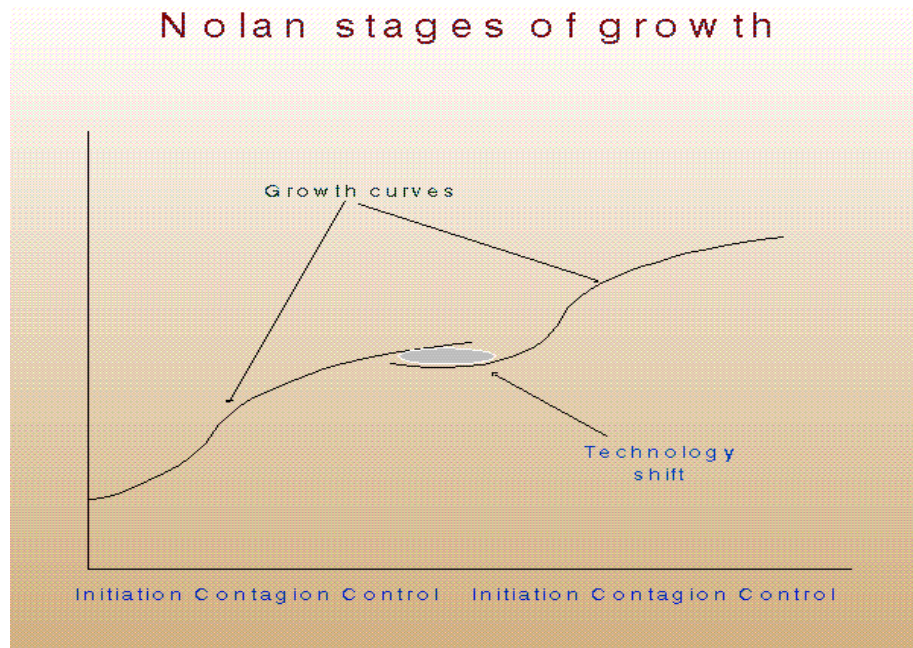


Figure 1.6 Nolan's Stages of Growth Model

One the period of "contagion" has passed, organizations move into a mode of controlling the technology until there is a technology transition. Following the "dot.bomb" failures, it was inevitable that organizations would engage in heavier than usual control of these investments. The danger then was in under-investing and letting the competition leap frog with new technical capabilities.

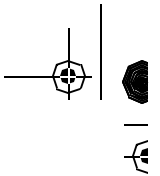
## 8 SUMMARY

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