

# **EVOLUTION TO E-ENTERPRISE**

It is change, continuing change, inevitable change, that is the dominant factor in society today. No sensible decision can be made any longer without taking into account not only the world as it is, but the world as it will be.... This, in turn, means that our statesmen, our businessmen, our everyman must take on a science fictional way of thinking.

*Issac Asimov* Asimov on Science Fiction<sup>1</sup>

Isaac Asimov was correct in saying that we must not only consider the world as it is, but the world as it will be. This is especially applicable to the Internet age. The Internet bubble has popped. Dotcom stock has become the proverbial swampland in Florida, as in "If you believe that, I've got some dotcom stock to sell you." As we take our fist step in the exploration of Internet-Enabled Business Intelligence (IEBI), we must take heed of Dr. Asimov's advice. We must not only consider the world as it is, but the world as it will be. What will be the fate of the Internet in the world to come? Where have we been, and where are we going? As we understand this, we can understand how to position our organization's IEBI solution for the future.

We begin by asking about the nature of the Internet itself. Is it merely a lot of hype? Is it "a tale told by an idiot, full of sound and fury, signifying nothing"? Or is the hype really wisdom, wisdom that "is better than the merchandise of silver, and the gain thereof than fine gold." We will explore the grandiose claims made by its proponents and the derision espoused by its detractors. We will attempt to decide if the Internet is really all that some say it is.

<sup>1</sup>Asimov, Isaac, Asimov on Science Fiction, Random House, 1981. Used by permission.

Asimov talked of thinking in a *science fictional* way. As we go on to discuss the history of the Internet, we will meet such visionaries as J. C. R. Licklider, Ivan Sutherland, Bob Metcalfe, and Tim Berners-Lee, influential people who thought in the future. We will come to see how the Internet was the culmination of many advanced ideas, developed independently and in parallel. We will come to see how truly revolutionary was the dream of an *Intergalactic Network*, how truly extraordinary that it could become a reality.

We then ask, What does all this mean to business? After all, the subject of this book is not just the Internet, but Internet Enabled *Business* Intelligence. How does the Internet affect business? After reviewing the Internet's history, this chapter discusses how businesses developed over the Internet and the possible future for those businesses. We will travel from the era of *brochureware*, billboards along the information superhighway, to the integration of supply chains across the Net.

Finally, we will discuss the different types of businesses we will encounter on the Internet. Not all businesses have developed their Internet capabilities to the same level. Some have just scratched the surface. These e-commerce organizations are just now developing ways to reach their customers over the Internet. Others have advanced to a stage in which they are integrating their entire supply chain. As these organizations move to the Internet, they all have one thing in common: the need for IEBI. In this chapter, we will survey the landscape in which this intelligence is to reside.

# 2.1 The Internet: Hype or Hope?

The Internet is the catalyst for a tectonic shift in industrialized societies throughout the world. The metaphor, while appropriate for the magnitude of the shift, breaks down when it comes to the speed in which these changes have taken place. Tectonic shifts are rather slow in human terms. The Internet, however, has revolutionized the worlds of entertainment, communications, and business at an astonishing pace. The Internet has transformed the exchange of information. The entire world has been caught within this net, taking it to...*yada, yada, yada*. Are you as sick of the same old Internet hype as I am?

It seems that everything you read lately about the Internet fluctuates between two camps. The first camp, the "it serves those start-up rich kids right" camp, portrays the dotcom mania as all a hoax and the burst of the Internet bubble as well deserved. Now that it is thankfully over and we have all wised up, we can get back to real work. The second camp is the "ever faithful." As soon as we pull out of this slump, things will get back to normal and we can all be rich again.

Let's try to attack this from a different angle and possibly avoid both the derision and the hype. In the 2000 presidential election, Vice President Al Gore suffered a fair amount of ridicule after he *supposedly* claimed to have invented the

Internet. While the media may have exaggerated his remarks, we cannot deny that the man is a visionary who did have more than a little part to play in bringing about the Internet age. In his book, *The Digital Economy*, Don Tapscott quotes Al Gore as saying "Guttenberg's invention, which so empowered Jefferson and his colleagues in their fight for democracy, seems to pale before the rise of electronic communications and innovations, from the telegraph, to the television, to the microprocessor and the emergence of a new computerized world—an information age."<sup>2</sup> Guttenberg pales before the Internet? What causes so much hoopla about a network of computers? Do you really think the ability to email Aunt Lorraine pictures of your trip to Hawaii can compare with the Guttenberg press, the most important invention of this past millennium?

Perhaps comparing the Internet to Guttenberg's press is not all that great a stretch. In Victor Hugo's *Notre Dame de Paris* there is a scene in which Jacques Coictier visits Dom Claude Frollo. There is a discussion between the men, during which Dom Claude opens the window of his cell and points to the massive Notre Dame. "The archdeacon contemplated the gigantic cathedral for a time in silence, then he sighed and stretched out his right hand towards the printed book lying open on his table and his left hand towards Notre Dame, and looked sadly from the book to the church: 'Alas,' he said, 'this will kill that.'" He continues "Alas and alack, small things overcome great ones! A tooth triumphs over a body. The Nile rat kills the crocodile, the swordfish kills the whale, the book will kill the building."

The same thing is happening with the Internet today. Rather than attempt to explain Dom Claude's thoughts, allow me to provide Hugo's own explanation:

As we see it, this thought has two facets. Firstly it was the thought of a priest. It was the alarm felt by the priesthood before a new agent: the printing press. It was the terror and bewilderment felt by a man of the sanctuary before the luminous press of Guttenberg. It was the pulpit and the manuscript, the spoken and the written word, taking fright at the printed word; something like the stupor felt by a sparrow were it to see the angel legion unfold its six million wings. It was the cry of the prophet who already hears the restless surge of an emancipated mankind, who can see that future time when intelligence will undermine faith, opinion dethrone belief and the world shake off Rome. The prognosis of a philosopher who sees the human mind, volatilized by the press, evaporate from the theocratic receptacle. The terror of a soldier examining the bronze battering-ram and saying: "The tower will give way." It meant that one power was going to succeed another power. It meant: the press will kill the church.<sup>3</sup>

Hugo was partially correct. Although the press did not destroy the church, it certainly had a role in transforming it. Prior to Guttenberg, the church was the center of society. The center of many a town was the cathedral. The clergy were not just men of God but men who were the keepers of knowledge. The western world was orthodox because the church controlled what was said and what was written.

<sup>&</sup>lt;sup>2</sup>Tapscott, Don, The Digital Economy, McGraw Hill, 1996.

<sup>&</sup>lt;sup>3</sup> Hugo, Victor, *Notre Dame de Paris*.

Then came Guttenberg and messed everything up. The press allowed the free expression of ideas, bypassing church censors. While the powers that existed tried to suppress this form of speech, it survived and transformed the world. Direct access to the Bible allowed the populace to define Christianity for themselves, giving rise to Protestant reforms. Even democracy owes a debt to Guttenberg in that the printed word gave rise to the age of enlightenment, empowering men like Jefferson.

Let's jump ahead in history to Edison. Reportedly, he once said that movies would eliminate the need for books. After all, why invest all that time reading when you can catch the same thing in a movie? The answer is simple: You can't. Despite his brilliance, Edison was wrong. Books and movies are distinctly different. Books communicate ideas that cannot be expressed on film. The same is also true of films; they present things that cannot be expressed in books. A culturally rich society requires both.

So what does this have to do with the Internet? Just as movies did not eliminate books, the Internet will not eliminate the structures of the industrial age. Each delivers something that the other cannot. As we said earlier, Hugo was *partially* correct. The press did not destroy or bring down the church; it transformed it. Similarly, the Internet will not destroy, but transform, the structures of the past. This should sound familiar. We are simply restating what we discussed in Chapter 1: The Internet is part of a solution. In a solution, each of the ingredients is transformed by the other.

Like the Guttenberg press, the Internet transforms the structures of the past by providing a conduit for the free and open exchange of ideas. Just as Guttenberg could not be suppressed, neither can the Internet. It is global; no single power can suppress the thoughts expressed on it. The Internet also provides a voice. Freedom of speech means nothing if you have no voice, if you cannot be heard. The Internet provides this voice. Anyone can set up a Web site anywhere and be instantly heard anywhere in the world. As you can see, it is an extraordinarily powerful tool for the communication of ideas. Freedom of speech and voice were tremendous tools in the emancipation of humanity. While it is obvious that we can easily fill the remaining chapters with the sociological implications of the Internet, that is not what we are here to discuss.

Just as these changes have affected the social and political worlds, they have also affected the business world. The ability to easily communicate globally has had enormous impact on the marketplace. When a competitor's offering is only a mouse-click away, customers can easily price shop or change suppliers when dissatisfied with a service. Manufacturers of new, innovative products now have immediate access to global markets. For these and other reasons, the information age has changed the business world.

At the dawn of the American industrial revolution, Eli Whitney transformed the manufacturing process. The story is actually quite fascinating. Whitney received contracts from the government for the manufacture of rifles in a time of war, but did not actually deliver on that contract until well after the war was over. It wasn't that he was slacking in his obligation. He was perfecting a process, a process that created products with interchangeable parts. The trigger mechanism of one rifle fit the stock of another. This enabled production to move from artisans to mass production. It gave birth to the American industrial revolution. During the ensuing industrial age, companies succeeded by capturing economies of scale and scope.

The industrial age view of technology was to employ it in the automation of an existing manual process. The vestiges of this thinking are with us to this day. How often do systems designers simply automate a manual process rather than explore the use of these systems in new and more efficient ways? In moving from the industrial age to the information age, businesses no longer derive sustainable competitive advantage by injecting new technology into physical assets. Doing things the same old way with new technology just doesn't cut it. Today organizations need to do more than manage their assets and liabilities well. Organizations must find new ways to differentiate themselves. They must look to some of the following areas:

- Introduce products and services that fulfill the desires of targeted customers;
- Deliver products and services with short lead times and at low cost;
- Develop long-term relationships with customers that retain customer loyalty; and
- Develop employee skills to improve the ability of the organization to achieve the previous objectives.

Well, I guess I wasn't able to avoid the hype, and I am guilty of being one of the *ever faithful*. The world is caught up in the Internet, and it is changing everything. Perhaps, just perhaps, Gore was correct. Maybe future historians will one day look back and see the dawning of the Internet and the information age as having a greater significance than Guttenberg's press. I don't know. I still have a hard time swallowing that one.

# 2.2 Building the Internet

The emergence of the Internet was the result of several technologies developing in parallel. The Internet's story begins at the height of the cold war, back in 1962. John F. Kennedy was in the White House and Camelot was in full bloom. The gauntlet had been thrown down, and we were facing the Russian challenge to reach the

moon. (When they make this book into a movie, the screen will go all wavy at this point.) The good sisters of Saint Agnes School would gather my classmates and me in front of a small black and white television screen to watch the latest space shot.

While we pondered how the space race would change our future world, another development was occurring with much less fanfare. This other development, however, would have as great, if not greater, an impact on all our lives. This was the year that the visionary J. C. R. Licklider was appointed the first head of the Information Processing Techniques Office (IPTO), a department of the then 4-year-old Advanced Research Projects Agency (ARPA) of the U.S. Department of Defense. Even at this early stage, Licklider envisioned a network spanning the globe. He dubbed this network the *Intergalactic Network*, where anyone in the world can access any system's applications and data from anywhere. We must emphasize that, for this time, such a vision was remarkable. We are talking about an age before even the simplest of computer networks, much less one that spanned the globe! Even if such a network were in place, data was not standardized. How were systems, all of which were proprietary, to communicate? Still, Licklider had a vision.

The Internet, as stated previously, is the result of many technologies developing in parallel. Two other developments occurred in 1962 that would affect the development of the Internet. First, Ivan Sutherland created Sketchpad, which laid the foundation for today's graphical user interfaces. Also, the Semi Automatic Ground Environment (SAGE), an early warning system, was fully deployed. SAGE was significant in that it used a light-gun to identify moving objects on radar screens. The following year, 1963, Licklider hired Sutherland to work at ARPA. In this same year the American Standard Code for Information Interchange (ASCII) was developed. ASCII was the first standard for computers that allowed systems to exchange information regardless of manufacturer.

Although Licklider left ARPA in 1964, his successor, Ivan Sutherland, continued to work on making a network that spanned the globe a reality. Shortly thereafter, Larry Roberts and Thomas Marill connected a system at MIT with one in Santa Monica using a dedicated telephone line and acoustic couplers. With ARPA funding, they created the first wide-area network. They were still, however, a good way off from the dream that would become the Internet.

Sutherland's stay at IPTO was short, and in 1965 Bob Taylor took over as director. He, like other researchers within ARPA, was faced with the same problem of computer systems that do not easily communicate with one another. Taylor presented these issues to the head of ARPA, Charles Herzfeld. To remedy this situation, a million-dollar networking project was launched to connect all the IPTO contractors. Taylor hired Larry Roberts of MIT to head up this project. Roberts began by convening a conference of ARPA researchers that concluded with Wesley Clark proposing *Interface Message Processors*. These IMPs, as they were called, were the precursors of modern-day routers.

Again, we see the parallel development of technologies that ultimately led to the Internet. While Roberts and Marill may have succeeded in having systems communicate, their method of using telephone lines wasted bandwidth and was expensive. In 1964, MIT, RAND, and the National Physical Laboratory in Britain developed packet-switching networks. In this scheme, data was put together into fixed-length packets. Network nodes routed the packets by passing them on to the other nodes in the network. Replacing Roberts' and Marill's telephone lines with packet-switching technology for the ARPANET increased line speeds from 2.4 Kbps to 50 Kbps.

In 1968 things began to happen at a quickened pace. ARPA refined the specifications for ARPANET. They also requested quotes for the development of the IMPs. Bolt, Beranek, & Newman (BBN) won the bid and began 1969 with the formation of a team to develop IMP software. Teams were formed at the University of California Los Angeles (UCLA), Stanford Research Institute (SRI), and University of California Santa Barbara (UCSB) to write the software that enables computers to communicate with the IMP. Each team delivered an important piece of the developing Internet. The UCLA team evolved into the Network Working Group and developed the Network Control Protocol (NCP). SRI used it as an opportunity to develop wide-area distributed collaboration while the UCSB team experimented with the display of mathematical functions, using a storage display.

The chaotic decade of the 1960s ended with two momentous events. First, man walked on the moon. Second, October 25, 1969, the Internet was born. Just like any other newborn, the Internet entered the world crying. The first logon attempt crashed the IMP. The second attempt succeeded, and a host-to-host connection was established between UCLA and SRI. While the 1960s gave birth to the Internet, it was in the 1970s that this infant that came crying into the world started to mature. ARPANET began the decade as an experiment, but concluded it as an uncontested success. Throughout this decade developments occurred, sometimes independently of one another, that led to the ultimate success of the Internet.

The first development of the 1970s was the completion of the UNIX operating system by Dennis Ritchie and Ken Thompson. While it may seem by today's standards that a universal operating system such as UNIX was inevitable, this was not always the case. Back in that era there was a great deal of cynicism concerning the possibility of a single operating system that would be supported by all platforms. In the days of proprietary hardware and operating systems, the very concept of having a single operating system was so alien that it was chided by many. Today, UNIX support is table stakes for any Independent Software Vendor (ISV) that wants to develop an enterprise class solution.

The other groups that were involved in the development of ARPANET weren't sitting idle either. In 1971 the Network Working Group delivered the Telnet protocol. The protocol provided a way to establish sessions on remote systems over a network. Within this same timeframe, the Networking Working Group also defined the File Transfer Protocol (FTP) and the Transmission Control Protocol

(TCP). FTP allowed the exchange of files between differing systems. Both TCP/IP and UUCP (UNIX-to-UNIX Copy) were incorporated into Berkeley UNIX, a version of UNIX enhanced at UC Berkeley. We will discuss the structure of TCP/IP when we take a closer look at some of the technologies upon which the Internet is based.

Additional developments included the introduction by Bell Labs of a new programming language called C. Ray Tomlinson of BBN introduced the @ sign for email headers. Unfortunately, this conflicted with other networks that used this symbol as a control character, and the controversy over email headers began. Also at this time, Bob Metcalfe of Xerox PARC developed a protocol for Local Area Networks (LANs) that eventually became Ethernet. By the mid-1970s over 3 million packets were traveling across ARPANET among 61 nodes. The network was a success. With IPTO's assignment complete, Licklider (who had temporarily returned to IPTO) turned over the operational responsibilities of ARPANET to the Defense Communications Agency. The first chapter of the Internet story drew to a close.

The next step in the history of the Internet began in 1977. Larry Landweber built THEORYNET, a network that connected part of the University of Wisconsin and provided email to over 100 researchers. Recognizing the importance of what he had created, Landweber started to discuss with other universities the construction of a computer science research network, CSNET. Robert Kahn, representing the U.S. Defense Advanced Research Projects Agency (DARPA), and Kent Curtis of the National Science Foundation (NSF) participated in these discussions. The idea caught on and was refined into a three-tier architecture that included ARPA-NET, TELENET, and an email-only service. CSNET was built using TCP/IP.

The inclusion of TCP/IP is significant. Many protocols were contending to become the standard, and there was no one clear leader at this time. Even the International Organization for Standards proposed its own Open Systems Interconnection (OSI). In addition to being used for CSNET, however, TCP/IP received greater and greater acceptance in the industry. Berkeley incorporated it into its version of UNIX, which shipped with the newly developed SUN workstations. Finally, in January 1983, ARPANET standardized on TCP/IP. TCP/IP continued to gain popularity, becoming available on most workstations and personal computers.

The NSF took the concept of CSNET a major step forward in 1984. Rather than just supplying an email service between researchers, the NSF sought to establish a way to provide researchers throughout the entire United States with access to supercomputers. In 1985, five supercomputer centers were selected: Cornell Theory Center, the John Von Neumann Center at Princeton, the National Center for Supercomputer Applications (NCSA), the Pittsburgh Supercomputing Center (PSC), and the San Diego Supercomputer Center (SDSC). A 56Kbps backbone was established between these centers around which grew regional networks. By the close of 1987, there were approximately 30,000 interconnected networks.

Despite its success, the very nature of ARPANET created limitations. UUNET was established to resolve these issues. This network provided commercial access to UUSCP and USENET newsgroups. At about this same time, 1988, the NSF backbone connection between supercomputers was upgraded to T1. The network also took on more of an international scope with connections to other parts of North America and then to Europe and Japan.

At about this time, Tim Berners-Lee of CERN in Switzerland wrote a proposal for a hypertext markup language. This in and of itself was nothing new. There were at the time various hypertext projects, such as those at Brown University and at Stanford Research Institute. The proposal from CERN, however, described a markup language that was able to execute in a heterogeneous distributed environment. Two years later, students at the NCSA at the University of Illinois at Urbana-Champaign created MOSAIC based on Berners-Lee's proposal. The World Wide Web took flight.

In the past 40 years we have seen private industry work together to develop what Licklider called an "*Intergalactic Network*." Even legislation played an important role in the development of the Internet: The Gore Bill, for example, was passed in 1991 by Congress to create the National Research and Education Network. All of these things played together to create this vast network in which we have all become entangled. What we have described up to this point is the network itself. Business and the development of the e-enterprise was still a few years in the future.

# 2.3 The Evolution to e-Commerce

In the 1800s, when telegraphic communication was first established between Texas and Maine, Thoreau pondered the possibility that it perhaps was an improved means to an unimproved end. He observed that "our inventions are wont to be pretty toys, which distract our attention from serious things. They are but improved means to an unimproved end." The essence of Thoreau's point is that we may have improved the mechanics of communication, but we may not really have improved what we are communicating. In this information age, have we really anything meaningful to say to one another? Simply establishing the infrastructure, the hardware and the software that enables the Internet, is one thing; having something meaningful to say is quite another.

Consider the role played by the telegraph in America's westward expansion. Without it, the railroads would not have been able to span the western frontier. How many times have we seen in movies about the Old West telegraph lines strung alongside railroad tracks? This is actually one of the few cases where Hollywood got it right. The telegraph provided railroad management with a means to coordinate the resources of the organization over a wide geographic area. During the Civil War, the telegraph was used to coordinate the movement of units and

deliver intelligence information. Grant, recognizing the telegraph's use in command and control, would often cut his own telegraph lines to free himself of centralized command. In answer to Thoreau's question concerning the telegraph, yes, we did have something meaningful to say. The first attempts at e-commerce, however, were an entirely different matter.

## 2.3.1 BILLBOARDS ALONG THE INFORMATION SUPERHIGHWAY

In 1994 I was involved in a large data warehouse project. The system, when all was said and done, required a budget of approximately \$1.5 million. In order to receive funding, I had to justify this cost in front of the board during the semiannual budget review. On the schedule, just prior to my presentation, was the manager in charge of researching new technologies. No one really knew what he did, and he didn't really have anyone working for him. Yet, he always seemed to be doing something. In the couple of months prior to our meeting with the board, he had been fooling around with the Internet. He was trying to create a *presence* for our company on the Web. When he demonstrated a corporate Web site to the board, they were impressed. The site gave a rundown on our company, our office locations, and even a picture of the CEO. The concept he presented was simple, a new slick way to promote the organization. The Internet, as far as the board was concerned, was just another communication medium, not much different from a newspaper or television. The data warehousing stuff was something radical, something requiring change, something entailing risk. The data warehouse was a solution: Being a solution it was going to change the way the company did business. Unfortunately, it was a solution to a problem they didn't realize they had. Hence, they did not see the ROI. In the end, the new technologies manager received funding, and I did not.

What my colleague had demonstrated was something safe, something to which the CEO could relate. It was what has become known in the industry as *brochureware*. At first, companies didn't know how to take advantage of the World Wide Web. People began with simply creating Web sites that provided information about a company or product. These early Web sites were mere billboards along the information superhighway. They were little more than electronic copies of company brochures. Business processes such as purchasing and sales were still carried out in the traditional manner. Some sites went as far as providing a way to contact the company over the Web, but no real transactions were carried out.

Contrast these early attempts at e-commerce with the telegraph. The telegraph was used to do things differently. It enabled a nation to expand. It allowed industry to coordinate resources across great distances. The telegraph was part of a solution. Brochureware did nothing new. It used the Internet as just another venue for publication, little more than an electronic newspaper. Brochureware lacked the imagination and innovation to take advantage of the capabilities of the Web.

Giovinazzo\_Final.book Page 19 Thursday, August 8, 2002 10:29 PM

## 2.3.2 THE CHALLENGES OF EARLY E-COMMERCE

Before we start to vilify these early Web designers, we should remember that most organizations *couldn't* do much more than brochureware. To achieve true e-commerce, three main issues needed to be resolved. As we shall see, two of them weren't even technological. The first was how to actually sell something over the Internet. We needed to develop a means by which we could carry out secure transactions. If I were giving you all the information necessary to purchase something, I needed to feel secure that you were the only one to receive this information. Then, assuming you received the information, I had to feel secure that you would use it only for the purposes for which it was sent.

Creating a secure transaction was only part of the problem of carrying out a sale over the Internet. The second issue was order fulfillment. Sure, the Internet was a great way to exchange information, but we still had to get the product in the hands of the customer. Even with a T1 line, this was a problem. The challenge of order fulfillment varies with the characteristics of the product. With some products, an order must be delivered immediately, while other products lend themselves to delivery times of a week or more. Order fulfillment is dependent on the nature of the products and the way in which people otherwise purchase the item.

When purchasing a book, for example, I might find a week to 10 days an acceptable period to wait. My alternative to buying a book over the Web is to go down to my local bookstore. If they don't have the book, which is usually the case for me, I have to order it, wait, and then make another trip back to store when the book arrives. Purchasing over the Web eliminates most of this process. I just order the book and wait approximately a week. Purchasing groceries over the Web has a different set of characteristics. Order fulfillment must be immediate. When I normally buy groceries, I simply go to the store, buy what I want, and go home. When I purchase groceries over the Web, I order what I want, and when I get home, the order is there. The process is simpler than the normal method, and fulfillment is easier. Each product has its own set of fulfillment requirements. When moving to e-commerce, a company needs to understand the normal purchasing patterns of the consumer and the demands it must meet to compete.

The third issue was perhaps the most important. No one knew what kind of market we were facing. Why should I, Billy Boy Bowling Balls, supplier to King Pins across the world, be interested in resolving these issues? Why should I make that investment in technology? Who the heck wants to buy bowling balls over the Internet anyway? Remember that most people in the mid-1990s *didn't* have an Internet connection in their home. True, some people were getting online, but mostly it was through some service that charged on an hourly basis. While the person with an email address is the norm and not the exception today, it was just the opposite back then. If you weren't connected to a business that used the Internet, you probably didn't have Internet access. The Internet was still the domain of geeky programmers who wore thick glasses and pocket protectors. (As a spokesperson for this group, I must say that pocket protectors have been greatly maligned. When one invests good money in a nice shirt, it is only natural to not want to mess it up with ink and pencil marks!)

## 2.3.3 THE NAKED TRUTH ABOUT EARLY E-ENTERPRISES

This brings us to a part of the Internet story that most people don't like to discuss. There was one industry that was extraordinarily well suited to e-commerce. The characteristics of the Internet made it the perfect medium for this industry to conduct business. It is one that has consistently blazed new cybertrails across the Internet. What developed between this industry and the Internet was a type of symbiotic relationship in which each thrived off the other. In spite of its contribution to the health of the Internet, most professionals seldom give it credit for its contributions. In fact, many work at suppressing the first true e-commerce industry. Which industry has done so much for the Internet? The adult entertainment industry—in short, pornography. The benefits of *cyberporn* we are discussing here are technological. It is not my intention to suggest that pornography is beneficial either socially or morally. As the old expression says, however, one must give the devil his due. Sociologists and ministers can best deal with whether this expression is either figurative or literal when applied to cyberporn. Here, we are simply discussing the technological benefits this industry has brought to the Internet.

Cyberporn did three things for the Internet, two of which resolved the initial challenges to e-commerce. First, it helped spur the market. People became interested in the Internet. Let's face it: Sex sells. In the early 1990s, the traditional media spent more time discussing the evils of cyberporn than reporting the educational benefits of Internet communication. The evening news did stories on chat rooms and online sex. Talk shows discussed pornography on the Internet. News magazine programs did stories on sexual addiction and the Internet. A technology users' group in the Santa Monica area held a symposium on cybersex. In addition to discussing the current state of sex over the Internet, there were designs for peripheral devices that would allow people to do more than just *talk* about sex on the Internet.

It was all about sex. Radio and television broadcasters along with publishers had their own motivations: Titillate the viewer and drive up ratings. These shows did something else though. They also sold people on the Internet. Just as the sex stories drove people to tune in, they also drove people to get connected. The image of the Internet went from some network frequented by techno-nerds to a place where something exciting was happening. People were meeting other people over the Internet. Heck, people were even having affairs over the Internet! It wasn't necessarily that people were getting connected to be sexually stimulated, although some obviously were. It was really that the basic image of the Internet had changed. It was where things were happening. If all this sex stuff was going on, what else was happening?

Second, cyberporn demonstrated that money can be made over the Internet. The right product with the right profile could create a profitable market on the Internet. The pornography industry is perhaps the most successful because it is so well suited to the Internet. The entire transaction is carried out over the Internet, from the purchase to the delivery of the product. There is no need for the supplier

to develop relationships with third parties for product delivery. The transaction completes immediately. Product purchase and delivery is virtually simultaneous. This is different than with books or groceries that involve product shipment. Most importantly, the Internet offered anonymity. Normal purchasing methods are embarrassing for the consumer. Think of the embarrassment one would feel if his or her minister or neighbor were to see him or her with a copy of *Hot*, *Nasty Monkey Love*. The Internet is private; no one other than the individuals involved know about the transaction. As we can see, cyberporn has advantages over traditional pornography.

Finally, cyberporn developed some of the basic technology necessary for ecommerce. Since this industry was the first, it was the one that had to figure out how to carry out secure transactions over the Web. It was among the first to deliver large volumes of images, sound, and video over the Web. It pushed the technology.

Cyberporn in fact serves as an excellent case study for companies attempting to go to the Web. It was able to find ways to leverage the technology to compete with traditional distribution channels. It was also able to offer products and services that were not readily available in other venues. What is the equivalent of a chat room? Where could one go to receive the benefits of a chat room and still maintain his or her anonymity? As companies explore e-commerce, they must offer more than the standard distribution channels. To do this, some companies may have to do away with the old way of doing things. Again, we return to the concept of a solution. Applying the new technology means doing things differently.

## 2.3.4 THINKING DIFFERENTLY

It is all well and good for us to sit here and extol the virtues of thinking differently, of doing things in bold new ways, but what does it mean to think differently? As we have seen in the first section of this chapter, the Internet has been the catalyst for enormous change in our culture. How we do business is part of this culture and has not been impervious to these changes. This should be obvious to anyone who has been not been trapped on a deserted island for the last 10 years. Yet, many do not understand how business has been transformed. To many, the Internet is just another way of doing the same old thing. To others, it is all encompassing, completely transforming the purchasing process. We are back to the two camps, derision and hype.

In their book *Convergence Marketing*,<sup>4</sup> Yoram Wind and Vijay Mahajan discuss a third and more accurate alternative: convergence. Convergence is where the two markets—the traditional and the Internet-enabled—come together. No longer do we have consumers who are completely in one camp or the other. Modern consumers are a hybrid of the two, combining the two different methods of purchas-

<sup>&</sup>lt;sup>4</sup> Wind, Yoram, and Mahajan, Vijay, *Convergence Marketing: Strategies for Reaching the New Hybrid Consumer,* Prentice Hall, 2001.

ing into one. Wind and Mahajan describe this hybrid consumer as the centaur. They discuss in their book strategies for reaching this new mixed breed. The first step in their strategy is to understand the centaur. They then explain how to use this understanding to *run with the centaurs*.

A realization that the focus for the e-business is on a new breed of consumer is critical to success. The first Business-to-Consumer (B2C) sites moved the actual process of sales and support to the Internet. The emergence of B2C gave rise to an entirely new set of Internet organizations. Companies such as Amazon.com gave customers the ability to search catalogs, choose an item, purchase the item, and select the method of delivery, all from the comfort of their own homes. We now know that not all B2C sites were successful; most weren't. The successful ones recognized that the automation of a manual process was not enough. They had to do more. They had to take what was the normal process and improve it.

This improvement came in the form of *personalization*. The Internet provides capabilities that cannot be met in the brick-and-mortar world. On the one hand, the Internet gives the e-business a global reach, a market in which there are tremendous economies of scale. On the other hand, through personalization, the organization can give each customer individualized attention. No longer are customers dealing with a cold, impersonal corporation. They are dealing with a trusted advisor, someone with whom they have a relationship. In Chapter 12, we will discuss how to personalize the customer's experience and develop a relationship.

What we are saying is that we use the Internet as a tool in our Customer Relationship Management (CRM) strategy. Let's be clear: Establishing a relationship with the customer is not just some warm fuzzy way of doing business. It is something of actual and real value to both the customer and the business. The objective of CRM is to establish a *mutually* beneficial relationship with the customer. As we shall see, it is impossible to manage your customer relationships without customer knowledge. It is impossible to have this knowledge without intelligence, business intelligence. In the Internet age, this intelligence needs to be Internet-enabled. It needs to be IEBI.

## 2.3.5 INTEGRATING THE SUPPLY CHAIN

For the most part, when people discuss e-commerce, they have focused their attention on the B2C market. The burst of the dotcom bubble has caused those with such myopic views of the Internet to become disenchanted. The B2C market is, however, only a part of the Internet revolution. The real money to be made over the Internet in the future is not in the B2C market, but in the Business to Business (B2B) market.

The repercussions of B2B markets will be far greater on the economy than anything we have seen in B2C. It is a new infrastructure, a new way of doing business. To understand these implications, look at B2B from a historical perspective. One of the reasons for the success of the American industrial revolution was that we started with a clean slate. There was no infrastructure. Industry was able to carry out

business in unique ways. For the Europeans to develop a new way of doing business, they would have to replace a preexisting infrastructure. This European resistance crushed innovation. One such modification that was actually developed in France and implemented in America is the concept of manufacturing a product all in one factory. Raw materials go in one end of the factory and finished goods come out the other. Europeans visiting the early states were amazed by American industry. This was drastically different than in Europe, where each step of the supply chain was carried out by different suppliers. Wool was converted to yarn in one location, dyed in another, and made into garments in yet another. Germany and Japan in World War II had their infrastructures destroyed. During reconstruction, they found new and more efficient means of production that spurred tremendous economic growth. Keep in mind that the Internet is a new phenomenon. We are just beginning to understand how to take advantage of its capabilities.

One example of how the Internet can improve how businesses work together is in the procurement process. For most organizations, the procurement process has remained relatively unchanged for years. Figure 2.1 shows the typical flow for purchasing a product. First, some employee identifies a need. Perhaps his or her laptop is no longer functioning properly, or he or she is running low on direct materials. The employee manually completes a requisition, which is manually forwarded to a manager for approval. The approval process, especially for items that are out of the ordinary, may require the signature of several managers. If there is some question, the requisition is bounced back to the original employee, who must justify the purchase and start the process over again. When the appropriate approvals are finally received, the requisition is sent to purchasing. Purchasing may in turn question the requisition, and the employee or the manager must then justify the expense. In many cases, purchasing sends requests to suppliers for quotes. Once a supplier has been chosen, a purchase order is manually generated and the product is ordered. After the product is received, purchasing pays the supplier. As we can see, this is primarily a manual process and remains so in most companies today.

Organizations that move from a manual process to e-procurement will experience significant savings and operational efficiencies. It has been projected that a significant percentage of purchasing costs are attributed to the manual effort involved in processing and managing the purchase request. It is common for the administrative cost of a purchase to be greater than the purchase itself. The electronic processing of these requests removes the manual intervention and reduces overall cost. We have emphasized throughout this text that systems need to do more than automate a manual process. This holds true for e-procurement as well. When implementing an e-procurement system, we need to look beyond the manual process and understand how we can truly leverage the power of the Internet. ۲

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We should begin with putting as much of the process as possible in the hands of the employee making the request. Employees with a need for direct or indirect materials should be able to *easily* select from catalogs of preapproved vendors. They should be able to compare similar products of multiple vendors to get not only the best price, but also the best product for that price. Once an employee has selected a product, the system should provide online forms that can be processed electronically. Management approval should be electronic as well, automatically routing the request to the appropriate managers. If the manager does not approve it within a specific period, the request should be sent either back to the original requestor or to the manager's superior. When the request receives all the required approvals, it should be passed to purchasing to be consolidated with other requests prior to being electronically sent to the supplier.

One of the most important features of the e-procurement system is improved purchasing intelligence. The integration of IEBI into this environment provides purchasing with the information it needs to improve the purchasing process. With purchasing consolidated into a single electronic system, detailed reports can be easily generated. Purchasing can see which suppliers are providing what products to whom. We will be able to detect individuals and departments that purchase products outside of our accepted purchasing practices. Online Analytical Processing (OLAP) provides analysis of purchasing by individuals, departments, and divisions within the organization. Data-mining applications can detect patterns in the organization's purchasing habits. Armed with this information, purchasing can forecast needs more accurately, plan more efficiently, and negotiate with suppliers more effectively.

As we become more intelligent in our purchasing, competition among our suppliers increases and markets become tighter. A true free market is very much a Darwinian environment; only the fittest survive. As markets tighten and competition intensifies, the battle for survival becomes much more fierce. It is the ability of the organization to adapt to this changing environment that will mean the difference between survival and extinction. As we learned in the pervious section, we need to learn to do things differently to meet the challenges of an evolving market. The answer to competing in a more demanding B2C market is to establish a relationship with our customers. The answer for suppliers competing in a more demanding B2B market is to establish a relationship with their customers and other trading partners.

When we discussed CRM in the B2C market, we talked about personalization. We could see how personalization changes the customer's view of our organization from a faceless corporation to a trusted advisor. In the B2B space, businesses seek to do the same with one another. Both the supplier and the supplier's customer recognize the value of establishing a long-term mutually beneficial relationship. Both organizations recognize that just as the Internet has created a market in which a relationship is necessary, it has also provided the means to establish it. We can envision this relationship as establishing a virtual company, a single, uninterrupted supply chain that extends from the consumer through the distributors and man-

ufacturers to the actual suppliers of raw material. For a more complete understanding of such a virtual organization, refer to *e-Procurement from Strategy to Implementation*<sup>5</sup> by Dale Neef.

Consider for a moment what such a virtual organization can do for our manufacturing processes. As our organizations work in conjunction with one another, we are able to meet one another's needs in a more timely and efficient manner. Organizations can begin to implement Just-In-Time (JIT) manufacturing, where we reduce safety stock and excess inventories. For example, let's say that I am the map king of Southern California. I make every kind of street, city, and state map for which you could ever possibly hope. One of my hottest products is a map to the homes of both the famous and infamous. My suppliers are the printers. My distributors are the folks who sell the maps on the street corners of Hollywood and Los Angeles. When one of my distributors goes to my Web site and orders another shipment of maps, the system immediately checks the inventory levels. If we are unable to fulfill the order, the system communicates with our printer and we receive a shipment date. The system responds to the distributor with a promised delivery date based on the printer's commitment to deliver the maps to our offices.

In Chapter 1 we discussed how business intelligence permeates the organization. We discussed how the information infrastructure is to the organization what the nervous system is to the organism. If we are to extend our organization to form a virtual organization with partners and supplier, must we also extend this information infrastructure. In the past there were significant barriers to establishing such tight integration between information systems. Remember that it was little more than 10 years ago that the passage of the Gore Bill made it possible to do business over the Internet. The power of this integration is more than just the ability to pass information between companies. The real benefit, the real power, the real strategic competitive advantage is in the organizations' ability to work as one. It is the power to act intelligently with one another. In order to work and cooperate with one another in this manner, we need intelligence, business intelligence. The Internet is the medium through which we communicate, the link between our information systems. This, of course, means that we will need to employ IEBI.

# 2.4 The Internet Marketplace

So far in this chapter, we have followed the growth of the Internet from a concept in the minds of some forward thinkers to an actual reality that has had profound effects on our society and business. The Internet has evolved from an environment where researchers share ideas to a ubiquitous medium of commerce. We have seen how business has gone from merely posting information on billboards along the

<sup>&</sup>lt;sup>5</sup> Neef, Dale, *e-Procurement: From Strategy to Implementation, Prentice Hall, 2001.* 



FIGURE 2.2 Types of e-organizations.

information super highway to leveraging the technology to integrate their information infrastructures. We have also seen how the Internet has given businesses the ability to form a single virtual organization that spans the entire supply chain.

Before proceeding, let's stop and look at the different types of organizations that we now encounter in the Internet age and their interaction with the market. There are four basic categories: traditional brick and mortar; e-commerce; e-business; and e-enterprise. With the exception of the traditional brick-and-mortar company, these organizations have embraced the Internet as a way to exchange information. What distinguishes them from one another is what information they exchange and with whom they exchange it. Figure 2.2 demonstrates the distinctions between each of these groups. In the following subsections, we will discuss each of these categories in a bit more detail.

## 2.4.1 BRICK AND MORTAR

We begin with the traditional brick-and-mortar company. These organizations are really outside the scope of our discussion. They have chosen, for one reason or another, not to participate in the Internet revolution. The point of mentioning them at all, however, is to note that the market in which the company competes mandates the extent to which an organization participates in the Internet revolution. Some companies may have nothing to do with the Internet. While this may be blasphemy in some circles, how a company applies Internet technology to its business processes must be driven by the conditions of its individual market.

One company that comes to mind is a map-making company with which I am familiar. The company receives orders over the phone; the vast majority of its customers are not set up for ordering over the Internet. It makes its own maps and deals with one or two local printers. Only two or three maps are produced a year, so it is not cost effective to set up some way of transmitting the maps other than

carrying a tape to the printer. In fact, the printer isn't even set up to receive the information electronically. There is no ROI for this small company to become Internet-enabled. Organizations should leverage the Internet where the solution requires this level of communication. One should not look on the brick-and-mortar company with disdain when the market conditions for that organization do not require an Internet-enabled solution.

## 2.4.2 E-COMMERCE

Certainly, e-commerce has captured the imaginations of many in the media. When people think of an Internet-enabled organization, they typically envision e-commerce. An e-commerce company is one whose forward-facing functions are Internet-enabled. Forward-facing functions include such activities as marketing, sales, and support. These companies compete in B2C markets. Of course, there are degrees of e-commerce. Some companies may still use traditional outlets for the sale of their products while providing post-sales support over the Internet. Others have integrated the Internet into their brick-and-mortar enterprises: the brick-and-click enterprise.

The brick-and-click company integrates the Internet into its brick-and-mortar infrastructure. While such integration poses its own set of challenges, significant benefits can be derived from this approach. Organizations attempting to transform themselves to brick-and-click need to understand how the Internet can complement current business processes. Keep in mind the *centaur* described in Yoram and Mahajan's *Convergence Marketing*. The purchasing process is not Internet-enabled or done by physically visiting retail stores. It is not exclusively one or the other; it is a matter of both. The brick-and-click company can market directly to this hybrid consumer.

There are also variations on the B2C theme. One variation is the customer-tocustomer (C2C) site, where one customer sells directly to the other. In such markets the e-commerce organization becomes a facilitator of the exchange between the two customers. Customer-to-Business (C2B) sites are another variation, where the consumer actually determines the conditions of the transactions to be carried out. These are sites where businesses compete with one another for the consumer's business.

In all of the cases cited above, IEBI plays a key role in driving business. We noted earlier in the chapter how the objective of CRM is to establish with the customer a mutually beneficial relationship. The organization does this by striving to understand the needs and desires of the consumer and fulfilling them. It is through this fulfillment that we are able to drive business in B2C, C2C, and C2B markets.

There is a difference between a need and a desire. We need to eat. We desire a porterhouse steak smothered in onions with a baked potato and asparagus in Hollandaise sauce on the side. We need to drink liquids. We desire a nice California Merlot vintage 1998. A need is something without which we cannot achieve necessary objectives. A desire is something that we want but can live without. Through

personalization, companies can understand the customer's needs and create desires. The creation of these desires will generate new business. We can do this in each of these environments.

In a Web-based environment we can record and store the customer's interactions with our site. We can then analyze these activities, comparing them to other customers who demonstrated similar behavior with the same general demographics. Based on this analysis, we can then tailor the customer's shopping experience to address his or her specific needs and desires. In a B2C environment, we can offer products that complement products purchased by the customer. We can also recommend products that were rated favorably by other customers who had similar tastes as the current customer. We can use a similar method in the C2C space. In an online auction, for example, we can notify a customer when a particular product that may be of interest is up for bid. Not only does this benefit the buyer, but the seller has a larger market for the sale of his or her product. In C2B markets, companies can negotiate more effectively with customers. Perhaps companies can offer additional functionality or service to secure a purchase at a desired price.

In all of the markets described above, companies use the Internet to reach their customers in some way. The organizations that will be successful in these markets, however, are those that are able to use the Internet to do more than simply reach their customers. They are able to use it to forge a more enduring relationship with those customers.

#### 2.4.3 E-BUSINESS

The e-business organization is the company that has taken its information infrastructure and moved it to the Internet. As shown in Figure 2.2, e-business is internally focused. This is not by any means as glamorous an undertaking as e-commerce, but its reward can be substantial. An example of such a system and the associated benefits is the e-procurement system we discussed earlier. Through Internet-enablement of just this one application, the organization was able to be more effective in purchasing and realized significant cost savings.

We need to emphasize that the information infrastructure is to the organization what the nervous system is to the organism. Think of the devastating effects of diseases that attack the nervous system—leprosy, for example. Victims can't feel pain in parts of their body; they don't know when they injure themselves. Consequently, infections set in. Is a sick information infrastructure any different? Inordinate levels of safety stock, the production of unwanted goods, and excess inventories are all symptoms of a sick information infrastructure. These are signs that parts of our organization are not communicating with one another.

Think of the power of a tightly integrated information infrastructure. Imagine an environment where the finance, budgeting and planning, forecasting, supply chain management, and manufacturing systems all work together as one, not for just a department or a division but for the entire enterprise. For this to be truly effective, every part of the organization must have access to the same set of appli-

Giovinazzo\_Final.book Page 29 Thursday, August 8, 2002 10:29 PM

cations. Geographically dispersed departments, remote offices, foreign divisions, all must be able to tie into this one system. The vehicle for this integration is, of course, the Internet.

We return to our theme of a solution. The e-business uses the Internet to change the business processes of the organization. They transform one another. As the organization becomes Internet-enabled, so too must business intelligence. As the organization moves its internal processes to the Internet, it must also transform its business intelligence systems to provide IEBI.

#### 2.4.4 E-ENTERPRISE

Returning to Figure 2.2 we see that the e-enterprise is the organization that has fully Internet-enabled its value chain. The e-enterprise has succeeded in creating the virtual company we discussed earlier. In this environment, the information infrastructures of the organizations within the value chain have become fully integrated with one another. We are reminded of our analogy between information systems and the nervous system. Two organisms can form a symbiotic relationship in which each thrives off the other yet maintains its distinct identities. When two organisms start to share the same systems, nervous systems or cardiovascular systems, for example, they cease to be two organisms and become one. When organizations integrate information systems, their nervous systems, they form one virtual organization. The two have evolved through adaptation into a new more powerful organism—an organism fighting for survival in a market of lesser, weaker competitors.

You may have noticed a difference in terminology from what we used earlier in this chapter. Here we use the term *value chain* as opposed to supply chain. You can envision the supply chain as the process that is carried out *within* an organization that entails the procurement of materials, the processing of those materials to create finished goods, and the distribution of those finished goods to customers. For the purposes of our discussion, the value chain is a chain of supply chains. The value chain extends from the customer all the way back through retailers, distributors, manufacturers, and suppliers. The entire length of the value chain reaches from the customer to the actual supplier of raw materials.

As we stated earlier, while the B2C aspects of the Internet have certainly captured the imagination of most industry watchers, the real action is occurring in the B2B space. In their book *B2B Exchanges*,<sup>6</sup> Sculley and Woods project that the B2B market will reach \$1.5 trillion in the United States by the year 2004, while more than \$600 billion of that market will pass through B2B exchanges. Compare this to a B2C market of \$108 billion.

<sup>&</sup>lt;sup>6</sup> Sculley, Arthur, and Woods, William, B2B Exchanges: The Killer Application in the Business-to-Business Internet Revolution, Harper Business, 2001. Copyright © 1999 Arthur B. Sculley and W. William A. Woods. All rights reserved. Reprinted by permission of the authors and ISI Publications.

As the expression says, there is nothing new under the sun. The concept of supply chain integration has been with us for some time. Electronic Data Interchange (EDI) has been with us since the late 1960s. Since then organizations have attempted to share information using a number of different technologies. Some organizations attempted direct connections between systems. Others attempted to create Value Added Networks (VANs) or clearing centers. In these environments, a company will post a message with a destination address in a post box. The VAN takes the messages from the various boxes, sorts them, and distributes them to the recipients. The exchange of files between systems, however, was just one piece in the EDI puzzle. Receiving a message is one thing, understanding it is quite another. Of course, it was always possible to share flat ASCII files. To do this, however, both the sender and the receiver needed to understand the structure of the file in advance; deviation from the agreed upon structure caused errors and possibly the failure of the entire transmission.

As one can see, these systems, in addition to their exclusivity, were complex, which made them difficult to implement. This in turn made them expensive. These drawbacks made EDI the domain of large organizations that could afford such costs. Smaller companies that could not afford this investment in technology were excluded from the party. Internet technology solved some of these problems, opening the world of EDI and the ensuing integration of information systems to even the smallest of organizations.

The first issue resolved by the Internet is the communication between systems. In the Internet age, anything from a PDA to a supercomputer can communicate. Organizations with the smallest of budgets can easily establish communications with suppliers, sharing data in a variety of ways. Such methods as email, HTTP, and FTP are all simple, inexpensive, and easy ways of sending files over the Internet. The eXtensible Markup Language (XML) was soon seen as a solution to the second part of the problem, which was understanding what was being sent. Being a cousin of HTML (Hypertext Markup Language), XML was viewed as a better way of transmitting data over the Internet. XML is not necessarily the panacea some would claim. There are still issues with XML, such as the extraction and integration of XML data. Yet, it is far simpler than maintaining communication between systems using flat ASCII files. Organizations can now develop communication systems that interact with not only one supplier, but many.

Who hosts the system is another important advantage over EDI in the Internet age. In the past, a ball bearing company, interested in EDI, suddenly found itself in the business of setting up a communications network. This was an expensive undertaking. Beyond the initial development costs were network maintenance and support costs. In the Internet age, companies focus on what they do best. Organizations wishing to participate in B2B markets can enter via Application Service Providers (ASPs). The entire system can be outsourced. As we shall see, organizations can become part of exchanges with virtually no additional hardware or software.

The Internet has provided the foundation upon which we build our virtual organization. It provides the vehicle for the communication of data along the value chain in addition to a common language, XML. We have Internet-enabled our information infrastructure, expanding it across the entire value chain. As we enhance the power of our information infrastructure with the power of the Internet, we must also enhance the power of our intelligence systems. We transform our business intelligence to IEBI.

## 2.4.5 THE EXCHANGE

When EDI was first attempted, many of the connections between companies were peer to peer. The Internet improves on this. Using the Internet, organizations can maintain many simultaneous connections. It is interesting that Bob Metcalfe described the value of a network as the number of people on that network squared. Networks with 10 people on it would have a value of 100, while a network with 100 people would have a relative value of 10,000. This observation was made in the context of a point-to-point network. Kevin Kelly noted in *New Rules for the New Economy*<sup>7</sup> that in the Internet age multiple simultaneous connections can be maintained. In such environments the value of the network increases not by squaring the number of people on the network but by raising the number of people on the network to power of that number. Using Metcalfe's example, the value of a network of 10 people is 10 to the 10th power, or 10 billion. The network of 100 people has the relative value of 100 to the 100 the power, or 1.e + 200.

As we can see, the wider the audience, the more effective and ultimately the more profitable our efforts. For this reason, we see that B2B exchanges have enormous power. Consider the nature of an exchange. In the traditional brick-and-mortar exchange we have a place where a number of people come together to do business. We see this in stock exchanges. Stockbrokers come together to buy and sell stock. We see similar activities in B2B markets. Buyers and sellers come together in one virtual space. The business of the exchange itself is to facilitate business between the participants within the exchange. To this end, the exchange acts as a neutral and independent third party in transactions. If we continue the analogy between B2B exchanges and the stock exchange, the organization operating the B2B exchange would be the equivalent of the Securities and Exchange Commission.

There are four basic types of exchanges. The first, *aggregate exchanges*, collect the products offered by multiple suppliers into one place. The buyer can then compare similar products from multiple vendors. Vendors whose products are included in this aggregation may not necessarily have a Web presence of their own. This is another way for companies that may not otherwise be able to participate in EDI to find entry into B2B markets. In our discussion on e-procurement we proposed that organizations have a catalog of approved vendors. We can easily implement

<sup>7</sup> Kelly, Kevin, New Rules for the New Economy, Penguin Books, 1999.

Giovinazzo\_Final.book Page 33 Thursday, August 8, 2002 10:29 PM

this through an aggregate exchange. The exchange provides for the management of the catalogs, such as maintaining content, approving vendors, and monitoring quality. As new vendors enter the marketplace, the exchange can determine their acceptability. Companies participating in the exchange can accept all or a subset of the vendors as suppliers.

The second type of exchange is an *auction exchange*. In these exchanges, bids are submitted for products and services. These bids can originate from either the buyer or the seller. Auction exchanges can operate in a variety of ways. In the basic auction exchange, blind bids are submitted and evaluated. The auction process can also be fully automated, where the system matches bids between buyers and sellers. Obviously, such markets are highly competitive and offer advantages to both buyers and sellers. While buyers are able to drive prices down, sellers have a distribution channel where they can offload excess inventory.

The third type of exchange is a *trading hub*. A trading hub is a virtual marketplace in which vendors can advertise and sell their products. Trading hubs have a distinct benefit to the buyer in that they typically set up communities comprised of both buyers and sellers. These communities provide the buyer with information concerning their businesses. They can learn the latest on industry trends. Buyers can share information on where certain products fail and helpful tips on the use of other products. Again, we see similarities between B2B and B2C markets. Earlier, we discussed personalization. Part of personalization is the ability to create communities of users. These communities can be centered on basically any aspect of the B2B exchange, whether it is related to product sets, product utilization, or industries that use a particular type of product. All are valid types of communities that can be established within a trading hub.

The fourth type of exchange is the *video dating exchange*. I refer to these types of exchanges as video dating because they provide introductions between potential buyers and sellers. The exchange is involved only in the initial introduction of the two parties. Subsequent activities occur outside of the exchange. A buyer or seller posts a description of the product or service in which he or she is interested. The second party responds, and from there they go on to carry out the transaction as they normally would.

# 2.5 Conclusion

We have reached the end of our exploration of the Internet world. What have we learned? What conclusions can we draw?

To begin, we see that the Internet is truly more than hype. It is also more than mere technology. The Internet is a new medium by which we can communicate. As Guttenberg's press transformed the old world, the Internet is transforming the current world. It is transforming society, business, governments, all aspects of our

daily lives. Such a transformation has created a much more competitive business environment. Just as the Internet has posed a problem, it has also provided a solution. It has equipped businesses with the tools necessary to succeed in this more competitive world.

What is staggering, perhaps, is that the Internet began as the dream of J. C. R. Licklider. His dream was to establish an *intergalactic network*. Certainly the Internet started simply enough—two computers in two different universities communicating with one another. From little acorns, mighty oaks grow, and that little acorn grew into the mightiest of oaks. From this modest beginning the network grew, adapted, and incorporated other networks until it formed a massive oak in whose branches many organizations have come to nest.

At first, how to do business over the Internet was not so obvious. Many began simply by creating a Web *presence*. As companies became more sophisticated in their use of the Internet, more of the business processes began to be carried out over the Internet. Forays onto the Internet ranged from e-commerce sites, where the forward-facing part of the company were Internet-enabled, to e-enterprises. An e-enterprise has achieved the long sought after goal of integration of the entire value chain.

As we look into the future, we cannot help but conclude that the Internet will continue to expand and that it will continue to strengthen its influence on business. There will come a day in the not too distant future when we will no longer discuss Internet-enabled this or Internet-enabled that. The Internet will so permeate society, business included, that we will simply discuss business. It will be understood that the Internet forms the backbone of communication. Of course, this is a pretty safe statement to make—the conclusion is all but confirmed.