The growth in the number of businesses moving toward enabling e-commerce technologies to conduct e-businesses on the Internet will accelerate exponentially during the next few years. Research firms are predicting that business-to-businesses e-commerce growth will skyrocket. As seen in Figure 10.1, during 1998 only $43 billion of online e-commerce was conducted by businesses. Recent forecasts from some of these same research firms predict that in the United States alone business-to-business e-commerce will reach unprecedented levels: $1.3 trillion by 2003. That figure represents about 9.4 percent of the total business sales projected for that year. The migration of other industries toward e-commerce will vary, with the computing industry reaching 20 percent and other industries (like heavy-duty equipment) reaching less than 2 percent. The results of applying e-commerce solutions will change the tactics of many companies, especially in terms of supply chain management. This startling e-commerce growth will accelerate to high speed between 2002 and 2003, growing at a projected annual rate of 99 percent.

E-BUSINESS CATALYST

What is the catalyst behind this astounding e-commerce and e-business growth rate? In fact, many industries are moving toward the e-business life-cycle continuum at an alarming rate. Industries are crossing over business chasms by linking their customers, business partners, suppliers, decision makers, and other key employees together to conduct various forms of collaboration and e-business (see Figure 10.2). This is being achieved through the utilization of Internet, intranet, and extranet technologies.

During the coming years, more industrial and business enterprises will move toward e-commerce solutions, primarily because of the enhanced business value they will yield, once carefully crafted into one or more innovative e-business solutions. What once was more suggestive of a corporate strategy will become a key component of their core business operations management. This is a catalyst. Global networking
infrastructures now exist to support such advanced e-commerce models as auctions, bidding, contracting, service deliveries, product deliveries, hosting e-business content, and more. Solutions are really limited only by one’s way of thinking; an idea-share of a sort. This of intellectual capital (for the moment), and not yet intellectual property.

Figure 10.1
Almost every industry has established some form of Internet e-business presence.

Source: Forrester Research, November 1998
The enablement of e-business services is rapidly reaching the stage where information technology competitors are focused on supporting e-commerce, rather than the more traditional methods of computing technologies (see Figure 10.3). In line with

Figure 10.2
The “chasm” seems to be the most difficult area for businesses to traverse in their movement toward a successful e-business transformation.

The enablement of e-business services is rapidly reaching the stage where information technology competitors are focused on supporting e-commerce, rather than the more traditional methods of computing technologies (see Figure 10.3). In line with

Figure 10.3
The e-business transformation has very distinct levels of change that tend to result in improved revenue streams, new e-business service lines, and more effective business practices.
this, mainstream hardware and software suppliers (for example, Microsoft, IBM,
Netscape, Oracle, Compaq, Dell, Cisco, Novell, and others) are developing and intro-
ducing advanced e-commerce application environments and machine platforms.

The e-business transformation effect will spark a hyper-growth catalyst that will lead
to unprecedented levels of innovation in e-commerce solutions using the Internet. There is,
perhaps, an e-commerce threshold that symbolizes the dynamics of e-business—that is, a
radical change from rudimentary supply chain relationships, toward an environment with
much broader and deeper market dynamics (see Figure 10.4). The effect of e-business is
somewhat analogous to the chain reaction of a shock wave; it sets off what appears to
be an endless chain reaction of businesses embracing e-commerce and adding their own
innovative solutions to the chain. In a sense, e-businesses acts as a vortex staging other
e-business opportunities that, in turn, leverage other e-business solutions.

LEAD FROM THE FRONT

E-business leaders, such as IBM, EDS, Cisco, L.L. Bean, Schwab, CitiBank, and
Federal Express, provide excellent examples of the business values realized in appli-
cations of e-business solutions. These firms, along with other early leaders of innova-
tion, are leading by example, acting as a catalyst sparking the excitement of other
e-business effects. An e-business road rage, of a sort.

Corporations able to “lead from the front” will be those enterprises that can best manage their
own innovations.
As larger enterprises create e-business environments and leverage e-commerce applications in their own core businesses, they will encourage buy-in from other supply chains. For example, Ford, GM, or GE strongly encourage their key suppliers to trade with them, online, as they seek to lower their own costs of doing business and improve their internal efficiencies. This means that meeting customer demands will supplant staying even with competitors.

Suppliers, in turn, will provide much of the stimuli for customers to buy over the Internet. They will also offer incentives to their own suppliers by means of various partnership or alliance programs, hoping that their customers will gradually embrace online channels instead of more costly channels like telephone and fax. Customer relationship management, which aims to leverage e-commerce solutions to manage enhanced customer relationships, looms large in the era of online trade. Enterprises are looking to gain economies of scale through the collaborative environments fostered by the Internet. There will clearly be (and there are today) outstanding leaders in e-business solutions. These corporate leaders will be the pace setters for other businesses and industries around the world. These business leaders will change the rules of many, if not all, of our industry practices. As illustrated in the text that follows, there is an e-business continuum that enterprises must traverse in becoming an e-business, with significant realized values as the result.

Typically the path starts out with simple and small initiatives, soon showing gradual growth toward reengineering their core business processes to achieve their strategy. This will then help them to realign themselves to be more profitable and to gain greater competitive advantages.

The travel industry is a leading e-business model; it has crossed the business chasm and reengineered its core business processes. Interestingly, the insurance industry is definitely challenged in the e-business continuum.

THE E-BUSINESS EFFECT

The e-business model will emerge as the new model for doing business (see Figure 10.5). This will represent a major shift in how global trade is conducted and will clearly force new economic models to emerge. Buyers and sellers will reengineer their core business processes to adapt to the new e-business economy.

Perhaps the most significant area that will act as a catalyst to online trade will be the supply chains that link trading partners as they develop and distribute products. Each industry will have varying rates of adoption. How quickly industries enable e-business in their respective markets will depend on the level of sophistication of the their current IT environments, their agility and their core skills, and their use of new e-business technologies and e-commerce applications and platforms.
Some examples of early adopters of e-commerce representing various industries would include L.L. Bean, Boeing Aerospace, Moore Business Products, Cisco, Citibank, Schwab, IBM, Intuit, and Microsoft. Consider IBM, which began reengineering core business processes as early as 1993, gradually moving toward becoming an e-business company that offers many services (see Figure 10.6). No longer would the “big blue” company image make tremendous sense.

Companies like IBM began with their human resource and financial systems and moved rapidly to integrate e-business technologies into their supply chain; they ultimately have successfully linked their suppliers and business partners into their legacy systems. The results of these initiatives are nothing short of spectacular: hence the term e-business. For example, e-procurement e-business solutions have resulted in a tremendous savings for many global corporate enterprises. This area of business is often a starting point for many e-business transformations. The time it takes to process and fulfill purchase orders has dramatically been reduced, from days to minutes.

In the supply chain area, IBM has significantly improved its order-processing cycle-time, thereby dramatically improving customer satisfaction numbers. Now IBM has achieved an overall savings of about $1.7 billion annually. Cisco was able to double its annual revenues from $2 billion to $4 billion, in part by using e-business technologies. Cisco, with its many router products, is also considered by stock analysts to be a main infrastructure provider to the Internet industry. IBM is a main provider to the Internet

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**Figure 10.5**

An example of the business transformation that can occur, depending on the industry segment and specific e-business objectives.

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<table>
<thead>
<tr>
<th>Stage of Adoption</th>
<th>Focus</th>
<th>Travel Industry Example:</th>
<th>Web Publishing</th>
<th>E-business</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Security Chasm</td>
<td>Business Value Chasm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Stage of</td>
<td></td>
</tr>
<tr>
<td>Awareness</td>
<td>Presence</td>
<td>Pilot</td>
<td>Process Investment</td>
<td>Cross Process Integration</td>
</tr>
<tr>
<td>Reliability</td>
<td>Openness</td>
<td>Low cost</td>
<td>Security/Integrity</td>
<td>Process reengineering</td>
</tr>
<tr>
<td>Low Cost Distribution Platform</td>
<td>Improve Business Process</td>
<td>Redefine Business Process</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Reliability**
- **Openness**
- **Low cost**
- **Security/Integrity**
- **Process reengineering**
- **Integration (to process legacy system)**
- **ROI**
- **Ease of implementation**
- **Security/Integrity**
- **Process definition**
- **Integration across multiple processes and legacy systems**
- **Business value/impact**
- **Competitive advantage**

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industries, with its innovative leadership in “e-business” and its diversified set of platforms that support and interact with the Internet in almost any way one could imagine.

Both IBM and Xerox Palo Alto Research Center (PARC) spend vast amounts of money on research. It was PARC that in 1993 first began to research ubiquitous computing. The Internet, at this early stage, was merely a topic being carefully introduced by the ARPA development team. Many creative scientists have contributed to this e-commerce playing field over the years. Such individuals are key to the overall success and direction of both Internet and Internet/2 practices; the future set of e-commerce technologies.

Schwab created a whole new way of trading stocks and other securities using e-business technologies to enable online trading capabilities for its customers. Schwab grew rapidly from day 1, gaining more than 100,000 customers; in just three months, Schwab found itself serving 1.5 million clients. There are many other excellent e-business trading companies on the Internet; Schwab is merely one example. TradingDirect, E*Trade, and many more e-business sites are definitely worth investigating for those interested in placing closer (more personal) controls on their investments. Some trading sites like E*Trade offer after-hours trading capabilities for the convenience of its customer base. These “benefits” are attractive to the casual Internet end user.

Safeway, the grocery store chain, offers still another example of an enterprise achieving new innovative business values through the integration of e-business technologies. Safeway currently manages point-of-sale profile data on 6 million customers, helping the company to determine which stock items to maintain on their shelves to meet customer demands. Safeway is not the only supermarket performing

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**Figure 10.6**
The e-business transformation enterprise needs to consider the various levels of e-commerce.
this. NCR (National Cash Register, Co.) is working on home-based virtual shopping. Chase Manhattan Bank delivered significant business values by using e-business technologies to develop a *big picture* view of its customers, greatly enhancing its customer relationship management capabilities and online banking facilities.

**MARKET DYNAMICS**

Market dynamics will drive industries through the e-business continuum. These powerful, rather unpredictable forces will also be a major factor in how quickly online trade will develop within any given industry segment. The speed of e-business adoption will vary from one industry to another. Market space structural factors and available e-business technology adoptions will be the ultimate determining factors. For instance, industries that are more innovative yet agile will forge new ways to accommodate customer demands for online buying.

Table 10.1 describes some examples of industrial supply chains and their gradual adoptions of e-commerce solutions.

<table>
<thead>
<tr>
<th>Industry</th>
<th>Whats Included</th>
<th>What Moves to E-commerce</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computers and electronics</td>
<td>Semiconductors, manufacturing, wholesale and business retail of hardware, software products</td>
<td>Wholesale, business retail, and manufacturer supply chains</td>
</tr>
<tr>
<td>Motor vehicles</td>
<td>Auto components, manufacturing, distribution</td>
<td>Vehicle wholesale, subassembly supply chain, spare parts wholesale</td>
</tr>
<tr>
<td>Petrochemicals</td>
<td>Equipment, extraction and refining, manufacturing, distribution</td>
<td>Wholesale and distribution of petroleum, chemicals, and plastics</td>
</tr>
<tr>
<td>Utilities</td>
<td>Gas and electric industry equipment, exploration, production, distribution</td>
<td>Transmission and wholesale distribution of gas and electricity, equipment, spare parts</td>
</tr>
<tr>
<td>Paper and office products</td>
<td>Paper and furniture manufacturing and supplies, distribution</td>
<td>Distribution and replenishment, manufacturing supply chains</td>
</tr>
<tr>
<td>Shipping and warehousing</td>
<td>All modes of transport, warehousing, and logistics</td>
<td>Load tendering commitments, contract bids, dead-load auctions</td>
</tr>
<tr>
<td>Food and agriculture</td>
<td>Farm equipment and supplies, farm products, food processing, distribution</td>
<td>Equipment supply chains, grocery and farm supplies distribution, machinery spare parts</td>
</tr>
<tr>
<td>Consumer and goods</td>
<td>Manufacture and distribution of appliances, home electronics, leisure goods, furniture, and apparel</td>
<td>Consumer goods wholesale, manufacturing supply chains</td>
</tr>
<tr>
<td>Pharmaceutical and medical</td>
<td>R&amp;D, manufacture and wholesale of pharmaceuticals, medical equipment, and supplies</td>
<td>Pharmaceutical distribution, supplies replenishment, medical manufacturing supply chains</td>
</tr>
</tbody>
</table>
Table 10.1  Vertical markets with centralized needs (Continued)

<table>
<thead>
<tr>
<th>Industry</th>
<th>Whats Included</th>
<th>What Moves to E-commerce</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerospace and defense</td>
<td>Manufacture and wholesale of aircraft, space vehicles, and defense materials</td>
<td>Commercial aircraft spare parts, military replenishment, some manufacturing supply chains</td>
</tr>
<tr>
<td>Construction</td>
<td>Logging, construction materials and machinery, fixtures, engineers, contractors, and architects</td>
<td>Project and subcontractor bidding, materials wholesale, replenishment</td>
</tr>
<tr>
<td>Heavy industries</td>
<td>Mining, minerals, steel production and wholesale, infrastructure construction</td>
<td>Raw materials and steel wholesale spot markets, construction bidding</td>
</tr>
<tr>
<td>Industrial equipment</td>
<td>Industrial machinery and equipment, manufacture and wholesale, industrial supplies</td>
<td>Spare parts and supplies, some wholesale and some supply chain</td>
</tr>
</tbody>
</table>

Source: Forrester Research, November 1998

The current trends in technology, telecommunications, and media markets highlight an increasing interest in e-commerce solutions by supply chain enterprises across many industrial segments. This growth is beginning to gather a great deal of momentum. In fact, some investment analysts believe that the success rate will reach high speeds during the next few years. There are several reasons for this somewhat rapid growth; it is a technologically-focused change. Continuous management of innovation and evolutionary change are also very fundamental to fostering the growth.

**INTERNET THOUGHT CONTINUUM**

Internet years are currently introducing a new thought continuum for the computer industries, one that is challenging to companies that compete in this space. The challenge is to establish success criteria that embrace greatly reduced technology development life cycles.

The Internet has emerged as an effective and inexpensive means for new competitors, and well-established competitors, to quickly earn a “brand” presence. They can perform this “branding” while providing support for their customers, their business partners, their supply chain constituents, and especially their employees and any other prime influences. This is done in an environment where changes occur rapidly and where products and business relationships are in constant flux.

**A WHITE-HEAT PACE**

There is no doubt that the computing and electronics industries have entered an environment of exponential growth. Companies that are leaders in the online race, like
Cisco, IBM, AT&T, Dell, Microsoft, Amazon.com, Verisign, Excite, Yahoo!, and Lycos, continue to set a white-heat pace for their competitors. Other competitors like Microsoft, Intel, and Sun have quickly adopted e-commerce channels-to-market, as well as using e-commerce in their own logistics and supply chains. Other industries have entered the race and are now picking up speed as they begin to integrate online Internet technologies with their core business processes. Some key industry sectors that appear to be making significant progress in the adoption of e-commerce are telecommunications, computers and peripherals, networks, software services, and multimedia. Each of these sectors shares common but unique interests in e-commerce.

The aerospace industry is beginning to use extranets in its supply chains. An example of this is Boeing’s sale of commercial aircraft spares, using e-commerce applications linked to its back-end systems. The utilities industry is being compelled by federal order to begin retooling. This forced innovation by the utilities industry is heavily influenced by significant wholesale trading of electricity and gas over the Internet. Pressures to reduce information technology costs while embracing new supply chain requirements are driving the automobile industry to leverage e-commerce and the Internet. For example, large automobile auctioneers are using the Internet to generate billions of dollars of sales. At the same time, the automobile industry supply chain is leveraging extranets to realize additional revenues from their production supplies.

In the strategic horizon years (beginning in the year 2001), cost pressures will drive most industries to leverage e-commerce applications and the Internet. The petrochemical industry trade will shift from traditional EDI and fax to extranets, and the shipping and warehousing industries will use the Internet for shipping, billing, and responding to requests for proposals from other enterprises that are interested in the competitive bid market. The consumables industry (paper and office products suppliers) will move distribution channels online to drive down costs; other online communities in the pharmaceutical and medical supplies industry will use e-commerce to move hospital requirements for new supplies to the Internet.

There will also be an impact on many supply chains as they go through a metamorphosis, reacting to the turbulence caused by the dynamic growth in Internet use by most industries. This will be most notable in the beginning years of the 21st century. This will affect supply chains from commodity supplies, production capabilities, and distribution services.

Another major industry affected will be the commodities markets. Linking the commodity exchanges (for instance, corn, pork bellies, and soybeans) to the Internet will enable buyers and sellers to price products—based on real-time supply and demand. Furthermore, these buyers and sellers are now able to operate from their own homes, using home computing devices to assist in their decision processes. This encourages market-clearing prices to avoid artificial price supports. The utilities industries will experience lower prices and new online trading services from new and emerging energy intermediaries that will, in-turn, have significant effects on the commodity supply chain.
Even raw materials businesses—for example, steel, mining, and minerals—will be realizing the effect of e-commerce as new online exchanges emerge. As the gap between the early contenders and the new beginners continues to grow, this progress will lead to significant shifts in market power and positioning across all competitive environments. Supply chains will also strive to become more efficient by working with partners in demand-driven production environments, for instance, in banking and financial markets. There will also be a drive by some industries (for instance, consumer products) to leverage the use of e-commerce solutions to reduce development cycles; this too will render some realizable competitive advantages.

What does all this mean? It means that industrial supply chains will potentially streamline themselves, causing the elimination of traditional approaches of suppliers. Conversely, this yields an increase in suppliers’ revenues, which in turn provides improved services, simply by designing and integrating e-commerce solutions into core business competencies. Following the realization of this, managing inventories online and better controlling their own costs and efficiencies will become the next challenge.

Perhaps the most dramatic e-commerce changes will be realized in the distribution areas of many supply chains. Companies competing in this market space will strive to differentiate themselves by providing value-added services. These firms recognize that leveraging e-commerce solutions will be needed to stay competitive. Buyers will be better positioned to dictate, or perhaps they will be able to screen out (even programmatically) the suppliers that make their supplier short-list. This will encourage suppliers to leverage e-commerce procurement applications. Intermediaries in most industries will be forced to make investments to scale or to pursue other niche markets. Spare parts will be auctioned online as industries begin to leverage the Internet and take advantage of the convenience of online purchasing to sell spare parts. Major automobile suppliers will disintermediate traditional middlemen, just in order to sell direct to dealers.

The United States is anticipating market share representation of approximately 45 percent of worldwide e-commerce by 2003. This rate is influenced by the rest of the world’s pursuit of aggressive entries into e-commerce areas.

In summary, e-commerce will absolutely change the ways that many company decision makers and business leaders think, as their companies compete in an online virtual world of business: a real-time, highly competitive marketplace. Companies will be required to rethink their core business processes and then create new strategies for performing e-businesses. Supply chain businesses that play in multiple industries will gain significant and substantial competitive advantages. Distributors that do not quickly adopt e-commerce solutions and leverage their own online e-business capabilities may face the volatility of disintermediation.

Enterprises are currently investing aggressively in Year 2000 correction initiatives while, at the same time, recognizing the importance of investing in e-commerce solutions to resolve and offset the (known) Y2K problems. Competitive advantage is the primary
intent in the “offset.” They recognize that e-commerce is clearly the future and that they must find ways to finance e-commerce initiatives, strategic to their visions.

These aggressive businesses may choose to seek assistance from integrators, services providers, and hardware and software providers—with in-depth industry knowledge to apply in a short time. This is essential because their customers are linking e-commerce applications to the back-end systems; at the same time, they are reengineering their core business processes.

Finally, enterprises will gradually move from simple online services to e-commerce-based e-business distribution relationships. Support of customers across the value chain will drive collaboration with suppliers and their partners.