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Glossary
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I. RATIONALE
Internet e-commerce has become the basis for a new form of business around the world. Built on the foundation of electronic digital interfaces (EDI), Internet e-commerce is bringing the future to life today. Where paper has long dominated, electronic signals in virtual space are becoming the preferred medium of communication, both inside and between organizations. Consumers, increasingly savvy about computers, are turning to the Internet to locate and buy their goods and services. A rich source of product and company information, the Internet is helping organizations that use it wisely provide better, faster, cheaper goods and services to their customers. Regular coverage in the media, Wall Street's growing interest in the technology sector, and a steady stream of product announcements have helped to foster this increase in public interest in the online phenomenon.

Internet e-commerce is redefining industry value chains, shrinking the dimensions of time and space to create a dynamic competitive environment. Serving as a powerful new distribution channel for both information and transactions, Internet e-commerce is replacing the intermediaries that have historically bridged the gap between a company and its customers. As links in the value chain are removed, the responsiveness of a company to the final consumer increases—communication between buyers and sellers becomes practically instantaneous.

Senior executives in both public and private sectors will face serious challenges as our global economies become more of a virtual reality. As new digital markets evolve, they will supplant older, outdated forms of trade. The entire economic infrastructure could (and most likely will) change forever. If organizations do not keep up with this evolutionary change, the danger is growing that they will become, as businesses, much less potent. Senior leaders must be aware of these emerging, new, and increasingly complex environments of Internet e-commerce to compete on a global (or domestic) level.

II. SCOPE
This Statement on Management Accounting (SMA) is addressed to financial professionals and others who may lead or participate in efforts to implement Internet e-commerce in their organizations. The concepts discussed in this document apply to:
- large and small organizations; and
- enterprises in all business sectors.

The focus of this publication is on those business-to-business and customer-to-business techniques dealing with the use of the global Internet for the purchase and sale of goods and services, including service and support after the sale. It is not intended to cover “within business” techniques such as intranets that facilitate workgroup communications and electronic publishing.

The information in this SMA will help financial professionals and others:
- comprehend the underlying principles of Internet e-commerce;
- understand the key properties of the Internet;
- learn about various e-commerce business models;
- determine the uses and benefits of Internet e-commerce for their own organizations;
- develop a framework for planning and managing the implementation of Internet e-commerce;
- understand the roles and responsibilities of financial professionals in Internet e-commerce implementations; and
- broaden employee awareness and obtain their buy-in for Internet e-commerce systems.
While this SMA cannot provide comprehensive knowledge of these concepts, the information contained within this document serves as a starting point for the exploration and implementation of Internet e-commerce. The discussion will illustrate core ideas and provide finance and operations professionals with a basic understanding of Internet e-commerce, its applicability to their organization, and its unique challenges.

III. THE ROLE OF MANAGEMENT ACCOUNTING

Financial practitioners should play a central role in any initiative that affects or alters the transaction flow within an organization. Protecting the privacy of companies, customers, and the general public is an engrained, critical element of the formal training and activities of the finance profession. In the world of Internet e-commerce these responsibilities take on new meaning.

In the future, the most successful finance executives will be those who apply technology best. To carry out their duties as finance professionals successfully, they must be able to explain in business terms what they need from technology, and they must arm themselves with knowledge about new technology standards to take a proactive role in developing their company’s strategy. They need to understand the information highways, the impact from the evolution of e-commerce, and the value created through virtual integration.

It falls to the finance professional to take a leading role in the design and implementation of a strategy based on Internet e-commerce. Most of the internal transactions controlled and/or initiated by finance are affected by this change in the nature and focus of business.

Some of the key functions of the management accountant in Internet e-commerce include:

- serving as a proactive leader of the e-commerce initiative;
- identifying primary areas where the organization could benefit from information automation;
- locating weaknesses in the existing transaction processing systems that would inhibit the security or effectiveness of Internet e-commerce;
- participating in the development of a business case that supports the development of internal competence in e-commerce;
- gaining knowledge in the existing and potential software models that can be used to implement e-commerce;
- helping to create a series of strategic and operational performance measures, both financial and nonfinancial in nature, to guide management decisions in both implementing and utilizing Internet e-commerce;
- assessing the audit risks and developing internal controls or procedures to mitigate their impact on the business, its trading partners, and customers;
- participating on the Internet e-commerce project and implementation teams;
- helping to identify areas where nonintegrated data will impede the initiative;
- helping find solutions to the problems the organization faces in implementing an Internet e-commerce solution, such as the need to have multiple servers and databases to support analysis and decision making by management; and
- becoming an e-commerce champion, supporting the development of internal expertise needed to embrace the technology successfully.

The finance professional plays a critical role in any Internet e-commerce implementation and utilization because of the dominant focus on...
streamlining transaction-based activities within and between organizations. Finance is the guardian of transaction reliability and integrity. Without the active involvement of the finance professional, security concerns can become system failures. More than a policeman, though, the finance professional should be a key thought leader in an Internet e-commerce project. The initiative represents an opportunity for finance to add value to the organization that directly benefits all stakeholders.

IV. INTERNET E-COMMERCE DEFINED

Internet e-commerce has been defined in a number of ways. For example, e-commerce can be defined as the transaction and post-transaction set of activities performed by buyers and sellers through the Internet, where there is a clear intent to buy or sell. This e-commerce definition embraces an evolving set of technical designs, technical implementations, and advanced (or reengineered) business practices.

A very high-level definition of Internet e-commerce simply states that an organization or individual is doing business utilizing predominately electronic (Internet) methods. “Doing business” in effect becomes a set of buying and selling activities, primarily of specific goods and/or services as illustrated in Exhibit 1.

According to the European Commission, Internet e-commerce “is simply doing business electronically.” This includes the sharing of various forms of business information by any electronic means (such as electronic mail or messaging, World Wide Web technology, electronic bulletin boards, smart cards, electronic funds transfers, and electronic data interchange) among suppliers, customers, governmental agencies, and other businesses in order to conduct and execute transactions in business, administrative, and consumer activities.
Just as there are a variety of businesses and business transactions, there is a range of perspectives that can be taken on Internet e-commerce, including:

- a *communications* perspective: Internet e-commerce is about the delivery of information, products/services, or payments via telephone lines, computer networks, or any other means of electronic data interchange;

- a *business process* perspective: Internet e-commerce encompasses any application of technology to facilitate the automation of business transactions and workflows;

- a *service* perspective: Internet e-commerce is a tool that meets the desire of organizations, consumers, and management to cut service costs while at the same time improving the quality of goods and services and increasing the speed of service delivery; and

- an *online* perspective: Internet e-commerce provides the capability to buy and sell products and information on the Internet and through other online services.
E-commerce is a system that includes not only those transactions that center on buying and selling goods and services to generate revenue directly but also those transactions that support revenue generation such as stimulating demand for those goods and services, offering sales support and customer service, or facilitating communication between business partners. Internet e-commerce is typically divided into two main categories: business-to-business and business-to-consumer. It is important to understand these models, since e-commerce is approached differently depending on whether an organization is communicating with a business or with an individual on the Internet.

**Business-to-business** implies the selling of products and services between corporations and the automation of systems via integration. This category of commerce typically involves suppliers, distributors, manufacturers, stores, etc. Most of the transactions occur directly between two systems. For example, suppose that an aircraft company wants to build a plane. The plane requires parts from both large and small suppliers. The goal of e-commerce is to automate the entire supply chain. The top half of Exhibit 2 illustrates a typical business-to-business e-commerce model. The model relates indirect suppliers, direct suppliers, transportation of the supplies, and their entry into the distribution system.

An example of a business-to-business e-commerce system is that of DaimlerChrysler Corporation. Chrysler’s suppliers of parts, packaging, and technology, now numbering over 20,000, rely on Chrysler to communicate standards and share critical software applications through its Chrysler Corporation Supply Partner Information Network (SPIN), a supply chain management and support environment for distributing files over the Internet. Over 3,500 supplier locations access the Chrysler SPIN website. More than 12,000 users access information such as Chrysler’s EDI Guide or QS 9000 certification policies and procedures. They can also access dynamic database applications, such as real-time data, procurement analyses, and strategy applications.

**Business-to-consumer** commerce involves interactions and transactions between a company and its consumers. Focus is placed on marketing and selling goods and services to the consumer. The main focus of companies such as Dell, Amazon.com, and eBay is to sell to consumers via the Internet. The bottom half of Exhibit 2 illustrates a typical business-to-consumer e-commerce model.

There are hundreds of e-commerce sites that are very successful in the business-to-consumer market. These companies search for innovative ways to sell products and services on the Internet. For example, a company called Infoseek allows its visitors to search phone books, yellow pages, and e-mail addresses online. Once a person is located through this service, he or she can be sent a card or flowers or can even be called directly using a specific carrier. All of these transactions happen online.

**V. UNDERLYING NETWORK INFRASTRUCTURE OF E-COMMERCE**

Applications that fall within the realm of e-commerce depend on the underlying network infrastructures as illustrated in Exhibit 3. The network infrastructure covers the media required for moving information, and thus includes the Internet, as well as cable telecommunications, telecommunication networks, and private corporate networks.
As suggested by Exhibit 3, the building blocks of e-commerce include third-party services that support the e-commerce buying cycle (e.g., digital cash), e-commerce applications, and the browser and server subsystems (e.g., value-added networks).

These building blocks can be thought of in a slightly different way—as three basic components or aspects of the electronic environment that combine to create Internet e-commerce: client browsers, Web server, and third-party services. The client browser includes local or company-specific data, the core Web browsers such as America Online, and browser extensions (e.g., Yahoo!). The functions that the Web server supports within this infrastructure include information retrieval, data and transaction management, and secure messaging. Finally, a number of third-party services make the entire network operational. These third-party services include digital libraries of documents and related data servers, third-party information processing tools and services, and electronic payment services.

No one element of the electronic marketplace defines Internet e-commerce. It is the combination of these elements into one integrated system that is its defining feature.

It is important to understand that Internet e-commerce is not about building new database management systems, data repositories, computer languages, software agent-based transaction monitors, or communications protocols. Internet e-commerce is, instead, an information architecture that synthesizes the diverse resources already in place in corporations and society to facilitate the integration of data and software to improve performance.
VI. BENEFITS OF IMPLEMENTING INTERNET E-COMMERCE

The benefits to companies that succeed in business-to-business e-commerce are compelling. Effective business-to-business e-commerce implementations can help organizations realize substantial cost savings, increase revenue, provide faster delivery, reduce administration costs, and improve customer service.

These benefits result in substantial return on investment. The most significant benefits are reduced administration, increased time for business, more accurate information, improved response time, and reduced errors. Also, less time is spent on paperwork, phone calls, faxes, and tracking all of this information. For example, the typical purchase order costs between $75 and $125 to process manually. With the improved automation that e-commerce offers, that cost can be reduced to about $3. Organizations can focus on increasing revenue through extending geography, improving sales channels, adding services, and growing market share.

In addition, determining a current stock position, the shipment status of goods, and total costs becomes timely. Since information is the key to any business success, organizations can manage inventory on hand, shipment cost and methods, buying patterns, and distribution channels.

Business-to-consumer e-commerce sales provide extraordinary opportunities to sell products and services 24 hours a day, to reduce costs associated with retail space, personnel, and supplies, and to increase market share. Small businesses can compete against much larger organizations. The most significant advantages include higher visibility, branding opportunities, direct revenue generation, attraction of new customers, and worldwide exposure of the business.

A Forrester Research Inc. study of financial institutions estimates that Web service costs companies just $.04 per customer on average for a simple Web page query vs. $1.44 per phone call. Shifting service to the Internet, notes Forrester, could allow companies to handle up to one-third more service queries at only 43% of the cost. This not only saves companies dollars but also provides additional convenience for their customers to get the help they need immediately.

While improving costs, relationships, channels, processes, and shareholder value is the goal, if these benefits cannot be defined and measured it will be difficult to win top management support for the initiative. It is crucial for the finance professional to develop measures of these benefits and to provide benchmark data to calibrate and evaluate the organization’s performance. These measures can be used to build the initial business case and gauge the downstream performance improvements gained from the Internet e-commerce initiative. In the end, the question that needs to be answered is not “Why implement Internet e-commerce?” but rather “Why not?” It is an initiative that provides both short- and long-term benefits and payoffs to adopting organizations and creates a competitive barrier for those that fail to embrace it. The only question that has merit is “when,” not “if” Internet e-commerce should be implemented.

VII. INTERNET E-COMMERCE BUSINESS MODELS

The capabilities enabled by e-commerce technologies are driving the creation of new business models or roles that companies can take on. Several e-commerce models are changing the way value is delivered. Organizations implementing e-commerce must take on one or more of these models. Each of these models is being implemented in business-to-consumer and
business-to-business environments. The models are not mutually exclusive. The most successful e-commerce organizations take on multiple business models concurrently. The e-commerce models include:

- E-business storefront;
- infomediary;
- trust intermediary;
- E-business enabler; and
- infrastructure provider.

The E-Business Storefront

The E-business storefront model is an entity in the e-commerce business-to-business or consumer domains in which commerce occurs, margin is created, and value is extracted using existing as well as new digital market channels. E-business storefronts usually have a dot.com identity.

E-business storefronts are the online analogue to traditional ways of selling products or services. Similar to their industrial counterparts, E-business storefronts provide ultimate purchasing platforms to buyers; they also allow owners to cross-sell and up-sell, maintain higher margins, and, most important, compress the value delivery system by reducing transaction costs.

But as much as E-business storefronts redefine the consumer value chain, they have a more profound impact on the business-to-business model. E-business storefronts create unprecedented value for business-to-business enterprises by creating new markets and brands, driving friction out of the process, and eliminating asymmetries of information.

Amazon.com, E*Trade, Onsale, eBay, Dell, and Bluefly are, in one sense or another, E-business storefronts. They represent the intersection of the Net and e-commerce, as illustrated in Exhibit 4.

Sensing new worlds of opportunity in e-commerce, Dell, already an E-business storefront, turned its attention to the question of how the Internet could enhance its direct-sales approach. The company conducted a survey of both regular customers and casual visitors to its website to determine what they wanted the most. The answer was accurate and effective technical support. This became the website’s mission.

Exhibit 4. E-Business Storefronts

E-business storefronts are the storefronts of the e-economy. When end users need to buy something, chances are they go to the E-business storefront.

Offerings
- Products (product offering, order taking)
- Services (fulfillment, customer service, and support)
- Content (information on products and services)

Target Audience
- Niche markets and buyers

Activities
- Provide standalone network-based products, services, and content, distributed in an e-economy model

Competencies Required
- Multiple relationship management
- Ability to form/dissolve relationships rapidly
- Robust/flexible infrastructure with plans for growth
- Scaleable to meet evolving challenges/opportunities
- Continuous innovation in product offerings and customer service

Goal
- Dominate target niche

Revenue Stream
- Product/service margin
- Advertising

Dell set to work expanding its already substantial database of technical-support information and deploying it onto the website. If customers had a
problem getting their computers to recognize a hard drive or to connect with a modem, they could type in a brief description of the problem, identify the components they were using, and instantaneously view Dell’s problem-solving manual.

Dell’s Internet e-commerce business model relies on three qualities:

- an information-technology system that speaks the customer’s language—the language is user friendly, and applications are doable even for novices;
- Internet e-commerce that is fully integrated with business processes—without seamless communication between all functions, Dell would not be able to deliver what customers want: the ability to retrieve information, shop, build a new hardware system, complete an order quickly, have it processed accurately, and receive the product in good working order; and
- online support capabilities that can help customers solve their own problems—a Dell owner can customize his or her own solution to a problem.

Infomediary

Infomediaries are entities that broker content, information, knowledge, or experiences that add value to a particular E-business transaction; they are also known as content aggregators. Infomediaries bring together buyers and sellers and provide value by offering content in the form of advice, personal service, or other benefits. Infomediaries can serve as aggregators of logical prospects or as buyer advocates.

Unlike E-business storefronts, which have inventory to move, infomediaries typically own nothing. They have to rely on partners to succeed. Operationally, infomediaries focus on forming numerous partnerships, maintaining extensive content, and promoting their sites to buyers. Commissions, advertising and tenancy deals, and supply-side subscriptions are common means of generating revenues.

Infomediaries range from portals such as Yahoo! to net start-ups that are creating unique markets on the Net, such as the travel aggregators Travelocity or Expedia. The business models that infomediaries are employing are as diverse as they are inventive. For example, Instill serves as a virtual order desk for restaurants and food services and steers them to manufacturers and service providers in return for a fee or a cut of transactions. Other infomediaries include sites such as Autoweb.com, credit companies such as GetSmart.com and E-Loan, and insurance services such as InsWeb.

Infomediaries aim to be the nexus of large numbers of buyers and sellers. The key dynamic: Once the infomediary gathers a critical mass of buyers and sellers, more keep flocking to the site, because that is where the action is. For example, Autobytel.com is an infomediary for people and cars. Autobytel.com’s mission is to give prospective car buyers access to the data they need to choose the automobile that is right for them. Then Autobytel.com connects these people to car dealers who offer no-haggle, competitive prices and convenient—often one hour or less—delivery of vehicles. Autobytel.com’s network of over 2,700 accredited dealerships is testament to the company’s intelligent use of information. The company’s business model depends on Web technology it developed, called Dealer Real Time, which smoothly integrates its own business processes with those of its affiliated dealerships. This system works so well that customers sometimes receive calls from dealers before they have logged off the site.
During 1995, Autobytel.com’s network of accredited dealers received more than 50,000 purchase inquiries. The following year that number increased to 361,000, and by the third quarter of 1997 it had recorded over 1 million customers. By the end of the second quarter of 1998, Autobytel.com had received 971,681 purchase requests for that year alone, 25 percent of which were estimated to translate into actual sales. That added up to $1.5 billion in e-commerce during the second quarter of 1998 alone. Exhibit 5 profiles the infomediary business model.

Trust Intermediary
Trust intermediaries are entities that create trust between the buyer and seller. There are two special types of trust intermediaries: payment enabler and trust enabler. Each has a unique function in e-commerce.

Payment enablers are entities that enable secure payment transactions and reduce risks to buyers and sellers. An example of a trust enabler is VeriSign, which is a provider of digital authentication services and products for e-commerce and other forms of secure communications. It has set up its businesses to benefit from the need for trusted certification authorities and processes by issuing different classes of certificates and managing them for various vendors and markets.

Trust enablers are entities that create a trusted or authenticated environment in which parties can interact with confidence and recourse. Entities such as TradeSafe, which protects e-commerce transactions in a safe cocoon called an escrow agreement, is a classic trust intermediary. Exhibit 6 profiles the key elements of trust intermediaries.
Another e-commerce model is that of E-business enabler, as illustrated in Exhibit 7. An E-business enabler uses its technology or competencies to facilitate or enable another set of business processes. To its end users it is frequently transparent.

**E-Business Enabler**

E-business enablers frequently take shape as business-to-business trading hubs that cater to business constituencies ranging from aviation to zoology. These new trading hubs are typically extranets built and maintained by E-business enablers whose value proposition is that they can provide the extranets at cost. They allow individual businesses to leverage these sites to build their own extranet-based networks of suppliers and customers without requiring major investments in infrastructure.

Federal Express started as a transportation company, but today it functions as an E-business enabler. With *FedEx Virtual Order*, businesses have the capability to electronically integrate the ordering of products online with the ability to fulfill and deliver them anywhere in the world. This solves one of the key limitations of e-commerce by linking the automated order and fulfillment system to the delivery of the product to the end customer. Thus a company of any size can quickly become a global marketer and create new sales channels without the need to invest in additional customer service and warehousing.

Federal Express works with qualified merchants to host their e-commerce Web sites, create electronic catalog templates, and even input their inventory for them. When an order is placed, Federal Express receives it, initiates a shipping order, and updates the catalog inventory. A customer confirmation number is linked to a Federal Express tracking number to give the merchant and the buyer instant real-time access to package order and tracking information from pickup through delivery. Companies such as Cisco, Monorail, Sun Data, and Insight are benefiting from Federal Express’s integrated ordering and logistics approach.

### Exhibit 6. Trust Intermediaries

Trust intermediaries provide a secure environment in which buyers and sellers can confidently exchange value.

**Offerings**
- Secure environment
- Escrow services
- Privacy
- Recourse
- Brands

**Target Audience**
- Buyers
- Sellers
- Affinity groups
- COINs

**Activities**
- Provide an auditable environment in which informed consent may be determined, value may be exchanged securely, and privacy may be maintained

**Competencies Required**
- Billing, order processing, invoicing, fulfillment, and other core processes with respect to escrow or other service offerings
- Security and customer trust building, for example, expertise in secure payment transactions, encryption
- Exquisite attention to detail
- Rich historical analytical capabilities to determine risks

**Goal**
- Extract value from each transaction by enabling a safe, secure transaction environment

**Revenue Stream**
- Licensing fees
- Subscription fees
Infrastructure Provider

Infrastructure providers aggregate communities across a set of complementary interests (products, content, and services) and markets. What makes infrastructure providers so compelling is that they apply the Internet as a collaboration platform and value delivery driver. Infrastructure provider value chains depend on the Internet as the underlying service infrastructure. Infrastructure providers enable the creation of new value by reducing market fragmentation and leveraging an entirely new set of service opportunities.

Infrastructure providers bring suppliers, customers, and complementary services together and allow them to initiate and settle transactions securely on the Internet. These providers reduce price and transaction costs, minimize inefficiencies, and make allies of competitors, because everyone in the value chain derives benefit from the completion of transactions. Exhibit 8 illustrates the details of infrastructure providers.

Chrome.com is a business-to-business, members-only digital automotive network. It operates as an infrastructure provider by facilitating vehicle transactions between consumers and new car dealers through value-added auto-buying assistance programs provided by a network of members such as credit unions, banks, and insurance companies.

The Chrome.com infrastructure is made up of more than 5,600 car dealers, 250 auto brokers, 1,200 credit unions, 30 commercial banks, 500 fleet administrators, and 250 leasing accounts. In operation, Chrome.com is a password-protected extranet made up of a configuration engine and a quote center, and a separate application that matches buyers and sellers. The company derives income from three main sources. First, it charges transaction fees for deals enabled by Chrome.com. Second, it charges subscription fees to every member of the community of interest (COIN). Third, it licenses its configuration and pricing engines to other sites.
VIII. IMPLEMENTATION STRATEGY

The implementation of an effective Internet e-commerce solution can be broken down into several key steps:

- developing strategy;
- assessing readiness;
- designing the project;
- integrating the solution; and
- measuring effectiveness.

Each of these steps brings with it its own unique issues and challenges. A sound implementation plan recognizes this fact, creating a clear strategy that reflects and incorporates them.

Developing Strategy

Unfortunately, many companies do not think through their e-commerce strategy adequately before launching the initiative. It seems that they believe they should have a website but really don’t have any idea of what that site should achieve and what they want to do with it. It is far too common for organizations to launch a website with no other plan than to see what happens once it is in place. It shouldn’t be surprising that often what happens is far less than what the organization thought would occur—leaving any aspect of business channel design and strategy to chance is a high-risk approach.

Before implementing Internet e-commerce, an organization must clearly define its goals. Many companies create goals that are not measurable or specific. Examples of business objectives that should not be used when creating an e-commerce capability include:

- having a presence on the Internet;
- increasing awareness;

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**EXHIBIT 8. INFRASTRUCTURE PROVIDERS**

Infrastructure providers create environments for exchanging value in which participants with common interests can interact.

*Offerings*
- Seamless infrastructure across value chain
- Explicit agreement between buyers and sellers
- Tight integration among advertising, e-economy, and fulfillment
- Support of infrastructure maintenance
- Replicable framework and methodologies

*Target Audience*
- COINS
- Complementary players in an industry
- Service providers tightly integrated into a transaction (e.g., automotive manufacturers and dealers, lenders, car purchasers, insurers for automobiles, aftermarket part suppliers, etc.)

*Activities*
- Aggregates information, technology, networking, and brand/trust management to create a seamless infrastructure to support the creation and exchange of value in a discrete vertical market

*Competencies Required*
- Governance and coordination
- Channel enabling
- Platform provisioning
- Ability to port infrastructure to vertical markets
- Development and maintenance of infrastructure
- Unbiased, open processes using standard platforms

*Goal*
- Extract a piece of the new value created by providing infrastructure supported by value-added aggregation, and e-economy services

*Revenue Stream*
- Advertising
- Subscription fees
- Partnership fees
- Percentage of transactions
improving sales;
reducing costs;
increasing the number of hits; and
getting more repeat visitors.

Examples of effective goals for implementing e-commerce are:

- reducing support center costs by 30 percent over the next 24 months;
- receiving 25 percent of corporate revenue through e-commerce within the next four years;
- decreasing sales and support costs by 25 percent over the next four years by moving to online applications; and
- reducing the cost of customer support by 15 percent by leveraging online communication technologies and maintaining excellent service.

For example, Boeing Company’s objectives for establishing its website to sell spare parts included, achieving much faster customer fulfillment cycles, providing a greater reach to more customers (including non-EDI customers), and lowering customer ordering costs. Within one year the company succeeded in eliminating 25 percent of its order-processing costs. The website also helped Boeing to level out the number of people in the spare parts data entry group, even as the order volume increased by approximately 30 percent. This resulted in a cost avoidance of 10 percent in additional resources.

Organizations developing their e-commerce strategy should have answers to the following essential questions:

- Why do we want to be on the Internet?
- What does the company want to achieve through business on the Internet?
- Is the goal of the e-commerce solution to generate revenue?
- Is the goal to interact more effectively with customers, partners, vendors, advertising, and media?
- Is the first phase of the implementation focused merely on generating interest in the company?
- Do we plan to engage in business-to-consumer, business-to-business, or intraorganization activities on the Internet (or some combination of the three)?
- Is the Internet strategic to our core business, or is it a new business for us?

Also, the specific types of Internet e-commerce desired must be decided on. Does the organization plan to:

- offer something for sale?
- market its products and services to consumers and build brand recognition for those offerings?
- enhance customer service and satisfaction by building an online relationship with another business unit, another company, or customers?
- exchange information with business partners to facilitate research and development or speed up and simplify the processes involved in buying and selling, inventory management, billing, delivery, and so forth?

A company must have a clear understanding of what strategic, financial, and operational objectives it wants its Internet business to accomplish. No matter which Internet e-commerce activities are chosen, organizations will need to determine how these activities will affect the organization’s current business model. Retailers, for example, must consider what effect Internet e-commerce will have on store sales, how the 24-hour world of the Internet might alter inventory management, and whether they are equipped to handle sales in foreign currencies.
A best-in-class Internet e-commerce strategy and application must incorporate both marketing and technical aspects of the system. Strategic marketing defines the optimal tactical implementation of the sales, public relations, and advertising activities of the organization. It is the marketing strategy that serves to link technology capabilities with the requirements of customers in the target markets.

Assessing Readiness
Before taking on the complexities (and risks) associated with implementing Internet e-commerce, an organization and its management should take stock of their current systems and capabilities. Four key drivers predict an enterprise’s ability to succeed in e-commerce. These four drivers are:

- leadership;
- governance;
- competencies; and
- technology.

When an organization demonstrates the ability to execute in these four dimensions consistently, it is ready to implement Internet e-commerce. The four attributes can be combined in an infinite variety of permutations and are consistently displayed by the most successful players in e-commerce. Separately, these four attributes represent prerequisites or barriers to e-commerce success. It is unlikely that durable e-commerce success will come to any organization lacking in any of these four areas.

Leadership
The essential qualities of leadership in support of successful e-commerce implementations are embodied in the following:

- business process problems are solved first (investment in technology will be wasted unless the business issues are integrated with the technology);
- senior management is attuned to the opportunities and threats enabled by the e-economy;
- e-commerce initiatives are integrated with the organization’s business strategy;
- generating a competitive advantage via e-commerce is a top priority of senior management;
- senior management is involved in, buys into, and participates in e-commerce efforts;
- an e-commerce vision in the 12- to 18-month time frame exists and is communicated up and down the organization (planning past an 18-month time horizon is fruitless because events change too quickly in the e-economy);
- an e-culture (web-enabled mind-set) exists up and down the organization; and
- a culture of information sharing exists.

For example, Cisco Systems, the worldwide leader in networking on the Internet, cultivates a culture of information sharing. From its first days, the company posted a list of all known bugs in its products on its website. At the time the prevailing tradition in America was to hide mistakes and acknowledge them only in a very controlled way. Cisco’s departure from tradition brought the company a lot of positive attention. Today, that culture of information sharing contributes to an effective record of knowledge management that, in turn, supports an enviable level of product achievement.

Governance
Governance is the operating model—the glue—that defines the very nature of the organization. Governance determines the nature of relationships within the organization as well as relationships among the constituencies outside the formal organization. Governance involves control, accountability, responsibility, and authority. The
dynamics of these relationships determine how well an organization can maintain integrity in the face of changing values while shifting directions in response to external events.

Successful e-commerce implementers have an operational framework that defines how attributes such as control, accountability, responsibility, and authority interrelate and how conflicts between them are rationalized. The structurally rigid frameworks that typified many organizations in the traditional economy tend not to be very successful in the e-economy.

Organizational structure informs e-commerce readiness. Without a well-considered and well-articulated governance model, organizations have a very hard time exploiting creative energy. Without a satisfactory governance model, the creativity is dissipated in a whirlwind of initiatives that have little synergy to each other and cannot be distinguished as to their relative potential contributions to the bottom line. Successful e-commerce implementers have appropriate answers to the following questions:
- What are the e-commerce roles and responsibilities of each member of the organization?
- Is it clear who has decision-making authority on e-commerce initiatives?
- How are e-commerce initiatives funded?
- Is sufficient funding allocated for ongoing e-commerce maintenance?
- Is there an established method for assessing and selecting Internet e-commerce initiatives and for allocating resources?
- Are there established metrics for measuring the impact of the e-commerce implementation?
- How are e-commerce activities rewarded?
- What drives the Internet e-commerce initiatives (IT, marketing, customers, competitors, etc.)?

**Competencies**

Competencies determine the way successful e-commerce implementers respond to changes in the world, exploit available resources and opportunities, and accommodate emerging realities. Competent e-commerce implementers either have or can readily develop answers to the following questions:
- Is the enterprise capable of dealing with rapid and ongoing change?
- Can the organization adapt and drive change quickly across itself?
- Does the organization have the implementation competencies to execute ruthlessly (three months or less)?
- Does the organization have the technical competencies to support Internet initiatives?
- Does the organization have the operational capabilities required to support its Internet strategy?
- Does the organization have adequate experience managing multiple relationships (both internal and external)?
- Can the organization form and dissolve relationships/partnerships quickly (building and managing an e-commerce system)?

**Technology**

A key driver of success in the area of technology is to build an architecture that is robust and comprehensive, one that enables organizations to develop and implement new e-commerce applications rapidly. With such a corporate-wide architecture, e-commerce leaders can easily and frequently deploy applications without having to justify the cost of incremental investments in infrastructure for every value-added initiative. E-commerce leaders who have such an infrastructure are in a much better position to launch initiatives rapidly and to exploit emerging opportunities.
Cisco Systems is a good example of a company that has embraced such a model of architecture. While Cisco rightfully insists on serious and accountable metrics, it does not require Cisco managers to justify every investment if that investment is aligned with Cisco’s strategic objectives. For example, a strategic Cisco objective—perhaps the fundamental objective—is raising the level of customer satisfaction. Cisco allows its managers to deploy systems or processes designed to reach that end without requiring them to state a dollar amount to be returned.

On the other hand, Cisco does expect managers to measure the improvement in customer satisfaction. That measurement is justification enough for the investment. The result is that managers have a great deal of latitude in experimenting with initiatives that move the company’s agenda broadly forward.

To determine their readiness for implementation along the technology dimension, organizations should answer the following questions:

- Do we have standards across the enterprise?
- Can we buy it?
- Do we have the technological infrastructure (network services, hardware, software, security) required to develop and scale?
- What do we need to do to create a business-smart technology organization and a technologically smart business organization?
- Do we insist on simplicity, standardization, and flexibility in every corner of our e-commerce environment?
- Are the talents of the people across the enterprise optimally harnessed?
- Are our solutions flexible enough to accommodate change?
- Are solutions customizable to our customer’s needs?

The importance of having in place an enterprise infrastructure, such as that illustrated in Exhibit 9, cannot be overstated. E-commerce readiness requires an architectural foundation that encompasses a standards-based, enterprise-wide technology platform on which the organization can deploy a variety of value-added applications and networks.

**Designing the Project**

One of the keys to a successful Internet e-commerce implementation is an effective project design. A typical e-commerce implementation will involve software from several vendors, some custom development (or at least customization) by an in-house team or outside consultants, the operational services of several organizations, the integration of the new application into the existing business models and practices, and many other activities. Without effective project design, it is unlikely that all the pieces will come together for a successful implementation. Although projects will differ greatly in the details, there are some common requirements for implementing Internet e-commerce, including:
- managing the project;
- developing an outsourcing strategy;
- selecting an Internet service provider;
- selecting e-commerce service providers; and
- designing website security.

**Managing the Project**

E-commerce implementations require people who can deliver a cross-functional effort that embraces a business component and a technology component. If the necessary staff with the right skills to implement the application cannot be found within, consultants or contractors with specialized knowledge will need to be located. The idea is to start small (but not insignificant). Organizations should focus on high-impact quick wins first. Long-term goals should be broken up into short-term projects with defined, measurable goals.

An important aspect of project management is determining what the real costs of the project are likely to be. Initially, a company’s website consisted of a well-defined set of technical resources. At the most basic level, it might have included a single Web server, its connection to the Internet, basic Web-server software to publish Web pages, and a Webmaster. Today, a website supporting e-commerce for even a medium-size company may consist of a much more intricate set of servers and services not physically in the same location. Several more people, from both the technical and business side, may be involved in it.

Furthermore, websites will certainly be interfaced to several other existing IT systems and databases, internally and externally. So, the lines that used to define what constitutes a website are blurring and melding very rapidly with the rest of the organization. This means that the costs incurred in rolling out website capabilities are also being mixed with other costs and therefore are more difficult to track on their own. In addition, a given website for a large organization might actually consist of 30 different physical sites, mirrored across the universe. Overall, costs can be spread into five categories:
- **platform**: hardware, system software, Web software and tools, peripherals, networking and infrastructure, security, and Internet connection costs;
content: digital content creation, design and enhancements, digital catalogs, Internet applications development, software customization, applets and other Internet software tools, and utilities;

integration: database integration, legacy systems integration, data mining interfaces, application-to-application integration, business process integration, and workflow enhancements;

human resources: various human costs in technical and business responsibilities; and

promotion and marketing: both online and off-line, the costs of launching the business, educating customers, advertising, public relations, links to other sites, direct-mail activities, and other print media.

A common mistake is to look primarily at the upfront cost of the software as being the dominant part, when in fact the costs of customizing or adding on to the base software may be much higher. The operating costs may also be much higher, depending on the details of the e-commerce application. It is important, therefore, to look at the cost of ownership for the project, not just the initial software costs.

Another key element of effective project management is predicting the required level of performance and size of the server systems. The usual problem is that an interesting site can attract a large number of people over a short period of time—word of mouth can spread very quickly on the Internet. When the site is overloaded, it can get a reputation for poor performance just as quickly.

This suggests that organizations need to plan their systems for a peak load with a desired service requirement, and a different set of expectations for load and service requirements on average. These plans should be separate from what would be considered a “successful” load or number of users on the system, since the goal of the planning is to handle the potential load. The potential load may be well in excess of what would be considered successful.

Maintenance, support, and upgrades are also aspects that need to be considered in the project design phase of an e-commerce implementation. What is the expected evolution of the e-commerce application? Are the software components on track with the expectations for the evolution? Who will perform the maintenance and support on custom components or extensions? Will upgrades of software components have stable programming interfaces to enable reintegration with other systems?

All too often, e-commerce applications are developed without a long-term plan, and shifts in products and technology can leave them isolated over time. Although such shifts may happen even to the best-planned projects, careful planning in advance can avoid many such problems.

Organizations also need to articulate the expected benefits from implementing Internet e-commerce. Is this project a strategic investment or one for immediate return? Are the primary benefits expected to be lower costs (from having to print and mail fewer catalogs, for example) or increased revenues? Is this a pilot project to be replaced by a larger-scale (and possibly different) system, or is this the primary system?

Having a good idea of the expected benefits—and making sure that the expectations are shared across the organization—makes it possible to measure them over time and to ensure that the organization can evaluate whether the implementation is successful or not.
Developing an Outsourcing Strategy
With any ongoing service, it is useful to ask whether it is best performed in-house or outsourced to a specialized organization. Internet e-commerce is no different, and the rapid evolution of Internet technologies can often make it difficult to keep up without some assistance. A method of analyzing outsourcing versus development is to consider how closely the project is aligned with the business.

- **Is the project a core competency?** Are the development and operational skills required already available in-house? If not, would this project alone justify the hiring and training necessary for success? If the answer to these questions is no, then outsourcing may be appropriate.

- **Is the technology a commodity?** This is a difficult issue. If the technology is not a commodity, then the necessary development skills may be available only from a few specialized sources. Commodity technology may be less expensive to manage internally, especially if excess capacity is available. Operational considerations may be the reverse—if the operations of the project are a commodity, then outsourcing operations may have an economy of scale that makes them superior to in-house operations.

- **What is the technology and project rate of change?** Are the technology and project expected to change rapidly? If so, then internal development, closely coupled to the business, may be indicated.

- **To what extent does the project need to be integrated?** If a project has few and well-defined interfaces with an organization’s core business systems, then it may be a good candidate for outsourcing. On the other hand, if complex and custom integration work is required to interface the application with existing in-house systems, then internal development and operation may be more pragmatic.

Selecting an Internet Service Provider
Internet service providers (ISPs) supply many of the services required for Internet e-commerce. First and foremost, they connect individuals and organizations to the Internet so their customers can communicate with other Internet users. Second, they often provide hosting services for websites or other Internet applications, where the ISP installs and operates the server computers and software that make up the website. In such cases, the server systems are usually located on the ISP’s premises, not the customer’s. Third, ISPs may provide transaction services, such as payment systems, for the e-commerce applications of their customers.

When selecting an ISP, an organization must address several important issues. These points include:

- **Cost for the desired bandwidth:** The ISP can usually help an organization size its application to select the most cost-effective bandwidth.

- **Outbound connection:** The Internet is a collection of networks that interconnect with each other. That means that some ISPs are closer to the Internet backbone—the high-performance core of the Internet—than others. The effective bandwidth between an organization’s site and its customers depends not only on its ISP but also on its customers’ ISPs and all the other ISPs in between.

- **Reliability:** How reliable is the ISP’s service? How quickly do they respond to problems? As with any other service, it is frequently a good idea to talk with other customers of the ISP to learn about their experiences. Higher reliability and better customer service may also cost...
more. Some ISPs can provide redundant connections (at higher cost) that may improve the overall reliability.

- **Extra services:** What additional services does the ISP provide? Are they required? If not, an organization will be paying for services that it does not use.

The performance and reliability of the ISP are fundamental to the performance and reliability of an organization’s Internet e-commerce application, so it is very important to select an ISP that can provide the level of service required at a reasonable cost.

### Selecting E-Commerce Service Providers

The next step beyond hosting services for Internet e-commerce applications are transaction services: providing the infrastructure for order capture, payment, and fulfillment. Entities providing such services are referred to as commerce service providers (CSPs). Internet service providers are often CSPs, but other kinds of organizations may be CSPs as well. A bank, for example, may provide transaction services for Internet e-commerce as an extension of the services it provides to its merchant customers. Important questions to consider for selecting CSPs include:

- What kinds of payment systems are supported now? What kinds may be added in the future?
- Does the CSP handle the kind of business model required (e.g., business-to-business, business-to-consumer)?
- What is the cost structure? Is the pricing based on a flat rate, transaction volume, transaction value, or something else?
- What kinds of reports are available to sellers?
- How and when are funds transferred to sellers?
- What customization of the ordering and payment processes can be performed for each seller?
- Can the look and feel of the ordering and payment processes be customized to appropriately brand the site?
- Which tasks do the sellers manage, and which are managed by the CSP?

### Designing Website Security

Security is one of the primary areas of concern for organizations implementing Internet e-commerce. Indeed, the security of the system is of critical importance in a successful system over the long term. There are important security issues in the design, implementation, and operational phases of any Internet e-commerce implementation. Security issues can be broken down into four main areas:

- **System Security**
  How secure is the operating system of a computer? Can authorized users log in to it? Can information be protected from different users on the system, or can any user on the system read (and modify) any information on the system? Is the system physically secure? Who can get into the room? These are basic questions about the system underneath an application, and they are extremely important, because it is impossible to build a secure application on an insecure foundation.

- **Communications Security**
  It is often important to protect the contents of a message from eavesdroppers or others who might otherwise see the message. A common example for e-commerce applications is protecting a customer’s payment credentials, such as a credit card number, when the customer sends it to a merchant’s server.

- **Data Security**
  After data has been communicated securely, organizations must be concerned about how the data is protected in the end system. In some cases, it is processed immediately and discarded, so no additional protection is needed. In other cases, organizations rely on the
protection mechanisms of the operating system to safeguard the data.

- **Authentication and Authorization**
  Authentication is the means of answering the question “who are you?” in a reliable manner. Passwords are a common method for authenticating users to computer systems, although there are others.

These essential aspects of security are important for any Internet e-commerce system, and they should be included as part of any project design efforts.

**Integrating the Solution**

In developing an Internet e-commerce platform, an organization must also consider how to integrate its e-commerce applications with its other business processes. For example, the richness of corporate intranet applications positively affects e-commerce capabilities. Extending intranet applications into the Internet permits an organization to provide more value to customers in several ways:

- real-time access to information; and
- ability to perform business transactions;

The integration and development of these applications and tools must be at the forefront of any e-commerce implementation initiative. No “turnkey” application will work without prior exploration and resolution of key integration issues. The Web is about integration—integration of the organization and with its partners, suppliers, and customers.

Integrating the Internet e-commerce applications with the accounting system is an example of a software decision that is critical to the success of the initiative. The transactions that take place electronically must be completed quickly, accurately, and with assurance of security and confidentiality. An accounting package in an e-commerce system is more than a data recording and analysis tool—it is a vital linkage between the economic structures of the participating organizations and their customers.

Electronic workflow, electronic data interchange, and electronic catalog solutions are all options for integration with Internet e-commerce. For example, adding electronic workflow enables a purchase order or check request to be electronically routed, then delivered direct to the accounting system. The benefits of integrating the accounting system with the Internet and other Internet e-commerce applications are substantial. By expanding accounting to the Internet, organizations enable customers to place orders around the clock. Customers can view and update accounting data online, which reduces the number and cost of phone calls to service staff.

A certain evolution for integration might include the following steps:

- gathering, sharing, locating, processing, and publishing information, including applications such as knowledge sharing, full-text retrieval, directories, online catalogs, and audio-visual broadcasting;
- collaboration, communication, and education with people, computers, and entities, including e-mail, discussion forums, calendaring, and scheduling;
- internal mission-critical applications development and deployment, including customer support and other administrative applications such as accounting, human resources, and purchasing;
- information and services exchange with external partners, including order tracking applications, shipping logistics, and product and marketing information; and
- electronic commerce with suppliers and cus-
customers, including procurement services, all aspects of buying and selling, certificate management services, payments processing, and delivery of information-based products and services.

The seamless integration of intranets with the Internet is a phenomenon that represents an advanced but required evolution of an e-commerce strategy. A suggested evolution of an integration strategy is illustrated in Exhibit 10.

**Measuring Effectiveness**

Given the major investment that implementing e-commerce entails, it is only common sense to measure the return. Successful e-commerce companies have serious and accountable metrics and clear agreements about using them across the organization. It is in the appropriateness and completeness of the metrics selected that typically set successful e-commerce implementations apart from the ones that are unsuccessful. Metrics used by successful e-commerce implementers typically include the following:

- **Cost reduction**
  - number of support calls, cost of call/revenue;
  - total marketing/communications expenditures as a percent age of revenue;
  - cost per order dollar;
  - total dollars spent on net-ready initiatives.

- **E-economy growth**
  - online sales dollars;
  - number of transactions completed online;
  - online support sales dollars;
  - number of e-selling pages viewed online.

- **Customer satisfaction and reach**
  - online customer satisfaction survey score;
  - numbers/percentages of return visitors;
site reach (number of new site visitors, new registrants, etc.).

- Operations
  - most requested pages/site areas;
  - quality control metrics (percentage of server uptime, frequency of broken links, etc.);
  - compliance with look and feel, navigation, e-commerce policies.

IX. CHALLENGES TO E-COMMERCE

One of the common errors that organizations make is to underestimate the realities of challenges facing Internet e-commerce deployment. These challenges can be categorized into the following issues, as illustrated in Exhibit 11:

- technological;
- organizational and business;
- legal and regulatory; and
- behavioral and educational.

On the technological front, various challenges combine to create a thorny problem for the Internet e-commerce system. No one element or aspect of the system can be safely ignored. While technology solutions continue to multiply and mature, it remains essential that the organization acknowledge and manage the technology challenges that remain.

Organizational challenges tend to be overlooked as an organization focuses its attention on technology developments and issues. Overcoming these barriers begins with an effective Internet e-commerce strategy, defined and supported by top management, deployed through simple yet effective communication methods. Creating a culture friendly to e-commerce requires ongoing effort and attention by the implementation team. A failure to attend to these underlying barriers can spell disaster for the effort; avoidance begins with their recognition.

Within the legal and regulatory environment, the lack of consistent rules and policies, customs and tax uncertainties, and other regulatory and political issues are shaping Internet e-commerce. National frameworks, internally focused policies that fail to reflect or support global commerce, global organizations that seek to influence these policies, and various industry associations (i.e., technology provider interest groups) interact to create the dynamic Internet e-commerce environment. What remains to be seen is whether self-regulation or imposed regulation will ultimately define and delimit the industry.

Behavioral and education challenges run the gamut from trust and privacy between trading partners to fraud and hype. Internet e-commerce is not immune from the challenges to business integrity and security—it is in fact more susceptible to them than many traditional modes of doing business. Awareness about the availability of services, consumer changes in behavior and comfort with the new medium, cultural acceptance of the “virtual storefront,” and the development of secure trading systems are part and parcel of transforming a business and industry to electronic commerce.

None of the challenges to Internet e-commerce, whether in the categories above or the general need to attain critical mass or avoid channel conflict, are insurmountable. Creating and sustaining effective Internet e-commerce solutions begins with understanding these challenges and developing a strategy and deployment approach that addresses and overcomes them. Foresight and knowledge are an organization’s best weapons in the drive toward success in the fast-paced, increasingly competitive electronic marketplace.
### EXHIBIT 11. IMPLEMENTATION CHALLENGES

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<thead>
<tr>
<th>TECHNOLOGICAL</th>
<th>ORGANIZATIONAL AND BUSINESS</th>
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<tbody>
<tr>
<td>• Strength of security</td>
<td>• Lack of business process integration</td>
</tr>
<tr>
<td>• Availability/interoperability of payment instruments</td>
<td>• Lack of understanding of potential value (i.e., perception of &quot;no need to do anything different about it&quot;)</td>
</tr>
<tr>
<td>• Interoperability of technologies and applications</td>
<td>• Not enough proven business models</td>
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<tr>
<td>• Comparative buying capabilities</td>
<td>• Not enough best practices documented</td>
</tr>
<tr>
<td>• Richness and depth of content</td>
<td>• Unpredictable cost justification</td>
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<tr>
<td>• Lack of reliable network infrastructure services</td>
<td>• Corporate structures as barriers to change</td>
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<tr>
<td>• Lack of standards</td>
<td>• Not enough qualified individuals within the organization</td>
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<tr>
<td>• Deployment of public key infrastructure (PKI)</td>
<td>• Initial and ongoing costs of implementations</td>
</tr>
<tr>
<td>• Technical integration with existing applications</td>
<td>• Channel conflict on-line or off-line</td>
</tr>
<tr>
<td>• Bandwidth costs</td>
<td>• Not all members of value chain on-line</td>
</tr>
<tr>
<td></td>
<td>• IT management vs. business management: Who is the barrier?</td>
</tr>
<tr>
<td></td>
<td>• Limited executive vision</td>
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<tr>
<th>LEGAL AND REGULATORY</th>
<th>BEHAVIORAL AND EDUCATION</th>
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<tr>
<td>• Lack of consistent rules and policies</td>
<td>• Trust and privacy</td>
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<tr>
<td>• Customs and tax uncertainties</td>
<td>• Complexity of PKI</td>
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<tr>
<td>• The role of governments and nations</td>
<td>• Fraud</td>
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<tr>
<td>• Other regulatory issues</td>
<td>• Hyde</td>
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<tr>
<td></td>
<td>• Awareness about availability of services</td>
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<td></td>
<td>• E-money laundering</td>
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<table>
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<tr>
<th>OTHER CHALLENGES</th>
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<tr>
<td>• Channel conflict</td>
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<tr>
<td>• Critical mass</td>
<td></td>
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<td>• Fulfillment process</td>
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X. CONCLUSION

Internet e-commerce communities and providers are changing the rules of competition, and they are mobilizing people and resources to achieve new levels of performance. Creating a responsive, exciting, and informative basis for finding, interesting, and securing new customers and better satisfying existing ones, Internet e-commerce promises to transform the global marketplace—once again shrinking the boundaries of time and space that separate people, companies, and nations.

Achieving the benefits of Internet e-commerce requires careful analysis of the broad range of opportunities, technologies, channels, and customer segments available. Not every market or every channel will be equally suited to an organization’s current and future marketing strategy. Gaining the maximum benefit from this new technology enabler begins with understanding how it can serve the company and its stakeholders best. It is not a toy or a fad—Internet e-commerce is an increasingly popular method for reaching new markets and providing new services. It is a trend that is expected to increase in penetration and importance in the new millennium.

GLOSSARY

AUTHENTICATION. A means of ensuring that a message came from the party who claims to have initiated the message. In e-commerce, one of the greatest challenges in processing transactions is to validate that the transacting parties are who they say they are, that they are accepting responsibility for the transaction, and that the transaction has not been altered in any way.

BLIND SIGNATURE. A recently developed means of ensuring privacy in electronic commerce transaction. The blind signature is the equivalent of a pseudonym. The bank that processes a payment or purchase over the Internet does not get the real name of the person; instead the bank receives a coded, disguised identifier. The software used to generate and decode the blind signature guarantees its validity.

CERTIFICATION AUTHORITY (CA). An unbiased third party that intermediates the exchange of “keys”—coded data—between two entities. A key is the secure code used to encrypt and decrypt data to protect it from prying eyes. Cryptography applies complex mathematical procedures to turn a number or a string of words into a stream of bits that cannot be interpreted, altered, or misused. The resulting encrypted message then looks like a random jumble of electronic garbage.

CYBER CASH. A method of carrying out a transaction that employs the strongest tools of cryptography and processes the key elements of transactions offline, so that the many hackers roaming the Web cannot sabotage it. Cyber cash may or may not become a market standard, but its basic strategy seems to be a blueprint for secure electronic commerce on the Internet.

CYBERSPACE. A term coined by science fiction author William Gibson to describe the whole range of information resources available through computer networks.

DATA ENCRYPTION STANDARD (DES). Part of the mathematics of security. Data encryption converts numbers and text such as a name, account number, purchase amount, and accompanying message into a stream of apparently meaningless digital bits.

DATA MINING. The analysis of massive aggregations of computer data to find nuggets of gold—patterns, anomalies, exceptions, and trends that can be used to target customers, identify market niches, and detect new opportunities. It is a new term for a not-so-
new market research practice—companies have been analyzing customer data for this purpose since the 1980s. What is really new is the combination of masses of data automatically generated as a by-product of electronic commerce operations and massive low-cost computer power to process it.

DIGITAL CASH. A “token-based” currency that translates into equivalent real currency units backed by a bank. This payment system usually involves a trusted authority that allows users to conduct and pay for transactions with digital cash after a predetermined relationship has been established. The main purpose of this payment form is to enable commercial transactions over the Internet for amounts too small to justify the cost of credit card payment processing and, more generally, to create the electronic equivalent of cash: convenient, private, widely accepted, and legal currency.

DIGITAL SIGNATURE. An unforgeable signature on an electronic document to guarantee that a specific person agreed to the sending of the document, in effect signing it. A digital signature has three requirements: (1) it must be reliable and safe—that is, it cannot be forged, (2) it must be verifiable—it can be directly attributed to the person, and (3) it offers “nonrepudiation,” which means that the signer cannot disown it later and claim that he or she did not in fact sign the document in this way.

DISINTERMEDIATION. The process of bringing a company closer to its customer by cutting out the information middleman.

DOMAIN NAME. The unique name that identifies an Internet site.

ELECTRONIC CATALOG. A data file that contains product and pricing information (and in many instances, inventory data). The pharmaceutical industry, for example, is replacing its drug catalogs printed on paper with electronic catalogs, which not only cut down on the cost of production and updating but also provide a much easier and more effective method for ordering and shipping. Electronic catalogs can be updated by the hour.

ELECTRONIC PURSE/WALLET. An application of the related prepaid card or stated-value cash card. The term was coined while marketing what is often called the “smart card.” The terms “purse” and “wallet” further define and segment the concepts of these electronic payment tools.

ELECTRONIC PAYMENT SYSTEM. A means of collecting payments over the Internet.

EXTRANET. A network that allows a company to share information with other businesses and customers. Extranets transmit information over the Internet and require a user to have a password to access data from internal company servers.

FIREWALL. A hardware and software barrier between the outside world and the entry point to an organization’s communications and computing resources. Typically, a firewall is placed immediately behind the server into which Internet traffic flows as a World Wide Web page is accessed. The firewall software checks whether the message seeking entry is authorized. It also handles other control and security operations and looks for evidence of any effort to break into systems or introduce viruses.

HYPERTEXT MARKUP LANGUAGE (HTML). A simple tool for designing World Wide Web pages on the Internet. Easy to learn, it is included with most Internet software browsers, as well as with word processing and multimedia software packages. HTML is the most basic tool for getting a presence on the Internet. Other
more powerful tools that add three-dimensional graphics and virtual reality to traditional Web pages are rapidly superseding it.

ONLINE PURCHASING. The technical infrastructure that makes it possible to purchase a product over the Internet.

PORTAL. A key site on the Internet that most people visit (e.g., AltaVista, Yahoo!, America Online).

PRIVATE KEY. A tool used in cryptography. In contrast to a public key, a private key is known only to its owner and is used to encode messages. A public key decodes them.

PUBLIC KEY CRYPTOGRAPHY. The generally accepted base for guarding the security of information transmitted electronically. It employs complex mathematical theory and algorithms to generate two electronic values, called keys. The private key is kept secret and must be highly guarded. It is used to encode messages—that is, to convert ordinary language, known as “plaintext,” to an apparently random stream of electronic bits. Trading partners, via software applications and computer hardware chips, apply the public key, which can decode messages but cannot encode them.

SECURE ELECTRONIC TRANSACTIONS (SET). A protocol designed to secure credit card transactions on the Internet, developed jointly by Visa and MasterCard. Microsoft and Netscape also participated in the design and development of the protocol and enable users to use their credit card numbers while making transactions on the Internet, with improved security protection. SET is based on the use of the RSA algorithm.

SECURE SERVER. Technology that ensures that the information a customer enters on an e-commerce site is encrypted and cannot be stolen.

SHOPPING CART. An icon that, when pressed, enables an online customer to save the current product, allowing him or her to continue shopping on the website.

WEBMASTER. A person in charge of technically maintaining a website.

BIBLIOGRAPHY


