

Value and Productivity in the Internet Economy

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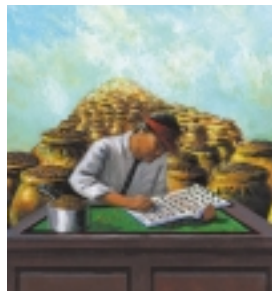
Internet technologies and applications have grown more rapidly than anyone could have envisioned just five years ago, opening up new frontiers of interaction between consumers, businesses, and trading partners. What started out as haphazard compilations of company brochureware or static personal Web pages with images that users merely shared with friends and family has quickly evolved into a myriad of highly sophisticated online applications and business processes.

Forward-thinking companies are leveraging the Internet's massive public technology infrastructure to create new value for their stakeholders and to attain new heights in productivity. While the Internet may appear to be just another technology wave like the client-server phenomenon in the business world in the early 1990s or the enterprise resource planning movement in the late 1990s, its scope and potential impact on the global economy are much larger.

Organizations have traditionally invested in non-Internet related information technology, established electronic links with selected suppliers and buyers, and enjoyed productivity and efficiency. However, the Internet is fundamentally different from other IT because of its ubiquitous and open nature, low access costs, and the ease of using related applications. As a result, we have witnessed an unprece-

dent level of adoption of the Internet by both consumers and businesses, leading to an exponential growth pattern.

While the Internet is often considered to be a sales and marketing channel, we take the position that it has created a



The successful players in the new electronic economy leverage Internet technology in every aspect of their business operations.

complete electronic economy that is already large and growing rapidly, creating new opportunities and jobs. The successful players in this new economy are the companies that can leverage information and knowledge in every aspect of their business operations.

THE INTERNET ECONOMY: A DEFINITION

The Internet economy comprises these components:

- a large set of IP networks spanning the globe, software applications, and human capital involved in the creation and deployment of an open

and globally accessible networked environment;

- interconnected electronic markets with a variety of exchange mechanisms that the IP networks and applications enable;
- online consumers, producers, and electronic intermediaries providing trust, visibility, assurance, certification, and other market-making services;
- one or more electronic currency systems that can be used in Internet-based transactions; and
- legal and policy frameworks.

Some components of this new economy—such as currency systems and the legal framework—are still under development. However, three related but distinct economic forces have primarily driven this nascent economy's growth: positive network externalities, the complementary relationship between the Internet's technology components, and lower transaction costs. Positive network externalities are a motivating force on the

Internet in that consumers and businesses find it increasingly more valuable to be a part of the Internet as other consumers and businesses adopt the medium. For example, as its suppliers and customers start using the Internet in their daily operations, a manufacturer can derive maximum benefits from the "Webification" of its own business processes.

A complementary relationship implies that the value of doing more of one factor increases by doing more of another. In the Internet economy, there is a strong complementary relationship between the network infrastructure, Internet applications, and e-commerce. As the Internet bandwidth increases dramatically with the

spread of broadband technology, application vendors are rushing to develop powerful multimedia software that can take advantage of the increased bandwidth. These factors lead to increased economic activity on the Internet in the form of media-rich content. The Internet's open nature stimulates innovation in both the network and applications infrastructure, leading to the vastly accelerated development and deployment of new technologies in the Internet marketplace. Furthermore, instant communication, coordination, and collaboration across the Internet are helping firms lower their transaction costs through virtual integration with suppliers and customers.

Our conception of the Internet economy is distinct from what the business press often refers to as the digital economy, a catch-all definition that generally includes all IT as a part of the technology infrastructure. Although electronic data interchange is an integral part of the digital economy, over the course of more than 20 years, only a small fraction of the business world adopted EDI. Problems such as the lack of an open global infrastructure and powerful applications to link every aspect of a business relationship have continued to plague EDI and similar interorganizational IT.

Vendors are now adopting the Internet as a delivery channel for EDI documents. Along similar lines, the strength of the prevailing economic forces will ultimately cause all IT to become Internet-based. However, in the interim, making a clear distinction between Internet and non-Internet based technologies is prudent because the economic forces favoring the Internet's growth have not been favorable to non-Internet technologies.

THE INTERNET ECONOMY'S STRUCTURE

The traditional economy's performance is based on, among other things, technology, the transportation infrastructure, availability of raw materials, and the quality of a skilled labor force. In contrast, the Internet economy comprises the four-layered model shown in Figure 1.

The Internet's infrastructure consists of two layers:

- global high-speed IP-based networks and applications, and
- consulting, training, and integration services.

The electronic infrastructure and its associated human capital make conducting economic activity over the Internet technically feasible. This economic activity takes two forms: transactions involving electronic intermediaries and direct online transactions between producers and buyers. The transactions between intermediaries involve third parties who provide market-maker services, domain expertise, and certification that enable buyers to choose sellers and products, and search, retrieval, and aggregation services that lower online transaction costs.

Each Internet economy layer has a complementary relationship with every other layer. For example, with advances in layers 1 and 2, firms at layers 3 and 4 can provide media-rich content to consumers as well as offering new digital products and services (information and software goods that are delivered online). This interdependence also exhibits itself in the form of alliances in which conduit and content providers or applications vendors and electronic retailers (e-tailers) join hands to create bundled offerings that are valuable to consumers. Don Listwin, executive vice president of Cisco Systems, describes this interdependence in the new economy as the Internet ecosystem (<http://www.internetindicators.com>), implying the existence of a symbiotic relationship between players across different layers of the Internet-economy model.

According to two studies conducted at the University of Texas at Austin, the total size of the Internet economy (mea-

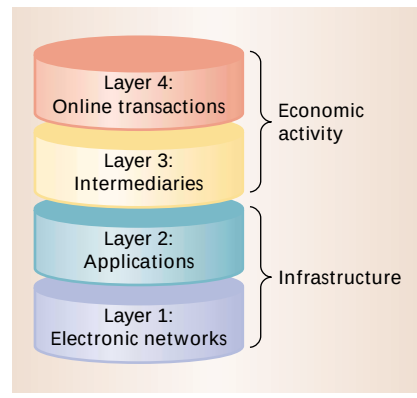


Figure 1. The Internet economy's four-layer structure. Each layer has a complementary relationship with every other layer.

sured by revenues) exceeded \$300 billion in 1998 and was projected to reach \$507 billion by the end of 1999. Table 1 shows the figures for the Internet economy's four individual layers.

But is big also better?

The Internet economy's rapid growth is changing the way business is conducted. But is this growth productive and efficient? After all, big is not necessarily better. What types of players are creating the highest value in this Internet economy?

From the first quarter of 1998 to first quarter of 1999, online revenues for companies selling products and services directly over the Internet grew from 10 percent to 14 percent of total revenues, while related jobs grew from 7 percent to 9 percent. This implies a healthy growth in revenue per employee for electronic commerce, a metric closely followed by most organizations.

An import/export view

Business will realize the Internet's max-

Table 1. Estimated revenue for Internet economy layers.*

Layer	Q1 1998	Q1 1999	Growth (percent)
Network	\$26.795	\$40.139	50
Applications	13.925	22.487	61
Intermediaries	10.992	16.666	52
Commerce	64.000	107.969	68

*Figures are in billions.

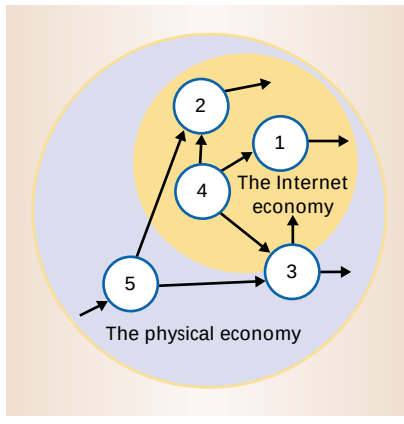


Figure 2. An import/export perspective of the physical and Internet economies that groups companies in five categories.

imum benefits when all players in the physical economy adopt the Internet in every aspect of their enterprise. Today a relatively small percentage of US businesses actually use the Internet to sell products and services, while a vast majority continue to operate in the physical world, doing business as usual.

Figure 2 shows an import/export view of the Internet and physical economies that groups businesses in five categories:

- *category 1*—pure digital-products businesses that offer content, knowledge, or services directly over the Internet
- *category 2*—Internet-based companies that deal with physical products, importing goods to be sold from the physical economy
- *category 3*—traditional businesses that sell some of their products or services directly over the Internet
- *category 4*—content developers, Internet service providers, Web and applications hosting services
- *category 5*—companies that do not sell directly over the Internet

Category 1 companies such as Yahoo.com obtain their digital products from category 4 players. The consumer goods e-tailers in category 2 often buy their products from manufacturers through non-Internet channels and manual processes. Category 5 represents companies that do not sell directly over

the Internet. An example of a category 5 company is a book publisher that exports books to Amazon.com, a category 2 e-tailer. Category 3 companies are traditional brick-and-mortar businesses that are also click-and-mortar enterprises because they sell part of their output directly over the Internet. Thus, category 3 companies obtain their products from both the Internet and the physical economy, and they also sell these products in both economies.

Over time, category 5 companies will enter the Internet economy through the digitization of their business processes, while category 3 companies will increase the percentage of business they conduct online. Internet-based coordination and collaboration between supply chain partners will create new value and increase the productivity and efficiency of the overall Internet economy.

DIGITAL AND PHYSICAL PRODUCTS COMPANIES

Does the fact that the Internet deals with the creation, storage, processing, dissemination, and sharing of information and knowledge mean that firms with intangible products and services can leverage the Internet more than others? Digital products companies like Yahoo, eBay, and America Online offer content and services directly over the Internet. Some companies provide intangible services such as consultation, counseling, and advice online. In contrast, e-tailers sell physical products such as toys, jewelry, and electronics on the Internet that are then shipped to consumers.

Both types of companies can benefit from the Internet through reduced transaction costs, global market reach, and new ways to create value through mass customization and personalization of products and services. However, while IT investments can have a significant positive impact on the revenues and gross income of digital product companies, similar investments by e-tailers have no impact on performance. An immediate and striking implication of this finding is that an e-tailer's marginal dollars are currently better spent on labor rather than on additional IT investments.

This seemingly perplexing finding is

supported by the rationale that digital products companies have a higher business process digitization level than Internet-based companies that sell physical goods. This difference may not be obvious at the online storefront level because both types of companies generate their revenues online and interact with customers directly over the Internet. Thus, some customer-facing features of a digital products business may be similar to those of an e-tailer.

The most important distinctions between a digital and a physical dot com, however, are the degree to which companies can digitize business strategies, processes, and relationships and the type of inputs each company uses. In fact, a digital products company's complete business model is reflected in its IT applications. For example, online content personalization engines customize content. eBay uses Web-database connectivity tools to accomplish its successful business strategy of creating a feedback and rating system for all buyers and sellers on its auction site.

Intermediary services that find the lowest price or a combination of specified criteria for a product on the Internet use powerful search and comparison tools. In other words, any business strategy in the digital products world is directly translated into systems capabilities.

Digital products companies manage content inventory directly through their Web sites and related applications. In contrast, physical products companies often implement their Internet differentiation strategies offline, and may have little to do with IT.

The ability to provide fast and reliable delivery of goods to customers is the motivation for physical products companies to deal with warehouses and inventory so they can be more responsive to customers. In this regard, e-tailers are currently not significantly different from their brick-and-mortar counterparts. For example, most publishers have not yet adopted electronic business processes to the extent that they can print any number of copies of a book on demand. If Amazon.com sells 50 copies of a particular book on a given day, it cannot possibly rely on the book publisher to ship

50 copies within, say, 24 hours. Therefore, to provide the highest level of customer service, Amazon.com has large warehouses to hold its inventory of books, CDs, and other physical products.

As another example of the processes involved in the operation of a physical dot com, consider an online grocery store that uses its Web store front to take a customer's order, but which must rely heavily on people and manual processes to fulfill the order efficiently and to the customer's satisfaction. Thus, an online grocery store's differentiation strategy might call for investment in a faster delivery network.

Other important distinctions between these two categories enable digital dot coms to leverage the Internet more than e-tailers. For example, a digital products company can grow by creating more content alliances and by expanding and enhancing its Web presence. In contrast, an e-tailer has to undertake an elaborate and often labor-intensive expansion program to expand the volume of business. Further, a digital dot com's ability to differentiate itself from its competitors directly depends on being able to translate innovative business strategies into online capabilities. In fact, Jeffrey F. Rayport, head of Monitor Marketspace Center, a strategy consulting firm, suggests that IT businesses are likely to undergo more dramatic changes in the Internet economy than businesses based on traditional products and services.

The lack of IT productivity does not imply that physical products companies should abandon their current business. Rather, the negative findings indicate a high level of manual processes in e-tailing, especially in the fulfillment and logistics areas. This calls for rapid digitization of all internal and external business processes. An e-tailer cannot leverage the Internet merely by digitizing the customer side of its business while continuing to rely on physical means for order fulfillment. As more companies adopt the Internet, an individual firm can start reaping the true benefits of digitization through total electronic coordination with external entities. The large-scale adoption of the Internet by every

Resources

These resources provide additional information about value and productivity in the emerging Internet economy.

- ✓ A. Barua et al., "Not All Dot Coms Are Created Equal: An Investigation of the Productivity of Internet-Based Companies," Univ. Texas Working Paper, 1999, <http://crec.bus.utexas.edu/works/articles/digital.pdf>.
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organization in every aspect of business is therefore crucial to the new economy's overall success.

Non-Internet technologies such as EDI failed to benefit from the economic forces that are rapidly propelling the Internet economy to new heights. The value proposition that attracts businesses to the Internet economy is that they can adopt its low-cost global connectivity infrastructure instead of having to build it from scratch. Technological innovation in the global marketplace drives new business models, thereby speeding up the Internet economy's growth.

Unlike the physical economy, which relies heavily on physical resources, the Internet economy thrives on information and knowledge to create value, productivity, and efficiency. Firms that rely on these intangible assets are more likely to succeed in this new world than those that continue to focus on physical processes. The Web's information and knowledge intensity is a crucial factor in driving performance metrics like online revenue and gross margin, and every partner in a value Web must adopt the Internet in its daily operations to maximize the benefits of electronic business. ★

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