



## Building the virtual world

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..... Stop and think about the building and delivery of electronic commerce, all the activity that goes on behind your PC. It is not just a routine stringing of computer to network server to backbone connection. The framework for characterizing that activity is more complex and involves commercial and market factors along with the technology that makes electronic commerce possible.

Any reasonably comprehensive framework would have to answer four general questions. Has the vertical chain for delivering electronic commerce settled? Does the creation of value depend on how firms commercialize technology? Do vendors approach similar commercial opportunities with similar or different strategies? How important is adaptive activity to a firm's growth strategies?

### Vertical chain

Consider the vertical chain for delivering electronic commerce. It is comprised of all the various pieces that are active when a user engages a producer in some sort of electronic activity. Is this chain settled? I think not.

Conservatively, the vertical chain is comprised of at least two dozen distinct categories including

- client applications, operating systems, hardware, processors, etc.;
- server hardware, database management software, system software, etc.;

- enterprise software, middleware, office applications, etc.; and
- network access, operations, and data transportation, etc.

This vertical chain is not settled for several reasons. There is no single firm that dominates all phases. Leading firms include Microsoft, Dell, IBM, Intel, Sun, Compaq, AOL, UUNET, MCI, AT&TWorld Net, Cisco, Novell, Oracle, Hewlett-Packard, EDS, Andersen Consulting, SAP, Peoplesoft, Baan, and Computer Associates, as well as many others.

Because firms specialize at different layers of the vertical chain, there is no organizational consensus on how the chain should be organized, nor is there any stability in its market dominance. Rather, there is a situation of divided technical leadership, where many firms possess roughly similar technical capabilities. With a few notable exceptions, if a firm doesn't maintain its place in the technical frontier or doesn't satisfy its immediate customer base, it will quickly be replaced by a more viable and more highly organized entity from a nearby competitive space.

The structure of the vertical chain also influences its instability. There is new technology here, especially in the wires, cables, hubs, routers, and new switching equipment. Yet, it is also a retrofit onto the old telephony communications system, as it is an incremental change to the established data transport system and to

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many users' existing client/server systems. This design makes everyone unhappy; if firms were going to build a system from scratch around Internet protocol, this is not how it would be done.

Why is this vertical chain so confusing? It is because it defies existing classifications of economic activity. It changes too rapidly for stable definitions. Moreover, economic activity involves a mix of tangible durable assets and intangible ever-changing business processes, a combination that tends to defy documentation by all but the most dexterous consultant. In addition, the mergers of the last few months garnered headlines, but this is hardly the end of the restructuring.

### Creation of value

Does the creation of value along the vertical chain depend on how technology is commercialized? I think so. Yet, this bland question masks complex detail.

The first detail is well known to most telecommunications insiders, but new to some PC industry watchers. That is, data transport is cheaper at high volume. This is because of economies of scale in aggregation and density. This was true in the voice network and is still true of data networks, whether it has a PC at the end of it or a mobile intelligent Internet device. It should continue to hold true in the future. Therefore, we can expect this part of the vertical chain to contain only a few suppliers in any given location.

Second, the "last mile" of data transport, where the densities are not too large and the volumes are not too high, often offers a good business position. This is particularly true for some electronic commerce applications such as business-to-business automation. Yet, sometimes it is not profitable, which gives rise to hundreds of vexing business decisions. Does it make sense for small and medium-size firms to have a large online presence? Does it make sense for someone to get in the business of helping a rural farmer check the financial markets regularly with a Palm Pilot? Does it make sense for a cable company to deliver high-speed data over its cable lines to neighborhoods where only 25% of the

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## Does it make sense for a cable company to deliver high-speed data over its cable lines to neighborhoods where only 25% of the households have a PC?

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households have a PC? This part of the market is getting so much attention right now for good reason; this is where the have/have not split gets decided.

Third, key technical enablers for this structure are the processes underlying data interchange. These are comprised of TCP/IP, W3C, and many other nonproprietary standards. There is no natural reason why it had to be this way, nor for it to stay this way. Indeed, plenty of firms would love to overlay this system with their own proprietary processes. That said, today, at least for now, interconnection is easy and doesn't reside in any firm's unique domain, not even Microsoft's. At least, not yet.

Though everyone understands that electronic commerce creates value, it is quite difficult to document even the basic trends. Prices change frequently, but it is not clear what economic activity has produced them. The diffusion of new technology has rapidly moved across income, geographic space, and type of application. There is no consensus on the best way to regard these commercial developments.

### Same opportunity, different strategy

The Web can be overwhelming because there is so much variety. This arises for good reasons. To put it mildly,

electronic commerce is just like any other uncertain competitive market where vendors approach similar commercial opportunities with different strategies.

This is partly a reflection of the newness of the market and its gold-rush hype. In the present era, it is not hard to start something on the Web. Entry costs are low in all but the most technical of frontier activities. It is inexpensive to put up a Web page. It is inexpensive to open an ISP. In most urban areas it is not hard to find programming talent. And, for most users of electronic commerce, new applications are only an incremental change in their lives. Hence, many small firms can, at least, get a start.

Variety exists for another—somewhat less faddish—reason. Many vendors are deliberately targeting unique user needs; tailoring their service to the peculiar needs of local markets, to their own special niche, or to offering their own peculiar background. Whether this is associated with different visions of the future or a different core capability, it results in variety.

To put it more starkly, variety thrives because of divided technical leadership. Two types of strategies characterize electronic commerce entrants. First, a firm may try to combine electronic commerce with nonvirtual activity in some unique way. For example, established media is full of efforts like *The Wall Street Journal*, *The New York Times*, and *Business Week* that try to maintain both a virtual and nonvirtual presence. There are also plenty of less-established media doing the same, such as *Industry Standard*, *Wired*, and *Red Herring*.

Endeavors also exist in retailing, where some firms use their Web presence to complement users' nonvirtual shopping experiences. Dell Computer's presence on the Web is one of the best-known examples. But many other examples stand on their own and also complement the specialty of the home office, such as E-Schwab, Microsoft Network, AT&T Worldnet, and so on.

There are also the pure electronic commerce undertakings, tailored to visions of

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