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The One With the Most Networked Stuff Wins

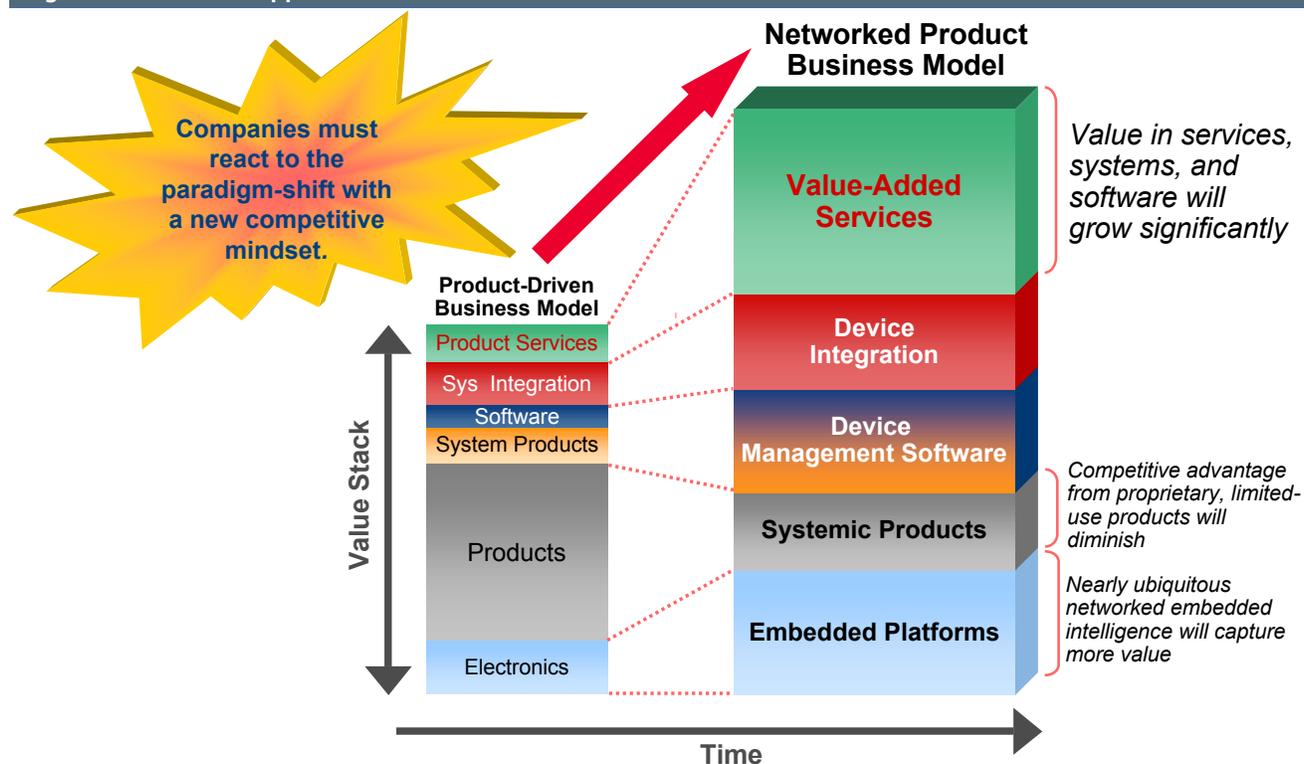
“The Internet changes everything.” That was the mantra of the Dot-Com boom. The big irony is that it was absolutely true—but not in the way it was meant at the time.

Surprisingly few product companies appreciate how profoundly the M2M / Pervasive Internet era will change their business.

The Internet: it’s not just for humans anymore

When you say “network” to most people in business, they think “my company’s network”—meaning the combination of LANs and WANs and intranets that connect computers throughout the company and therefore connect the people in the company. If “the network is down,” that means you can’t print something, or get a file off the server, or “look something up.”

Figure 1: Value-Add Opportunities of the M2M / Pervasive Internet Era



The networked product world will be very different from the standalone product world. The value of services, systems, and software will grow significantly.

Source: Harbor Research, Inc.

Interestingly, people in business usually don't think of the Internet itself when they hear the word "network." And they certainly don't think of the telephone. No one picks up the phone and says, "Excuse me, I have to get on the network." Of course, they are getting on a network, they just don't think of it that way.

With all due respect, most people don't really understand what networking is, and what it could mean for the way they do business. Deep down in their bones, they don't get "Metcalfe's Law"—also known as "the network effect"—which says that every time you add a device to a network every other device on the network increases in value, and the network itself increases in value. Phrases like Sun Microsystems' "the network is the computer" have been around for a long time, and people dutifully repeat them, but somehow it just hasn't sunk in.

So, if you say "device networking" to most people outside the device networking community, you'll pretty much get a blank stare. And if you go on to say, "Well, we want to network all your refrigerators," the response is likely to be, "Why would you want to do that?" Networking does not fire their imaginations. It does not provoke any glorious vision of the future.

The vision is not in itself new. It has been around at least since the 1950s, when such thinkers as Jay Forrester (*System Dynamics*) and MIT's Norbert Weiner (*Cybernetics* and *The Human Use of Human Beings*) wrote landmark books describing a world transformed by automation, machine intelligence, and optimized systems.

If you applied this vision in a practical way to business, it might simply be called "electronic commerce." But we don't mean the e-commerce of the dot-com era. We have that today, and it's not e-commerce at all. At best, it's "e-shopping"—simple mechanisms that make certain B2C and B2B transactions, *performed by human beings*, somewhat easier, somewhat more convenient. It took a first tiny step toward global business automation...and then stopped.

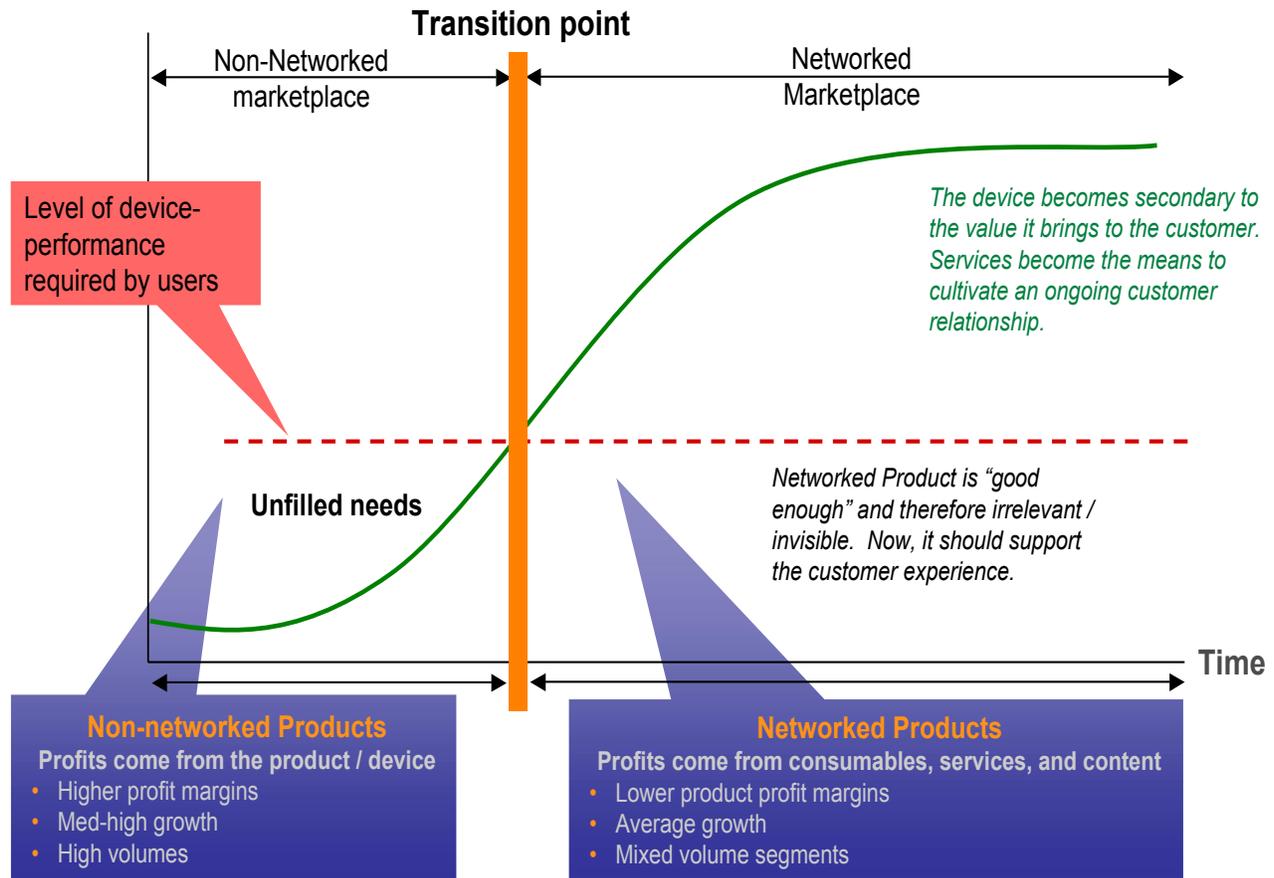
Genuine e-commerce re-thinks the whole relationship of people and devices to business systems. It must be built upon true, across-the-board digital automation, accomplished by enabling everyday electronic devices to communicate with and control each other, along with a whole new generation of information tools ("killer apps") for managing rich, vast streams of meaningful data. The goal is to network devices into electronic commerce systems that are self-sensing, self-controlling, and self-optimizing—automatically, without human intervention. It would not be far-fetched to call them "self-aware."

Inside such systems, reliable and blindingly fast microprocessors do what they are very good at doing (and what people are very bad at doing): digesting billions of data-points, talking to each other about the data, controlling each other based upon the state of the data. All in a matter of nanoseconds. Human beings cannot do this, nor should they; this incessant stream of ongoing business information should be "invisible" to people. At the same time, all this



invisible machine activity makes the state of (i.e., the information about) a business's assets, costs, and liabilities vastly more visible to managers and to the decision-making process—when decision-makers need or want to know it, and not otherwise.

Figure 2: Vast Profits Will Be Found in Value -Added Services, Not in Devices Themselves



The business opportunities for using device information are virtually unlimited.

Source: Harbor Research, Inc.

Such systems will open an entirely new portfolio of "killer apps" that will transform the way business is done around the world, and profoundly improve customer satisfaction and vendor profitability. This represents an entirely new life for the IT and telecom industries—one that will literally dwarf their starring role in the "dot-com" era. But they have been very slow to pick up on it.

They called it "dot-com" and that was the problem

Technologically, the 20th century ended with a very big bang: the dot-com boom and bust. What's in a name? In this case, everything. "Dot-com" refers to the naming convention used for Web domains—network destinations intended for people, primarily via PCs. But we must

remember that the Web is not the Internet. The Web is a presentation technology built on the protocols of the Internet. The Web is a people thing. The short-sighted dot-com era was all about people building Web sites, people "surfing" to Web sites, people looking at screens with their eyes, people typing on keyboards with their fingers.

People, people, people.

People are great, but let's face it: for many important tasks they're an impediment. Unless you're living in ancient Egypt, people are not the proper resource for the excavating and heavy-lifting of skyscraper construction. *We have machines for that now*—backhoes, bulldozers, cranes, and so on—and no one seems to lament "the old days" when thousands of slaves carried pyramid-blocks on their backs.

Yet as we move into the 21st century, the prevailing vision of the digital future is still focused on systems and devices whose value requires the full attention of human beings. For the IT and telecom industries, it's still all about "mindshare," "eyeballs," "broadband content," and a lot of yakking on cell phones. With all the opportunities for networking devices, it seems that the telecom industry can't get past the handset—which has no value unless a person is operating it. Obviously, this is not where the growth will be.

IT and Telecom: Living Large in the Past

The IT and telecom sectors have been very slow to re-evaluate their relationship to advancing technology and to their constituents. One would think that their own recent distress would prompt them to get on the stick, but for the most part it hasn't. The business paradigms to which these industries cling today are far too limiting, too saturated, and too expensive to foster and sustain new growth. Meanwhile, as they gasp for air, an unprecedented opportunity stares them in the face—the opportunity to provide the modern, automated information and communications tools that 21st century business needs so desperately.

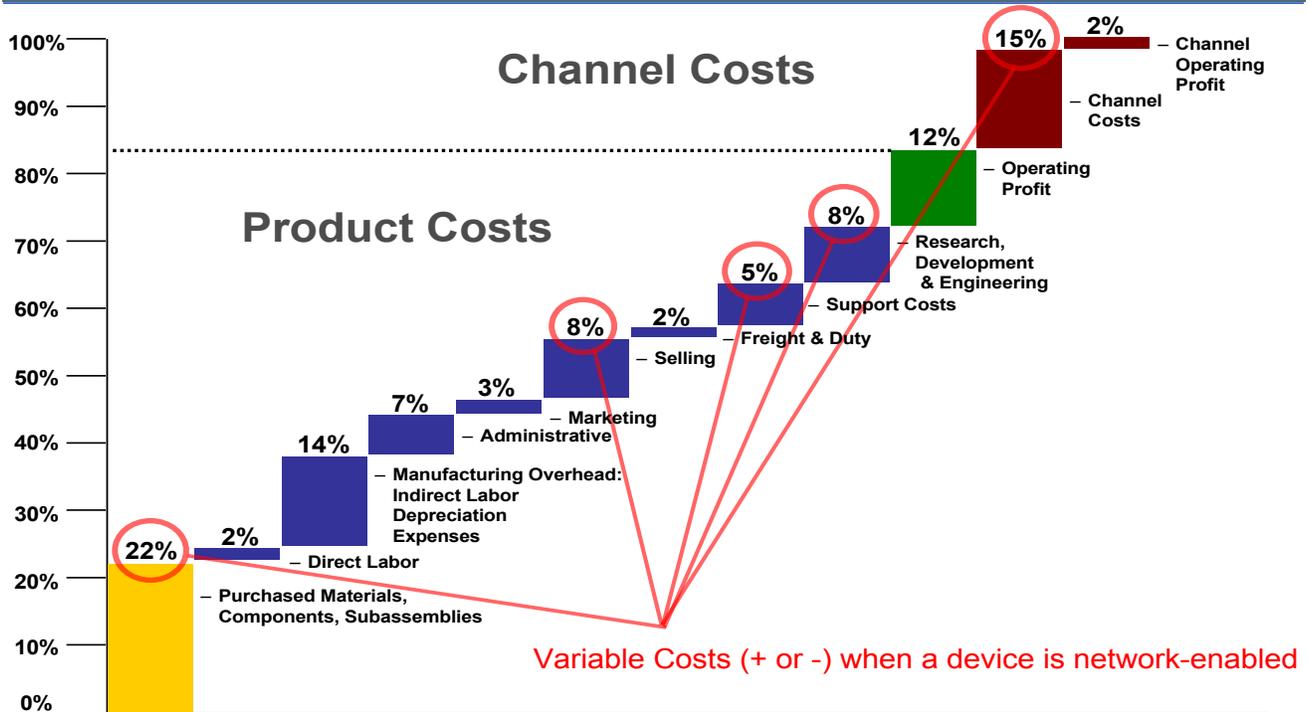
If "the network is the computer," and if the network increases in value with every added "member" or device, then the real asset, ultimately, is the network. If you network every individual asset in a building, for example—from the HVAC systems and elevators right down to the door locks, lighting fixtures, and even the light switches themselves—then the real asset is the networked building, and the real services opportunity lies in leveraging the value of that integrated and optimized system.

It used to be that only very expensive assets had high in-use value and long-term services revenue opportunity. A jet engine or an elevator carried a high price tag, but it was also expensive to make. The real money was in the service relationship over the life of that product, which could represent 20 or even 30 times the purchase price of the asset itself.



Today, low-cost assets can be leveraged like that. A meter mounted on an aluminum smelter is not in itself an expensive physical asset, but it has high in-use value and can be the portal into a lucrative service relationship. Why? Because the system is the real asset, and the meter provides information about the system. The meter is an important sensor aggregation point and therefore a window on performance, costs, system optimization, and, ultimately, profitability.

Figure 3: Cost-Savings Opportunities of the Pervasive Internet



M2M / Pervasive Internet technologies will have an across-the-board impact on OEM cost structures.

Source: Harbor Research, Inc.

From Vertical, to Horizontal to... Axis Integration

In the beginning of the Industrial Revolution, companies vertically integrated to control the modes and means of production. Ford Motor Company, to cite a classic example, owned steel plants, rubber plants, and other manufacturers of parts and sub-assemblies. As the economy grew, companies found that specialization afforded greater gains in productivity. This approach fragmented many markets into the horizontal structure we have today. When buying a car today, a customer might interact with a dealer, which has an affiliation with an automotive OEM. That OEM purchases finished parts from other suppliers to assemble and brand. The parts suppliers interact with raw material suppliers, and so on.

When the customer buys that car, he/she has options about who will finance, insure, maintain, and dispose of the vehicle. With so many players involved in the process, huge inefficiencies

exist in profiling, supporting, and servicing the customer, and the OEM ultimately loses touch with its customers—the phenomenon called “disintermediation.”

Pervasive computing and the Internet will change this industry structure radically. An ongoing stream of device-generated information can feed automated systems that integrate the horizontal and vertical in an information feedback loop that transcends the inadequacies of either axis alone and ensures system optimization. It will now be possible to more efficiently tailor services and respond to customer needs in real-time. As vehicles and other devices become connected to networks for monitoring and servicing, customers will find that they can receive a higher level of service at the right times. Device OEMs can take greater ownership in the experience of their customers by centralizing and coordinating other vendors’ activities, and by tailoring services to each customer.

The “takeaway” for adopters and suppliers is the same:

- ▶ The changes for the typical device / product / systems manufacturer will be radical.
- ▶ The divide between the Haves and the Have-Nots will widen considerably as some figure this out early and others don’t.
- ▶ Network products will drive a shift in Infocom technology spending to reflect a device-centric, rather than a human-centric, IT world.

Why should an OEM step up to the plate and network-enable its manufactured objects now? Because in any given market, the first players to do so will own the information feedback loop to the customer, and it will be very hard for competitors to pull customers out of that loop. Inside this “information circle,” a whole world of new, attractive, and more profitable services will take shape. Because those next-generation services cannot be offered without device information, and because even traditional service relationships will be made vastly more efficient inside the information circle, channel partners can no longer cut an OEM out of the services action. In fact, “disintermediation” is turned right over on its head. Now, no one can touch your customer profitably without going through you. You made the product that sends out its heartbeat, and it sends that heartbeat to you. You’re the Have, and your potential service competitors are the Have-Nots.

That’s the game as we leave the human-centric PC era: The one with the most networked stuff wins. ◀

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