



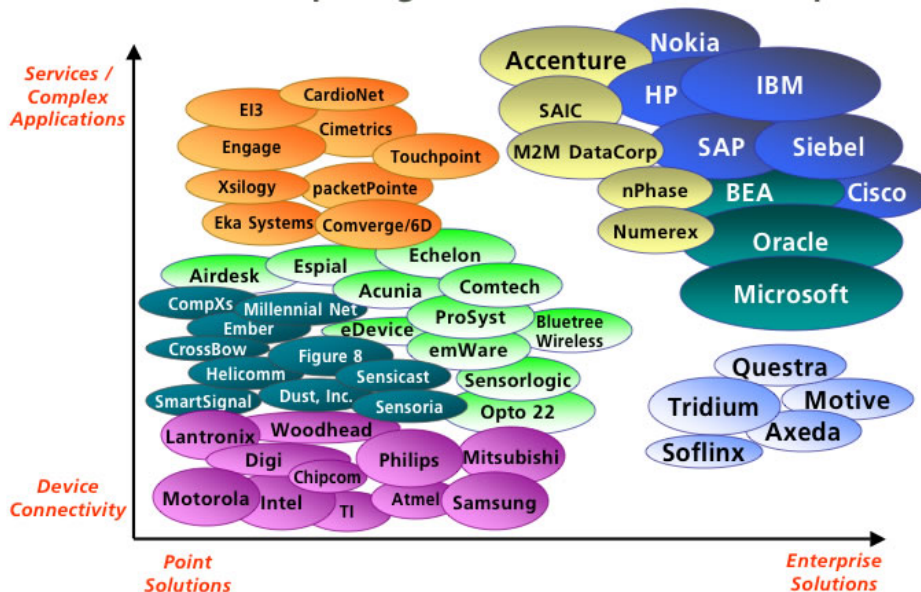
Think Pervasive

Where's the Money in Wireless Sensor Networks?

Physical networking products can make money in the early years. After that, they will become mature and decreasingly profitable.

Both suppliers and adopters need a long-term strategy that positions low-margin physical products as “portals” into high-margin smart data services.

Pervasive Computing & M2M Market Landscape



Distribution of Pervasive Internet / M2M players in terms of product / services mix and scope of solution, circa March 2004. This diagram is not intended to portray every active player, nor is it etched in stone. Company position is constantly evolving. (Click the image for a larger on-screen view.)

Source: Harbor Research, Inc.

[Download a printable PDF file of the diagram above \(125 KB\).](#)

The ubiquitous computing paradigm shift

The major chipmakers offer a good example of the business-model challenges posed by the era of ubiquitous computing. Today, those companies drive tens of billions of dollars in annual sales with IC products costing US\$50.00-US\$200.00 and intended for a one person/few computers marketplace. But we already live in a world that contains more sensors than people. And we're about to be catapulted into an era of networked embedded intelligence that will mean hundreds, even thousands, of connected computing devices per person—the often invisible ones in your car, your home, your office building, and nearly every electronic product you buy. The key IC products for this era will be much less expensive than the current cash-cow

chips (about US\$5.00 in the short term, falling to as little as US\$0.50 by the end of this decade), though they will be produced in staggering volumes.

Companies like Intel are now attempting to prepare themselves for this new reality. To state the obvious, they will need to change the way they do business. And they won't be alone. All the players in this new landscape—from small, privately held technology innovators to large OEMs and system integrators—must develop an understanding of the new ubiquitous-computing value chain, and make some crucial decisions about where they want to live on it, and with whom.

The movement away from the physical

Cheap, self-organizing wireless sensors (often called "motes" or "dust") have nearly infinite potential installations and applications. Their widespread adoption is inevitable. But that doesn't mean that every participant will automatically be shaking a money tree.

Value and profitability are playing a new game of hide-and-seek. They're still there, but not where they used to be. If you keep looking in the old places...well, you know what's going to happen.

We think that profitable vendor activity in wireless sensor nets will recapitulate the tendency we've seen for decades in digital technology generally, and more recently in other kinds of product businesses—less and less physical value (products), more and more metaphysical value (services).

Buckminster Fuller saw this general phenomenon decades ago and called it "ephemeralization"—the tendency of evolving technology to become less and less material. More brains, less brawn. At one point in human history, you have the Egyptian pyramids. Perpetuity via lots of mass. Many years later, you have the Eiffel tower. Less brawn (mass), more brains (laws of physics). In electronic technology, the exponential miniaturization of integrated circuits and data storage are obvious examples of "ephemeralization."

Short-term revenue and long-term revenue

In our modeling of the Pervasive Internet / M2M opportunity for clients, we have found that with only a few "mission critical" exceptions, enablement and developer tools tend to be declining profit activities—even though literal growth can be enormous. Sustainable profits, on the other hand, can be achieved in data management and the analytic activities that flow from the data themselves.

In the short term (say, the years 2004 to 2006), networking products and gateways can be profitable if suppliers play their cards right. They may also be able to differentiate themselves and make money with toolsets for deployment and development, analogous to the offerings of a company like Redhat in the Linux OS space.

But after that, physical enablement and network-management tools will become mature and decreasingly profitable. So where's the long-term money? Well, the galaxies of "dust"-borne data generated by networked devices will be worthless unless they can be translated into actionable business intelligence. The high margins in roughly 2007-2008 and beyond will not be in products at all, but in data management and related services. The products will continue to exist, of course, but only as "portals" into the valuable services offerings, not as ends in themselves.

Our conclusion? If you're a vendor of wireless sensor networking products with no long-term data services strategy, you're in the Pervasive Internet booster rocket. You may well have a great short-term lift-off. But when the booster runs out of fuel (product-centric profits), you'll fall back to Earth.

And that's going to hurt.

http://www.harborresearch.com/currents/issues/currents_20040310.html