



Wireless access and electrical markets: Becoming similar?

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.....There is a seductive prediction floating through IT consulting; it promises a simplification of many managerial challenges. To wit, soon companies' PC and network support will become a utility, and the staff will become the computer equivalent of electricians.

The other day I put this prediction to a small test. I moved an older desktop PC at home to a new room that lacks wires. Was a wireless upgrade as easy as changing a lighting fixture?

It wasn't, but to be fair, it was close. In very little time the router recognized the computer. The security protection kept my neighbors from surfing on my system, as it was supposed to, but it also conflicted with my work-related virtual private network. Over a couple days my system administrator and I tried several solutions. After a couple trials, we figured out something that works when the wireless connection stays up continuously, which it does about six out of seven sessions.

This experience was not unusual. Wi-Fi marketers have found that most households do not bother to enable their security. Most households do not have someone to call for advice when problems arise.

The story illustrates why the comparison between Wi-Fi and electrical markets fascinates so many participants in this market. Wouldn't it be nice if this type of small task became as easy as installing and operating standard electrical equipment? There is a grain of truth behind this question. These two markets do have some similarities. But

there are some subtle differences and they need to be appreciated.

Competitive evolution

In the last half dozen years, Wi-Fi became reliable—almost as reliable as electrical equipment. This evolution is a good place to start. How did it happen?

It almost goes without saying, but it all began after the Internet diffused in its commercial form. Throughout the latter part of the 1990s, demand for the Internet fueled the building of a national network for supplying access. Wires delivered the access, whether it was over the phone or over an Ethernet line, tethering users to their wall jacks.

At the same time, mobility blossomed in almost every other electronics device. Cell phones sales began to boom. So too had the use of notebook computers, and soon enough many handheld devices. In some applications, such as trucking and shipping, a new set of global positioning system applications also had shown their worth.

To make a long story short, mobility had value and so did the Internet. Many firms could see that putting them together would create value, but that was easier said than done. The big question was how to do it.

This could have gone a bunch of different ways, but the key event occurred in December 1997. The IEEE subcommittee for IEEE Std. 802.11 (*Information Technology, Telecommunications and Information Exchange Between Systems, Local and Metropolitan Area Networks*, IEEE, 1997)

published IEEE 802.11b to improve on an earlier and commercially unsuccessful attempt at a standard for wireless access.

The publication spurred commercial experiments. The earliest entrants gambled a bit. It was not clear that customers would like short-range wireless access. These firms sold antennae, the Personal Computer Memory Card International Association (PCMCIA)-compatible cards, and adapters for laptops and desktops.

Did you ever use one of these cards? I recall those days as exciting but full of glitches. There was always an outside chance that something could go wrong in a specific laptop. And even if something worked at one place with one antenna, there was a good chance it would not work at other locations.

Despite the technical hiccups, early experience demonstrated the presence of market value. That demonstration motivated more sophisticated firms to introduce ever more reliable products. Near-Darwinian competition drove quality up and prices down.

In the midst of this progression, the next upgrade, IEEE 802.11g, arrived in September 2000. In addition, a big gorilla stepped in: Intel installed wireless capability in its notebooks, branding its mobility-capable chip Centrino.

To be fair, Intel's strategic success was *not* inevitable. It ran into several snafus at first, such as insufficient parts and a trademark dispute over the use of the butterfly. Also, and nontrivially, motherboard suppli-

ers, PCMCIA card makers, and original equipment manufacturers did not like it. Yet, only Dell was able to put up any substantial resistance, insisting on selling its own branded Wi-Fi products, supporting some of the card makers. Despite this resistance, the cooperation from antenna makers and (importantly) users helped Intel reach its strategic goals.

Now Intel has invested more money and employee time in related actions, such as supporting Wi-Max, that is, IEEE 802.16 and the Wi-Max Forum (an organization for conformance testing). To be sure, that will make the transition to Wi-Max, if it occurs, more reliable than the days of PCMCIA cards, though it would be naïve not to expect a few glitches along the way, too.

Incremental value

Step back from the specific events. This example illustrates the general patterns of a *transitional technology market*.

Generally speaking, transitional markets are markets for equipment, where users attempt to move from one level of technology to another. Issues with reliability are endemic in such markets, and vendors must resolve them for the technology to become ubiquitous.

Why is that?

First, such markets emerge because the installed base of preexisting older equipment operates at a level far from the potential of a new-frontier prototype. Widespread subpar operational performance creates a market opportunity. However, the variety or complexity of existing equipment typically makes it nonobvious how to go forward.

Second, it is usually not obvious what catalyst will change things. In the case of wireless access, that key moment arrived after the publication of a specification for a standard. The standard established a focal point for potential designs, which was useful because one firm's products had to communicate with another's. Firms could go forward with one aspect of the product design—that is, communication protocols—set for the near future.

Third, if a technology has demonstrable value, one of two types of markets can

take shape, one that requires professional help and one that does not. Typically only the latter becomes ubiquitous.

It is a long story why, but to put it bluntly, after-sale service raises costs and scares many normal users. Though such service is essential in the initial period of experimentation, the expense and hassle can retard later growth in demand.

In other words, ubiquitous use does not necessarily emerge after experimentation, but it can. When it does, with rare exception, it only does so for simplified products or services that let the professionals turn their attention to other things.

Now let's go back to Wi-Fi. It turned out to be commercially ubiquitous because it is not expensive to install or operate, and most users do not need to call their electricians or IT support staff to operate their wireless router. That is a bit of an oversimplification, but not much of one.

So, once again, chock up another one for the increasing similarity between Wi-Fi and electrical markets. We are not there yet, but we seem only a few mere steps away.

Yin and yang of transitional markets

So where does the comparison go wrong? In Wi-Fi, as in most transitional markets, there is market-based yin and yang between reliability and experimentation. There is no such process in electrical equipment. This will take some explaining.

In a transitional market the establishment of reliable products motivates augmentation. Just as soon as one wave of improvement settles into a reliable state, intrepid users will be open to look for the next thing to come along. Sometimes it is a replacement for the old and sometimes an additional capability.

For example, in the beginning, no sane observer was sure how much market value Wi-Fi would create. Many were surprised and delighted by its use in a wide variety of locations, such as a coffee shop or the offices of a notebook user. By now, however, there has been enough experimentation that all vendors and users know what works reliably.

Hence, we are in a new phase of experiments that takes advantage of this rela-

bility. Businesses have organized wireless services for all their campuses. City governments are also trying to encourage new suppliers to support an entire city.

We are also observing another type of experiment: upgrades to the most common specifications. Some of these are in writing, such as the specification for IEEE 802.11g. But some of it—such as IEEE 802.11n and Wi-Max for mobile applications—is now being written. These new specifications are reacting to experience and anticipating new uses. They will also spur further experiments.

I do not expect many of these experiments to work well at first, nor should anyone else. At the same time, I am pretty certain some of these will eventually work out big. That is how it is in transitional technology markets.

In other words, although both Wi-Fi and electrical equipment markets contain the institutional trappings of a reliable product market, their evolution is quite different. Electrical supply companies do not serve markets where new, unanticipated commercial value emerges every few years. In addition, most electricians do not anticipate learning a new set of skills every half decade—nor do most do-it-yourself homeowners, for that matter.

More to the point, like most transitional technology markets, Wi-Fi is merely a stepping-stone to something better. It would be naïve to believe that any seeming stability is anything other than temporary.

Where the comparison misleads

The Wi-Fi market has achieved a certain level of reliability and still has a ways to go. Progress appears possible, perhaps even inevitable. Yet, a reliable and ubiquitous technology for wireless access will bring ephemeral stability at best. It will generate new business uses and new ways to augment operations, as well as motivate firms to invent further upgrades.

Vendors and sellers should not buy into seductive wishful thinking. Instead, recognize reliability when it arrives and be thankful for a blissful, albeit brief, respite from another inevitable period of experimentation.