

The consumer electronics industry has been flat for several years. Hopes are now being pinned on the emergence of home networks. The theory goes that if consumers were able to "internetwork", that is, connect all their gadgets – from televisions to personal computers to digital video players to phones and anything in between – they would rush out to buy new toys and devices.

The incremental business has been estimated by one New York investment bank as \$250 billion over seven years, of which two-thirds would go to the consumer electronics industry. A quarter of a trillion dollars – that gets people's attention.

It can be dangerous, however, to get what you hope for. I believe that, in the long run, the traditional consumer electronics industry will be significantly weakened by home networking, unless it can drastically change its business model.

Home smart home

The idea of the "home sweet home" becoming the "home smart home" isn't exactly new. As far back as 1893, one magazine wrote about the "electrical home", with "electric stoves in every room" that could be "lighted by pressing a button at the bedside door", with electric windows and a lot more besides.

For a century, most scenarios of the electronic home were gushing and premature. Today, however, the building blocks seem finally to be in place.

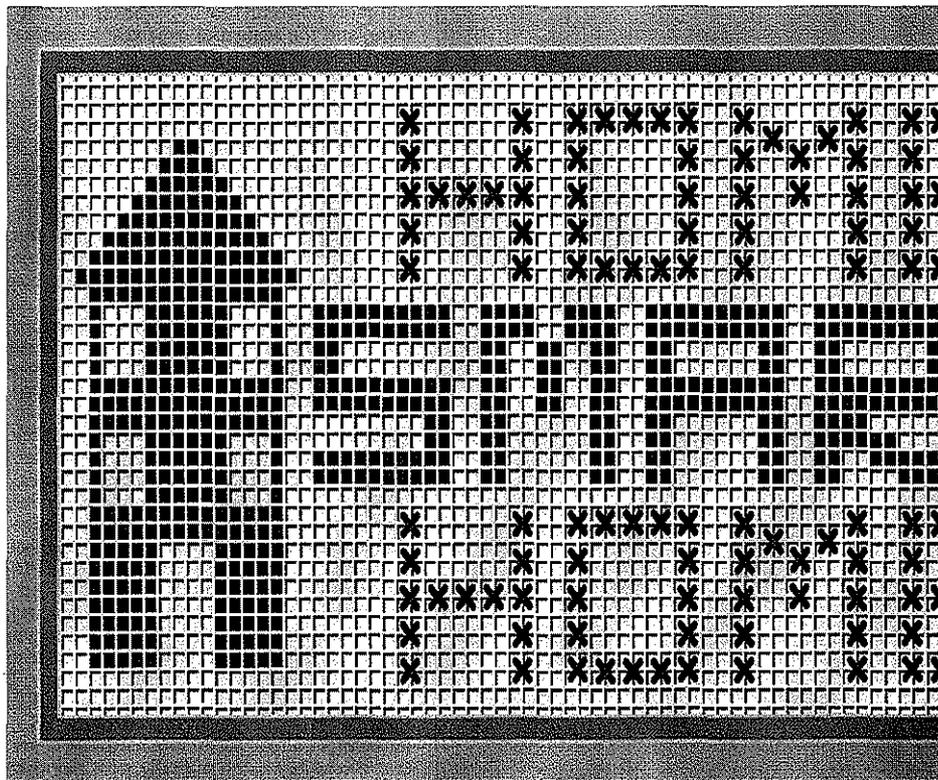
There are three enabling factors. First, there have been advances in computing as encapsulated by Moore's law, which predicts exponential progress in the miniaturization, cost-reduction and performance of electronic devices. The second factor is digitization. We can treat different types of media and content – music, films, letters, photos and games – as strings of zeros and ones. The third factor is internet-style communications that established interconnection arrangements between billions of people, information resources and devices.

This internetworking has moved beyond the office and has now reached the home. The home is at the centre of our private life but it is also a technology nightmare. It is often quite old and has rarely been configured for high-tech gadgets. The system operators are typically unqualified for their jobs, unless their teenage son is present.

Virtual appliances

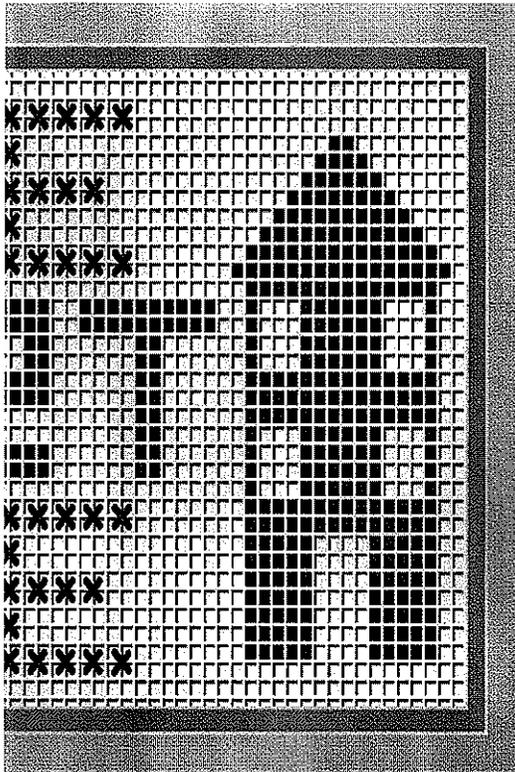
Home networks in the past have been complicated and expensive. For example, IBM's home network cost \$20,000 a decade and a half ago. Now it can cost just a few hundred dollars to network one's home. Will this confluence of technology and low cost finally bring us smart homes and, with them, revival for consumer electronics?

I think not. Let's start with the observation that if one makes some forms of communication cheaper and more powerful, others become relatively less powerful and more expensive. New means of integration tend to



Smart homes

Many predict that home networking will spark a revival for consumer electronics firms. Instead, says **Eli Noam**, it may make them obsolete



drive new ways of disintegration. As we interconnect our many domestic gadgets, we also enable their physical fragmentation. Traditional devices were self-contained – a system of subsystems. But if all devices in the home are interconnected, why have numerous separate storage subsystems, multiple separate power supplies, multiple antennae, signal processors, tuners, input devices, displays, codes and software?

Instead, it will make sense to have more powerful specialized devices for different functions, such as storage boxes, antennae and processors, and to network them.

What we would have left in the foreground are primarily the human-to-machine interfaces, principally visual displays that will increasingly take over entire walls. Everything else can be out of sight. It will be specialized, functional equipment that can be put into some sort of electronic closet, just as we hid away the boiler when we moved from stoves and fireplaces.

In that environment, consumer electronics move from the self-contained, attractively-styled hardware boxes – the TV set, the stereo radio, the personal computer and the game console – to virtual appliances, put together into ever-new configurations by software programs.

From hardware to service

Why stop at the home? Indeed, these specialized boxes do not have to sit in some closet at home. They could move to the remote facilities of specialized service providers that will have

still-more powerful functional boxes and software, and the scale and expertise to service them reliably.

In such a scenario, consumer electronics would move from making consumer products to providing a service. This has happened before, for example when voicemail, a service provided by phone companies, replaced many answering machines.

This is not going to happen overnight or completely. Some electronic intelligence and storage will remain with individual home devices because of privacy, security and speed of response.

There are powerful advantages, however, to shifting many functions to remote locations: economies of scale, efficiency, backup security, redundancy, cost and, in particular, greater simplicity to the user. It makes it easier for consumers to adopt new services because they don't have to buy a device, install it and then spend weeks calling troubleshooting hotlines.

Who will be the consumer electronics service providers, the CESPs? In theory, there is a range of potential service providers: cable companies from their central operational "headends" (a master facility for receiving TV signals distribution over a cable TV system); phone companies from their switching centres; broadband internet service providers and portals; games providers and consumer electronics firms themselves.

A consumer can have more than one CESP. Hybrids are possible and, indeed, likely. TiVo, for example, already combines hardware boxes that record television digitally with monthly services that can anticipate as well as react to the programmes that viewers want to record.

Goodbye to the consumer

What then will be the impact on consumer electronics firms? Home networks will create an initial demand spike for the new generation of hardware – especially for flat-panel TVs – good while it lasts. However, unfortunately for the big consumer electronics companies, their carefully-cultivated brands will become less important. Much of the infrastructure equipment will be bought by service providers rather than consumers.

In that market space, information technology companies have at least as much credibility as consumer electronics companies. (This will also be bad news for retailers.)

Among consumer electronics firms, the vast, multiproduct, consumer brand-oriented traditional firms will often give way to specialized high-performance producers.

Goodbye to the office

When we look at how people work today, two trends conflict with each other: mobility, on the one hand, and the digital home, on the other. Both trends of the digital lifestyle weaken the traditional location of white-collar work, the office. The separation of work and private spheres blurs and returns to what it used to be for farmers in the past.

Home networks accelerate this trend. With powerful information tools at home, or accessible from home, people will not simply be employees working part-time at home, but they will increasingly become independent free-

lancers who work as specialists for companies on particular projects.

The first to cut the steady, nine-to-five, regular employment pattern (besides people who, for a variety of reasons, cannot easily leave home) will be the most creative employees who have options and market value: designers, creators, marketing specialists, engineers and strategists. Those people can live at greater distance, at places they like or can afford, rather than close to the office and commuting to it.

This means that the city becomes less important as a place for white-collar teams, since these become, over time, less physical and more virtual. On the other hand, some cities will become magnets for independent freelancers who want to be in touch with each other and with information. Paradoxically, being independent requires an extensive social network of contacts and sources of information.

This is why information industries develop clusters of specialists. Think of Silicon Valley, Madison Avenue, Wall Street and Hollywood. This trend, however, will favour a few creative urban hubs, but definitely not all cities.

New business models

We are moving to smart homes that are inter-networked, interconnected and interoperating. This is an important development, and it will have many positive effects.

Consumer electronics has been a terrifically creative and innovative industry that has created marvels for the living room, study and pocket. But what has worked in the past, will not work for the future.

Unless the industry transforms its business models, it will be done for. Its products will be split up. Its prices will be commodified. Its devices will become services provided by others. Its overall business will become volatile and cyclical. Its most desirable employees will become independent. Its organizational structure will be split up.

This is not good news for the industry. Tragically, this is not for lack of efficiency and innovation, but precisely because of them. That, indeed, is a tragedy in the Greek sense.

All this may sound negative, maybe provocative. But it is better to pronounce warnings in advance than obituaries later. ■



CV ELI NOAM

Eli Noam is professor of economics and finance at the Columbia Business School. He is also director of the Columbia Institute for Tele-Information, a research centre focusing on strategy, management and policy in communications, mass media and information technology.