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TeleLiving:

The Next Generation of the Information Age

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My inaugural column that appeared in the last issue of *OTH* provided an overview of the research project we have underway at George Washington University to track emerging technologies. Now I'd like to tell you about a more specific part of this work that focuses on E-Commerce – defined broadly to include e-business, e-government, distance education, telemedicine, and other electronic transactions that are increasingly part of normal life.

Although the dot.com bust left a disenchantment with everything electronic, powerful trends are forming the next generation of infotech that is likely to emerge in about 8-10 years. I call it “TeleLiving” – a conversational human-machine dialogue that allows a more comfortable and convenient way to shop, work, educate, and conduct most other social relationships. Two major trends are moving the Information Age in this direction:

The Power of InfoTech is Underutilized

The infrastructure we use to communicate is rapidly developing into big, fast pipes that can convey huge amounts of information. New installations of DSL, coaxial (TV) cable, fiber optics, wireless, Ethernet, and satellite transmission are expected to increase communications capacity by roughly 100-fold over the next few years to make broadband capabilities commonplace. Broadband is only being used now by 5-10 percent of American homes, but 85

percent of the users love it. A recent survey found that wireless services alone are expected to produce \$1 trillion in revenue by 2010.

At the ends of these big pipes, computational power increased ten-fold in the past few years, and it will increase another ten-fold very soon. For \$1000 you can now buy a PC that runs in the gigahertz range and stores gigabits of data, while 3-dimensional chips, exotic materials, nanotechnology, and other advances should extend this trend for decades.

This abundance of IT power is underutilized, however, because it lacks a “killer application.” That’s why telecommunications companies and PC makers are struggling through a recession. Yes, early adopters love the convenience of broadband, the power of sophisticated computers, and the ubiquity of their cell phones. But average Americans are reluctant to spend more when their old PC hooked up to a 56 K modem works just fine at word processing, spreadsheets, and the Internet.

Thus, the IT world seems poised at the cusp of another major transition, just as the ‘80s brought us the PC and the ‘90’s brought the Internet.

Coming of the Intelligent Interface

Replacing today’s dumb machines with an “intelligent interface” holds the key to putting all this underutilized IT to work.

Cell phones are proliferating like rabbits, but why bother trying to access the web on a 2x2 inch screen. And who can really type on a 2x2 inch keypad? If this isn’t sufficiently discouraging, connect speeds are usually no faster than a 56 K modem, incompatible standards prevent use in many areas, and data storage is minimal. Little wonder that only eight percent of cell phone owners use the Internet.

Even PCs – despite all the power noted above – are too dumb to be truly useful. The other day I was stumped by a problem on Microsoft Word, so I called some colleagues over for help. After 20 minutes or so, a small group of professors was standing around my PC mumbling “I can’t figure it out.” If a group of PhDs – including three experts in Information Systems – can’t understand a word processing system, what hope is there for the rest of us?

Fortunately, help is on the way as the IT Revolution rushes out new capabilities. Speech recognition, for instance, used to be slow and error-prone, but faster machines and more sophisticated software should bring it to maturity soon. Speech recognition is now common for simple phone conversations, and if current trends hold, a simpler version of the talking computer made famous by Hal in the movie *Space Odyssey* should be available about 2010. *Business Week* noted, “Talking to PCs could soon be quick, simple, and commonplace,” while Bill Gates claims “The future lies with computers that talk, see, listen, and learn.”

Similar trends suggest that more convenient displays may soon replace the cathode ray monitor. Liquid crystal monitors are available now in large sizes, and dropping prices will soon make it feasible for homes and offices to use them for large flat wall displays, roughly like movie screens. For mobile use, a comparable display may be projected directly into the eye from a small device installed in eyeglass frames or attached to the head like a microphone.

These two developments – speech recognition and large displays – promise to transform the human-computer interface. Instead of hunching over a keyboard, these smart PCs will disappear into a corner while the user speaks with life-sized virtual persons responding from large wall monitors. When moving outside, a mobile version will project these talking images to create a virtual space floating ahead that appears as real as the images on a wall. Today’s cell-

phone will then morph in an all purpose voice/Internet/video/data device about the size of a cigarette pack that can be slipped into a shirt pocket.

From TelePhones to TeleVision to TeleLiving

The impact on everyday life should be profound. Almost any social transaction could soon be conducted in a conversational mode, speaking to life-sized images as comfortably as we now use the telephone and television. It should seem as if these virtual people are right there in the same room with you. This intelligent interface should be so inviting that it would likely find wide use for teleworking with colleagues, buying and selling online, conducting educational courses, consulting with your physician, petitioning your government, and possibly even holding religious services online.

Rather than the complex web pages we struggle to master when conducting an online transaction, sites could be represented by a virtual robot playing the role of a salesperson. Unlike a real salesperson, this virtual salesperson would have infinite patience, he/she would know everything about the merchandise, and would cheerfully guide you around until satisfied. It might even be feasible to allow visitors to define the robot's image and personality, about the way we now change the "wallpaper" on a site. Men might choose to deal with a virtual Kim Bassinger while women might prefer a virtual Paul Newman. Such robots are being used now for simple purposes. The Japanese have turned a rock star robot into a national idol.

This scenario may seem extravagant, but all of the required technology is here in rough form and progress is advancing rapidly. Considering well-established trends in computer power, broadband, wireless, artificial intelligence, speech recognition, and image displays, my GWU project forecasts the various components of this scenario to arrive about the end of this decade,

none later than 2020. Some of the simpler capabilities – usable speech recognition and wall monitors – should be fairly common before 2010.

No, teleliving will not replace human contact because people crave real social relationships, and all indications are that this will remain unchanged. We will always want to meet our virtual teammates from time to time, visit real stores to feel the merchandise, and so on. Surveys suggest that most people would prefer to work at home roughly half of the time and go into the office the other half. In short, teleliving offers *an alternative* that is likely to be used for added convenience, time or cost savings, and other advantages.

That is the main lesson to be learned from the dot.com collapse. The physical world and the virtual world coexist in parallel dimensions, and modern societies are struggling to determine their relative merits. Teleliving seems likely to serve a major purpose in bridging these physical and virtual worlds.