Going Online

A classic technology adoption story

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History is driven by new ideas and new technologies. The domestication of plants and animals led to food supplies sufficient to allow the creation of cities and specialization of labor. Electric lighting freed us from the strictures of the sun and revolutionized our work and sleep patterns. Last January, a book proposal by inventor Dean Kamen on breakthrough technology, described only by the code name "Ginger," set off a flurry of speculation in the media. Predicted to turn

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patterns of transportation, city planning and energy consumption on their heads, the invention was backed by tech computer industry giants Jeff Bezos of Amazon.com and Steve Jobs of Apple Computers.

In marked contrast are the many potentially revolutionary innovations that are stifled before they can make their mark, as they fall prey to politics or resistance from entrenched interests. Other ideas or technologies may be adopted and adapted for something quite other than their original use.

Over the last half century, researchers led by Everett Rogers, professor of Communications and Journalism at the University of New Mexico, have looked into the question of why and how people adopt, adapt, or reject new ideas. The "innovations" studied have ranged from the boiling of drinking water in rural areas to the planting of genetically modified seed.

Disparate as the innovations themselves are, the patterns that dictate adoption or rejection are remarkably consistent. The same factors that affect people's use of new water purification methods, new agricultural techniques, and immunizations can be applied to understanding how and why we embrace new communications tools.

In short, this scholarly work can shed much light on the current exploration of the growth of the internet in America, and the debates that swirl around access to the internet and its impact on American society.

Take, for example, Rogers' story of the plight of South American coffee growers in the 1960s. Agricultural experts wanted to introduce new coffee strains to Colombian farmers. The new breeds promised dramatically increased harvest yields—but with significantly increased up-front costs. The trees required use of costly new chemical fertilizers and weed-killers. This meant that only the wealthy, the well-informed, and the highly-committed were likely to take the risk of adopting the new practice. They were in the best position to assume the initial expense and the three-year wait for the new varieties to bear crops.

The early adopters of the new trees and nurturing techniques were amply rewarded for their patience and investment. Over the course of seven years, they earned twice the cash per acre of later or non-adopters. They used this income to buy more land and plant more coffee. At the same time, the acreage of those who could not afford to adopt the new strains dwindled (often from being sold to richer farmers), and almost a third of the poorer farmers gave up altogether to look for day labor or jobs in the city.

Adopting a new idea takes confidence—an optimistic cast of mind that is often born of having the social or media contacts to hear about ideas, the education to evaluate them, and the financial resources to absorb any potential loss.

In Rogers' scheme, individuals who represent the leading wave of those embracing a new technology are called "innovators" or "early adopters." They are cosmopolitan, well-connected people who have the means to recognize the potential benefits of new ideas and to pursue them. Adoption of a new idea may hover exclusively in the realm of these individuals for a few months or several years before it becomes visible and attractive to larger portions of the population, who then follow suit.

Rogers calls the next wave of adopters the "early majority." Once the first steps have been taken by the innovators, they readily see how the new technology can be put to practical use in their own lives.

Some parts of the population may not jump on the bandwagon until much later. They are the "late majority." Not necessarily members of the local Luddite chapter, those in the late majority may simply need the chance to see an idea in action before they will embrace it, and that may require a trickle-down effect from the early and mid-term adopters. Often in a "show-

me" frame of mind, they need to see the idea presented in a way that benefits them. Or they may simply need to wait until they can afford it.

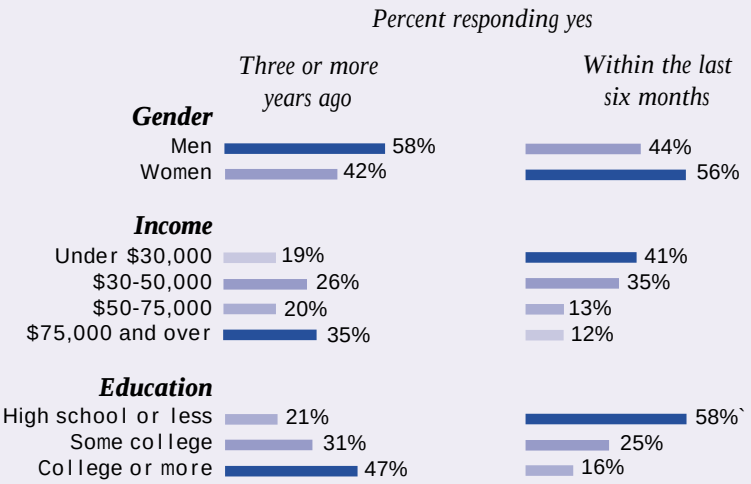
Finally, the laggards embrace the technology. They do so only after it has become indispensable and relatively affordable. Sometimes they come aboard through subsidies, such as those that were provided by the government to rural areas to help them get access to electricity and telephones, decades after those technologies were created.

A 1995 survey by the Times Mirror Center for the People and the Press, taken not long after the creation of the Mosaic browser made the World Wide Web easily navigable, showed that 14% of American adults had some form of access to the internet. Yet even among most of them, CD-ROMs were seen as a more useful technology than online access. The population of internet users was dominated by young, well-educated, relatively well-to-do, white men.

Figure 1

From Innovators to Laggards

Question: Do you ever go online to access the internet or World Wide Web or to send and receive email?



Source: Survey by Princeton Survey Research Associates for the Pew Internet and American Life Project, November 22-December 21, 2000.

The general American population's embrace of the internet has followed the evolutionary scheme outlined by Rogers. The internet was created in the 1960s and became a popular communications tool for students, academics, and assorted nerds through the 1980s. But the general population only began to become aware of it in the early 1990s.

By late 1998, a survey by the same organization (now called the Pew Research Center for the People and the Press) showed a tripling of the number of adults who had access, as more women, minorities, adults with less than college educations, the middle-aged, and people from moderate income households got wired.

By the end of 2000, surveys by the Pew Internet and American Life Project recorded that 56% of American adults had access. Moreover, the internet population was looking more and more like the rest of America as it became majority female (by a hair), as 43% of African-American adults and 47% of Hispanics gained access, and as those with high school educations or less and those in households earning less than $50,000 jumped sharply.

The demographics and motives of those at various stages of the adoption process have shifted along the lines laid down by Rogers and his colleagues (see Figure 1). Nowadays, the internet population is approaching saturation among the well-off (those in households earning more than $75,000), the well-educated (those with college or graduate degrees), and the young (those under 30). More than three in four of the people in these groups say they have internet access, and they are the most likely to say they find it useful in a variety of contexts—for instance, managing their health and finances and doing their jobs.

Many of these people have been online for three or more years—that is, they are innovators. A healthy majority (almost 60%) reports that their initial reason for getting access was related to the availability of the internet at work or at school. They and their institutions were quick to see the value of connectivity, and they hardly needed persuading. They had little doubt they could master and exploit the new technology for both professional and personal reasons.

Among today's internet novices (in Rogers' terms, the late majority group and some laggards), the phenomenon is different. Over 60% of the newcomers say they go online for their

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own personal reasons, rather than to meet work or school requirements. The vast majority has gained access at home, which is particularly striking because more and more schools and work places offer internet access.

About half these newcomers say they first went online at the prodding of family and friends. Many older Americans report they decided to get access after their children or grandchildren urged them to try the internet.

This is a classic example of what economists call a "network effect," where the value of a technology increases dramatically as more people use it. When the world had one fax machine, it was worthless because it had nothing else with which to communicate. When millions of fax machines came into use, their value grew geometrically because it was an extremely efficient way to communicate.

The same thing is happening with email. Older Americans were not likely to see any virtue in getting internet access until many of their younger family members were online and encouraging them to get wired.

Perhaps more than any other innovative technology, the internet lends itself to being shaped simply by being used, and that is the reason it will eventually achieve the ubiquity of the telephone and television. As new populations come online, they can choose to take an active role in shaping the internet to meet their own needs, or at least frequent the sites and activities that matter most to them. For instance, the growing African-American population has shown interest in content and services specifically tailored to blacks, and that has prompted the creation of portals, and niche enterprises to fill them, online. Similarly, the enthusiasm of Hispanics for specialized sports information, styles of music, and other cultural content has increased the volume of that material online.

It is also apparent that the next wave of improvements in software and hardware will address some of the frustrations users have with the internet now, and that will likely draw more laggards online. Many current internet users complain that dial-up access is painfully slow; the deployment of more high-speed connections will help on that front. The difficulties of mastering computers will be addressed by a new generation of internet-ready appliances that will come into being in the next few years. The development of smarter information organizers and web sites will make it easier to find specific information online. And anxiety over online privacy will be alleviated by the next generation of web browsers and other privacy-protection schemes.

Many of these concerns are cited by non-internet users as the reasons they have no interest in going online. Thus, it is likely that improvement in these areas will help convince them that their reasons for resisting the internet have diminished.

Still, about half of current non-users say they have no intention of going online. Many are older Americans who have lived much of their lives without the internet and are not sure it can bring any benefit to them. For that reason, it might take another ten to fifteen years before internet access reaches the same level of penetration in American society as the telephone and the television.

However, there is no reason to doubt that day will eventually come. Like all powerful technologies before it, the internet is progressing along a normal evolutionary path to becoming a standard tool in the lives of virtually all Americans.