

Each year, the Institute steps out beyond the edge of today’s common knowledge and asks uncommon questions about the trends and innovations that are likely to reshape our world in the coming decade.

This map is a summary and synthesis of the answers we found in the last year. As a summary, it provides some key highlights from our research results. As a synthesis, it pulls together ideas from across the research programs to create an at-a-glance view of a changing world.

In 2002, we focused on five key areas of innovation: households, communities, markets, organizations, and technology. Looking for common themes across these five areas, we identified six big trends that describe emerging culture of a highly connected world.

These trends are not simple monikers for simple movements. They are rich and complex shifts in our attention, our behaviors, and our capacities as social beings. They are also not simple replacements for what came before. As we move toward something new, we keep much of what came before, and this often creates dilemmas.

We hope that this map can be a conversation starter about these emerging dilemmas, a way to focus our attention on some of the not-so-obvious patterns of future—and the not so obvious opportunities that they provide for improving lives everywhere.



Household diversity increases

At both ends of the age spectrum, households are taking new forms. The young adult boomlet will match living arrangements to a variety of new lifestyle preferences. Aging baby boomers will care for ailing parents in their homes or try new household arrangements to support those who are widowed or single and on their own. Only a third will be traditional single-family households with children.

Householders become their own agents

In all arenas—from finance to health to personal risk management—householders are assuming responsibilities they used to delegate to agents. They manage their own stock portfolios. They shop around for multiple loan deals. They cobble together insurance packages from multiple sources. With this new self-agency comes more personal risk.

Information tasks are shared across the household

As homes become increasingly connected, the responsibility for managing household information becomes more distributed. Each household member takes on different information and communication tasks—using a variety of tools, media, and resources. Each household thus becomes a unique information ecology with a sometimes less than obvious path to decision making.

Entertainment is personal, self-generated, experiential and embodied

Information technology is shifting from a tool to a new medium. As it does, entertainment will emphasize personal participation and co-creation of experiences that take over where broadcast television ends. For example, in sports fantasy leagues, Internet "coaches" use information about real-world teams and players to create their own fantasy teams, make their own trades, and test their sports acumen against one another online.

Personal presence becomes a daily practice

As the physical and digital worlds merge, as people become increasingly connected across far-flung personal networks, the management of personal presence—the sense that I am here or not here, I am here for some interactions but not for others, I am tracking events or processes regardless of where I am—becomes increasingly complex. It also becomes a daily practice that involves multiple identities, multiple channels of communication, and a variety of strategies for deciding when to use each of these.

Health values guide more household spending

The household is ground zero for health choices. In the emerging health economy, these choices will proliferate across many domains of daily life, driving multiple health identities for household members, multiple health agents in the household, and more continuous communication with health helpers outside the household.



Swarms and networks are the new communities

Community was once a function of place, of economic and social standing, of family history. Today, community is increasingly ad hoc and distributed, independent of place, linked by communication channels that are both dense and flexible. Young people say, "My network is my family," and they mean that their identities, their resources, and their values come from interactions with people who may or may not be in the same household, neighborhood, or country. The ability of networks to coalesce quickly into swarms gives these new forms of community new kinds of clout and new ways of fashioning that clout into action.

Just-in-time relationships build ephemeral communities

A network society creates a world where people can quickly find the right people at the right time—and create an ad hoc relationship for the need at hand. Increasingly, people are relying on these just-in-time relationships, using information and technology in place of traditional (and sometimes time-consuming) rituals as the foundation for their interactions. While these relationships may look like traditional relationships on the surface, they trade expediency for the commitment and rewards of more long-term bonds. Confusion between these forms may lead to mistakes, misunderstandings, and misrepresentations.

Information tasks take up more social time

Social time is time spent for the creation of joint meaning and value. While this time might be spent at the opera, at a ball game, or in a video arcade, people are spending more social time in explicit information tasks—sharing information about how they navigate the fast-changing worlds of personal and public life. These tasks, in turn, shape what it means to be part of a community.

Physical places fuse with virtual spaces

While technology has freed the social network from particular geographical locations over the last couple decades, it will begin to lure communities back to physical places that are embedded with information and entertainment of shared value. Distributed communities will find their favorite meeting places in physical space. And places will begin to include a full complement of "digital overlays" that provide an augmented experience of the physical space for those who are well connected.

Instant media creates a new immediacy, celebrity

As wireless bandwidth grows, instant messaging will evolve into instant media, combining the serendipity of instant messaging with the interpretive filter of the media director. Like reality TV, it will be both immediate and raw, but with a "public spin." Everyone's a celebrity.

Health information creates new health behaviors

The science of health is now accessible to anyone with Internet access—at least in principle. In practice, the need to make sense of the science is driving new forms of community behavior: new personal networks with health gurus, new forms of health advocacy, even new definitions of healthy places and spaces.



Supply chains self-organize

Over the last couple decades, information technology has helped large organizations achieve unprecedented economies of scale by more tightly integrating goods and processes along the entire supply chain. Now, data tagging technology based on XML will give many medium- and small-size companies access to the same kinds of integration opportunities. The technology could eventually allow supply chains to self-organize, linking processes from the bottom up instead of from the top down.

Engaged consumers take the spotlight

The new consumer—affluent, educated, and well-equipped with technology—has been a good lead indicator of consumer attitudes and behaviors. As information technology penetrates the marketplace, a new kind of consumer is emerging that cuts across income, education, and technological boundaries. This is the engaged consumer—a consumer who both demands more responsiveness and assumes more responsibility for the things that matter in his or her life. This engaged consumer will have a disproportionate impact on the marketplace.

Metadata becomes a market

Extensible markup language (XML) is a robust approach to metadata that will allow documents to declare themselves as business documents, as health documents, or as voice-accessible documents on the Internet—with lots of metadata to indicate how the documents are to be used and by whom. As these tags become ubiquitous, tagging strategies will become valuable intellectual property, and the metadata for a document could be worth as much as the contents.

Everything fragments—channels, products, consumers

Over the coming decade, the trend toward market fragmentation will continue as products and even consumer segments proliferate. This proliferation will demand new ways of targeting consumers. Particularly important lenses on the consumer will be swarms, networks, and contexts.

Focus beats everything

The proliferation of products, consumer segments, and marketing channels will raise the value of focus. Companies that provide simple value propositions will win over those that try to be everything to everyone. Focus will support both large companies and small. Wal-Mart will continue to win market share with the simplest of value propositions: lowest price, lots of stuff. Companies like Dell demonstrate how to meet customer needs by focusing on niche markets.

Health care boundary markets proliferate

The health economy marketplace will mix the third-party payor system of traditional health care and the burgeoning commercial marketplace for health-oriented systems. The challenge of the health economy will be to integrate these two systems. Much of this work will fall on consumers as they juggle the products and services of both to meet their needs. But strategic advantages will go to companies that succeed in crossing this boundary, and health information will be the key to their success.



Social networks create new forms of R&D

Social networks will play a greater role in R&D. Networks have played a key role in organizational structures and dynamics of innovative regions like Silicon Valley and Northern Italy's fashion industry. In fact, Silicon Valley can best be viewed as a network of innovators who move freely among organizations, transferring ideas and knowledge. These natural networks have several key characteristics that will influence the shape of network R&D. They are scale-free. The majority of their nodes have few links, but they co-exist with a few big hubs that have a very high number of links, and keep the networks together. Further, the highly connected tend to become even more connected. A key organizational strategy will be to create and manage network hubs.

Hybrid organizational forms emerge

Many organizations will look like hybrid species, crossing the ecological boundaries of academia, business, and government. Hybrid organizations like MIT's Media Lab, Bio-X at Stanford, and SRI International, have pioneered organizational structures and processes that foster rapid development of new intellectual property that can be quickly commercialized, usually via spin-off companies. This kind of interdisciplinary, cross-organizational research will become increasingly important as technologies from materials science, energy, and biology intersect with IT over the next decade.

Customization becomes a user function

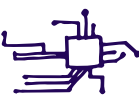
Five years ago, many experts thought big advances in customization would come from new business processes, but it now appears that the most exciting advances will come from consumers themselves. Products with embedded intelligence, communications ability, and expandability lend themselves to user customization and allow customers to create highly personalized product and experience portfolios, often by-passing manufacturer-defined packages.

Real-time monitoring creates new culture

Sensors will begin to pervade business processes from the supply chain logistics to worker productivity. These sensors will create a culture of real-time monitoring, as people begin to track things as diverse as product lifecycles and mildew growing on the walls of the workplace. This new culture will be fraught with dilemmas: concerns about privacy and liability will compete with opportunities for improving worker health, customer service, and the natural environment. Each organization will work out its own micro-culture to deal with these dilemmas.

Every organization has a health profile

The parallel health and health care systems will create high-risk and low-risk decisions. Low-risk decisions will be made in the marketplace of healthy products and services, and here companies will have to do their own due diligence. Even companies in apparently non-health related markets will need to document quality and safety. In a highly informed health marketplace, health claims will be more easily evaluated and injuries more publicly documented.



Connectivity grows, technology disappears

Ten key technologies are increasing connectivity while embedding intelligence in products and services. These technologies will ultimately create the world of ubiquitous computing envisioned in the 1980s by Mark Weiser.

Sensor networks change the scale of computing

Sensors are shrinking to the size of dust motes and driving new ways of thinking about networks and operating systems. Swarms of sensors will begin to function as tiny distributed processors, communicating with each other across multiple networks. As input devices, sensors will record visual, tactile, audio, and chemical data. As processors, they will individually perform only the smallest operations, but communicating with one another, they will offer supercomputing power embedded in everyday life—often acting without human intervention.

Desktop manufacturing changes the game

Nanoscale materials and processes will usher in desktop manufacturing, in which molecular-scale materials are deposited on surfaces with great precision using ink-jet technology. This technology could revolutionize manufacturing and it will certainly blur the lines between prototyping and production. It could even find its way into the home, where consumers customize their own goods.

Web services work small to get big effects

Web services are programs that can be distributed throughout the Internet to perform simple operations on data from many sources. They are the workhorses of the new distributed computing environments. They can be designed to work across operating systems, database architectures, and organizational domains. Ultimately, they will enable pools of data created by different people to be shared among lots of different users for different purposes worldwide.

RFID shrinks the size and price of tags

Radio-frequency identification (RFID) will become the standard, not only for product tags, but for fusing information with physical objects throughout the natural and manufactured world. Commercial RFID tags are already the size of glitter and cost \$.10 per tag. Organic polymers could bring the cost down to less than a half-cent per tag within a decade. At that price, tags could be included in the manufacture of virtually every product and package.

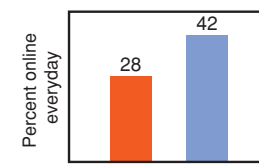
Materials get smart at the molecular level

Increasing control at the molecular level will make materials the frontier of innovation in the coming decade. As technology barriers arise in computing, energy, and medical systems, the solution will be to go smaller—to work at nanoscales of one to a thousand molecules.

Technology mimics biology

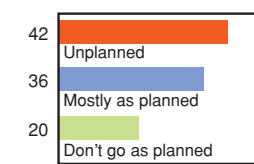
Biology will become the basic template for innovation in a wide range of fields and industries. The key term here is "biomimetics," an interdisciplinary approach to system biology that studies phenomena in nature that we can mimic synthetically and apply to practical problems. Examples? The use of bone structure as a template for developing protective products like helmets or the study of the skin of a worm to create artificial muscles using polymer gel.

TRENDS



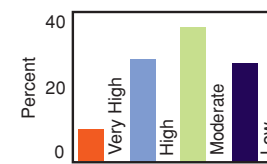
Share of those who connect to Internet everyday has doubled

ITF Surveys, 1999 and 2002



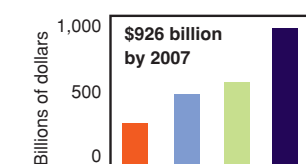
In U.S., daily life is unlikely to be planned or predictable

ITF Survey, 2002



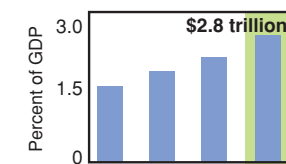
8% of adults have very high social reach—and undue influence

ITF Survey, 2002



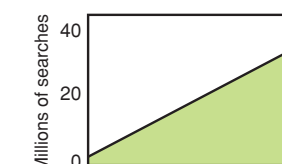
Hispanic spending power doubled in last 10 years and will almost double in next 5 years

University of Georgia, Selig Center for Economic Growth, 2002



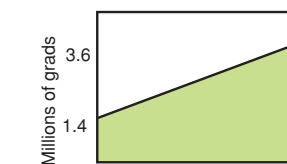
U.S. health care spending will reach 17% of GDP by 2011

Centers for Medicare and Medicaid Services



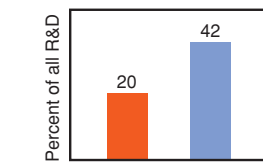
Health info market: online searches growing 50% per year

National Library of Medicine, National Center for Biotechnology Information



College grads in science more than doubled from 1980 to 2000

National Science Foundation



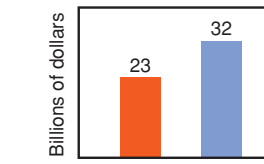
Outsourced pharma R&D to double from 2000 by 2004

Advantech Monitor, Frost & Sullivan



Funding for nanotech has more than tripled

National Science Foundation



Private biomedical R&D funding surpassed public funding by \$9 billion in 2002

Pharmaceutical Research and Manufacturers Association

EMERGENCE

From top-down control to bottom-up sophistication

Emergence is about the unpredictable phenomena that occur when lots of individual actors following simple rules create complex behavior.

THE NEW AGENCY

From trusted agents to self as agent

Agency is about who acts on behalf of the individual, the organization, and the community—and who assumes the risks and burdens.

SHARED VALUE

From the value of proprietary ownership to the value of shared interests

Shared value is the increased value that information, products, and services acquire when they are held in common by players with diverse interests.

FOCUS & FUSION

From virtual boundaries to embedded focal points

Focus is about the relationship of the center to the periphery. In a distributed information world, the search for center—fused with real places—comes foreground.

SMART PRESENCE

From episodic interactions to persistent experiences

Presence is defined by the experience of persistence—whether it's an always-on web cam or the digital tracks of left behind by visitors to public spaces.

HEALTH VALUES

From traditional health care to a burgeoning health economy

Health values are like family values—they provide a touchstone for all kinds of decisions in the home, in the workplace, and in the community.

