WHEN PUSH COMES TO PULL

The New Economy and Culture of Networking Technology

A Report of the Fourteenth Annual Aspen Institute
Roundtable on Information Technology

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Foreword

It is clear that in many ways our world is working differently today from the way things were 25 years ago, or even ten years ago. Often these changes begin with technological innovations, leading to new products, services, and ultimately, new behavior patterns, though not necessarily in linear order. An obvious example is the recorded music business, where the capabilities of broadband communications, search engines and directories, reductions in the cost of producing music, and peer-to-peer networking have combined to radically change the way people create, listen to and purchase music. There are similarly profound shifts underway in broader business models and procedures (both manufacturing and service-oriented businesses), consumer behavior patterns, military and government services, and social interactions.

Finding and describing the levers of these changes is a large part of the work of the Aspen Institute Roundtable on Information Technology, an annual gathering of 25 leaders from business, academia, government and the non-profit sector. Some are experts in information and communications technologies, others are generalist leaders in the broader society affected by these innovations. Together, they address issues of the societal impact of the advances in information and communications technologies.

In 2005 the Roundtable commenced a multi-year exploration of the major changes that information and communications technologies are creating throughout our lives—from business and the economy to community and social institutions. The large lever, where this inquiry begins, is the movement over the past few decades from "push" technologies to the "pull" approach, from a hierarchical center-out structure to a network-based decentralized architecture, in essence a reversal in the flow of communications from the center out to the user up, or what Andrew Shapiro once described as "the control revolution."

The conference itself followed the definitions propounded by John Hagel, who with John Seely Brown has written a recent book on the pull phenomenon in the business world. Hagel defined a push economy, essentially the mass production economy, as based on the company's anticipating consumer demand and then producing the right

resources at the right time and place to meet that demand. In contrast, he defines the pull economy as based on "open, flexible production platforms that use networking technologies to orchestrate a broad range of resources." In the media world, the simplified distinction is between watching a "pushed" television network newscast and using a search engine to "pull" news of interest. Hagel has many refinements to describe pull business models, including the ability to use open source software to create continuous learning environments that allow users to "experiment, improvise and tinker in ways you can't anticipate."

From the definition came many refinements and implications, as David Bollier, our rapporteur, aptly memorializes in his report of the Roundtable meeting, held in Aspen August 1-4, 2005. The group wrestled with the co-existence of both push and pull, that is, how they interact, evolve, and overlay each other. They then explored the application of "push" to the worlds of business and economics, the content and intellectual property industries, the emergence of an economy of the commons, personal and social dynamics including leadership in a pull world, and touched on how push applies to learning models, the military in the form of network centric warfare, and the provision of government services.

In the following report David Bollier does his usual magic in bringing together in a most coherent fashion the various strains of dialogue over a three day period. Bollier brings in outside material where appropriate to provide the greatest value to the reader in a sometimes esoteric but most important topic. For the past 14 years, Bollier has done a deft job in performing this difficult task, but this is among the very best of the Roundtable series.

Acknowledgments

for their efforts in producing these materials and the Roundtable itself. We also thank each of the Roundtable participants, listed in the Appendix, for sharing their time and insights with us, the synthesis of which is the ultimate value of this exercise and report.

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WHEN PUSH COMES TO PULL

David Bollier

When Push Comes to Pull

The New Economy and Culture of
Networking Technology

If the world seems a confusing place at this moment, part of the reason may be that we are living in an epochal period of transition bridging two very different types of economies and cultures. That, at least, is what technologist and policy researcher Carlota Perez might argue, on the basis of her study of technological revolutions and the recurrent patterns they exhibit.

In her 2002 book *Technological Revolutions and Financial Capital,* Perez describes how any transformative new technology introduces deep tensions into a society that must be recognized and resolved:

> [T]he full deployment of the enormous wealth-creating potential brought forth by each technological revolution requires, each time, the establishment of an adequate socio-institutional framework. The existing framework, created to handle growth based on the previous set of technologies, is unsuited to the new one. Thus, in the first decades of installation of the new industries and infrastructures, there is an increasing mismatch between the techno-economic and the socio-institutional spheres, as well as an internal decoupling of the economic system, between the new and the old technologies. The process of re-establishing a good match and creating conditions both for recoupling and full deployment of the new potential is complex, protracted and socially painful.[1]

Perez's insight was the premise for the 14th Annual Aspen Institute Roundtable on Information Technology, convened August 2-5, 2005, in Aspen, Colorado, by the Aspen Institute Communications and Society Program. The gathering brought together 27 leading entrepreneurs,

technologists, academics, venture capitalists, and policy experts to discuss a phenomenon that some observers are describing as the transition from a "push" society to a "pull" society. The Roundtable was moderated by Charles M. Firestone, executive director of the Communications and Society Program. This report is the rapporteur's interpretive synthesis of the Roundtable participants' wide-ranging discussion.

A "push economy"—the kind of economy that was responsible for mass production in the 20th century—is based on anticipating consumer demand and then making sure that needed resources are brought together at the right place, at the right time, for the right people. A company forecasts demand, specifies in advance the necessary inputs, regiments production procedures, and then pushes the final product into the marketplace and the culture, using standardized distribution channels and marketing.

By contrast, a "pull economy"—the kind of economy that appears to be materializing in online environments—is based on open, flexible production platforms that use networking technologies to orchestrate a broad range of resources. Instead of producing standardized products for mass markets, companies use pull techniques to assemble products in customized ways to serve local or specialized needs, usually in a rapid or on-the-fly process.

A "push economy" is based on anticipating consumer demand and then making sure that needed resources are brought together at the right place, at the right time, for the right people.

In the pull model, companies recognize that trying to anticipate demand is a losing proposition and that, in any case, customers have far more market power than ever before. Small niches of consumer demand, long dismissed or patronized by sellers, are a growing market force unto themselves. They can increasingly induce sellers to develop specialized products and services to serve narrow and time-specific market demands.

John Hagel, a noted management consultant and author, introduced Roundtable participants to the notions of "push" and "pull" in an opening presentation. Working in collaboration with John Seely Brown, former chief scientist of Xerox Corporation and director emeritus of Xerox Palo Alto Research Center (PARC), Hagel has been studying the emergence of the pull paradigm for years.

It is becoming clear that the "pull" phenomenon is not confined to business or online commerce. As more of American life migrates to the Internet, countless activities are being transformed to shed less-effective "push" behaviors and embrace novel "pull" techniques. These changes may be most evident in the structures of markets and business strategies and organization, but their influence also can be seen in diverse areas of social life, education, politics, and government. To be sure, the push/pull model is only a general template of understanding—one that misses important complexities if it is extended too far or mechanistically. Nevertheless, the dualism does help make sense of the confusing mash of developments constantly evolving on the Internet.

> **A "pull economy" is based on open, flexible production platforms that use networking technologies to orchestrate a broad range of resources.**

From Push to Pull

The transformation from push to pull is being driven largely by the Internet and a variety of digital technologies more generally. Computers and networking technology have matured enough to enable sophisticated new types of communication, and huge numbers of people are now online and ready to exploit the new technology. A vanguard of innovative companies is pioneering all sorts of new techniques that have significant economic and practical advantages over conventional push practices.

Hagel cited several early, limited forms of pull models in business. The "lean manufacturing" pioneered by Toyota and Dell Computer's "build-to-order" model are two notable examples. The focus of these innovations has been fairly limited, however, Hagel said. "These com-

panies have focused on pulling inventory and resources to the right place at the right time," he said, "but they do it by constraining participants in the process. Toyota and Dell both have standardized a limited number of supplies in order to create their kinds of pull systems. But it is actually possible to see opportunities to create even broader kinds of pull platforms, ones that mobilize a much broader range of specialized participants."

One cutting-edge example, Hagel said, is the Chinese apparel company Li & Fung. This company of 5,000 employees has developed an extremely sophisticated, yet flexible and responsive, pull organization that can rapidly leverage the resources of a network of 7,500 business partners around the world. As Hagel and Brown write in their book *The Only Sustainable Edge: Why Business Strategy Depends on Productive Friction and Dynamic Specialization* (Harvard Business School Press, 2005), Li & Fung "mobilizes this broader network to customize specific global supply networks for its customers." They write:

> Given the specific product and service requirements of individual customers, this company assembles the right business partners to meet demanding cost, quality and timing specifications. It can rapidly move specific business partners in and out of the supply networks to adapt to changing customer needs or market conditions.
>
> The company also concentrates on building the capabilities of its business partners. It provides them with performance feedback and shares best practices from comparable companies around the world so that the entire network grows value for every participant.
>
> Remarkably, this company generates over $5 billion in revenue—over $1 million per employee—and 30 to 50 percent return on equity.[2]

Li & Fung may be an exemplary pull business, but many other models are being developed, said Hagel. Cisco has a network of 40,000 specialized business partners it can mobilize to develop customized services for individual customers. Pull models are emerging in various media sectors now that Google search engines and weblogs are helping people identify, sample, retrieve, and remix music, for example. Open source software is another arena in which customer-driven "pull" is mobilizing resources from the global network to meet specialized local needs.

Pull techniques are highly attractive for customers because they can obtain very specific products more rapidly than through push techniques. Pull is attractive for companies because it enables them to leverage the expertise and resources of others, often for free. Bill Coleman, founder of BEA Systems, an enterprise software company, recently started a new software venture, the Cassatt Corporation. "We have 43 components of open source software in our product," Coleman said, "which constitutes over 90 percent of the product. What is cheaper than going to India and having somebody write that 90 percent of my code? Getting it for free, already debugged by the world that is out there, by open source modules."

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>
> *Bill Coleman*

Coleman explains that his deployment of capital is much more efficient in this pull model: "People are not buying from me, for the 43rd time, an event management system that happens to be embedded in my proprietary software. What people are buying from me is the core competency of doing something that nobody else is doing. They're going to pay only for real creative differentiation at the time they need it."

In short, pull offers choices and generates leverage. Hagel pointed out, however, that pull also is much more adept "at promoting innova-

tion, learning, and capability-building on the part of people. It assumes that you're going to give people resources in very flexible ways so that they can experiment, improvise, and tinker in ways that you can't anticipate. This enables them to address situations that have not been anticipated and, in fact, creates continuous learning environments."

Finally, Hagel said, pull models also can provide a platform for creating "increasing returns dynamics." Push models assume a more static set of resources, which means that growing a company's market share entails costly growth of administrative overhead to coordinate an explosion of disparate activities. By contrast, pull models are based on open, loosely networked platforms that are already configured to scale efficiently as growth occurs. Growth does not require an expensive, more sophisticated centralized administrative apparatus; the network itself accommodates growth through countless adjustments made by localized participants.

Pull platforms have several key design characteristics that enable them to change and grow with relative ease.

First and most important, pull platforms are modular and loosely coupled. A company can substitute any specialized function with another, more appropriate module with relative ease, as needed. Instead of having the entire corporation build around a rigid, standardized protocol, the *interfaces* among modules and the *protocols* for connecting them are standardized. "This means that anybody who wants access to these resources can figure out what they are and how to connect them," said Hagel.

Modularity and loose coupling of functions therefore facilitates frequent and rapid enhancements of the production platform. "The idea is that these platforms are not defined in advance," said Hagel. "They are emerging over time as a result of the actions of the participants, in rapid and frequent enhancements."

This characteristic points to another design premise of pull platforms: that more and more participants will join the process over time, adding greater value in the process. This added value enables compa-

nies to easily incorporate new supply and distribution participants and rapidly scale in size as market conditions or customer demands change.

Pull platforms have a subtle but powerful advantage over push systems in their ability to leverage people's enthusiasm and motivation. As Hagel and Brown have written, "Pull platforms harness the passion, commitment, and desire to learn of their participants, thereby enabling the formation and functioning of distributed communities that can rapidly improvise and innovate."[3] Pull platforms tend to be able to mobilize and deploy social energies more effectively than bureaucratic, standardized push platforms.

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The architecture of a "pull corporation" has profound implications for the structure of markets and new business strategies. It also implies new business processes and organizational practices to take advantage of the pull platform and leverage outside resources more efficiently than ever.

For employees, the pull platform entails a shift in identities (with whom do they identify in a networked environment?) and new sorts of self-development and learning opportunities. Companies will have to learn new ways to hire and reward employees. Instead of simply being rewarded for performing specified work, employees will have to learn how to work flexibly and independently and how to think critically and show personal judgment in changing circumstances.

Google considers itself a pull company, said Shona Brown, Google's vice president for business operations. "We largely hire for intrinsic potential, much more so than we do for specified expertise. Of course, we have ratios in different areas, where we'd like to have different types of expertise, but the reality is we don't have a specific set of jobs with specific set of requirements. We troll for the world's best talent, and we have a variety of ways to get such people to self-select us."

Finally, the pull environment implies a new set of public policies. The ways in which governments encourage innovation, retraining, and education will be radically different in a pull environment than in the existing push environment.

Why are pull models becoming so attractive to cutting-edge companies? Hagel explained some of the key reasons.

First, in the face of highly uncertain demand, a pull model helps a company deal more effectively with high risks and costly inventories. Compression of product cycles has ratcheted up risks and costs for apparel producers and computer makers, for example. The pull model provides a way to deal with these challenges. In effect, a pull network helps to displace many of these risks and costs that a company might otherwise have to absorb. In a more proactive sense, a company that is organized to work in a pull network is better poised to capitalize on brisk market demand that might suddenly materialize.

Greater consumer demand for specialization—facilitated by an abundance of resources and technologies—also seems to be driving the pull model. "What's really changed here is scarcity," said Esther Dyson, editor at large at CNET Networks and editor of *Release 1.0*: "We have moved from a world of scarce resources and local production to a world of mass production, which made very effective use of the resources we had, to a world of on-demand production, or a pull economy, in which anybody can have exactly what he wants because there is so much out there."

The abundance of resources, consumer demand, and network infrastructure are making entirely new types of business specialties possible. As examples, Dyson cited a new on-demand air taxi business, DayJet, due to be launched in 2006; a more real-time, demand-driven courier service in the United Kingdom known as eCourier; and a maker of user-side power management systems, GridPoint of Washington, DC, that allow people to sell their own self-generated or stored and time-shifted power back to the electric grid.[4]

As an economic matter, the new pull marketplace can work not just because resources are generally plentiful but because the Internet

enables people to express highly specific preferences, and sellers to meet those preferences, in ways that radically reduce transaction costs. Those cost savings enable highly specialized services to flourish in the marketplace. In a more conventional brick-and-mortar marketplace limited by local geography, high search-and-discovery costs, and uncertainties about trust and reliability, such niche specialization could not emerge.

Business strategies based on pull models seem to be especially well-suited to enterprising companies, developing nations, and the younger generation, said Hagel: "A lot of the innovations around pull models are actually being driven in China and India. It's driving a very interesting form of boot-strapping and capability-building, which push models have a much harder time achieving." He added that young people are driving a disproportionate number of the new pull models in business.

Hagel hastened to warn that the push/pull framework must not be applied too strictly: "This is not about movement from push to pull; it's about a spectrum of models, hybrids, and iterations that go back and forth. But if you ask, 'Where is the bulk of value creation going to be going forward?' I am placing my bets on pull models being the primary source of economic value creation in the next decade."

Is Pull Really a Paradigm Shift?
Although there is little doubt that a new set of pull dynamics is sweeping across commerce and culture, some Roundtable participants wondered whether pull represents a paradigm shift—a transformational reordering of basic processes—or whether the "old paradigm" is still comfortably entrenched but simply performing more rapidly. Is pull really that different from what used to be called "mass customization"?

Dyson pointed out that pull is truly demand-driven, not a discretionary and partial offer from the seller side: "Mass customization was sort of a marketing hype for what is actually now beginning to happen, on a mass basis. It's the movement of job shops from the production side to job shops on the demand side, with user tools for configuration and lower transaction costs and transparency that helps create trust…. You can now scale customization and still have the [product] granularity because the

transaction costs are so low and the commodity work can be outsourced. That is the fundamental big thing that has changed. Commodity production is no longer necessary to achieve economies of scale."

Distinguishing between badly executed push models and "true pull" models can be difficult, said John Kunzweiler, senior partner at Accenture. "Back in the old days of the computer, we had 'just in time' manufacturing, which was a technology-enabled process change. But it was push done well, or in incremental stages." Real models of pull production, Kunzweiler speculated, seem to exploit the abundance of supplies and choices of materials, skills, and knowledge that are now readily available through electronic networks—which is qualitatively different from even enhanced push models of business practice.

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>
> *Esther Dyson*

James Manyika, partner at McKinsey and Company, offered another way to distinguish pull from push: "Pull is simply becoming a new way of reaggregating and reforecasting demand. It becomes a way for business to think about what the majority of people really want. What has really changed is the latency around demand," he said. "The new economics of customization, enabled mostly by the Internet, enable companies to do the kinds of customization, on the margin, that they couldn't do before."

Nabil Fahmy, Ambassador of the Arab Republic of Egypt to the United States, suggested that the "only real difference" today relative to the past is the availability of information: "More people have more information about what's out there, and that drives their own personal demand to higher, more specific levels. Also, things are being done so much more quickly than in the past."

Will pull techniques supplant push models? Not likely, most Roundtable participants agreed. Push and pull have intrinsically different roles. "Push is just a different experience," said Gilman Louie, president and chief executive officer (CEO) of In-Q-Tel, a venture capital firm that develops technologies for the intelligence community. "Look at Ikea and Home Depot. Those are great models of push. And why is that? People are looking for a very different consumer experience when they go into those places."

Push is good for building things for which demand is unknown. If people or communities don't know what they want, or don't know what they don't know, said Aedhmar Hynes, CEO of Text100 International, a public relations agency that serves the technology industry, push is necessary for developing a market. "There is a danger in assuming that people will constantly pull because it assumes that they already know what they want," Hynes said. Consumer knowledge may exist only through participation in a push model, which defines and socially situates the product in the first place. Hynes believes that pull models may work only for highly commoditized, familiar products such as personal computers, airline flights, and apparel, where consumers already know what they want to consume.

> **Will pull techniques supplant push models? Not likely, most Roundtable participants agreed. Push and pull have intrinsically different roles.**

This assessment is not entirely accurate, responded Hagel. He noted that in sports such as "extreme skiing," mountain biking, and hot rodding—all of which require high-performance equipment—users are a primary driver of rapid innovation in products. "They don't know in advance what they want, but they're tinkering and rapidly innovating. And then, once they've identified features they want, the innovations come back into a push kind of model, with sports manufacturers adopting the innovations and pushing them out." This dynamic is part

of a larger trend whereby consumers become involved in production, said Hagel: "Communities of interest are morphing into communities of creation and communities of production."

Massachusetts Institute of Technology (MIT) professor Eric Von Hippel explores this theme in his recent book, *Democratizing Innovation.*[5] Increasingly, Von Hippel argues, innovation occurs through "innovation communities" of manufacturers connected with users. The most sophisticated skateboarders, kite-surfers, snowboarders, mountain bikers, software developers, and others tend to have a keener idea of what types of innovations might be useful to them. Information sharing within the community can be a rich source of low-cost research and development for manufacturers that are willing to listen to and engage with the user community.

> **"Communities of interest are morphing into communities of creation and communities of production."**
>
> *John Hagel*

Pull clearly appears to be better at developing new products through such socially driven, iterative processes that involve end users. Pull can take a faulty idea and improve it immensely, said In-Q-Tel's Gilman Louie. Again, however, what often happens is not push or pull alone but a strange mixture of the two.

Louie cited the bizarre push/pull evolution of a video game called "Falcon"—a somewhat buggy program that nonetheless attracted a dedicated group of users. The company that owned Falcon was suffering business troubles, however, and shut down, threatening to make the video game an orphan product without support. As a parting act of vengeance, one employee put the source code for Falcon on the Internet, making it available to anyone.

"What took place over the next five years was remarkable," said Louie. "The community of gamers took the code, dissected it, and started putting modifications to the code out on the Internet. They were using the pull model to modify the product in different ways and

improve it. The coolest part was, somebody figured out how to buy the rights back and pull together all the parts of the game that people liked best, repackage it and relaunch it in the market. It was relaunched three weeks ago [July 2005], and over the past two weeks, it was among the top 10 video games on Amazon for two weeks; it's #50 right now. What was amazing was that the game went from a push model, to pull, and then back to push," said Louie.

This phenomenon may not be so unusual, Louie continued, citing Apple's online music downloading service, iTunes. "This is a push model. It's just a repackaging of the distribution mechanism for music that is still made the old-fashioned way. But now people are doing lots of weird things, like publishing their playlists on iTunes, which changes how people buy music. So I caution people against thinking that pull is going to replace push; there is an interesting relationship between the two."

As these examples suggest, the emerging commercial environment will not necessarily be dominated by pull models but by hybrids of push and pull whose character is still evolving. John Seely Brown called it "rapidly expanding overlay networks" that enhance the capacities of current push systems. How well can the new pull models be integrated, however, with existing push systems? New social and technical practices must be coordinated; only experimentation can tell how far the pull models can be extended.

The collision of pull and push systems actually is a serious clash of worldviews and cultural norms, Brown said. He pointed to the U.S. Government's systems for military procurement and weapons testing, both of which are fundamentally push systems, and their incompatibility with the new pull forces that are ascendant in industry and military strategy (e.g., network-centric warfare). "There's a huge clash going on here, in terms of the mental lenses being used to look at the world," said Brown. In-Q-Tel, the CIA-funded technology development firm, is an attempt to mediate this clash between push and pull sensibilities.

The U.S. Army has its own modest experiment in trying to integrate push and pull in its procurement. John (Beau) Vrolyk, managing director of Warburg Pincus, noted that the U.S. Army now has a group in its pro-

curement division that actually monitors what parents are sending to their sons and daughters serving in the Iraq War. According to the Army's chief information officer, said Vrolyk, the inventory of materials being sent to soldiers helps the Army figure out what it should be buying.

Isn't Pull Simply Chaotic?

For some people, there is a troubling sense that pull is synonymous with chaotic and out-of-control. How can one govern or manage responsibly when institutions are organizing around satisfying pull demands? "If we really go to purely pull, you basically get no discipline, no particular plans of action, and complete chaos," said Madeleine Albright, U.S. Secretary of State from 1997 to 2001. "For me the interesting question is, How do you get the innovation that comes with pull, without everybody just going off in their own directions, without really having a plan?" Albright worried that you will get "totally atomized groups of people" who have no coherent, shared identity or national purpose.

Albright's reading of the challenge is accurate, said John Seely Brown: "How do you have a sense of discipline and coordination across highly fragmented, pull supply systems?" The reality, however, is that if there is a suitable *focal object*—a dynamic shared resource like open source software code, or a shared set of goals or discourse—a stable community can form. The resulting "swarms" of previously atomized individuals can self-organize to create new mechanisms and types of knowledge that never could have occurred through the top-down design of a push system.

The issue posed by pull models, said Brown, is this: "How do you start to utilize resources that you don't control? How does that system actually work? How are communities of trust formed? What are the 'overlay networks' that take the command-and-control functions of the push model and distribute them to entities you don't control? What is the role of the charismatic leader? What is the role of the focal object? How do you develop trust? These are the problems you must talk about."

From the perspective of push, the pull model does entail a certain loss of control. In other respects, however, pull empowers institutions

to deal more capably with the volatile dynamics of a world that can no longer be "controlled" by conventional institutions (to the extent that ever was possible).

Open source software stands as a monument to the idea that chaos is not inevitable in pull systems. "Code won't run if it's chaotic, and open source runs beautifully," said Scott D. Cook, founder and chairman of the Executive Committee of Intuit, the maker of Quicken and other software. "Wikipedia is an example of a highly disciplined system that involves tens of thousands of random contributors."

The deeper point about innovation, suggested Google's Shona Brown, may be that a certain level of discomfort is always necessary. "If you are trying to breed innovation, there must be a certain level of discomfort and chaos. Every day that I go to work at Google, I am uncomfortable with the level of discipline."

The appeal of pull models also may have something to do with a generational dissatisfaction with push models, said Brown. "The next generation is saying, 'Well, if it doesn't exist and it's not being given to me, I'm going to interact with others and try to build it myself. Part of the great pressure for pull models comes from dissatisfaction with the services and goods that are being pushed on us."

Leadership in a Pull Environment

The tensions between push and pull systems raise new questions about the nature of leadership in the transitional environment. The tension also raises questions about the most appropriate forms for marshalling and protecting "social capital." How should leaders interact with communities of practice, and how can they recognize the actual roles social communities play in creating value?

In-Q-Tel's Gilman Louie associates leadership with push models, citing the bold, assertive initiatives by Steven Jobs at Apple Computer. "He comes up with these weird and wacky products, and everybody goes, 'Oh, I should have thought of that!' and then goes out and starts personalizing and customizing it. Push is about coming out of the box, standing up for unpopular beliefs, and changing people's orientation

toward the world." Louie challenged the idea that pull is about innovation: "Pull is all about how I can make something a little bit better. How do I customize and personalize it? Push has more to do with taking a leadership position and speaking out."

Perhaps leadership in the push/pull environment is not linked with either push or pull but has more to do with knowing how leadership is exercised differently in the two environments. "In the pull environment, you need to know when to push and when to be pushed," said Idit Caperton, CEO of MaMaMedia, a website for children and learning. "The genius of leaders of the future will consist of knowing how to manage push as well as pull appropriately. Moreover, if you are a push-only type of leader, you'll probably experience some problems in leading the next generation; they are growing within a culture of pull and tend to respond better to pull-type environments, activities, and leadership—both online and offline."

> **"Push is about coming out of the box, standing up for unpopular beliefs, and changing people's orientation toward the world."**
>
> *Gilman Louie*

The practical issue facing leaders today, said Viviane Reding, Commissioner for Information Society and Media at the European Commission in Brussels, is to apply their leadership skills to pull communities. "How can 'pushers' utilize the pulling communities in order to achieve their pushing leadership goals, whether it is in business, the media, or politics? That is an interesting practical question."

The answers to such questions may have a lot to do with how traditional notions of (push) leadership have to change to work in the pull environment. Nor is there a leadership void in pull environments, said Beau Vrolyk of Warburg Pincus. There are still forms of leadership that make sense of things and bring order. "Pull doesn't turn into chaos because there are leaders who are clearly recognized by the people in pull environments as the ones who are well-read and know what's going on.

"The key valuable resource in the pull environment," Vrolyk said, "is editorial skill. Leadership is not absent in the pull environment. Rather, it is wielded by opinion leaders who have great linguistic skills; leadership is assumed by editorialists who have the skills to interpret, synthesize and inspire." Vrolyk recommended the science-fiction novel *Ender's Game,* which tells the story of two siblings who end up leading the universe by writing brilliant editorials.

A different type of leadership is needed in pull environments, said John Seely Brown, if only because the pull environment is based on radically new forms of social capital. Leadership is about mobilizing resources one does not directly control—which means that leaders must have moral and social legitimacy among the communities of interest they seek to lead. The power of leadership in the pull environment is less about coercion and more about inspiration, persuasion, and respect. The most powerful leaders in this environment will be those who have cultivated shared moral ideals and social relationships over time within distinct communities of practice. In this sense, leadership in the pull environment becomes more authentic and organically connected to communities.

The most powerful leaders in this environment will be those who have cultivated shared moral ideals and social relationships over time within distinct communities of practice.

The issues a leader must deal with also may differ in the pull environment, said Brown. "If the community generates positive network externalities, then you don't have the problem of diminishing returns. So rent distribution is not the fundamental problem of economics. If that's the case," said Brown, "then you have a whole new game. The things that have driven economies for almost a thousand years—control mechanisms with rent distribution arguments—may not be as central in the new economic ecosystem."

In fact, Brown said, the pull environment may call into question the very role of the business firm and government agencies, as conventionally understood. The collaborative peer production achieved through pull platforms can be radically more efficient than classically structured corporations can achieve.

A pioneering essay on this topic is Yochai Benkler's "Coase's Penguin," which contrasts the efficiencies of the firm (as postulated by economist Ronald Coase) with those of free and open source software (as symbolized by the "penguin"—the logo for the Linux operating system).[6] One of the main rationales for the firm was set forth by Ronald Coase in his classic 1937 essay, "The Nature of the Firm." Coase pointed out that firms can dramatically reduce the transaction costs associated with using markets by introducing command-and-control system and managerial hierarchies. Instead of having to enforce and manage property and contract rights in the market, a firm can internalize these functions and perform them more cheaply.

> **"The collaborative peer production achieved through pull platforms can be radically more efficient than classically structured corporations can achieve."**
>
> *John Seely Brown*

In many instances, however, pull platforms seem to be disrupting this algorithm, undermining a central premise of the firm. It is increasingly apparent that open platforms can perform certain functions more efficiently and creatively than corporations can. "Commons-based peer production" is an emerging third model of production, Benkler asserts, that relies on decentralized information gathering and exchange and more efficient allocation of human creativity. A related but somewhat different model is pull-based production, in which a "process network" of firms, each loosely coupled with the others, begins to emerge and collaborate in episodic, opportunistic ways over time.

These developments suggest that the role of the business firm and government agencies (as currently constituted) may need to be signifi-

cantly rethought. If social capital begins to take on new forms in the pull environment, said John Seely Brown, we may need new sorts of institutions and leadership.

The Economics of Pull

To properly appreciate the potential and limitations of pull platforms, we must situate them in the history of economics. Bill Coleman of BEA Systems and the Cassatt Corporation offered a short history of the economic development of human society.

Economic progress through history, said Coleman, has been based on improving productivity. The focus is on reducing transaction costs, and only two mechanisms improve productivity as a positive-sum game (the "free lunch"). These mechanisms are *innovation,* in which new technologies and business models produce new efficiencies, and *specialization,* primarily spurred by free trade that encourages companies and nations to specialize in what they can produce most efficiently.

Economic revolutions occur when disruptive innovations cause major advances in productivity, said Coleman. These revolutions tend to proceed through three successive phases:

1. *Invention,* which starts with a boom/bust, followed by incremental innovations that enable society to assimilate the disruptive technology;
2. *Diffusion of the innovation,* which is propelled by specializations (which reduce the barriers to entry in markets) and by labor arbitrage and competition (which drives down prices and drives up volumes); and
3. *Displacement,* in which the new economic order transforms the employment base from the preceding order.

There have been three major economic revolutions in human history, said Coleman: the agricultural, industrial, and information revolutions. In the agricultural revolution, the innovation of ownership of natural resources spurred improvements in productivity. A study by Alfred Sloan in 1990 estimated that innovations in agriculture led to a cumulative increase in productivity of 30—50 percent. In the mean-

time, however, the business model was a mercantilist model, in which production and distribution was primarily local and personal.

The industrial revolution marshaled the power of capital innovation to bring productivity gains of 100—200 percent. Alfred Chandler's 1977 book *The Visible Hand* attributes these gains to the invention of the "chain of commerce," wherein capital is deployed to develop a supply chain, a production chain, and a distribution chain. This process elongated production time, so to speak, and reduced transaction costs dramatically.

Mass production and mass marketing, in turn, helped fuel the emergence of the middle class. In the course of the 20th century, the industrial revolution radically displaced the agricultural employment base—from 50 percent of the population in 1900 to 3 percent in 2000. Economist Joseph A. Schumpeter hailed such disruptions as capitalism's distinctive dynamic of "creative destruction."

The information revolution—which is still in progress—has exploited innovations in information technology (IT), especially the Internet, which is expected to produce productivity gains of more than 1,000 percent during the 21st century, according to the Sloan study. The basic economic model is a pull model, said Coleman. In this case, the creative destruction of the new economic order is displacing the industrial employment base of manufacturing, mass production, and mass marketing, as well as the value-proposition of intellectual property.

"The chief enabler of the information revolution," said Coleman, "is the Internet. It is the world's most powerful transaction machine." The equation it enables, he said, is "Free reach to everybody plus total transparency to enable lower transaction costs." If the first stage of pull is represented by the process innovations pioneered by Walmart and Dell, the second stage is represented by eBay, Amazon, Yahoo, and Google.

Walmart initially leveraged pre-Internet electronic data interchange (EDI) technology to dramatically lower inventory costs, said Coleman, to the point that by the late 1980s and early 1990s, Walmart's inventory costs were being borne by its suppliers. Walmart continued to acceler-

ate the economics of scale by adopting Internet technologies in the late 1990s. This strategy enabled Walmart to disrupt the conventional chain of commerce and become the largest corporation in the world. The interesting aspect, however, is that Walmart learned that it could further leverage these technologies to give management of its inventories to the general manager of the local store. The store could begin to adapt itself to what was being bought in the local economy—possibly the first major example of a pull—enabled "brick and mortar" corporation. These two innovations allowed Walmart to leverage the economics of the Internet to change the overall economics of retailing.

Dell used IT to radically reduce the costs and time of distribution, making it "the first company to enter the information age and leave the age of capital," said Coleman. "Dell took your credit card payment, ordered the parts to build your computer, and shipped it before they had to pay the bill for the parts they were buying. This changed the very terms of transaction costs. This represented Pull 1.0…. Pull isn't going to eclipse push, but pull will rule in comparative advantage. That's where the competitive advantage will be."

Companies with Pull 2.0 capabilities are wholly built around Internet-transaction models, such as eBay, Google, Yahoo, and Amazon. What is distinctive about these business models is that they are built on open platforms that draw resources from and sell products to a vast, sprawling network of people. There is no need for a linear chain of supply, production, and distribution. "The production platform in the middle doesn't care what the ends want or how they are going to use it."

The next frontier in the evolution of the pull platform, said Coleman, will be developing a service-oriented software architecture to improve the production chain. The software that is now emerging allows "loose coupling," in which modular production components are loosely joined to each other. In the old-style production chain, all the components (programs) are rigidly integrated, which means that changing a production process or product pricing can take a long time. The system cannot adapt to volatile market conditions. With the new systems, businesses will be able to adapt to changing pull requirements and incrementally evolve and innovate in real time.

Why will the economics of pull prevail over push models? Coleman asked rhetorically. "Because pull has the ability to leverage all customers through customer self-service and to access all transaction information, transparently, in real time. The system can adapt to changing conditions better, faster, and cheaper. That changes the competitive environment. It turns the chain of commerce of the industrial revolution upside-down, resulting in dramatically lower transaction costs. That is where the battle is going, for the next two decades."

Based on this analysis, Coleman ventured some daring predictions about the character of "creative destruction" in the coming economic revolution. He estimated that the IT industry will be the first to be destroyed, probably between 2010 and 2015. "The economics of the computing hardware industry will change radically as servers, switches, hubs, and data storage become commodity appliances used by utility service providers to sell capacity on demand. As prices go down dramatically in an appliance commodity model, the margins go down even faster, resulting in the creative destruction of the legacy suppliers as new commodity suppliers rise to dominance."

The second industry to be transformed if not destroyed by the pull economy will be software and IT services, predicted Coleman. "At some point, you'll buy computing capacity from a commodity supplier. You'll buy by capacity, time or usage, time of the day or month, and quality of service. About 70 percent of the cost of computing today is operating expenses," said Coleman. "Those costs will be basically automated to near nothing. When that happens, all of today's outsourcing of back-end information technology and services to India (which itself supplanted the outsourcing of such services to IBM and EDS) will end. The pricing leverage will mirror the evolution of the cellular service and equipment providers as competition consolidates these industries around commodity providers of undifferentiated products and services." In this new world, said Coleman, economic history dictates that a relatively small number of suppliers will supply about 80 percent of the world's capacity.

As the economics of the current pull value chain becomes more adaptive and creative, said Coleman, Thomas Friedman's vision of a

globally integrated "flat earth" of commerce, which is already beginning, will become more of a reality. Pull 3.0 will arrive.

In this economic scenario, the political meaning of nations becomes more problematic. "What is the tax system when a product is produced in 23 different stages in 23 different countries?" asked Coleman. "It's all about value-added, which can be shifted anywhere. What, then, will be the meaning of economic and political borders?"

The Implications of Pull 3.0

Coleman's cataclysmic forecast elicited a deadpan reaction from the Aspen Institute's Charles Firestone: "A modest estimate of the complete destruction of our economic system." Roundtable participants spent some time critiquing the implications of Coleman's analysis.

Beau Vrolyk of Warburg Pincus agreed that transaction costs are diminishing dramatically: "The disintermediation of services that we all talked about in the dot-com era is just really starting. Craigslist does a great job of disintermediating the local print newspaper's classified ads. The apartment ads in the *San Francisco Chronicle* are gone; they've been on Craigslist for years. Disintermediation has massive economic consequences, and I don't think it is at all reversible."

Is disintermediation a one-way trip to market collapse? Not likely, because as Charles Firestone pointed out, "You still need intermediaries, but their functions will change somewhat. They will become aggregators, advisors, agents, and consultants. There will still be a need for intermediary functions."

John Hagel agreed; he said that the locus of scarcity has simply shifted: "At one time, the scarce resource was product reliability and quality, which led to the creation of brands and a focus on products. Then the scarcity was limited shelf space, which led to the creation of Walmart and other large retailers. Now the scarcity is your attention, which is spurring a new kind of brand, the 'trusted agent' or advisor, who helps you get more value out of your limited attention." Some bloggers also serve this function by acting as trusted interpreters of what's important in the news, politics, and other areas of interest.

For Americans who are troubled about the role of pull models in encouraging foreign outsourcing of production—"offshoring"—Philip Merrill, former president and chairman of the Export-Import Bank of the United States, urged them to consider the corresponding value of *insourcing:* foreign investment in the United States. The commonly accepted number of U.S. jobs that are outsourced is about 600,000 to 700,000, said Merrill, whereas the number of jobs insourced to the United States is no less than 7 million, and perhaps more. He noted that such companies as Honda, Toyota, and Siemens are building factories and creating jobs here in the United States, generating a net benefit for Americans.

> **"At one time, the scarce resource was product reliability and quality … Now the scarcity is your attention, which is spurring a new kind of brand, the 'trusted agent' or advisor, who helps you get more value out of your limited attention."**
>
> *John Hagel*

For Gilman Louie of In-Q-Tel, however, debate about the virtues of outsourcing or insourcing is irrelevant. What really matters, Louie said, is the "virtualization of production." He explained, "With virtualization, the economic unit of value can be made significantly smaller and dispersed throughout a network. The idea that you have to build in all the risk upfront in a factory, distribute the labor accordingly, and build the end-product at the very, very end of the production process, is going to go out the window. You don't need physical co-location and clustering."

Certain segments of the "old economy" associated with push models may suffer in the new pull era, Coleman concedes, but he hastened to add that the United States is well-positioned to capitalize on emerging trends: "This is really, really, really good for this country, in a number of ways. The number one reason is that we're the only economy in the history of the world that has shown a propensity—culturally, economically, and in terms of policy—to let creative destruction work, and therefore to let new jobs evolve.

"The second reason," Coleman went on, "is that the United States believes in entrepreneurship. We allow people to fail. That's not considered a good thing in Europe or Japan. But it will be a good thing over time, I believe. Most of the mission-critical software is still produced in this country, and while that is declining—mostly because of open source software, forcing creativity to move to higher and higher levels—we still have those people, and we've learned how to manage people and productivity on a global basis."

> **"We are talking about the acceleration of a value proposition and productivity the likes of which we cannot dream of today."**
>
> *Bill Coleman*

Despite dislocations and inequities along the way, therefore, Coleman is highly optimistic about the future: "We are talking about the acceleration of a value proposition and productivity the likes of which we cannot dream of today."

Content, Intellectual Property, and the Pull Economy

In the face of this giddy vision, Viviane Reding of the European Commission expressed a sobering concern: "Where is the content industry in this future? It doesn't have a chance to survive. What about copyrights and patents? How can you create a market if everything is free?" Dan Glickman, president and CEO of the Motion Picture Association of America (MPAA), echoed this concern. Glickman worried about "the compatibility of intellectual property right protection as we move between the push and pull models."

For many people in the technology sector, said Beau Vrolyk of Warburg Pincus, intellectual property amounts to an artificial impediment to innovation and new business models: "We have to face the fact that we've created a culture, in the technology sector, where getting around barriers to the free flow of information—patent rights, encryption, firewalls, etc.—is actually a badge of honor. It's not something to be ashamed of." Addressing this issue may be next to impossible, Vrolyk speculated, because the "enemies" of intellectual property are the very

people who are building the technology infrastructure industry needs to deploy its products.

Jordan Greenhall, CEO and founder of DivX, maker of a popular video software application, regards intellectual property as "a cardinal mechanism of antimarket force." The major problem, Greenhall argued, is that "we literally lack a fundamental theory of intellectual property and how it works." There is little empirical evidence that intellectual property works as it claims to work, Greenhall said, because intellectual property law is an accretion of many ad hoc policy decisions and is philosophically incoherent. It is "fundamentally rhetorical," used chiefly as a way to advance one's business strategy, not necessarily as a tool to foster innovation or the larger public good.

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>
> *Beau Vrolyk*

Dan Glickman of the MPAA took issue with this characterization of intellectual property, however, invoking the U.S. Supreme Court's 2005 ruling against Grokster and its peer-to-peer file-sharing software. That decision held that Grokster could be held liable for inducing users to infringe the copyrights of others. "Only 2 percent of the court's decisions in the last term were unanimous, and this was one of them," said Glickman. "The court defined what violated intellectual property and what didn't. They said that if you encourage somebody to break copyright law, you are liable. So I disagree with you. I think that there *are* some basic standards out there. I don't want us to get trapped in this illusory idea that there is *nothing* out there that is in violation of intellectual property law."

Notwithstanding Supreme Court rulings, several Roundtable participants noted that new technologies destroy entrenched business models

all the time, invariably creating new market structures in the process. That phenomenon is an intrinsic aspect of creative destruction, they argued. If the latest turns of the wheel are weakening the economic value of intellectual property, they suggested, so be it.

"The economics of the financial services industry were totally destroyed *twice* over the last 20 years," said Bill Coleman. "Each time it had to evolve into a new model of higher value provided to customers. Most financial services companies, especially those in capital markets, don't make money on transactions any more. They make money on leveraging the derivatives of those transactions, so they are giving you another level of value."

"This history is one indication of how content companies may evolve," Coleman continued. "Customers will pay only for content that is germane to them at the point that they absolutely need it. Therefore, we're going to have to change the economic models."

This reality has shaped the business model for Coleman's own newly formed company, the Cassatt Corporation, he said. Most of Cassatt's software product consists of open source components; about 10 percent is proprietary code. "What people are buying from me is a core competency that nobody else is providing," he explained. "They are paying only for that real creative differentiation that they need, and only at the time they need it."

The most serious threat to intellectual property is coming not from pirates, said Beau Vrolyk of Warburg Pincus, but from free, user-generated content. "The competition is not coming from the stealing of Rolling Stones' albums but from sites like Craigslist, which are a much bigger threat to intellectual property industries than piracy. The fundamental disintermediation caused by peer-to-peer pull models is that people are actually communicating with each other without intermediaries."

Esther Dyson of CNET Networks and *Release 1.0* agreed: Commercial creators of content "aren't simply competing with each other, nor with the people who steal their content, but with all the people producing videos of grandchildren that are of interest to exactly

four grandparents (except for modern families of *eight* grandparents). You have a huge set of forces sucking attention away from paid-for content—or at least, *would-be* paid-for content," said Dyson.

"*Time* magazine is no longer the arbiter of attention," Dyson continued. "If I want to know what's cool, I don't check with *Vogue*; I want to know what the 15 women I hang out with say. The challenge now is to be the intermediary that holds *that* content. Those intermediaries include the guy who runs the social network on which people are putting their comments and the sites where people hang their photos."

These arbiters of attention are aggregating people with social-networking service, offering value-added storage of content, and acquiring a hip cachet in the process. "This gets us back to utility computing," said Dyson. "Users are paying for value-added storage where the value is added by the others users; that's the way into content."

The surge of user-generated content is likely to continue, especially for low-cost genres of creativity such as music. Yet even expensive genres such as video and film, which have historically required expensive equipment, now are accessible to committed amateurs and upstarts. Homemade videos are quickly moving from the style of "America's Funniest Home Videos" to strikingly professional, if more idiosyncratic, shorts and documentaries. Such videos, in fact, constitute a great deal of content on Al Gore's new cable channel, "Currents."

Gilman Louie of In-Q-Tel noted that the new technologies are "exploding" traditional intellectual property regimes by democratizing creativity and creating new genres that are less susceptible to intellectual property control. "We've got to get out of the concept that intellectual property is about protecting a few people's rights," Louie said, "because we're going into a new world where there is going to be lots of high-quality content created by more people than we know. There are probably 20 more George Lucases out there who cannot publish, and people cannot get to them, because of all the barriers."

As an example, Louie cited the perplexing intellectual property issues in massively multiplayer online games. When someone creates a story

in that gaming environment, who is entitled to "own" it—the creator of the software or the gamer? How would royalty payments be distributed? In the networked environment, ownership and control become far more problematic, said Louie. He believes that "we're going to have some profound changes in how we think about intellectual property rights in media and how you monetize intellectual property rights."

Owning the creative content directly isn't necessary, agreed Roundtable rapporteur David Bollier, cofounder of Public Knowledge and editor of OntheCommons.org. It's possible to imagine "new ways to monetize creative work," Bollier said, citing the fashion industry. In fashion, anyone can legally copy the gown a Hollywood actress wears on the red carpet; indeed, some companies specialize in such knockoffs. In the apparel industry, owning the creative design is impossible, generally speaking. Yet fashion houses still thrive—by monetizing their creativity through their trademarked names and logos instead.

"As a general principle, intellectual property should find ways to incentivize innovation in order to move it forward," said In-Q-Tel's Gilman Louie. "It should not simply protect work. To monetize a work is different from protecting it," he said. The distinction is evident in the case of "Falcon," the online game, which was owner protected under intellectual property law but in effect abandoned because its owner did not believe there was a market for it.

One of the key justifications for strengthening copyright law and copyright enforcement is the extraordinary production and marketing costs of Hollywood movies, which often exceed $100 million. Without strong intellectual property protection and vigorous antipiracy enforcement, the argument goes, such projects may be financially impossible to produce. Similar arguments are made for other types of mass-market content, such as music CDs, television shows, and books. (Critics of this argument point out, however, that one reason for the high costs of Hollywood movies and mass-market music is precisely the expense of "push" marketing designed to create demand.)

Some forecasters say that networking technologies are fueling the rise of new market structures that are sweeping aside the "blockbuster" economics of the mass media. What is emerging instead is a more diversified set of niche markets that can be profitable with lower-volume sales. Instead of a supply-side push of content, technology is enabling a demand-side pull of content by radically reducing transaction costs—which, in turn, feeds the growth of niche communities of interest. In the era of the Internet, creative products that once were dismissed as too marginal or idiosyncratic to make money can be the foundation for a robust pull market.

In the era of the Internet, creative products that once were dismissed as too marginal or idiosyncratic to make money can be the foundation for a robust pull market.

The term associated with this phenomenon is the "Long Tail"—the title of a much-cited article by Chris Anderson in the July 2005 issue of *Wired* magazine. Anderson explained the "grand transition" now underway:

> For too long we've been suffering the tyranny of lowest-common-denominator fare, subjected to brain-dead summer blockbusters and manufactured pop. Why? Economics. Many of our assumptions about popular taste are actually artifacts of poor supply-and-demand matching—a market response to inefficient distribution…. Hit-driven economics is a creation of an age without enough room to carry everything for everybody. Not enough shelf space for all the CDs, DVDs, and games produced. Not enough screens to show all the available movies …

The "Long Tail" refers to the huge, untapped markets that exist among low-volume books, CD and DVDs. More than half of

Amazon's book sales, for example, come from books that rank below its top 130,000 titles. The implication is that "the market for books that are not even sold in the average bookstore is larger than the market for those that are," writes Anderson. "In other words, the potential book market may be twice as big as it appears to be, if only we can get over the economics of scarcity."

This Long Tail, in fact, is the avowed goal of online retailers. Unconstrained by the size and tastes of a local customer base or by limited shelf space, companies such as Amazon, Netflix (DVDs), Rhapsody (music), and iTunes (music) are showing that the Long Tail can be a very attractive business model. These companies have even developed new tools, such as collaborative filtering software and user recommendations, to drive demand for lesser-known titles at the far end of the Long Tail.

Please refer to the print edition for the long tail graph originally published in WIRED Magazine

The result is a larger, more diversified marketplace of creative products. "This is the difference between push and pull, between broadcast and personalized taste," writes Anderson. "Long Tail business can treat customers as individuals, offering mass customization as an alternative to mass-market fare."

The Social Dynamics of Pull

In introducing the pull paradigm, John Hagel emphasized that "pull platforms are not just about IT capability. They are deeply about social relationships of various types. In order for these platforms to operate, you have to have shared meaning. You have to have trust. You have to have a rich network of social relationships of various types. The business person, in particular, who misses that dimension is going to get into serious trouble."

To explore the social dimensions of pull, Roundtable rapporteur David Bollier of OntheCommons.org gave a presentation that focused on "the commons" as a broad paradigm that can help explain many of the dynamics of online communities.

Bollier started by noting that "Centralized Media"—broadcasting, cable television, films, recorded music—dominate markets primarily because of their control of critical "choke points" of product development and distribution. Their dominance also is buttressed by high concentrations of capital that generally are required to participate in these markets.

Less well appreciated, said Bollier, is that the profitability of Centralized Media and its control of these choke points entail some very large costs. These costs include investments in brand identities to help boost distribution and marketing; heavy reliance on "blockbusters" to yield large financial returns; a system for identifying and recruiting talent; an expensive marketing apparatus to find and retain customers; and legal and technological means to identify and prosecute piracy of creative works.

"In a more static commercial, technological, and cultural environment, this model worked fairly well, and its overhead costs could be absorbed," said Bollier. "But technological innovation is making the high-overhead business models of Centralized Media more vulnerable. Socially based

online media—i.e., online commons—are undercutting the historic cost structures and risk management strategies for major media companies. Because these companies can retain their dominance only by buttressing their centralized control and distribution, they are being forced to shoulder all sorts of new financial, technological, and political costs simply to 'tread water' in terms of revenues and market share."

Meanwhile, Bollier said, a profusion of new software technologies is reorganizing market structures and leveraging bottom-up, decentralized social energies in ways that Centralized Media simply cannot. Bollier agreed with previous comments that the biggest threat to Centralized Media is not piracy—deplorable as it may be—but "user-generated content and creativity."

Bollier urged that we treat the commons seriously as a paradigm for explaining nonmarket value-creation: "A commons," he said, "is a type of collective governance regime for managing shared resources sustainably and equitably. A commons does not use property rights, contracts, and money to generate value but leverages gift-exchange, shared ideals, moral commitments, etc. Familiar examples include scientific disciplines, voluntary civic organizations, and open source software communities." The value created through a commons-based, peer production model is not just economic in nature, he emphasized; it also is social and personal.

The biggest threat to Centralized Media is not piracy—deplorable as it may be—but "user-generated content and creativity."

What is notable about many online commons, said Bollier, is that many of them are outcompeting conventional markets. They often produce value more efficiently than the market. They also tend to be more flexible, personally satisfying, and culturally authentic than Centralized Media, he said.

A key attribute of online commons is that "excellent knowledge can be aggregated from a more disparate and dispersed group of people than

through centralized enterprises. Instead of dominant companies using top-down market structures to push and shape consumer demand, the new technologies are enabling the creation of bottom-up, self-organized communities based on fluid and shifting social preferences."

A preeminent example is the burgeoning community of Web logs ("blogs"), which now number more than 13 million. A related genre, "podcasting"—Web syndication of privately made audio broadcasts—is now attracting the attention of commercial radio stations.

There are other genres of commons. Social networking software is enabling people to locate others who share similar interests (Facebook; Meetup; Technorati), to share favorite web bookmarks (del.icio.ous), and to share photographs (Flickr). Other prominent commons include free and open source software, wikis, peer-to-peer file-sharing networks, collaborative websites, and online archives of public domain materials.

In the new context of pull platforms, social communities can efficiently exploit network effects, and proprietary value is no longer synonymous with ownership and exclusion (as facilitated by copyright, trademark, and patents).

Some of these commons have become remarkable cultural and economic phenomena. Linux, the open source operating system, has become a major disruptive force in the technology industry. Wikipedia, a user-generated encyclopedia, has amassed more than 600,000 entries in four years and inspired hundreds of other public wikis. The Internet Archive and Ourmedia.org have become enormous archives of public-domain information and creative works.

There are still other genres of online commons, including open-content educational initiatives such as MIT's OpenCourseWare curricular materials and peer-to-peer file sharing communities devoted to scientific research. Jerry Murdock, cofounder and managing director of

Insight Venture Partners, noted the rise of new communities populated mostly by young people. These new communities include people who play massively multiplayer online games, social networking communities, and mobile communities linked through short message service (SMS) and cell phones.

These communities often feature role-playing, anonymous participation and bimodal communication (alternating use of telephony and Internet communication). The size of these networked communities is startling, said Murdock: Friendster, a social networking space, has 13 million users per month. Another social networking site, MySpace that recently was sold to Fox, has 20 million registered young people. Xanga is host to 13 million teenaged girls. LiveJournal, an AOL-owned site, has more than 10 million users a month. Facebook, a community of college students, has 25 million users.

The Commons and Business

Conventional media are trying to figure out how they might base new business models on online communities. This inquiry is a serious challenge, however, because online communities are shifting the locus of value-creation in ways that can be difficult for conventional businesses to emulate. In the new context of pull platforms, social communities can efficiently exploit network effects, and proprietary value is no longer synonymous with ownership and exclusion (as facilitated by copyright, trademark, and patents). The community is a powerful platform for *indirectly* building new markets, and proprietary value-added activity occurs *on top of* the commons, so to speak, or on the edges of it.

Creators who insist on working within closed, proprietary regimes risk squandering the value that comes from sharing and distribution via open networks.

This shift in value-creation is reflected in a comment once made by copyright scholar Siva Vaidhyanathan, who quipped (with apologies to Oscar Wilde): "In the networked world, the only thing worse than being sampled is *not* being sampled."

Creators who insist on working within closed, proprietary regimes risk squandering the value that comes from sharing and distribution via open networks.

The power of networked content-sharing was vividly demonstrated when friends of an unknown remix artist, D.J. Danger Mouse, released the *Gray Album* on the Internet. The music was an accomplished (but illegal) remix of The Beatle's *White Album* and Jay-Z's *Black Album.* Many critics acclaimed the *Gray Album* as one of the best albums of the year. At one point in 2003, more people were illegally downloading the *Gray Album* than were buying Norah Jones' *Feels Like Home*—the best-selling CD at the time.

> **If online commons are going to be useful to business, companies will need to do more work to develop protocols for identity and reputation management.**
>
> *David Bollier*

If online commons are going to be useful to business, companies will need to do more work to develop protocols for identity and reputation management, said Bollier. He emphasized, however, that pull business models on open media platforms can significantly reduce business coordination and communication costs. They also can reduce investment risk, provide more cost-effective marketing and distribution than push models, and generate higher profit margins.

Bollier warned, however, that leveraging the commons for business gain "implies a different sort of social relationship with the customer base. It implies a more open, accountable relationship and a genuine respect for the autonomy of the people in a given commons."

Jerry Murdock of Insight Venture Partners noted that communities in pull networks are based on trusting relationships. "Every community has to have some form of an economy associated with it for it to be meaningful. In pull communities, trust gets created through transactions. This helps create an economy based on reputation."

Aedhmar Hynes of Text100 International agreed that the new online communities are "driving greater authenticity in communications." Before 2000, she said, "everything in public relations was about positioning and 'spin.' You can't afford to do that now. I cannot have a client go out and communicate something online that isn't truly authentic because I can guarantee that within minutes there will be a number of bloggers who will pull that down and make it look stupid." Hynes said that online communities have forced public relations to move from "a monologue to a dialogue and into a group discussion."

> **Online communities have forced public relations to move from "a monologue to a dialogue and into a group discussion."**
>
> *Aedhmar Hynes*

Despite the different sensibility that pull business models may require, online communities offer rich business opportunities, said James Manyika of McKinsey & Company: "You can now aggregate new ways of creating valuable economic goods and services on a much larger scale. You can organize communities around the Long Tail in a way that was previously unfeasible." Manyika also warned, however, that pull platforms are "disaggregating the coherence of geography as a way to organize communities, which raises all sorts of issues about governance, policy, and taxation."

Online communities are a valuable source of market research and feedback, said Gilman Louie of In-Q-Tel: "Think of a community as a place that defines *fashion*. Each person's virtual community is a fashion community, and there are participants who are very active and participants who just observe and buy. So think of virtual communities as a very fast way to leverage product R&D."

This is precisely what Google does, said Shona Brown, vice president of business operations for the company. "For many of our projects, we actually launch them on something called 'blabs'. If a product is in beta form, anyone can go there and look at it. We then deliberately solicit input. Essentially, the world tests our products. Not all of our products

are launched this way, but certainly a lot of them. For us, it's just a useful way to get better input."

Google goes a step further and actually relies on *volunteers* to do language translations for the search engine interface. "It's self-governing, and it's 100 percent volunteers," said Brown. She noted that Google even has volunteers who translate the Google interface into Klingon, the quasi-fictional language used by some characters in the *Star Trek* series.

Online communities and business have been exploring each other for some time, trying to find effective ways to balance profit imperatives with the social and psychic needs of the commons. Open source software is one notable offspring from this dialogue. As online commons and network effects grow in power, there are certain to be many more experiments to bring markets and commons into alignment.

Education in the Pull Environment

The new pull platforms and technologies pose many significant challenges to public education, above and beyond the many challenges it already faces. Although some observers worry that technology-driven innovation in education will degrade critical thinking skills and worsen the "digital divide" between rich and poor, others see major opportunities to encourage "passion-based learning" and a more "constructivist" learning paradigm.

Michael L. Lomax, president and CEO of the United Negro College Fund, pointed to "a crisis in American education that we haven't acknowledged. The 21st century is looking to African American and other minority children to be part of a highly skilled and diverse workforce. Yet the educational attainment gap between these minorities and the majority is widening, not narrowing."

"There is a particular crisis among males," Lomax said. "Studies show that African American males are expelled from preschool at three times the rate of white males, so the disengagement with school is beginning early on. The dropout rates are astronomical. Minorities go into postsecondary education primarily through the community college system, and the dropout rates there for minority students are huge. Again, the rates are higher for males than for females."

"I think we ought to remember that, in this country, there has been a longer tradition of *not* educating kids of color than there has been in educating them," said Lomax. "Up through the Civil War, it was against the law to teach African Americans to read. From 1865 to 1965, there was separate but unequal education. Today, we have tracking that makes it more likely that black and brown kids will be exposed to a watered-down, general education curriculum rather than the rich, rigorous, and academically challenging one that will prepare them for college or the jobs that must be filled in the 21st century."

The new technologies clearly will have a rich and powerful role in improving education, Lomax said, but will they be relevant and accessible to children of color? If basic needs such as poverty, food, and literacy go unmet, minority children are not likely to benefit from the sophisticated innovations that technology-based learning may offer.

> **The new technologies clearly will have a rich and powerful role in improving education, but will they be relevant and accessible to children of color?**
>
> *Michael L. Lomax*

Gaston Caperton, president of the College Board, believes that the core problem is the public's aversion to paying more for better public schools. "When people say it's not about the money, well…. I can tell you, it's about the money," said Caperton, who as governor of West Virginia struggled to raise taxes to pay higher teacher salaries and improve education in other ways. Now, as the head of the College Board, Caperton is improving the Advanced Placement and Preliminary Scholastic Aptitude Test (PSAT) programs to help identify promising students for college. Clearly the "creative destruction" that economic change is bringing to the American workforce will require a much broader response.

Many nations face the challenge of dealing with inequality and lack of opportunity. Mircea Dan Geoana, a senator and chairman of the Foreign Relations Committee of the Romanian Senate, notes that the

rise of Internet usage in Romania has coincided with worsening social polarization: "The number of 'have-nots' has increased, along with dropout rates from schools, while another segment of the country, what I call the global elite, is moving forward with fantastic dynamism and creativity." Geoana said that we must find "relatively fast ways to use the technology to empower the have-nots in our society."

Passion-Based Learning

Because the new technologies offer so many new tools for learning, a great deal of discussion during the Roundtable focused on the role of the new technologies in improving public education.

John Seely Brown, cofounder of the Institute for Research on Learning, made a presentation about the possibilities: "Maybe the time has come to take a bold move and ask, Could we radically rethink what schooling, formal learning, and informal learning, could be all about?"

> **We must find "relatively fast ways to use the technology to empower the have-nots in our society."**
>
> ***Mircea Dan Geoana***

Brown suggested that we need to consider revamping our definitions of learning, our assumptions about authority and control in education, and the institutional structures for facilitating learning.

One reason we need to entertain such changes, said Brown, is that students today have access to an overwhelming array of information and learning tools. "It's now possible for high school students to rent time on a major telescope in Maui," said Brown, "and there are new ways for kids to use electron microscopy to study bugs. It's called a 'Bug-a-Scope.'"

The list of online tools and resources is mind-boggling, said Brown: MIT provides the syllabi of all of its courses online through its OpenCourseWare initiative. Rice University's Connexions project is an international, interdisciplinary "content commons" that provides free scholarly materials and software tools that are helping more than 1 million authors, instructors, and learners in 157 countries. At Brown

University, the Decameron Web is an open Web platform that brings together a vast global community of professors and students of all ages to study Boccaccio's *Decameron* in truly novel, interactive ways. Google Scholar is offering people easy online access to an enormous trove of scholarly materials. And so on.

Computers, software tools, and Internet resources make possible some radically new styles of learning, said Brown. By using pull-based systems, students can function much like businesses in the pull environment: They can access resources they don't control and put themselves into flows of activity, rather than just building inventories of static, objectified "knowledge."

In this sense, the pull environment offers a way to move beyond the factory model of education, which itself is an artifact of the push economy. Students are now better able to pursue their own interests; obtain the resources they need; locate knowledgeable experts; learn by doing; and develop critical, independent skills. They can become part of "learning communities" that share similar interests and engage the world directly. These learning communities provide a structure to "scaffold learning" by encouraging personal tinkering and exploration combined with a kind of peer-review structure.

> **"Maybe the time has come to take a bold move and ask, Could we radically rethink what schooling, formal learning, and informal learning, could be all about?"**
>
> *John Seely Brown*

As an example, John Seely Brown cited a charter school in a tough, crime- and drug-ridden neighborhood in Providence, Rhode Island. "The school was based solely on passion-based learning defined by students themselves and using pull systems. Every kid that I met could look me in the eye, tell me what he/she was pursuing, and what university he/she was planning to get into. There was no graffiti on the walls and no noise or disciplinary problems in the classrooms—just kids working together, usually around computers, doing research.

"These kids were all engaged in a kind of pull based learning system that I never would have believed would have worked for that population," said Brown. "And their performance on standardized tests put them so far ahead of any other urban schools. It was amazing."

For Brown, the school exemplifies what he calls "communities of co-creation" and "the rise of the amateur class." "Kids are creating things to share, to extend, and to have other people in their learning community build on top that," said Brown. "There are tight feedback loops between production and consumption, which leads to some very interesting notions of social capital formation in which everyone is producing, consuming, remixing, and sharing as part of the same process."

Brown cited the familiar example of open source software development communities, which he called "a massive, distributed, cognitive apprenticeship program. Thousands upon thousands of kids are developing new skills and interesting sensibilities by being acculturated into, and appropriating from, these communities," he said. Similar dynamics are evident in collaborations between amateur and professional astronomers and in large communities of online "garage bands"—amateur musicians who sample music and remix it into new aural compositions.

All of these styles of learning might be described by Seymour Papert's theory of constructionism—the subject of a publication by Idit Caperton that was part of the Roundtable's reading packet.[7] Constructionism, Caperton writes, is "a theory of learning that claims that children learn best when they 1) use technology-empowered learning tools and computational environments, and 2) use these playfully in the active roles of designers and builders." This learning process creates more passion and can lead to more personal and deeper connections to knowledge among learners. Papert's theory draws inspiration from philosophers and psychologists such as Jean Piaget, John Dewey, Maria Montessori, and Paulo Freire.

Could the new technologies (used in constructionist ways) stimulate a new style of "passion-based learning"? This possibility may be one of

the most significant contributions to education reform the new technologies can make. Caperton writes that technology-assisted game-playing and game-making can be powerful learning methods:

> What's best about the best games is the way they draw kids into some very hard learning, and what is worst about typical school curricula is how adults seek to make it easy for kids. The fragmentation into little instructional pieces ends up depriving knowledge of personal meaning, and making it boring. For Papert, hard fun is the essence of good learning and good games.

Idit Caperton's MIT research and John Seely Brown's experiences with inner-city children confirms this observation. Brown observed, "Some of my colleagues at [the University of Southern California] work in Watts—one of the worst areas in Los Angeles—and the biggest problem is to get them to leave at the end of the class. Because when they start to be able to construct their own music and share it with each other, they're just fascinated. To find their own pathways into the material and capture their own knowledge, which then creates something that others can build on—that's part of the kind of game we're capable of playing here."

Simulation-based software is used widely as a tool for professional training, said Gilman Louie of In-Q-Tel, but remarkably, "it is not being used in the educational world." Louie believes that simulation could be "really, really important" in helping students develop hypotheses and develop critical thinking skills. It could be especially valuable for students with Attention Deficit Disorder, who thrive on having multiple streams of stimulation and learning, especially in a dynamic context.

The Fate of Critical Thinking in a Pull Environment

If we are indeed capable of moving from a learning environment based on *instructivism* to *constructionism*—in which students play an active, personal role in developing their skills and knowledge—will young people actually develop the critical thinking skills they need? Roundtable participants were divided on this question.

Madeleine Albright worries that students who rely on Google to do research, or on user-generated resources such as Wikipedia, will become lazy. They will not develop critical thinking skills and will never learn foundational bodies of knowledge. Or they will learn false information—such as the Wikipedia entry for Albright that claims falsely that she, as Secretary of State, once met with Saddam Hussein.

"I am definitely into passion-based learning, but I start talking about the Soviet Union and some students don't have a clue. What has happened to our common body of knowledge? I have students who can't spell and can't even proofread what the computer spell-check hasn't gotten right."

Albright fears that an educational system based on "à la carte learning" will fail to give students a sound base of knowledge and skills. She also is troubled by the idea that distance learning and Internet resources can be an adequate substitute for "an in-person community of learners."

Murray Gell-Mann, the Nobel Prize-winning physicist and a distinguished fellow at the Santa Fe Institute, worries that the online world offers no ready way to distinguish truth from falsity. "The Internet is like many information systems—it has an enormous amount of misinformation, badly organized information, meaningless information, and so on. The question is how to purify it. How can it be organized and synthesized into something useful? We need editorial systems to integrate and synthesize knowledge and get rid of the junk. If it's left to the so-called free market, we're likely to end up with a product dominated by entertainment and superstition."

Should someone try to separate "truth" from "falsity," asked Esther Dyson of CNET Networks, or should we instead trust that truth will emerge over time on its own? "The irony," said Dyson, "is that Murray is the dean of emergent systems, yet he is nervous about letting knowledge emerge from outside of a priesthood. You need to trust that it will happen. If Wikipedia does its job poorly, then it *will* be superseded by something else."

Gell-Mann responded that he does believe that knowledge should be allowed to emerge from outside of a priesthood but that it would be

useful to have broader competition to Wikipedia, for example, in the search for truth.

Jordan Greenhall of DivX offered a more provocative response: Perhaps the truth and falsity distinction no longer matters as much. "Whether something is true or not is becoming more peripheral to whether or not a particular engagement increases the capacity to act and engage further," said Greenhall. "The truth and falsity distinction is being displaced by the notion of usefulness and power."

This is not to say that truth and falsity don't matter, said Greenhall, but he is repelled by the idea that we must somehow insulate ourselves from things we believe to be false. "It's the idea that we must maintain our children in a pure environment that enables them to be free of exposure to the risk of sin. That's really what we're talking about. Yet we have to be able to survive exposure to falsehood, digest it, extract from it what is of value, and pull that back into ourselves to increase our capacities."

John Seely Brown believes that the online environment is extremely well-suited to fostering a critical engagement with truth. "One of the most interesting uses of Google is in our classroom," said Brown. "A kid will raise his hand and say, 'I just found this on Google.' The professor can suddenly create a productive learning situation by asking, 'Why do you want to believe that? Can anybody find a counterexample?'" By forcing students to make critical judgments on their own and to embrace them personally, the new technology tools can provide "new forms of productive learning," said Brown.

Politics and Government in the Pull Environment

Although the influence of pull platforms is felt more acutely in the marketplace than in government, pull technologies are having significant effects on politics in general and on government decision making and administration.

Intuitively, this development would seem to be a good thing: Politicians and governments are likely to be more responsive if they can be more directly scrutinized and held accountable by citizens. In part

this change is already happening. Enrico Letta, secretary general of the Agenzia di Ricerche e Legislazione Rome (AREL), described how the technology is changing political participation in Europe.   "The Blackberry is changing the way political leaders in Europe manage the decision-making process," said Letta. "With a Blackberry, you are able to force communication with a community of support groups, consultants, or a large team. While secretaries or assistants may blog for political leaders, because they are always on the run, with the Blackberry, you can communicate personally."

One danger of this rapid-response nervous system, however, is that politicians will become even more oriented to the short term and less deliberative. Michael Lomax of the United Negro College Fund finds it "exciting that the technology gives politicians the ability to instant message and do instant polling in inexpensive ways. But it also means that they're really more focused on responding immediately to the political environment, and that is troubling. It can mean that the elected official has no intermediary who is actually thinking about things, bringing experience to bear, and making difficult decisions that may not be immediately popular."

The technology raises real questions about what constitutes "the authentic voice" of the people.

Another pressure that has mixed implications is "the intense pressure on politicians to respond to mobilized special interests," said Lomax. When savvy organizers can flood a politician with 10,000 e-mails, should he or she heed that perspective—or perhaps listen to five citizens who can have a thoughtful in-person conversation about the issue? For the moment, the technology raises real questions about what constitutes "the authentic voice" of the people.

At a subtler level, digital technologies are splintering citizens' political and communication habits. Young people are embracing e-mail, instant messaging, blogs, and websites as sources of political news and debate, while the rest of the population relies on more traditional

sources. Viviane Reding of the European Commission reported, "On the one hand, I have people who I have to look directly in the eye, and on the other hand I have many young people who are best engaged through the medium of new technologies. I have to utilize different systems of communication with different groups of citizens."

In Europe, Reding reported, "the utilization of the media has changed, but unfortunately politicians have stayed the same." This problem is reflected by France's rejection of the proposed European constitution in a 2005 referendum, by a 55—45 margin, she said. Among young people, the "no" vote was even higher.

Reding said that an analysis of the written press and television showed a tilt toward "yes" on the constitution, whereas on the Internet, 83 percent of the information sources leaned toward "no." Young people ascribed greater credibility to Internet sources of news, associating them with the "voice of the people," and regarded television as biased. "This is a wonderful lesson to politicians," said Reding. "We utilized the push model and ignored the pull model. It is high time that we get to know the pull model and how to reach the younger generation."

Internet-based communication is changing the behavior of legislators as well. U.S. Representative Howard Berman of California says that he sees "a massive expansion in the scope of people who are following things in Congress and in the world." Berman constantly receives e-mail from more affluent regions of his congressional district, but very little from the Latino neighborhoods he also represents. This digital divide within the district means that Berman receives a disproportionate amount of e-mail about the Iraq War; constituents with immigration and Social Security problems tend to communicate via letters.

The Internet has not only enabled citizens to contact their legislators more easily, receive more diverse sources of news, and participate in all sorts of political dialogue, it has changed the political calculations of some legislators. "Unilateralism is getting harder and harder to pursue," said Beau Vrolyk of Warburg Pincus, "because constituents can

climb right on top of you [the politician] if you act in a unilateral and unpopular way. You not only have to make a decision, you have to account for it."

Paradoxically, however, even as citizens now have many more ways to learn about and engage in political life and hold legislators accountable, unilateralism is more prevalent in politics today than open deliberation and consensus-building.

Delivering Government Services Through Pull Models

A larger issue is how government agencies should change to take advantage of pull models. Governments are still grappling with this challenge. Developing new Web-based systems of citizen service has been difficult enough, let alone pioneering new pull innovations to deliver services.

A rudimentary innovation has been the use of e-mail and online submissions to government agencies. Dan Glickman of the MPAA reports that when he was Secretary of Agriculture he increased the number of public comments in rulemakings multifold. "I am not sure that the final work product was necessarily any better," he said, "but for the first time we brought the public into serious regulatory issues on matters that affected their lives. Vested interests had to compete with the 'nonvested' interests on some regulatory issues."

This openness in government also can lead to paralysis, however. Philip Merrill formerly of the Export-Import Bank said, "Some weekends I would get 8,000 e-mails to lobby me on some pipeline that we were funding somewhere. Obviously, I can't answer them all. The system gets clogged. One of the effects of e-mail and e-governance, however, is that the NGOs [nongovernmental organizations] of the world can become incredibly more effective."

A classic example of this development, Merrill said—whether one agrees with it or not—was the campaign to ban land mines, which was started by a Canadian activist. "Almost every country in the world agreed to this treaty even though there was little basic or formal diplomacy that moved it forward," Merrill said.

Merrill told a story that captures the staggering magnitude of information that government must now manage: "Last year, the National Archives was required by law to be able to file and retrieve 43.8 billion pieces of e-mail from government agencies, including presidential libraries. That year's quantity of e-mail is more than the mail sent in the entire history of the world prior to 1940—in every country for every year. That was just to archive the e-mail of government agencies so that it can be located, researched, and be subject to subpoenas 20 years from now. We're in a new world here."

One reason government agencies are so ill-equipped to move into a sophisticated technology environment is because they have trouble making capital investments, said Patrick W. Gross, chairman of The Lovell Group, a business and technology advisory and investment firm. "Businesses have capital budgets and capital expenditures, and you can justify them over multiple years and balance them with operating budgets. But capital expenditures in government are harder to justify because they're always competing with current expenditures. That's one reason why the State Department and government agencies end up with such archaic technologies. It's a gigantic institutional issue."

Government agencies also may resist new technologies because upgrading to new systems can reallocate power within an agency. The prospective "losers" therefore have a keen interest in delaying or thwarting a technology upgrade.

Innovation also may languish because governments do not face the same sorts of acute pressure for change that competitive markets can exert, noted John Hagel, the management consultant. Furthermore, the push systems that are already entrenched in government are designed to be resistant to change. Stability is one of their main purposes.

If government is going to make the transition from push to pull systems, said Hagel, we need to look at the pressure points. "What is going to force that kind of change on government and force it to address the challenges posed by pull? I'd say that information technology is going to play an indirect role by enhancing the choices that people have." As more states compete to attract technology investments, and more of the

"creative class" (as described in Richard Florida's book, *The Rise of the Creative Class*), he said, governments will indirectly feel more pressure to move to pull models.

The problems governments face involve more than capital investments and technology, however. There also are serious issues of privacy and identity that need to be protected. "Where government really differs from business," said John Kunzweiler of Accenture, "is that governments have no master customer file. In the state of California [where Kunzweiler lives], there ought to be a massive file of all citizens. But in California, that immediately triggers intensely political issues because if you are a citizen, you are entitled to a 'green card' that authorizes you to work, but if you're an illegal alien, you can't get a green card. There are also privacy concerns in having massive files of information about citizens."

Kunzweiler concluded, "To get an integrated, seamless e-government system that truly interacts with the needs of all citizens—be it automobile registration, tax concerns or health care—presents a mind-bendingly complicated set of integration issues. It also forces government to confront the issue of who is a citizen and what are their rights."

"In essence," said Charles Firestone of the Aspen Institute Communications and Society Program, "e-government contains a paradox. In order to work with transparency, integration, and participation, it creates political problems that go to the core of what our democratic values are. That's why some of the solutions being developed in business won't work in government."

Conclusion

There seems to be little doubt that a powerful new pull paradigm of commerce, culture, and government is emerging. Less certain is whether the pull paradigm will overwhelm, or merely alter, existing push models. What will the transition look like? What will the hybrid business models and market structures look like?

John Hagel cautioned that there will not be a full move from one model to the other but a blend that incorporates both in unfamiliar

ways. The big question is how the socioinstitutional change will occur. Hagel offered two scenarios: Either a new set of pull institutions will emerge and slowly marginalize and destroy existing push models, or the large push institutions of today will undergo a process of change that integrates new pull practices and values.

"I have to say that history does not give me a lot of confidence that traditional institutions will get through this kind of revolutionary change," said Hagel. It suggests that the leaders of traditional institutions—which were disproportionately represented at this Roundtable—have some serious thinking to do about making the transition to pull models. "What are the strategies for getting change to occur in institutional settings, in order to make the transition?" asked Hagel. "I think part of the answer has to do with identifying, aligning, and mobilizing the leadership group so that it can have the wisdom to lead this change in a productive way."

Jordan Greenhall of DivX observed that one's attitude toward pull models can be pivotal: "Do you see existing institutions as under threat from pull? Or do you see pull as an opportunity to address lots of challenges that are eminently solvable?" One's answer to these questions may depend a great deal on one's institutional affiliation and one's willingness to change. More fundamentally, it may depend on one's ability to see and embrace an emerging worldview that defies many established patterns of economic, cultural, and political life.

Notes

1. Carlota Perez, *Technological Revolutions and Financial Capital: The Dynamics of Bubbles and Golden Ages* (Northampton, Mass.: Edward Elgar, 2002), xviii.

2. John Hagel and John Seely Brown, *The Only Sustainable Edge: Why Business Strategy Depends on Productive Friction and Dynamic Specialization* (Cambridge, Mass.: Harvard Business School Press, 2005), 25–26.

3. John Hagel and John Seely Brown, "From Push to Pull: Emerging Models for Resource Mobilization," *The McKinsey Quarterly*, 3Q 2005.

4. See Esther Dyson, "Dr. Market: Or, How I Learned to Stop Worrying and Lose Control," *Release 1.0* 23, no. 6 (June 2005).

5. Eric Von Hippel, *Democratizing Innovation* (Cambridge, Mass.: MIT Press, 2005), available online at http://web.mit.edu/evhippel/www/democ.htm.

6. Yochai Benkler, "Coase's Penguin, or, Linux and The Nature of the Firm," *Yale Law Journal* 112 (2004), available online at http://www.yale.edu/yalelj/112/BenklerWEB.pdf.

7. Idit Caperton, "For Seymour Papert, 'Hard Fun' is the Essence of Good Games AND Good Education," *TELEMEDIUM* (spring 2005). See also Idit Caperton, "Games as Construction Zones," *SimSchool* (Fall 2005), 8, available online at http://www.simschool.org/simNews.htm.

APPENDIX

Fourteenth Annual Aspen Institute
Roundtable on Information Technology

When Push Turns to Pull:
The Technology-Enabled Society

Aspen, Colorado
August 2–5, 2005

Roundtable Participants

Madeleine Albright
Principal
The Albright Group

Howard L. Berman
United States House of
 Representatives

David Bollier *(rapporteur)*
Independent Journalist and
 Consultant

John Seely Brown
Former Chief Scientist
Xerox Corporation
 and
Director Emeritus
Xerox Palo Alto Research Center
 (PARC)

Shona Brown
Vice President, Business
 Operations
Google, Inc.

Gaston Caperton
President
College Board

Idit Caperton
Chief Executive Officer
MaMaMedia

William T. (Bill) Coleman III
Founder, Chairman, and Chief
 Executive Officer
Cassatt Corporation

Scott Cook
Chairman of the Executive
 Committee of the Board
Intuit Corporation

Esther Dyson
Editor, *Release 1.0*
CNET Networks

Nabil Fahmy
Ambassador of the Arab Republic
 of Egypt to the United States
Embassy of the Arab Republic of
 Egypt

Charles M. Firestone
Executive Director
Communications and Society
 Program
The Aspen Institute

Note: Titles and affiliations are as of the date of the conference.

Murray Gell-Mann
Distinguished Fellow
 and
Co-Founder
Santa Fe Institute

Mircea Dan Geoana
Senator
 and
Chairman of the Foreign
 Relations Committee
 of the Senate
Romania

Dan Glickman
President and Chief Executive
 Officer
Motion Picture Association of
 America

Jordan Greenhall
Founder and Chief Executive
 Officer
DivX, Inc.

Patrick W. Gross
Chairman
The Lovell Group

John Hagel
Author and Management
 Consultant

Aedhmar Hynes
Chief Executive Officer
Text100 International

John T. Kunzweiler
Senior Partner
Accenture

Enrico Letta
Member of the European
 Parliament
 and
Vice Chairman
Aspen Institute Italia

Michael L. Lomax
President and Chief Executive
 Officer
United Negro College Fund, Inc.

Gilman G. Louie
President and Chief Executive
 Officer
In-Q-Tel

James Manyika
Partner
McKinsey & Company, Inc.

Philip Merrill
Chairman and Publisher
Capital-Gazette Communications

Jerry Murdock
Co-Founder and Managing
 Director
Insight Venture Partners

Viviane Reding
Commissioner for Information
 Society and Media
European Commission

Note: Titles and affiliations are as of the date of the conference.

John (Beau) Vrolyk
Managing Director
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Staff:

Mridulika Menon
Project Manager
Communications and Society
 Program
The Aspen Institute

Note: Titles and affiliations are as of the date of the conference.

About the Author

David Bollier is an author, civic strategist, and consultant with a varied public-interest portfolio. Much of his work deals with progressive public policy, digital media, and the commons.

In recent years Bollier has concentrated on developing a new analysis and language for reclaiming the commons-a project he began with his 2002 book *Silent Theft: The Private Plunder of Our Common Wealth* (Routledge). He continues that effort through a series of essays and reports about the commons (archived at *www.bollier.org*) and through a new Web portal, www.OntheCommons.org, hosted by the Tomales Bay Institute, a think tank devoted to the commons.

Bollier also writes and speaks frequently about the public's stake in copyright, digital technology, and Internet issues. To help advance this agenda, in 2001 he co-founded Public Knowledge, a Washington policy advocacy organization. He also is the author of the forthcoming book *Brand-Name Bullies: The Quest to Own and Control Culture* (John Wiley & Sons), a collection of stories about extensions of intellectual property law that hinder creativity, free expression, and innovation.

Bollier is a Senior Fellow at the Norman Lear Center at the University of Southern California Annenberg Center for Communication, where he heads the Creativity, Commerce & Culture project. Since 1984 he also has been a public affairs and political advisor to television writer/producer Norman Lear. The author of seven books and a graduate of Amherst College and Yale Law School, Bollier lives in Amherst, Massachusetts, with his wife and two sons.

Previous Publications in the Roundtable on Information Technology Series

Information Technology and the New Global Economy: Tensions, Opportunities, and the Role of Public Policy (2004)

David Bollier, rapporteur

This report provides context and insight into the unfolding of new economic realities arising from the information revolution-how the world's players will live, learn, innovate, offer, consume, thrive, and die in the new global economic landscape. *Information Technology and the New Global Economy* draws a portrait of a changing global economy by describing new business models for the networked environment, exploring topics of innovation and specialization. Among the more creative concepts propounded at the roundtable was an analysis of the world's economy in terms of video game theory that suggests that if developing countries are not incorporated into the world economic community in some acceptable way-if they cannot make economic progress-they could become disrupters to the entire economic or communications system. The report also explores issues of outsourcing and insourcing in the context of digital technologies moving work to the worker instead of vice versa. Participants concentrated on developments in India and China, taking account of some of the vulnerabilities in each of those countries as well as the likely impact of their rapid development on the broader global economy. 57 pages, ISBN Paper: 0-89843-427-0, $15.00 per copy.

People / Networks / Power: Communications Technologies and the New International Politics (2003)

David Bollier, rapporteur

This report explores the sweeping implications of information technology for national sovereignty, formal and informal diplomacy, and international politics. Bollier describes the special challenges and new rules facing governments and nongovernmental organizations in projecting their messages globally. The author further explores the relationships between

the soft power of persuasion and the more traditional hard power of the military and discusses how governments will have to pay close attention to newly burgeoning social communities in order to prosper. 68 pages, ISBN Paper: 0-89843-396-7, $12.00 per copy.

The Rise of Netpolitik: How the Internet Is Changing International Politics and Diplomacy (2002)

David Bollier, rapporteur

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