# The Internet: An Unprecedented and Unparalleled Platform for Innovation and Change

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The Internet has evolved into a key enabler of today's economy and society. It has become integral to business, communication, education, and community building, as well as an essential tool in social life, empowering individuals and communities in ways previously unimagined. The Internet is bringing about unprecedented growth in global citizenry and an increasing diversity of stakeholders across an ever-broadening set of issues and causes. The Internet, directly and indirectly, is changing governance structures and bringing new levels of openness, accountability, and participation, effecting change around the globe. These changes are possible because the Internet encourages and facilitates the coming together of individuals, communities, entrepreneurs, activists, and many others in new and innovative ways.

In 2009, the Internet topped Knowledge@Wharton's list of the 'Top 30 Innovations of the Last 30 Years'. The panel of judges ranked the Internet number one, in part because it 'is an innovation that created an industry and subsequent new technologies, making it especially important.'[1] One of the judges noted not only the Internet's role as a facilitator of information sharing, but also—perhaps more importantly—its role as a catalyst of innovation: 'The Internet took away a major constraint to accessing knowledge and sharing knowledge.

But a bigger innovation is one that spawns other innovations.'[2]

The Internet is perhaps the greatest enabler of innovation linkages among individuals, communities, businesses, the public sector, and the myriad of new structures—such as social and professional networks—that shape the way innovation occurs and is perpetuated around the globe today.

## The genius of the Internet

The Internet's founding fathers were very deliberate in the networking model they devised. Developed primarily as a research and data-sharing tool, their genius was that they did not prescribe a technology or networking architecture. Rather they envisaged an open platform that would allow the sharing of information across networks, regardless of their particular architectures. The platform would be built around open standards and protocols developed in open fora. This vision of an Internet that would embrace existing and future networks was remarkable:

The Internet as we now know it embodies a key underlying technical idea, namely that of open architecture networking. In this approach, the choice of any individual network technology was not dictated by a particular network architecture but rather could be selected freely by a provider and made to interwork with the other networks through a meta-level 'Internetworking Architecture'.[3]

When one considers more traditional networking approaches—such as the hierarchical or centralized telephone network and technology development processes that are built on retaining rights for commercial leverage—one realizes that the approach taken by the founders of the Internet was all the more revolutionary, even inspiring John Perry Barlow to issue his famous 'Declaration of the Independence of Cyberspace'.[4] This fundamentally different approach to networking has shaped the Internet's nature and helped motivate an unprecedented change in the way individuals and communities now view rules and rights as they pertain to networks and content, as Stephen Crocker noted in his *New York Times* op-ed 'How the Internet Got Its Rules':

It probably helped that in those days we avoided patents and other restrictions; without any financial incentive to control the protocols, it was much easier to reach agreement. . . . This was the ultimate in openness in technical design and that culture of open processes was essential in enabling the Internet to grow and evolve as spectacularly as it has. . . . Put another way, we always tried to design each new protocol to be both useful in its own right and a building block available to others. We did not think of protocols as finished products, and we deliberately exposed the internal architecture to make it easy for others to gain a foothold. This was the antithesis of the attitude of the old telephone networks,

which actively discouraged any additions or uses they had not sanctioned.[5]

In his seminal 2009 speech 'Preserving a Free and Open Internet: A Platform for Innovation, Opportunity, and Prosperity' given at the Brookings Institution, Federal Communications Commission Chairman Julius Genachowski asked, rhetorically, why the Internet had been so successful in encouraging innovation and growth. The answer had a lot to do with those early pioneering days:

A big part of the answer traces back to one key decision by the Internet's original architects: to make the Internet an open system. . . . Historian John Naughton describes the Internet as an attempt to answer the following question: How do you design a network that is 'future proof'—that can support the applications that today's inventors have not yet dreamed of? The solution was to devise a network of networks that would not be biased in favor of any particular application. The Internet's creators didn't want the network architecture—or any single entity—to pick winners and losers. Because it might pick the wrong ones.[6]

### Catalysing business innovation and economic growth

The networking technology breakthrough that sparked the Internet phenomenon was to remove the physical barriers between networks and establish common protocols to share information across diverse local network computing environments. The Internet has also adapted and evolved, and has facilitated and embraced significant technological innovations:

The Internet has changed much . . . since it came into existence. It was conceived in the era of time-sharing, but has survived into the era of personal computers, client-server and peer-to-peer computing, and the network computer. It was designed before LANs [local area networks] existed, but has accommodated that new network technology, as well as the more recent ATM [asynchronous transfer mode] and frame-switched services. It was envisioned as supporting a range of functions from file sharing and remote login to resource sharing and collaboration, and has spawned electronic mail and more recently the World Wide Web.[7]

To this list one might add other, more recent and important developments such as Creative Commons,[8] the Internet of Things,[9] and Cloud Computing.[10] Indeed, the mission of Creative Commons 'is nothing less than realizing the full potential of the Internet—universal access to research and education, full participation in culture—to drive a new era of development, growth, and productivity.'[11]

This networking breakthrough was not just about technology. The Internet also brought down barriers to doing business, to collaboration, and to innovation. By spurring creativity and competition, the Internet has had a profound impact on economies around the globe. In 2008, the Organisation for Economic Co-operation and Development noted how innovation linkages that are the result of the Internet have brought substantive growth and restructuring to industries of all sizes:

The Internet and information and communications technologies (ICTs) are profoundly changing how research and creative activity are undertaken, for example by enabling distributed research, grid and cloud computing, simulation, or virtual worlds. They are also changing the organisation of science, research and innovation, by linking the creativity of individuals and allowing organisations to collaborate, pool distributed computing power and exploit new ways of disseminating information. This is fostering competition, stimulating the restructuring of industries and institutions, with potentially major impacts on innovation and growth. ICTs and the Internet account for a significant share of total research and development, patent applications, firm start-ups and venture capital. The global nature of the Internet is further spurring the pace and scope of research and innovation, and encouraging new kinds of entrepreneurial activity.[12]

Information and data are now more available to anyone with access to an online connection through new platforms such as the peer-reviewed Wikipedia; social or professional networks such as Facebook and Linked-in;[13] and innovative new mechanisms such as crowd-sourcing, where work usually undertaken by a specialist is instead undertaken by a group of individuals—a crowd. Such methodologies for information sharing would not be possible without the common platform that the Internet provides. Networked communities of interest have changed the nature of dialogue and research, making information available on an unprecedented scale so that any party can monitor it, access it, comment on it, and forward it on to others. The opportunities for 'permission-less innovation' have increased many-fold. [14]

Measuring the actual impact of the Internet on economic growth has always been challenging. But in 2011, the McKinsey Global Institute published 'The Great Transformer: The Impact of the Internet on Economic Growth and Prosperity', a report that researched the Internet and economic vitality:

The Internet accounted for 21 percent of the GDP growth in mature economies over the past 5 years. In that time, we went from a few thousand students accessing Facebook to more than 800 million users around the world, including many leading firms, who

regularly update their pages and share content. While large enterprises and national economies have reaped major benefits from this technological revolution, individual consumers and small, upstart entrepreneurs have been some of the greatest beneficiaries from the Internet's empowering influence. If Internet were a sector, it would have a greater weight in GDP than agriculture or utilities.[15]

Importantly, the McKinsey report notes that future innovation and change brought about by the Internet will be significant—for everyone:

… we are still in the early stages of the transformations the Internet will unleash and the opportunities it will foster. Many more technological innovations and enabling capabilities … are likely to emerge, while the ability to connect many more people and things and engage them more deeply will continue to expand exponentially.[16]

## Building communities and catalysing social innovation and change

Just as the Internet is facilitating linkages among businesses, entrepreneurs, and other entities integral to today's economies, it is also facilitating and encouraging linkages among a diversity of social entities, communities, academic organizations, and others, delivering unprecedented levels of social and activism–related collaboration and interaction around the globe. As the fathers of the Internet noted in their Internet history: 'The Internet is as much a collection of communities as a collection of technologies. . . . '[17]

The like-minded enthusiasts—academic, scientific, and engineering experts—who built and managed the Internet in its early days not only worked to develop technical standards and establish the basic functionality of the Internet, but they also helped shape the initial

spirit of the Internet—one based on the principles of sharing resources, of open access, and of open standards. These tenets quickly evolved into a credo that embraced both simple, open structures reflecting principles of freedom of expression and information, and consultation processes with a broad community of stakeholders.

This openness encouraged evermore diverse communities to use and build on the Internet as a platform for communication, creativity, and collaboration. The Internet user's horizon is almost limitless: a citizen with an Internet connection becomes a global citizen, instantly connected to individuals and communities and instantly aware of issues, happenings, and change at local, national, and international levels. Issues or interests that might once have been the purview of the few are now within the grasp of the many.

In 1992, when Vint Cerf and Bob Kahn announced the launch of the Internet Society, they remarked that 'a global renaissance of scientific and technical cooperation is at hand'. While that statement was true then, and remains true today, the announcement was incomplete. What was not said—what was perhaps unforeseen—was the degree to which the Internet would bring about unprecedented linkages and collaboration among individuals and communities across all sectors of society and the degree to which such collaborative efforts could and would address global challenges.

There are myriad examples of community-building and knowledge-sharing that address challenging issues around the globe. One such example, which brings together a diverse range of global stakeholders, is the Research4Life program, a public-private partnership of

the World Health Organization (WHO), the Food and Agriculture Organization of the United Nations (FAO), the United Nations Environment Programme (UNEP), the World Intellectual Property Organization (WIPO), Cornell and Yale Universities, the International Association of Scientific, Technical & Medical Publishers, and Microsoft. The partnership's innovative goal is to make available online scientific knowledge to those countries that typically would have very limited access to it:

The concept of Research4Life is simple: research in health, agriculture and the environment is better informed when it is based on the most recent, high quality and relevant scientific knowledge. Research4Life applies this, delivering knowledge to the world's poorest countries. Research4Life is empowering universities, colleges, research institutes and government ministries as well as non-governmental agencies and hospitals, with access to scientific knowledge that was never before imagined.[18]

The Internet is also being used to strengthen the well-being of existing communities in developing countries. The Millennium Villages project, for example, is enhancing the economic viability of communities in the developing world. Led by Jeffrey Sachs and the Earth Institute at Columbia University, the program is also designed to meet the UN's Millennium Development Goals (MDGs). Although technology and Internet access are but a part of the development equation, Sachs notes how they provide some of the key building blocks—innovation linkages—for meeting the MDGs and particularly how important they are to spurring innovative and sustainable multi-stakeholder approaches to development:

Information technologies such as mobile phones, Internet connections in schools and

community centres, and radio can enable training of health, education, agriculture and water personnel. They can allow better management of health delivery systems, and aid farmers by providing timely information on markets, prices and weather. ICT can be used to improve access to credit and remittances, as well as information on creating and managing businesses. Radio instruction and Internet access can further education, while better access to communications can empower and increase the impact of stakeholders' voices.[19]

These examples epitomize the innovation linkages that the Internet encourages and facilitates between diverse but similarly inspired organizations and communities. These linkages result in new ways of thinking and doing, effectively spurring innovation across all realms of economy and society.

## Driving innovation and change in governance and political processes

As individuals and communities communicate, organize, and take action, governments and the governance models that have been taken for granted for so long are coming under pressure. The Internet, the global economy, real-time news, and an explosion in actors and stakeholders are among many factors challenging political processes as never before. The governance stage is now crowded with nations, stakeholders, communities and others clamouring for a role and for recognition. Innovative linkages among diverse but aligned stakeholders and communities are bringing change to existing governance and engagement models and forcing governments to adapt the way they interact with all players, from the local citizen to geopolitical partners on the world stage.

At a 2003 Aspen Institute Roundtable on how the Internet

changes the powers of the nation-state and the conduct of international relations, it was noted that:

The Internet has greatly lowered the costs of transmitting information, enabling people to bypass traditional intermediaries whose power revolved around the control of information: national governments, the diplomatic corps, transnational corporations, and news organizations, among others. As a result, nongovernmental organizations (NGOs), academic experts, diasporic ethnic communities, and individuals are using the Internet to create their own global platforms and political influence. As the velocity of information increases and the types of publicly available information diversify, the very architecture of international relations is changing dramatically.[20]

These issues are also reflected in the discussions being held at the international level on the future of Internet governance—in other words, how the Internet is managed and by whom. The Internet Governance Forum (IGF) is the forum in which a diversity of stakeholders—governments, businesses, civil society, the Internet community, and so on—come together to discuss issues of relevance to Internet policy and governance. This model is an innovation in international policy circles, and its informality helps to build linkages not just between diplomats and technologists, but among all stakeholders. The minimal structuring has encouraged interaction on 'neutral' ground—outside the parameters of typical intergovernmental structures:

The Internet Governance Forum (IGF) serves to bring people together from various stakeholder groups as equals, in discussions on public policy issues relating to the Internet. While there is no negotiated outcome, the IGF informs and inspires those with policy-making power in both the public and private sectors. . . . The IGF is also a space that gives developing countries the same

opportunity as wealthier nations to engage in the debate on Internet governance and to facilitate their participation in existing institutions and arrangements.[21]

The ways in which stakeholders engage with governments is also changing. Innovative and unprecedented alliances and partnerships built using the Internet will have an increasingly significant impact on how government undertakes its policy making. Recent legislative efforts to combat intellectual property theft (such as the illegal downloading of content and the production and selling of counterfeit goods) in the United States have been shelved because of the groundswell of opposition. The Stop Online Piracy Act (SOPA) and the PROTECT IP Act (PIPA) were two bills in the US Congress that were withdrawn because of the concerted efforts by a truly multi-stakeholder effort, ranging from entrepreneurs to law professors, and from think tanks and nonprofit organizations to businesses.[22] The proposals would have mandated domain name system blocking and filtering by Internet service providers to protect the interests of copyright holders. Although many agreed that combating illicit online activity was an important public policy objective, opposition focused on concerns that such bills would undermine the viability of the Internet as a platform for innovation by compromising its global architecture.[23] The scale of the protest surprised many, including the sponsors of the bills, which were already losing support on the Hill:

On 18th January 2012, 30 million US citizens saw Mozilla's Firefox 'blackout' start-up page; 1.8 million visited its SOPA information page, and 360,000 people emailed congress about the issue. Other internet giants participating in the anti-SOPA campaign boast similarly impressive figures: 13 million people viewed

Google's anti-SOPA page, resulting in 7 million petition signatures; whilst Twitter saw 2.4 million SOPA-related tweets in 16 hours.[24]

Opposition to the legislation has demonstrated that ill-conceived policy making is likely to come under increasing pressure from concerned communities of interest, fuelled by the Internet, e-mail, and social media. The civil and corporate protest against SOPA and PIPA is but one example of the Internet producing or contributing to innovative change in the political landscape. Citizens can bring about substantive political change in a myriad of ways, largely enabled by the Internet: Votizen is an innovative platform designed to leverage social networks in political campaigning and elections;[25] Change.com is a platform that encourages users to start campaigns for social change;[26] and governments are increasingly implementing e-petitions—a medium for the citizen to promote an issue or cause for debate.[27]

Empowered and involved citizens and communities, collaborating and cooperating in many innovative ways around the globe—and using the Internet as their communication medium—are bringing about a pervasive and global awareness of social and political issues. In 2011 the world was witness to an unprecedented groundswell of civic involvement in the future of society. The Internet helped precipitate an increased freedom for millions and contributed to changing the political and social structures of nations in the Arab world. Mundane mobile phones linked to the Internet brought images of change to the world—those uploading the images and those viewing them may have been on different sides of the world but they were united in their concern and their resolve:

Alongside traditional activism and action, the tools of the trade today are the internet (for information dissemination and news), social media (to connect and coordinate), mobile phones (to capture what happens) and digital, particularly satellite, television to report it.[28]

## Conclusion and policy considerations

The genius of the Internet is that it is an open platform for boundary-less innovation, linking diverse and diffuse players in the quest for business success, community development, and social and political progress. It breaks down barriers, encouraging social and business entrepreneurs and businesses of all sizes, regardless of their location. These innovation linkages create unparalleled opportunity by facilitating and encouraging creativity and collaboration.

Just as importantly, the Internet also encourages and facilitates citizen activism by giving a voice to Internet users globally. The Internet's ubiquity enables partnerships and networks to address issues once thought to be out of reach or too difficult to tackle. Effectively, the linkages the Internet spurs are catalysing new and innovative ways of addressing what were once seemingly intractable challenges.

The Internet has brought about unprecedented innovation—in technology, economy, society, and governance. Yet, as the McKinsey report *The Great Transformer* suggests, the Internet has so much more to offer and more can be done to harness its benefits. To do so, that report suggests that policy makers should look to measures that foster competition, encourage innovation, develop human capital, and build infrastructure.[29]

But the Internet needs more than just good policy. The continued success of the Internet is dependent upon it remaining open, and on all of us nurturing it, building on it and participating in its development and management processes. Together, we can help shape the Internet's evolution and safeguard its invaluable role as a platform for innovation, economic and social development, allowing it to flourish for the benefit of all humankind.

## Notes

1   Knowledge@Wharton, 2009.

2   Knowledge@Wharton, 2009.

3   Leiner et al., 2012.

4   Barlow, 1996.

5   Crocker, 2009.

6   Genachowski, 2009.

7   Leiner et al., 2012.

8   See http://creativecommons.org/about.

9   See http://en.wikipedia.org/wiki/Internet_of_Things.

10   See http://en.wikipedia.org/wiki/Cloud_computing.

11   Creative Commons vision statement, available at http://creativecommons.org/about.

12   OECD, 2008.

13   See http://en-gb.facebook.com/ and http://www.linkedin.com/static?key=what_is_linkedin.

14   Marsan, 2011.

15   Manyika and Roxburgh 2011.

16   Manyika and Roxburgh 2011.

17   Leiner et al., 2012.

18   Research4Life.

19   Sachs, 2011.

20   Bollier, 2003.

21   IGF, 2011.

22   See netCoalition.com.

23   See Google Take Action at https://www.google.com/landing/takeaction/sopa-pipa/.

24   Cooke, 2012.

25   See https://www.votizen.com/.

26   See http://www.change.org/.

27   See http://epetitions.direct.gov.uk/.

28   Williamson, n.d.

29   Manyika and Roxburgh, 2011.

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