

SYMPOSIUM

The Wealth of Networks

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**The Wealth of Networks:
how social production transforms markets and freedom**

YOCHAI BENKLER, 2006

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PHILIPPE AIGRAIN. On the Economic Impact and Needs of the Wealth of Networks

When I drafted *Cause commune* [1] in 2003-04, my main motivation was to provide a comprehensive theoretical foundation for the growing information commons [2] movement in Europe. In the background was another motivation: helping continental European readers to better relate with American commons thinking. Several factors were limiting the ability of European readers to draw inspiration from or to build critical conversations with the generation of thinkers who have put information commons on the agenda in the USA. The absence in continental Europe of an equivalent to First Amendment thinking (despite commitments to freedom of expression); a stronger focus in Europe on the opposition between markets and State, with less consideration for the importance of societal action; the difficulty to translate terms such as commons in a modern sense, even though they are of Latin origin: all this contributed to possible misunderstandings.

Today, commons thinking has become global in scope, and develops in original forms in non-English speaking areas. Translations of 'commons' slowly percolate in various languages. In France, Members of Parliament speak about *libre* software in their debates and lawyers in university and official circles organize workshops on creative commons approaches. Brazil is at the forefront of commons-based creation, and despite some opposite trends, India hosts new approaches to commons-based innovation and some original commentators (sarai.net, Suman Sahai or Vandana Shiva). In North America, thinkers such as James Boyle, Lawrence Lessig or Eben Moglen have gone to great efforts to create narratives with a more universal perspective. James Love and Knowledge Ecology International [3] bootstrapped worldwide non-governmental organization (NGO) and government coalitions that push a knowledge commons agenda forward in

international organizations. The revision of the GNU GPL (General Public Licence) free software license has explicitly aimed at a more universal language and validity.

Yochai Benkler's *Wealth of Networks* takes a new step in this direction. Benkler's work is deeply rooted in American liberal philosophy. However, his interest in political philosophy globally has led him to express his views in a language that can be read from a European or global perspective. Central to this possibility is the bridge provided by Amartya Sen's theory of capabilities. Amartya Sen has emphasized [4] how freedom is necessary to development but also how health, education, or preventing excessive inequalities are necessary for the build-up of capabilities, without which freedom remains just an idea. By linking in an inseparable manner freedom, concrete capabilities of action, human development, and social justice, Amartya Sen has provided a theory of justice that can be heard across the Atlantic and elsewhere, in particular, of course, in India, his mother country. Recognizing it calls for radical reform to our ways of thinking, for instance, about education, culture, or public health. Seeing education mostly as a transfer of existing knowledge (which is still a predominant view in many quarters of Europe) is clearly challenged by the evidence that the construction of critical individuals able to take initiatives in the world deserves more emphasis in our information era. The traditional European view of culture as the recognition of a distinguished elite by connoisseurs (also adopted in some circles in the USA) is challenged by the alternative model of a continuum of practice ranging from reception to professional creation of the highest quality. Meanwhile, approaches to health based on targeted technological medical acts and drugs and the associated economic and patent models exhibit poor performance in comparison to systems that put more emphasis on education, universal access to medical services and drugs and the non-medical conditions of public health.

It is in the field of information and its technology that capability theory is most relevant.[5] When information and tools are available as commons for all, an unprecedented ability to express oneself, reach for others, criticize or praise, cooperate on all forms of achievements develops in individuals and groups that they form. *The Wealth of Networks* is an enlightening tribute to this power. However, this recognition, and the ability of European and American analysts to share this common umbrella is only the start of a new conversation. This conversation is likely to have many threads, but I will just initiate one, by asking: How does the growth of information commons and related non-market activities interact with the monetary economy?

From Parallelism to Collision

Yochai Benkler, just like Lawrence Lessig [6], proposes an optimistic view of the impact of commons-based societal production of information on the economy overall. There are strong arguments in favour of such an optimistic view as a long-term perspective. If a huge sphere of non-market activities develops, the provision of infrastructure and support services to these activities is itself a huge domain. In addition, more demanding consumers and more knowledge and innovation (for instance, on environmental issues) open new prospects for development in the material economy. However, what about the transition from our existing economy to this long-term perspective? Here is a small narrative to illustrate why this transition risks being a difficult and chaotic one, well beyond the choices whose need Yochai Benkler rightly stresses regarding our regulatory ecology.

Once upon a time, there came the information revolution. First, from 1945 to 1975, non-market societal production of freely exchangeable and usable information developed silently. It happened as a natural way of using information technology and information-based science, in specialized circles (scientists, programmers), often without naming explicitly what was done. In this period scientists and engineers created the best part of software techniques and algorithmics, of network protocols, user interfaces and digital media concepts, of information science and how it can be applied in biology. This infrastructure set the basis for the next 30 years of human development, new markets and growth. However, very different ways of using information technology also matured during the early information age. Large organizations (both companies and public organizations) which were at the time the principal users of computers focused on process, profit and cost optimizing, with contrasted results on the latter. These early trends are now visible at full range, with the domination of finance on industry agendas and with a form of globalization where

mechanisms [7] delay its positive effects on development. More recently, it was imitated by some emerging countries (mostly China) in which the lack of democracy makes it possible to exert lasting pressure against the build-up of local initiatives that serve human development. The control and surveillance aspects of information and communications technology (ICT) [8] have become more prominent: security and short-term profit optimizing have developed new synergies.

In a second phase, the two trends that earlier developed in parallel have started colliding. As first this collision was noticed only in specialized circles. Though the process preparing TRIPS (Agreement on Trade-related Aspects of Intellectual Property Rights administered by the World Trade Organization) can be traced back to the mid-1960s, who understood what was going on before its signature in 1994? Similarly, the expansion of information commons and societal production was visible only for its initiators until the mid-1990s. Today, it has become evident that there is a big battle to set the regulatory environment in favour of one or the other trend. However, this regulatory battle is only the perceptible part of deeper economic tensions. The two models are also fighting for money and for time. I mean capital and human time.

Capital and Profits

Let's start with capital. When one compares the ratio of stock capitalization to turnover, added value or profit [9] for major world companies in many sectors, one finds huge discrepancies. The ratio of capitalization to turnover varies from 0.11 (General Motors or Ford Motor) to 17 (Google) across companies, from 0.35 (automotive) to 3.55 (pharmaceuticals) across sectors. It ranges from 0.45 to 17 across the software sector where software service companies, proprietary software semi-monopolies and companies based on large network effects such as Google cohabit. Most companies that have high ratios are patent (mostly in pharmaceuticals and agro-food genetically modified organisms), copyright (in software and media) or trademarks (in food and luxury consumer goods) businesses.[10] These information capitalists [11] set the standards of desired return on capital. The effects of these standards are felt well beyond quoted (public) companies: research and development (R&D) funding or venture capital force many innovators to pose as future information capitalists rather than simply develop a sustainable and reasonably profitable activity that serves the information commons and non-market activities. In the present state of market organizations, the prospects of ROI (return on investment) for added-value intermediators in the non-market sphere are a huge question mark. In a given domain, one dominant collaborative medium can rest on advertising but serious economic works [12] have demonstrated that this model cannot scale up. Can the indirect funding by those who benefit from the non-market sphere (for instance, hardware manufacturers and telecommunications companies) and the recycling by some public interest-minded winners of financial games suffice to fuel the future wealth of networks? Can mutualizing between individuals provide enough of a complement? Is some form of government organization of mutual funds needed? All these questions deserve policy's and society's interest.

Human Time

The fight for access to capital is only a skirmish compared to the war that rages for human time. In a few decades, television has captured half of human free time in the developed world (3½ hours per day in most countries). Time recently liberated from television in favor of ICT-mediated activities has unfortunately gone for a significant part to immersive activities, such as games and advertising-dominated digital media. What is less known is the degree to which the present economy has come to depend upon the capture of human attention. We are not speaking here of media alone. The demand for many consumer goods is sustained only through what one of the French television chief executive officers described as 'available brain time' being provided by media to the providers of these goods. As brain time becomes less available, as more valuable endeavours compete for it, our present economy will go into a crisis. This crisis is also an opportunity, just as the environment and climate change challenges are an opportunity.

People becoming more independent, more critical, more able to choose how they use their time, becoming producers as well as consumers, members of the public in John Dewey's sense [13],

is an exciting perspective. It is infinitely valuable, whether or not it is good for the economy, but there is all reason to believe that it will lead to new forms of economic growth. However, we will go through chaotic paths before we are there. What will be apparently taken away from today's economy is actually fake; it is monetary face value that stands only on arbitrary monopolies, conventional beliefs or what will look retrospectively to be a strange consent to hypnotic consumption. We had better get our measures right as soon as possible, so they start showing what is being built during this process, with indicators that capture the many facets of the wealth of networks.

Notes

- [1] *Cause commune: l'information entre bien commun et propriété* [Common cause: information between commons and property]. Paris: Fayard, 2005.
- [2] In this article, information commons refers to productions that can be represented as information (creative works in all media, software, biological or other scientific information, information processing tools such as software, etc.) when they are given a commons status (are freely usable to relevant degrees). By extension, it also covers the collaborative activities that produce and value these productions.
- [3] Formerly the Consumer Project on Technology.
- [4] In particular in *Development as Freedom*. New York: Anchor, 2000.
- [5] See *The Wealth of Networks*, pp. 308-311, or my paper, 'Capabilities in the Information Era', TransAtlantic Consumer Dialogue (TACD) Workshop on the *Politics and Rhetorics of Intellectual Property*, Brussels, March 2006. <http://paigrain.debatpublic.net/docs/TACD-200306.pdf>
- [6] This section is the product of a conversation with Lawrence Lessig initiated in Berlin after his *Read/Write Society* talk during the *Wizard of OS 4* Conference and pursued through later exchanges by email.
- [7] Globalization of uniform patent and copyright rules, division of production in small modules with no visibility of local workers – including technicians and engineers – on the overall strategies.
- [8] The aspects were always present, from World War II to the Cold War. The difference is the degree of confusion between domains: non-commercial exchange of information covered by copyright can be depicted as a form of terrorist cybercrime by copyright stock holders who successfully lobby for making it the object of criminal sanctions, while the creation of data retention for security purposes can be included in a European directive on privacy.
- [9] Cf. *Economic Impact of Open Source Software on Innovation and the Competitiveness of the ICT Sector in the EU*, study conducted by a consortium led by MERIT for the European Commission Enterprise and Industry General Directorate, pp. 118-121. <http://ec.europa.eu/enterprise/ict/policy/doc/2006-11-20-flossimpact.pdf> (2004-05 data).
- [10] A small number are network effects companies, Google being the prototype of this category. They would deserve a specific treatment, as their activity is much more compatible with the development of commons-based non-market activities, though in a limited (in number of possible winners) and very unstable manner.
- [11] I use the word for all companies whose added value lies predominantly in the costless reproduction of an intangible entity, that can be information per se or some informational entity included or attached to their products.
- [12] See, for instance, Douglas A. Galbi, Some Economics of Personal Activity and Implications for the Digital Economy, *First Monday*, 6(7). http://www.firstmonday.org/issues/issue6_7/galbi/index.html
- [13] Informed by their awareness of the interest of a greater community

LESLIE CHAN: Human Development and Open Access 2.0**Overview**

In the landmark book that is the subject of this symposium, Yochai Benkler lays out a grand vision of how non-market commons-based peer production of knowledge and culture is transforming the global economic and political systems, while simultaneously empowering individuals and citizens with new forms of personal and political autonomy. In a world where one billion people have the capacity to create, store, share and distribute information at minimal cost, the distinction and boundaries between the intellectual centre and the periphery are beginning to blur, as each node on the network has the potential to become the centre. This dramatic shift from the industrial model of production to distributed and decentralized knowledge production has the enormous potential to alter the course of human development and greatly reduce the huge North–South asymmetries in economic power and access to knowledge. Both are fundamental to the improvement of human well-being.

However, the connection between the seemingly abstract notion of commons-based knowledge production and human development is neither obvious nor straightforward. Some might ask, ‘what has Wikipedia got to do with the 49 percent of the population of Congo that lacks sustainable access to improve water resources?’ (Benkler, p. 321). Is a commons-based and non-market approach to development possible and how would it differ from the dominant development thinking based on the neo-liberal philosophy of market competition and global economic integration? And what roles, if any, does open access to scientific literature play in international development, particularly with regard to poverty alleviation and the reduction of inequality in wealth and the general well-being of the citizens in less developed countries? Could open and collaborative research lead to substantive improvement in technical and research infrastructure, particularly in the areas of medicine, biotechnology and agriculture, in poorly resourced countries?

Benkler provides glimpses and examples for some of these questions in chapter 9 of his book, though he cautions against unbridled optimism, given that many of the commons-based initiatives are still in their infancy. Further, Benkler’s interest is in demonstrating the normative aspects of commons-based productions and why they should work, given the appropriate conditions, and he is less concerned with the details of how the various models – such as open access publishing – could be carried out in practice and, more importantly, sustained. For those of us involved in fostering alternative models of scholarly publishing and, in particular, providing open access to research originating from developing countries, economic sustainability is one of the most pressing challenges. This is in part because funding bodies, universities, donors and development agencies are not yet fully aware of the enormous benefits of open access to publicly funded research and, in particular, its effect on sustainable development.

In addition, universities and government funding bodies the world over are increasingly concerned with the economic return on research investment in terms of patents, spin-offs and intellectual property, while paying relatively little or diminished attention to the potential social and political return on research and public access.

Thus, another pressing need is the development of a framework for measuring social and intellectual capital and other benefits of open access that are non-market driven. Again, Benkler provides hints on how this can be accomplished, such as the development of new indicators, but further research and development in this area are much needed. There could also be an explicit link to Amartya Sen’s vision of ‘Development as Freedom’ [1], which Benkler cites. In Sen’s view, development should be seen not in terms of economic measures (e.g. gross domestic product [GDP] growth, average annual income), but in terms of the real freedoms that people can enjoy, such as educational facilities and social opportunities. Sen describes human freedom as both the primary end objective and the principal means of development, while economic measures are merely the means to this end. This view appears to be highly congruent with open access and this connection deserves further exploration.

In addition to economic sustainability and the need for alternative indicators, there are further challenges to the integration of open access and other forms of open and collaborative processes into current thinking and practices in the development arena. These include inclusive participation

and multiple layers of interoperability. I highlight each of these, and conclude with reasons why we should be optimistic about the future of human development in the networked economy.

Inclusive Participation

For researchers in developing countries, informed participation in global research agenda setting is often hampered by limited access to scientific information and essential data. Improved connectivity in many parts of the developing world is certainly improving access to the literature, but pricing and permission barriers are still significant impediments to the development of local research infrastructures. Programs such as the Health InterNetwork Access to Research Initiative (HINARI) supported by the World Health Organization and the sister programmes, AGORA (Access to Global Online Research in Agriculture, managed by the Food and Agriculture Organization) and OARE (Online Access to Research in the Environment, managed by the United Nations [UN] Environment Programme), are supposed to provide free access to researchers in qualified institutions in countries with gross national product (GNP) of \$1000 or less per annum. These initiatives are being tied to the UN's Millennium Development Goals, and aim to 'represent a truly global public private partnership for development, providing essential information for life to those who need it most'.[2]

However, these programmes are based on the implicit assumption that development is sufficient with the flow of knowledge or resources from the North to the South, as almost all the over three thousand journal titles are published in the North with only a small number of titles originating from the developing world. Are health and agricultural research conducted in America and Europe necessarily relevant to health workers, farmers and students in African countries, where disease profiles and food security are drastically different from the rich economies? Would work published in other developing regions of the world be more appropriate for researchers from those areas, particularly where development-related research is concerned?

Supporting scholarship in the global South must be a two-way street. In addition, the South-South exchange of scientific and traditional knowledge as well as common experiences may in fact be far more important for local development. Instead of just 'donating' information to researchers in developing countries, international foundations and the public-private partnerships must provide researchers with a way to share knowledge with each other and participate in research opportunities with peers in the developed world. The integration of journals and research results from the South in the global knowledge base, made possible through the use of open access repositories, may be a simple route for achieving this goal.[3]

In his recent book *Convergence Culture: where old and new media collide* [4], Henry Jenkins remarks, 'Increasingly, the digital divide is giving way to concern about the participation gap. As long as the focus remains on access, reform remains focused on technologies; as soon as we start to talk about participation, the emphasis shifts to cultural protocols and practices' (Jenkins, 2007, p. 23). Until recently, development programmes, particularly those initiated by the World Bank and the International Monetary Fund, have been top-down, bureaucratic, programme and donor driven. But we are now seeing more grass-roots driven initiatives based on participatory approaches so that decision making flows from the bottom up, rather than being driven from the top.

At the same time, we are still far from having a good understanding about what motivates participation in the new knowledge space. Numerous research universities in North America and Europe have set up institutional repositories, and an increasing number of repositories is also springing up in transitional countries.[5] Yet most of these repositories remain largely empty despite convincing studies that show the higher number of citations and impact of materials deposited in these spaces.[6] We know even less about researchers' behaviour, motivation and institutional practices in the developing world. Again, much empirical research remains to be done.

Interoperability

The term interoperability is generally understood to be a technical practice of ensuring that different computing systems can communicate and that diverse digital objects could be easily exchanged and retrieved through a common protocol. In the open access environment, the Open

Archive Initiative Protocol for Metadata Harvesting (OAI-PMH) has become the de facto standard for ensuring discovery and retrieval of OA objects. Interoperability is particularly important, as common-based production has been spreading rapidly across the various knowledge domains, from software to scholarly publications to educational materials. The Open Educational Resources (OER) movement is now a significant force in education and it also has great potential for transforming the nature of access to knowledge not only in the industrialized world, but also in fostering endogenous development and South–South collaboration.

The OA movement and the OER movements have been developing somewhat independently, with different agendas, institutional affiliations, strategies, technical tools and standards. Both movements, however, are also supported by the development of open source tools, reflecting the common philosophy of knowledge sharing and community building. These independent developments reflect to some extent the separation between teaching and research in most higher education institutions, where research tends to be more highly regarded and rewarded. It is time for a more coordinated effort between the two movements, and more emphasis on ensuring interoperability between open access scholarly repositories, learning management systems and learning objects repositories. The convergence of the two movements is natural given the deep interconnection between teaching, learning and research and it is surprising that little dialogue has taken place across the communities until recently.

While it is important to ensure technical interoperability, it is just as crucial to ensure social and institutional interoperability because ‘the institutional framework we use to manage the stock of existing information and knowledge around the world – can have significant impact on human development’ (Benkler, p. 310). In this regard, it is likely that developments such as the Creative Commons and Science Commons will play a key role in ensuring institutional interoperability.

In addition to technical and institutional interoperability, there is also social or organizational interoperability that needs attention. Even though the OA and OER communities are distinct, they are relatively permeable, as interest in the development of learning resources and the dissemination of knowledge is seldom driven by political or monetary concerns. This is not the case with many development-related initiatives, which are often dictated by the interest of public–private partnerships.

As an example, there are currently over 100 such partnerships operating in the ‘research for health’ arena, including MMV (Medicines for Malaria Venture), the Stop TB Partnership, IAVI (International AIDS Vaccine Initiative) and many more. They have undoubtedly boosted research activity in providing medicines for neglected diseases in recent years, and have created effective channels for joint international, philanthropic and private funding efforts. There are, however, serious questions with regard to the governance of these multiple initiatives, and the ways in which the partnerships are structured. There is often a duplication of efforts, as knowledge created is often kept in silos that are inaccessible. Indeed, the problem of reinventing the wheel is all too common in the development arena and an open and transparent environment would ensure a more efficient funding and knowledge building environment.

As commons-based production becomes more widespread across various knowledge and cultural domains and as more organizations (both public and private) begin to ride the wave, the issues of technical, institutional and organizational interoperability and governance will become increasingly important. Will international governing bodies for OA and OER be necessary? Or should these initiatives be left on their own, to grow and to perish, depending on the demands and usage by the creators and the users? When would institutional policies be necessary and how would they affect participants’ behaviour? The network information economy is ripe with interesting research questions with practical and policy consequences. Benkler’s book will keep students and scholars of the new economy busy for years to come.

Towards Global Partnership

In December 2007, hundreds of non-governmental organizations, major development organizations from around the world, UN bodies and officials, and many citizens, activists and academics converged in Kuala Lumpur for the third Global Knowledge Partnership extravaganza.[7] In keeping with the transition from the industrial information economy to the

networked economy, one of the stated goals of the Global Knowledge Partnership meeting was to examine the ‘need for a user driven approach to development and application of technologies’. The meeting was also dedicated to the development of public–private partnerships in the use of information and communication technologies for development; to exploring emerging markets and business models in the increasingly open network environment, and to promoting social networking in a global development context. Open access to the scholarly literature was a topic of discussion at several major sessions at the conference, and the topic turned out to be a new one for many of the participants at this venue. However, the productive encounters with a multitude of grass-roots driven initiatives and networked based innovation have broadened the perspective and meaning of OA, transforming it from a debate among publishers, researchers, and librarians, to a topic that is increasingly seen as central to the future of knowledge driven human development. Though there is no easy answer to the question of what Wikipedia has to do with the 49% of citizens in the Congo who have no access to clean drinking water, Benkler has provided us a structured framework and a set of powerful ideas with which to debate and examine the role of open access and network in development.

Notes

- [1] Amartya Kumar Sen (2001) *Development as Freedom*. Oxford: Oxford University Press.
 - [2] <http://www.who.int/entity/hinari/Hinari-Oare-Agora%20Leaflet%204pp.pdf>
 - [3] See Leslie Chan, Barbara Kirsop & Subbiah Arunachalam (2005) Open Access Archiving: the fast track to building research capacity in developing countries, *SciDev.Net*, November. <http://www.scidev.net/ms/openaccess/>
 - [4] Henry Jenkins (2006) *Convergence Culture: where old and new media collide*. Cambridge, MA: MIT Press.
 - [5] See the Directory of Open Access Repositories. <http://www.opendoar.org>
 - [6] See Steve Hitchcock’s bibliography on open access citation advantage. <http://opcit.eprints.org/oacitation-biblio.html>
 - [7] See <http://www.gkpeventsonthefuture.org/>
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JEAN-CLAUDE GUÉDON. Network Power and ‘Phonemic’ Individualism

Introduction

For the last 60 years, sometimes silently, sometimes noisily, computers have invaded ever larger segments of our lives. In the early phase of the digital age, the military came first; then management took advantage of the new technology. From defence (e.g. the Electronic Numerator Integrator and Computer – ENIAC – or, later, the Semi-Automatic Ground Environment or SAGE) to aviation (American Airlines SABRE), computers became the workhorse of vast managerial structures. Their presence was felt in ways that could not have been predicted: many people first met the digital world through the punched card that, for a time, adorned the billing processes of a number of utilities and other large companies. Destined to be treated by mechanical reading devices, their physical integrity became an issue: ‘do not fold, spindle or mutilate’ was the stock warning. Ultimately, the injunction was ironically extended to the misuse of human beings in bureaucracies and in the Vietnam war.[1]

Meanwhile, the blinking lights of computer displays were hard to miss and predictably attracted Hollywood types. They often came to symbolize threatening and uncontrollable technologies (e.g. Stanley Kubrick’s *HAL in 2001: A Space Odyssey* [1968] and Joseph Sargent’s *Colossus: the Forbin Project* [1970]). Although dealing with the future, these films reiterate a well-worn argument going back to at least Samuel Butler’s utopia, *Erewhon* (1872), particularly its chapters on ‘Darwin among the Machines’ and to Karel Čapek’s famous play *RUR* (1921) where the word ‘robot’ was first introduced [2]: human beings would have to compete with their own machines and would not necessarily win.

To be complete, the digital world needed to add another dimension – that of the network. In the early 1960s, J.C.R. Licklider came up with the startling notion that computers were communication tools and could communicate either among themselves or with humans.[3] Under the somewhat hyperbolic title of ‘Galactic network’, Licklider envisioned a world where computers *and* information would be linked and accessible to anyone anywhere in the world. This vision was later implemented, first through ARPAnet after 1969 and a little later, by the Internet. At that point in history, most of the tools needed to connect computers together were in place. Connecting information through computer networks was the next step.

The dream of connecting documents together is actually an old one. Ramelli’s famous book wheel is a clear example of the desire to compare and connect texts together.[4] Similar devices appear as late as the eighteenth century, thus demonstrating the staying power of a device that incorporated the collating, verifying and stabilizing functions of the codex when it was redesigned into the Hexapla by Origen in the third century CE.[5] Diderot and d’Alembert’s *Encyclopédie* incorporated a series of ‘renvois’ allowing the reader to both navigate large amounts of information organized in alphabetical order, and read this information as if it were a book, but a book dispersed within a dictionary format.[6]

Closer to us, Vannevar Bush is often seen as a precursor of the contemporary concept of hypertext, and his celebrated article ‘As We May Think’ [7] is often mentioned in this context, but it would be just as easy to see him as a distant disciple of Origen. However, a further and decisive step was made possible when Tim Berners-Lee, then of CERN near Geneva, developed the foundations for the World Wide Web, starting in late 1989. By providing a simple protocol (http or hypertext transfer protocol) and a simple ‘tagging’ language (html or hypertext mark-up language), Tim Berners-Lee did manage to add the document-linking function to the machine-linking capacity of the TCP/IP protocols that defined the Internet. In 1993, when Mosaic, the prototype of our modern browsers, appeared, it can be said that the publishing tools of the World Wide Web had found their reading aid complement. It can also be argued that the ‘Network Age’ had then reached its first complete implementation stage, however ‘incunabular [8] it may already look to us because of its touching attempts to emulate the print world.

In the last dozen years, many scholarly and journalistic efforts have been expended with the objective of understanding or interpreting what, for lack of a better expression, could be termed the ‘Network Age’. As a result, a considerable bibliography has developed around the nature of Internet communication, the creation of new ‘communities’, the redefinitions of self, etc. Hypertexts, multimedia, interactivity, immersion and virtuality are but a few of the terms that have focused the attention of countless scholars. The Internet has spawned intellectual cottage industries that have already produced several hundreds of titles in practically all the major languages of the planet. These studies vary from frantically enthusiastic to somber and dystopian. For example, the French, true to their sceptical form, have been very active in predicting all kind of disasters ranging from the loss of social cohesion through anarchic fragmentation (Dominique Wolton) to the birth of dark religious-like sentiments fed by some sinister cybernetic impulse (Philippe Breton), but they also harbour their enthusiasts, such as Pierre Lévy.[9]

One main feature characterizes most of these Internet studies: they tend to react to some aspect of the Network Age rather than seek its deeper essence, and they do so to such an extent that, in many ways, they tend rapidly to fall on the side of primary sources. It would not be an exaggeration to treat them as incunabular reactions to events accompanying the incunabular phase of the Network Age. They provide many important insights, much-needed documentation and, on occasion, they even manage to reach a useful level of generalization or synthesis. However, these partial, incomplete and not entirely satisfactory results *a contrario* demonstrate the absence of a theory of the Network Age while underscoring the need for it.

The importance of Yochai Benkler’s book, *The Wealth of Networks*, lies precisely in the fact that it is the first book that attempts a coherent theoretical treatment of the Network Age. It provides a sound foundation for such a theory and the remainder of this small essay will try to demonstrate why this is the case and why it is important, including in some of its consequences.

What Sets *The Wealth of Networks* Apart?

Benkler's title is a sly wink at Adam Smith's classic, but it is also more than that. There is a foundational intent in the choice of this title and it is important to try locating it as precisely as possible. In Adam Smith's study, 'markets' and 'division of labour' correspond to two of the most important concepts of the emerging science of economics. What are the equivalent concepts in Benkler's study?

To provide an answer to this question, we must turn to what I consider to be the crucial passage in the whole book: it starts with defining three kinds of story-telling societies, the Reds, the Greens and the Blues.

Each society follows a set of customs as to how they live and how they tell stories. Among the Reds and the Blues, everyone is busy all day, and no one tells stories except in the evening. In the evening, in both of these societies, everyone gathers in a big tent, and there is one designated storyteller who sits in front of the audience and tells stories. It is not that no one is allowed to tell stories elsewhere. However, in these societies, given the time constraints people face, if anyone were to sit down in the shade in the middle of the day and start to tell a story, no one else would stop to listen. Among the Reds, the storyteller is a hereditary position, and he or she alone decides which stories to tell. Among the Blues, the storyteller is elected every night by simple majority vote. Every member of the community is eligible to offer him- or herself as that night's storyteller, and every member is eligible to vote. Among the Greens, people tell stories all day, and everywhere. Everyone tells stories. People stop and listen if they wish, sometimes in small groups of two or three, sometimes in very large groups. Stories in each of these societies play a very important role in understanding and evaluating the world. They are the way people describe the world as they know it. They serve as testing grounds to imagine how the world might be, and as a way to work out what is good and desirable and what is bad and undesirable. The societies are isolated from each other and from any other source of information.[10]

Benkler starts from an interesting anthropological basis: societies exist through what he calls 'story-telling' and the ways in which the social fabric is woven and maintained is related to the mode of storytelling adopted by a particular society. This raises a number of subsidiary issues, such as: how many modes of storytelling exist? How are modes of storytelling selected by a particular society? How long do the storytelling modes last? What makes them last? What makes them disappear? How does a society move from one mode to another? What are the implications of each mode of story telling for the corresponding social system? Leaving aside these questions for the moment, the storytelling hypothesis offered in *The Wealth of Networks* – itself presented as a story – provides a conceptual framework that shifts the analysis away from the reactive stance that has characterized most of the Internet studies alluded to earlier: to the market concept that Adam Smith constructed in the *Wealth of Nations*, Benkler adds a market of ideas that can emerge only if a number of conditions are satisfied. Otherwise, the communication modes that prevail are based on power, and, in turn, serve to maintain that power.

As any good fable, Benkler's is a '*roman à clef*' and it is not difficult to decipher: absolute monarchies and most forms of religion would fall in the red category, as would (appropriately red) Marxist countries and all kinds of fascistic governments where freedom of expression has been or is severely controlled. From Benkler's perspective, the famous, if somewhat disingenuous, distinction between 'authoritarian' and 'totalitarian' regimes that Jeane Kirkpatrick advanced when she was US ambassador to the United Nations in the Reagan years, appears completely irrelevant: both types are red, solidly so. Even formally democratic regimes could be easily classified as red states if their control over the press, radio and television is a little too tight – a point which Ithiel de Sola Pool explored some years ago.[11]

The blue version reserves a few more surprises. The vote described in Benkler's text refers to the way in which the storyteller is chosen and it corresponds to the set of thousands and even millions of decisions made to tune radio or television, or it resides in the choices of printed materials. Bob, member of a blue society, sees his autonomy constrained not so much by the storyteller as by the choices of his contemporaries. As Benkler continues, 'If the majority selects only a small group of entertaining, popular, pleasing, or powerful (in some other dimension, like

wealth or political power) storytellers, then Bob's range of options will appear only slightly wider than Ron's, if at all'.[12] The majority rules even though, in principle, anyone may tell a story. The problem is that only a few stories will be available on the main and most accessible channels. As for the other stories, only a few, in the best of hypotheses, will make the effort to seek them out. And the perspective of a very small audience contributes to limiting offerings that do not conform to the majority's wish. The constraints in this case will emerge out of practical rather than doctrinal considerations, and for this reason, the blue world is a lot more stable than the red world because its constraining machinery is built on acquiescence rather than forcible or violent repression. In fact, the blue world is better at controlling the scope of dominant themes than the red world. In so describing the blue world, Benkler brings back to the surface some of the critiques of media as found in the Frankfurt school, and particularly in Herbert Marcuse's work. Intimations of Michel Foucault's theory of power can also be discerned in this context.

Gertrude's world, the 'Green' world, may well deserve its ecological connotation by the fact that, in it, everyone can be a storyteller and everyone can tell a story wherever and whenever he/she wants. Benkler's main point, however, is that the disappearance of the 'big tent' and of the 'evening session' provides a far more open context for the circulation of a wide range of stories. Unexpected and unusual stories may emerge from anywhere and reach unintended audiences. In short, all of society would begin to work as if all the stories obeyed diffusion and transmission mechanisms similar to those of jokes and rumours.

How does a society choose between a particular mode of storytelling and another? Benkler's answer, for the present world, is largely an economic one: in what he calls the 'industrial information economy', two characteristics contribute to the tight control over who can tell stories: high entry barriers and large economies of scale. In other words, to become a storyteller, one needs a lot of capital; once that hurdle is past, the economies of scale contribute to maintaining the achieved system in place. Newspapers and other print products, radio and television stations, as well as movie studios all obey these two fundamental rules. They fundamentally explain why Orson Welles's famous *Citizen Kane* was more of a citizen – 'more equal' would quip Orwell – than his contemporaries.

To pursue the exploration of subsidiary questions already listed earlier, the three modes of storytelling refer back to three basic social systems – centralized and hierarchical, apparently decentralized but recentred around a majority, and distributed. The centralized and hierarchical model maps easily onto the holistic vision of the universe that prevailed through various neo-Platonic doctrines that dominated the Mediterranean world until at least the Renaissance.[13] The decentralized, majority rule maps onto the modern political theories that emerge around Locke and other thinkers such as Montesquieu that still make up the philosophical foundation of modern liberal democracies. In it, the individual, either as citizen (or actor in a market), is a fully informed being *à la* Descartes that always makes rational choices. In the end, this individual behaves very much like the social and moral equivalent of a physical atom: in this view, the social world, like the physical world, is built up from 'simples'. This is the world of both the American and French Revolutions.

As for Benkler's green world, it is a social form that presently exists only in niche areas of our societies. The world of 'free software' provides him with both empirical ammunition and theoretical fodder. However, this is not the only available example. Scientists conform to this distributed form of social structure. Robert K. Merton, the well-known sociologist of science, described the scientific ethos as significantly different from society at large and resting on a number of values that, taken together, are specific to scientists – organized scepticism, disinterestedness, universalism and communalism. The scientific 'ethos' thus distinguished the collective behaviour of scientists and functionally contributed to its social success.

Earlier, we raised the issue of how does a society move from one form of storytelling to another? Yochai Benkler's answer is interesting because if there is indeed a link between the mode of storytelling and social order, then a new mode of storytelling should correspond to a new form of social structure with associated forms of power and economic systems. What sets Yochai Benkler's book apart from other studies of the network age is not that he sees it as revolutionary (although he does) – many others have made similar claims; it is not that he distinguishes it from other periods of history – again, several authors have used phrases such as 'network age' or

'Internet epoch'. It is really based on the second element also taken from the foundational contributions of the *Wealth of Nations*: the division of labour. And from there Benkler invites us to revisit the whole idea of individual.

Towards 'Phonemic' Individualism

Whereas division of labour is seen by Smith as the result of a top-down, managerial intent, as a production masterplan that sets everyone in a well-defined role, Benkler, when he deals with the 'green' world, sees the division of labour as an emergent phenomenon stemming from interactions between individuals: out of the constant dialogues, discussions and debates fluid roles arise. Like eddies in a stream, these roles enjoy relative, but only relative, stability. Individuality, in this perspective, sums up the possible role shifts one person may live through.

In the 'Green' world, individuals are found positioning themselves temporarily in one role or another according to the relations they develop with other individuals. In other words, in the green world, individuality is no longer built like an atom, in full self-sufficiency. It is no longer an individual simply endowed with 'properties' – the whole polysemic wealth of the term is needed here – but rather an individual whose very essence, paradoxically, depends on his/her relations with other individuals. More precisely, existence depends on distinguishing oneself from others.[14]

A form of individuality that necessarily rests on the individuality of others calls for a general interpretative scheme that goes beyond what earlier theories of society have contributed. It goes beyond an 'emanation' or holistic theory of individuals, based on divinities and their human proxies, leading to a feudal vision of society.[15] It cannot limit itself to the self-sufficient atom-like individual that stands as the foundation of the liberal age (where 'liberal' here means adherence to the tenets of classical economics). We must therefore reach beyond emanation and atom-like individuals to reach for a third kind of individuality. Let us call this third way the 'phonemic' approach. Although as powerful in its reach as the holistic or atomistic approaches, it has not been used nearly as much until now.

What is a 'phonemic' approach? It is based on the concept of phoneme, of course.[16] Here, it is adduced as, in a sense, a synthesis of the holistic and atomistic explanatory modes: imagine a universe where every existing entity would have the appearance of an atom, but, simultaneously, would appear to emanate from a number of these other apparent atoms. Let us add that the emanation is not a transitive, transparent process: the link between two phonemic entities is not guided by some form of analogy, but, on the contrary, by some distinctive characteristic. The total result could be described as a 'peer-to-peer emanation system'. Phonemes, in the field of phonology, behave precisely in this manner. They exist only by being distinct from other phonemes. The existence of one entity depends on the existence of all, and it also depends on maintaining a distinctive uniqueness with respect to all of the other entities. Their existence marks the fact that their difference makes a difference – precisely the definition of information according to Gregory Bateson.[17] They offer, therefore, a powerful metaphor to think beyond atomistic or emanation-based individualism.

What Yochai Benkler is founding with his important book is not only a revision of the market concept, or of the division of labour that accompanies it. What Yochai Benkler is really inviting us to do is to revisit our understanding of markets and division of labour in terms of a new form of individuality that cannot be thought within the atom category, or denied on account of a divine hierarchy out of which everything emanates (and to which it must return).

What remains difficult to apprehend with social phenomena such as the free software movement, Wikipedia and other peer-to-peer processes that seem to fly in the face of long-accepted notions of 'human nature' becomes far more comprehensible if we begin to look at human beings behaving like phonemes. If we remember that phonemes relate to language and that human beings do speak, the metaphor appears far less contrived. On the other hand, the reasons why human beings should be apprehended as emanation of some wholeness can only be based on faith. And if human beings chose to apprehend themselves as the similes of as atoms, it may simply have been a reaction to that faith. Neither emanation nor atoms need language incidentally, but human beings distinguish themselves through language. And the full deployment of language requires the existence of phonemic individuals. The wealth of networks, therefore, lies in

phonemic individuality. Any other approach to human beings will simply be sub-optimal and that is the fundamental thesis of Yochai Benkler's crucial work.

Notes

- [1] Steven Lubar (1991) 'Do not Fold, Spindle or Mutilate': a cultural history of the punch card.
<http://ccat.sas.upenn.edu/slubar/fsm.html>
- [2] In Czech, 'robotá' means boring and unpleasant labour. The word was re-used by Doug Chiang and Orson Scott Card for the title of an illustrated sci-fi book of this title (2003).
- [3] J.C.R. Licklider & W. Clark (1962) On-Line Man-Computer Communication, *Proceedings of the AFIPS SJCC*, 21, 113-128.
- [4] Agostino Ramelli (1588) *Le diverse et artificiose machine del Capitano Agostino Ramelli* [The various and ingenious machines of Captain Agostino Ramelli]. Paris: in casa del'autore.
<http://www.sil.si.edu/Exhibitions/Science-and-the-Artists-Book/76-14435.jpg>
- [5] The excellent anthology, *Books and the Sciences in History*, ed. Marina Frasca-Spada & Nick Jardine (Cambridge: Cambridge University Press, 2000) contains an illustration, p. [169] taken from the *Recueil d'ouvrages curieux de mathématiques et de mécanique ...* by Gaspard Grollier de Servière (Lyon: David Forey, 1719). The same illustration can be found online at <http://cnum.cnam.fr/CGI/fpage.cgi?4PO3/204/110/223/31/213>. On the Hexapla and its potential history for the history of the codex and of reading, see Anthony Grafton & Megan Williams (2006) *Christianity and the Transformation of the Book*. Cambridge, MA: Belknap Press of Harvard University Press.
- [6] This point is well made by Richard Yeo in his 'Encyclopedic Knowledge', in *Books and the Sciences in History*, pp. 207-224. My own PhD thesis tried to demonstrate this point in the case of chemistry, albeit without any reference to the possibility of a history of reading. See Jean-Claude Guédon (1974) *The Still-Life of a Transition: chemistry in the Encyclopédie*, PhD thesis, University of Wisconsin-Madison.
- [7] *Atlantic Monthly* (July 1945). The article can be accessed at <http://www.theatlantic.com/doc/194507/bush>
- [8] The term 'incunabular' applied to digital documents was introduced by Gregory Crane. See Gregory Crane, David Bamman, Lisa Cerrato, et al, *Beyond Digital Incunabula: modeling the next generation of digital libraries?* <http://www.cs.umass.edu/~mimno/papers/ecdl2006.pre.pdf>
- [9] Dominique Wolton (2000) *Internet et après ? Une théorie critique des nouveaux médias*. Paris: Flammarion; Philippe Breton (2000) *Le culte de l'Internet. Une menace pour le lien social?* Paris: La Découverte; Pierre Lévy (2002) *Cyberdémocratie*. Paris: Odile Jacob.
- [10] *Wealth of Networks*, p. 162.
- [11] Ithiel de Sola Pool (1983) *Technologies of Freedom*. Cambridge, MA: Belknap Press.
- [12] *Wealth of Networks*, p. 163. In Benkler's fable, Ron is Red, Bob is Blue and Gertrude is Green.
- [13] Arthur O. Lovejoy (1976) *The Great Chain of Being: a study of the history of an idea*. Cambridge, MA: Harvard University Press.
- [14] Although Pierre Bourdieu does not use the 'phonemic' terminology, many of these arguments are present in his aptly titled study: *La distinction. Critique sociale du jugement* (Paris: Minuit, 1980).
- [15] Neo-Platonic philosophy has provided a great deal to this general vision. In Europe, it controlled the understanding of the natural and social order until the end of the sixteenth century. See A.O. Lovejoy (1936) *The Great Chain of Being*. Cambridge, MA: Harvard University Press.
- [16] On the phoneme, see <http://en.wikipedia.org/wiki/Phoneme>
- [17] Gregory Bateson (2000) *Steps to an Ecology of Mind*, 457-459. Chicago: University of Chicago Press.

References

- 2001: *A Space Odyssey* (1968) dir. Stanley Kubrick (Metro-Goldwyn-Mayer).
Colossus: the Forbin Project (1970) dir. Joseph Sargent (Universal Pictures).

JOHN WILLINSKY. The Educational Implications of Networks

With *The Wealth of Networks*, Benkler takes on Adam Smith's epoch-defining work, first published in 1776, at the very point in history when the economic system that Smith so carefully describes in *An Inquiry into the Nature and Causes of the Wealth of Nations* appears to have finally realized its global destiny, with market economies having now taken root around the world. It may seem an odd moment, then, for Benkler to turn the tables on Smith's vision; that is, to displace nations with networks and transform markets through social production (into *nonmarkets*, as it turns out). Although Benkler does not anywhere else in his book make such direct use of Smith's influential book, *The Wealth of Networks* establishes the economic viability of what is, at many points, much the opposite of what Smith was describing then as a new economic regime and what has subsequently taken on the qualities of natural law.

In the process, Benkler takes hold of capitalism's two dearest concepts, wealth and freedom, and gives them both a second economic life. He identifies project after project which is driven not by national and personal self-interest – which figured so prominently in Smith's work, as well as the continuing stream of economic theory following that tradition – but operates instead cooperatively through global, collaborative networks. These networks represent for Benkler a revolution in individual autonomy and democratic action, given how they freely distribute the means of participation to others, and those two concepts have a certain resonance with other events from 1776.

Yet if Benkler's book plays off the *Wealth of Nations*, concept by concept, it still resembles Smith's book in form. Both books describe new developments by identifying the logic and economic benefits in each case. Both give name and shape to what are already growing segments of the economy; both deploy prime instances, like the pin factory and open source software, leading to improvements in quality and increases in productivity and creative application. By rendering these developments sensible and visibly part of a larger development, Smith and Benkler accelerate their take-up by others over the longer term, if Smith's success is anything to go by.

To begin at the beginning: when Smith introduces on the first page of the *Wealth of Nations* the 'division of labour' as the new best hope of 'the productive powers of labour', Benkler's opens with 'the networked information environment' which represents the evolution of 'liberal markets and liberal democracies' that have prevailed since Smith's day (p. 1). To stay with Benkler's key term, the *networked information environment* brings to the fore what is most valuable and what might otherwise be overlooked in 'the Internet Revolution' (p. 1). At a time when, as he rightly points out, academics are dismissing such revolutionary talk as 'positively naïve', Benkler compresses into a triple-decker phrase like *networked information environment* the pervasive and encompassing flow of information through our lives and work, whether in call centres or college campuses. But if Benkler had left it at that, we would have little that was not already well known and often stated. Instead, he follows this initial portmanteau of a phrase with, in quick succession, the new terms of this revolution, marked by 'cooperative nonmarket production' (p. 2), 'decentralized individual action' (p. 3), 'nonproprietary strategies' (p. 4), 'large-scale cooperative efforts' (p. 5), and so on. Recombinant possibilities soon emerge, with the likes of 'networked information economy' (p. 3), 'radically distributed nonmarket mechanisms' (p. 3), and 'nonmarket, nonpropriety production' (p. 106). Each of Benkler's phrases has its own way of rewriting one or more of Smith's basic economic principles, whether one thinks of Smith's sense of *market*, *exchange value*, *self-interest*, *nation*, or the *division of labour*.^[1]

Benkler's forceful linguistic turn makes him a strong candidate for what the late philosopher Richard Rorty identified as the transformative poet. Benkler makes no pretence to being a poet, but he is certainly a writer capable of generating 'increasingly useful metaphors', in Rorty's term, who thus changes how the world is viewed and read (1989, p. 9). Benkler does appear to have an inexhaustible ability, again in Rorty's seeming simplification of things, 'to redescribe lots and lots of things in new ways', leading to 'a pattern of linguistic behavior which will tempt the rising generation to adopt it' (pp. 7, 9). For Rorty, there is no greater intellectual or poetic power than this particular knack; the 'talent for speaking differently, rather than arguing well, is the chief instrument of cultural change' (p. 7).

Now in addition to speaking differently, Benkler also argues these cultural changes, and exceptionally well, to my way of thinking. He makes fine distinctions, sets up sensible categories,

and marshals myriad on-the-ground instances to substantiate them, from Free High School Science Texts in South Africa (p. 101) to NASA's use of the public to mark crater maps and undertake other scientific work (p. 69). Yet this particular talent for naming what these various projects have in common contributes, in its own way, to 'an increasingly robust ethic of open sharing', as Benkler names what many of us hope will indeed carry the spirit of the age (p. 7).

By naming this economic model, if only in the negative terms, as both *nonmarket* and *nonproprietary*, Benkler makes it clear that the creation and distribution, for example, of free software code is not simply a circumvention or aberration in what is software's rightful market.[2] Rather, open source software represents a highly productive way for people to work together toward a public good. And while Benkler allows that people work on developing open source software because it provides people with access to what has become one of our basic communication systems, he also holds that it is about more than an ethics of openness. It is also about efficiency and productivity, those two critical wealth factors. Benkler very clearly sets out how cooperative approaches are contributing to 'the greatest improvement in the productive powers of labor' since the division of labour, to borrow from the opening from Adam Smith's first chapter (2006, p. 5). By demonstrating the effectiveness of cooperative ventures, such as open source software and *Wikipedia*, Benkler undermines what might otherwise have seemed, at the close of the twentieth century, to be the ubiquitous triumph of the market.

In the context of *Policy Futures for Education*, it makes sense to ask what the new terms of this alternative economy mean for the schools. When Benkler writes of the Internet's democratic spirit – in terms of how the 'network allows all citizens to change their relationship to the public sphere' as 'creators and primary subjects' – he could as easily be addressing what the public schools have long promised, if not always delivered (p. 272). This overlap is nowhere more clearly at issue than with the educational challenge posed by *Wikipedia*.

Benkler regards this multilingual free encyclopedia, not surprisingly, as a leading instance of an 'open, peer-produced model', and 'one of the most successful collaborative enterprises that has developed in the first five years of the twenty-first century' (pp. 71, 70). And yet *Wikipedia* is not like anything taking place in the schools today. It is the exact opposite. Ask yourself, as I have more than once in the face of *Wikipedia*'s heart-felt learning, what in today's schools can be said to really prepare students to collaborate anonymously, without credit or deadlines, on a drop-in basis, at the risk of being overwritten and vigorously attacked by equally anonymous strangers, as they press together collectively in the name of a 'neutral point of view' (as *Wikipedia* puts it), while being governed by a loosely organized (and enforced) series of principles having to do with verification and structure? *Wikipedia* demonstrates what a life of learning outside of school, for the sake of learning, can mean. It is a demonstration for the schools that continues to grow daily on a global scale and in a remarkably organic way. For all of its shortcomings, *Wikipedia* serves for most people as the primary educational gateway into this networked information environment. That this open and vibrant model of learning is so removed from the everyday world of schooling surely has implications for the policy futures for education.

I am not suggesting, however, that Benkler has fallen short in addressing the educational implications in *The Wealth of Networks*. He is above reproach on this count. He has done more than enough by pausing for a moment and offering a brilliantly sweeping educational vision based on 'the possibility that teachers and educators can collaborate, both locally and globally, on a platform model like *Wikipedia*, to coauthor learning objects, teaching modules, and more ambitiously, textbooks that could then be widely accessed by local teachers' (p. 315). It seems only fair to say that the onus for pursuing this book's educational implications falls on those who profess education for a living, at least in so far as they are persuaded by this book.

And that would be me, as I am an obvious enthusiast for Benkler's approach, and have already been involved in opening access to knowledge online (through work over the last 10 years on the Public Knowledge Project). This symposium may not be the appropriate place to pursue all of the educational implications of this work, although a few initial observations do seem in order, especially as it seems to me that Benkler's particular rhetorical casting of the new non-Smithean economics cannot be directly applied to the public schools. The schools may already be an information commons of sorts, operating outside of the commercialized world of markets. Yet schools that are going to have their students actively contributing to the intellectual commons

within their communities will have to teach these students many orders of propriety and property. In other words, the need is not, then, for a *nonproprietary* programme in the schools or a programme that engages in the nonmarket production of knowledge, per se. This is because, unlike the open revolt against the restrictive marketing of intellectual property represented by open source software, there has never been a market for the intellectual work coming out of the schools. In fact, some thought needs to be given to cultivating such a market, to finding ways for students to direct their learning toward work that serves others.

The educator, entering the school with *The Wealth of Networks* in hand, has now to assemble a curriculum that provides opportunities for learning about proprieties and properties, including the different forms of producing and utilizing intellectual property. It is not simply that one must learn the rules in order to break them. It is to understand that Benkler's nonproprietary economics is *nonproprietary* in very particular ways. It says *no* to only certain limited aspects of this broad concept. For instance, with open access research, another of Benkler's leading instances of markets transformed, we are seeing a number of scholars and librarians challenging an extremely damaging proprietary element of scholarly publishing, namely, the exorbitant pricing of scholarly journals that results in reduced access (which is further compounded by the impossibility of being able to subscribe to all journals even if they were reasonably priced). Yet the open access movement in scholarly publishing leaves untouched the proprieties of intellectual ownership that demands that authors duly credit those whose work they draw on, just as open access is not about the proprieties of grammar, genre, bibliographic formatting, graphic representation, and on and on.

But then when it comes to Benkler's particular focus on *nonproprietary* forms of cooperation and production, what seems clear is that schoolwork is already all too nonproprietary, in the sense that students' work lacks any value, as intellectual property. At a time when schools seem increasingly like training grounds for large-scale test-score production, there are few opportunities for students to engage in working on something that has value in its own right. The preparation for, and writing of, such tests has taken on such importance that it can end up teaching the students that their learning has nothing to do with creating a property. In this sense, the test-driven school is entirely a nonmarket and nonproprietary entity, and discouragingly so, given Benkler's sense that such entities otherwise are leading to increases in individual creativity and autonomy, as well as democratic responsiveness.

Yet there has always been a river running through the schools that is given to the cooperative, collaborative production – as students gather with paints, paper, glue, scissors, and computer – and it is now time to think about the market for what these students could produce, as they are gathered at perhaps the sole centre in their community engaged in non-commercialized intellectual production. The schools need to begin to think of the work that students do, as a result of their learning, as having value and interest for others, as itself one of the *properties* of intellectual work. Students can indeed, as Benkler suggests, help others in their learning, by developing resources for teachers and students; they need to contribute to *Wikipedia*, creating intellectual properties that begin with the local.

This suggests that students will have first to learn about their own capacity to produce intellectual properties of value to others, as well as learn, in the process, about the qualities (and proprieties) that such properties entail. Once students are thinking about producing intellectual properties of potential interest (and thus of value) to others, they could then take their first lesson in nonproprietary production by selecting one of the various Creative Commons licences for their work. In helping people select a licence, the Creative Commons provides a clear and readily comprehensive introduction to such issues as attribution, derivatives, share-alike, non-commercial use, etc. In thinking about their own work, students would be in a good position to learn about how properties of this sort – whether for photographs, maps, music, etc. – are marketed within and outside of traditional corporate economies. If terms such as nonproprietary are indeed metaphors, in the spirit of Rorty, then a basic concept like *property* can be further stretched and turned, rather than simply negated, as if it referred but to one thing, even within the economic realm.

By the same token, Benkler's use of the term *nonmarket* for this new economy is directed at negating but one aspect of *market*, by which goods are distributed on a commercial basis, with the goal of maximizing profits and, in the case of public corporations, increasing shareholder value. The nonmarket of (nonproprietary) open source software exists within the well-defined market of

operating systems, which is dominated by Microsoft, while the growing success of Linux, Apache and other open source software is measured in their 'market share'. That is, the nonmarket is itself a portion of the market that has grown out of the refusal of the current commercial model. It operates within an existing market of users.

As well, in the world of scholarly publishing, open access could be said to be creating a new manner of marketing research among authors and readers, one that ensures that the ability to find and read the relevant research on a topic is no longer unduly influenced by price structures and profit margins. But that said, scholarly publishing, as infused as it is today with various open access models, is no less a marketplace of ideas governed by long-standing proprieties. So, before the schools foster students of the nonmarket and nonproprietary aspects of this new economy, they would do well to consider using the very idea of *market* as a way of thinking about how students could direct some part of their learning toward the interests of those within their community, who could benefit from the sort of intellectual work that students are capable of producing, whether one thinks of local history, language services, performing arts.

Such work would still entail the proprieties of both student accountability and audience expectations, in terms of how this work is marketed within school districts and communities. On the question of accountability, for example, some educational jurisdictions have been experimenting for some time with students assembling portfolios for evaluation purposes, which represent a range of projects to which they have contributed (Tierney et al, 1998). These portfolios can capture the nature of the students' contributions, as well as – following the model of open source software development – provide evidence of the students' growing reputations for a certain quality of work (which will have been enhanced and developed in the hands of inspired teachers). In the process, the students learn the value of responding to the expectations of the market for their work.[3] By virtue of their work in the community, the students would have a stake in the game, and be able to see that their work within a public institution, like the schools, is already part of this knowledge economy.[4]

Progressive forces within the schools have long sought to embrace the commons, and take full advantage of the John Dewey moment that Benkler champions: 'There is emerging a broad practice of *learning by doing* that makes the entire society more effective readers and writers of own culture' (p. 299, emphasis added). Today, and in light of Benkler's book, what needs to be *learnt by doing* is how to direct one's learning toward sharing with others, even as learning how to establish a market for one's writing is exactly what being an *effective* writer is all about. Inspired by Benkler, educators have their own part to play in learning to do, by going back to public education's basic democratic promise, in examining how the schools can do more to ensure that, in fact, 'a networked information economy overcomes some of the structural components of continued poverty' (p. 307). To return, finally, to the title of Benkler's book, the schools should be able to use this model of social production, which they are so well suited for, to transform the current market for achievement-test scores into a new account of what students are learning and achieving in school, and they could do so in ways that would very much support the 'thickening of preexisting relationships with friends, families and neighbors' that Benkler notes as another effect of this new economy (p. 357). Such could be the wealth of networks when it comes to policy futures for education.

Notes

- [1] Part of the power of a compound concept like *networked information environment* is how each term shares equally in the idea and any one of the three terms can come to the fore, while the other two proximate terms can be hyphenated (i.e. networked-information environment; networked information-environment).
- [2] The refusal to hyphenate *non* in *nonmarket* and tying it to *nonproprietary* suggests that this negation is already commonplace.
- [3] There is a parallel here with what is known in educational circles as 'service learning' (e.g. Wolfson & Willinsky, 1998).
- [4] Another point of connection among progressive educators is with the 'see for yourself' political culture, which Benkler notes is superseding the sole reliance on mainstream media (p. 218), that is

found in those social studies classrooms that have set aside the textbooks (read mainstream media) and taken up the study of the primary sources around historical events (Wineburg, 2007).

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RESPONSE

YOCHAI BENKLER. Educating for Participation in the Networked Environment

There is something humbling about being in conversation with four insightful discussants simultaneously. I will try to do justice to these four very generous and entirely distinct interventions by asking a basic question: What question does each of these four ask about the future of education? Jean-Claude Guédon asks: What kind of person is it who comes into the conversation that is the educational relationship, and what kind of person ought we imagine coming out of that conversation as a lifelong participant in learning conversations? John Willinsky asks how we (educators) should engage individuals such as these, to create in them a sense of meaning and efficacy in their educational process. Philippe Aigrain and Leslie Chan both ask us what are the constraints on our ability to pursue an educational agenda focused lifelong engagement in peer production and open interactions, reminding us of the difficulties imposed by the limitations of resources. Aigrain highlights the fierce competition that the practices of peer production and commons-based production face for both capital and human attention. Chan complements his concern from competition in wealthy economies with his emphasis on the practical constraints faced by trying to implement the promise of the networked environment in poor societies, for example in providing access in the global South to research done in places that possibly have the most useful insight – elsewhere in the South.

Let me begin by telling four very short stories of a particular type of educational intervention in diverse contexts. The first I already mentioned in *Wealth of Networks* (p. 353): an initiative by William Scott, a chemistry professor at the University of Indiana Purdue University Indianapolis, who proposed teaching basic chemistry to undergraduates by having them synthesize molecules identified through computational biology as potential targets for developing world disease treatment. The idea consisted of developing low-cost experimental kits that could be used in classrooms across multiple institutions to teach chemistry and deploying them in a network of institutions, so that the multiple redundant classrooms and institutions could provide quality control for each other. The second story concerns my twelve year old nephew, who was matched up by his piano teacher as a tutor for another of her students, an eight year-old. The change was immediate – here was a near-teenager converting from a student who has to be persuaded to count or do his scales, to himself the teacher, patiently explaining and practicing the benefits of counting, and going slowly, and doing one's scales. The third is the case of law school clinical education programs, through which students take on real clients, selected by full time clinical faculty to present cases of manageable length and effort, through which students learn how to research, think, present, and innovate legal arguments in the context of providing legal services to people who simply are too poor to afford legal services, in contexts to which the resource-poor government-sponsored legal aid bureaus simply do not extend services – be it in employment and

immigration law help to immigrants, inmates' rights in prisons, or tenants facing eviction. The fourth and last story concerns a seminar I ran for students who were engaged in building a student network aimed at persuading universities to leverage their patent portfolios to influence pharmaceutical industries to either produce, or allow generic drugs manufacturers to produce otherwise-patented drugs for distribution in poor countries at affordable prices. They spent the semester reviewing the literature on university innovation and patenting, interviewing academics and administrators, developing substantial insights into the economics and politics of university patentable science and patents management and the relationships to the pharmaceuticals industry, and concluded with a program of action for their organization. The seminar occurred opportunistically – the students asked my substantive advice on their organization, and as we were talking about their interests we organized an *ad hoc* seminar on the subject, for which they worked much harder than a usual seminar, but out of which they learned and achieved an efficacy in the world much greater than the normal seminar.

How do these stories respond to the questions of Who?, What?, and Under What Constraints?, that are presented by the four essays in this symposium?

Who?

Jean-Claude Guédon has put his finger on a core problem that I found myself presented with in writing the book. The argument is situated in the American liberal tradition, driven by a search for political efficacy within my own society. But I also tried to provide a theoretical framework that would be available throughout parts of the world that have largely congruent, but nonetheless distinct ideas about freedom, justice, and society. This created the basic problem of characterizing what kind of individual human being would be both structured and constrained by practical systems of affordance and constraint, and capable of at least a practical autonomy worthy of respect as a creative, expressive individual and a participant in democratic discourse and cultural creation. Guédon's construct, the 'phonemic' individual, captures this continuous need for duality well. It offers us a way of thinking about individuals as both necessarily individual and distinct, as well as always in relation to others, and as capable of changing meaning and effect through continuous recombination with others. It also evokes our ambiguous relationship to structure – both enabled by it, and able to be creative by breaking it; as slang. or poetic license.

Easiest to map on to this shift is my story about my nephew. A rearrangement of the conversational role in turns rearranges the meaning of practice. From skill earned by rote achieved through discipline, the piano becomes a platform for conversation as mentor; a platform through which a pre-teen begins to differentiate himself from childhood through constructive enactment of the adult role of mentor and guide to a child. At the same time, the pre-teen comes to be respected by stranger adults (the mentee's parents) who make room for the tutor as a surrogate adult better able than they to fulfill this role; and the younger child comes to see maturity as within grasp, rather than as all powerful and authoritative. Practice as discipline, experienced by both children as impinging on their autonomy, shifts to becoming a form of serious play and transition to maturity and the acquisition through interaction with another. The clinical training has a similar structure, where students begin to practice in collaboration with peers, in conditions where they can use their emerging skills to provide empathetic help to others, and experience themselves through these relationships of caring as effective individuals and participants in a community. Their commitment as students in this context shifts from performing to test, and toward being successful in the real world, for the benefit of a real human being in real need. The meaning of what they learn shifts. Consistently, students who sign up for clinical programs rank them as among their most significant experiences in law school.

To emphasize, then. The critique of liberal individualism, on the one hand, or of the elimination of the individual in favor of some structure, deity, or entity like the nation or class, on the other, is not new. Finding some place outside of this unproductive binary has been a project of the intellectual center-left for a very long time. The rise of the networked information environment, and in particular of commons-based and peer production, however, creates new opportunities for large scale cooperative behaviors among remote strangers that simply will not be explained by either of the two ends of the binary. They create new practical urgency to develop

such an understanding of the self in context, and new domains of observation and reflection from which to develop it. The educational practices that are capable of utilizing persons of such a character, and building them up as both individual and connected in conversation are also not new, stretching back to Dewey at least. The networked information economy does, however, provide new avenues for communication and action by pupils and students, so that it offers not only a new urgency to educate people who are inquiring, cooperative, and creatively engaged, but also new means of doing so within one institution and across institutions.

What?

I take John Willinsky's core claim to be that we need to assure, as we embrace the role of nonmarket, distributed, nonproprietary production, that children and young adults whom we educate retain a sense of efficacy in their own work. He does so by, on the one hand, pushing back on the 'nonmarket' language I use and, on the other hand, re-appropriating the term 'market' to mean not only commercial, but more generally effective and valuable. I agree that efficacy and value are important to maintain and to render visible to children and students. I would offer a caution as to whether locating our concern with individual and collective efficacy in the metaphor of the market, by trying to extend that concept, or that of properties, is in fact the best strategy. My concern is that the market has long been the domain of not only commercial practice, but also of the instrumental view of human beings and their interactions. My preference is therefore to emphasize and legitimate the language of society, humanity, and efficacy, and to characterize these as practically usable, behaviorally and psychologically realistic, and analytically tractable constructs, rather than to try to expand the meaning of the market, while naturalizing and legitimating the expansion of its domain beyond the priced and instrumental. While I think the language is important, I want to emphasize that I do fundamentally agree with Willinsky on the importance of effective action, or the fact and sense of efficacy that students can experience, in the educational program. 'Learning by doing' isn't learning by *doing* if the outputs of the action are meaningless. The question becomes how one speaks of the value of the doing in terms that do not depend on the market and on property as the core metaphors. And again, I think the stories I tell offer an intuitive way of talking about meaning and efficacy that are not dependent on marketplace metaphors or on market value as the touchstone of effective doing as a modality of learning.

All four stories involve an instance of effective action. Be it synthesizing molecules whose quality and consistency actually matters, because they can be used to test compounds to battle neglected diseases, seeing a younger child improve his piano playing, seeing one's clients' interests protected, or seeing your hard work as a seminar student translate into political action about which you care, any of these represents a direct means of doing meaningful and effective work as the platform for learning. The different stories evoke very different levels of action, from the minutely local and personal, to the grand global scale of global health. From the educational perspective, it is the efficacy that matters, and in particular efficacy in a domain that carries meaning for the students.

How one translates the need for, and commitment to, effective learning by doing suggest several paths. At a minimum, allowing and enabling students and even younger children to pursue self-selected goals seems likely to support the sense of efficacy in a domain meaningful to them. Doing so risks, of course, many projects related to sports or celebrities, although even here, depending on context, this may be sufficiently useful a context in which to permit effective learning. Learning skills, like statistics, or the formulation of hypotheses and tests, may be as easily transmitted through putting together a presentation on sports statistics as it can for disease burden. Beyond pure selection, the approach in law school clinical training suggests structured choice – cases and clients can be selected for a combination of social impact and educational value, and then students can (at least in some instances), choose which among several projects and clients they will work with. Moving yet one level further in emphasizing efficacy and value, as understood socially, is to begin to connect schools with local public goods providers – beginning with local government, and moving to local social organizations and networks. Here, enlisting high school students at least, and perhaps even younger kids, in exploring solutions to local problems; learning how to diagnose problems, formulate solutions, identify resources and combinations of work, and

proposing them for implementation by the local government, organization, or school itself provides perhaps the highest form of effective engagement and the production of 'goods' that adults in their community value. Interestingly, this may be part of a broader move to harness peer production and open, collaborative models of social production to solving public goods problems well beyond the reach of the digitally networked environment. In this case, specifically online action offers a relatively simple avenue for developing visible and valued projects. The most obvious is developing enough research to correct or extend Wikipedia articles, and engage the other participants in conversation about why one's own summary of knowledge in this particular field is the one that ought to be respected, at least for now. But collecting information and producing well organized arguments about matters students care about, and then going about in social networks and other online mechanisms and trying to make that intervention visible and discursively significant for the relevant target audience or interlocutors is a more general approach. It is important to emphasize, however, that I see the networked environment as a domain in which technological-economic conditions have provided greater efficacy to actions that follow generally prevalent aspects of human motivation and social behavior. The critical educational intervention then is selection of domains of practically feasible effective action in the world, whether the feasibility is born of networked connections or of localized concern and focus.

Under What Constraints?

Phillipe Aigrain and Leslie Chan both represent concerns about the limits of peer production and collaboration as solution spaces, each from a very different perspective. Aigrain speaks from the hard experience of free and open source software. Here, the historical arc from open to proprietary to embattled open again suggests to him two distinct domains of competition between the open models of innovation and knowledge production and the proprietary, market-based models. These are first, competition over capital, driven by the high expectations of returns on investment (ROI) generated by proprietary models, which sucks capital out of peer production, and second, competition over human attention, whose capture and manipulation is the core focus of many Internet businesses, and which is a genuinely scarce resource on the Net. Chan focuses less on competition, and more on poverty. Much of my argument about how peer production and sharing are enabled in wealthier economies emphasizes the role of peer production in harnessing excess capacity – of computation cycles, storage, or bandwidth, as well even more importantly human creativity, wisdom, attention, and insight. To what extent is this abundance that I rely on in wealthier contexts still applicable in poorer economies?

I am more confident about my answer for wealthier economies than for poorer ones. First, the problem of capital accumulation is precisely the problem that the networked environment largely solved, because of the economics of personal computers. To me, the critical shift represented by the networked information economy is the fact that for the first time the most important material inputs, into the core economic activities, of the most advanced economies, are widely distributed in the population. Competition over capital occurs on the background of the widespread distribution of capitalization, and the emerging social practice of pooling human and material capital in large scale collaboration. These background facts shape the competitive environment for commercial organizations no less than the latter shape the environment for peer production. When venture capitalists have to decide where to put their money, then need to think not only of facilities for exclusion – say, through patents or copyrights – but also, perhaps mostly – on opportunities for growth, innovation, and scale. These have for several years come from platforms for peer production, not from platforms that rely on exclusionary practices. TripAdvisor is the leading site for tourist information, not Priceline. The former is a platform for users to comment on hotels and restaurants; Priceline famously received one of the first Internet business process patents for its reverse auction model. From Red Hat to Facebook, platforms for non-controlled, non-commodified interactions have fared better than many of the proprietary models, and there is neither need to think, nor obvious evidence, to suggest that open productive practices are losing out to proprietary models in the competition to attract capital. The same can be said for human attention – users appear to gravitate more toward sites that allow them either to engage in their own expression, alone or with others, or to use facilities to passively consume the outputs of the

peer production of others. While I do not think that we have reason to believe that peer production will dominate the networked economy, we certainly have reason to be reasonably secure in its sustainability.

The answer for poorer countries is more complex. Here, much depends on access to minimal physical capabilities—from computers to mobile phones and network connections, as well as software and most importantly skills and training of much larger proportions of the population than currently prevalent. Taking the ‘simple’ problem Chan raises – South-South open access publication – we can more-or-less hold general education to one side, because we are talking about communication among educated professionals who publish and read professional and academic journals. Constraints here are time and effort necessary to prepare and upload manuscripts to open access databases; maintenance and storage costs; developing search and archiving software; sufficiently fast connections to upload and download; sufficiently open platforms to allow use of the materials; and sufficiently open licensing models to permit these actions where technically feasible. The latter question is perhaps most difficult, as journals are resistant to open publication, and open access journals are rare, and often rely on ‘author pays’ models with only limited ability to fund unfunded authors. Of the other questions, the most significant is raised by the fact that the most likely information platform in poorer countries is the mobile phone, not the computer. This means that the primary communications and information platform is the descendant of an appliance, not a general purpose machine, and runs on networks optimized for billing and control, not for innovation at the edges. The question, which for now remains open, is whether competition from ever-smaller laptops in wealthier countries will drive mobile phone providers to develop more open systems that enable their users to be as flexible as computers now can be. Given open, widely distributed physical capabilities, and a legal regime that permits it, there is no obvious reason to think that the motivational profiles of scientists in poorer countries are any different from those of scientists elsewhere. The opportunity to publish in widely available open access resources, as long as it is easy to do and effectively at no additional cost beyond the sunk costs of computers and network connections, should suffice to achieve South-South open access publication.

To conclude, the basic questions we face are how we understand the human being who is revealed by the new practices of large scale, distributed cooperation in the networked environment; and how we educate such human beings as they are and become. My answer is that we must see, with increasing clarity, that human beings are basically diverse in their motivational profiles, proclivities to sociality, backgrounds, insights, and creativity, and that networks allow us to pool these individual capabilities in an ever-wider range of combinations and institutional frameworks, well beyond those that were available in the past, to a new and ever growing set of effective social tasks. As educators we need to emphasize the creative and social capabilities for children and students in later years, as individual explorers and inquirers who can take risks, fail, learn and teach others about their successes and failures; we need to harness the practical efficacy made possible by the network to place students in consistent relations of cooperation and communication among themselves, but also with the world outside them, as effective agents and participants in social problem solving exercises. Through this process we will make them better suited to a production system that increasingly depends on innovation, exploration, and learning by individuals who are only loosely constrained and afforded by the systems they inhabit, and who are expected to take an ever greater role in defining their own task environment and the human and material resource base they must pool to solve always-new problems. More importantly, perhaps, we will make them better able to be engaged citizens in a networked public sphere which, while far from perfect, still allows for much greater visibility and organizational capacity in the hands of loosely-connected individuals and cooperative efforts than was possible in the past, when the public sphere was dominated by the mass media. Early efficacy in action and communication, in an educational environment that is itself networked to, and has permeable boundaries with, the ‘real world,’ online and off, can be, and ought to become, the training ground for such cooperative and effective political and social action, no less than economic, later in life.

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