

Open Cultures and the Nature of Networks

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Content

- 5 "The Note Book" Project, *introduction by kuda.org*
- 7 Introduction by Felix Stalder
- OPEN CULTURES
- 12 The Stuff of Culture
- 19 Open Source, Open Society?
- 23 Culture Without Commodities: From Dada to Open Source and Beyond
- 30 Cultural Innovation Between Copyleft, Creative Commons and Public Domain
- 45 Sharing and Hoarding: Are the Digital Commons Tragic?
- 49 The Age of Media Autonomy
- 56 One-size-doesn't-fit-all
- THE NATURE OF NETWORKS
- 62 Information Ecology
- 66 Fragmented Places and Open Societies
- 71 The Status of Objects in the Space of Flows
- 79 Global Financial Markets and the Bias of Networks
- 87 List of Sources
- 88 Credits for the Illustrations in the Book
- 89 Biography of the Author and the Editor
- 91 Production and Support

“The Note Book” Project

“kuda.read” series, New Media Center_kuda.org

New technology has more than ever before engendered the emergence of new forms of collaborative work, quite often based on volunteering, free cooperation and gift economy. Having first been established through co-operation in Free Software development, these principles are being transferred onto the plane of human communication and production at large. Nowadays, these very principles make it possible to collaborate in dynamic, open and free publishing on the Internet with no regard to space distances. By contrast, considering the nature of traditional publishing, it could be noted that the book, as a medium, remains one-channeled. While its content is being created, the book, as a medium, can be reached neither by unlimited number of potential collaborators, nor by its end users, i.e. readers. The process of publishing the works of Felix Stalder involved a limited number of clearly defined collaborators: the author, editor, translator, publisher(s) and distributor(s). The role of each one of them had been pre-determined. Although, the process in question could not be considered as a completely open one, we tried to implement some of the principles of free co-operation and mutual trust, even in such a strictly defined circle of participants.

The Note Book project publishes and promotes works focused on new media, social theory, culture and arts. In particular, this project is aimed at supporting the work of young authors and researchers who have previously not had the opportunity to get their collected works published. It is our intention to recognize the legitimacy of the analysis of the cross-sections of technology, social theory, art and politics within a contemporary information society; as well as recognizing creative expression and free access to information within that society's framework. At the present moment, young researchers find themselves in the center of the cultural and social convergence engendered by the expansion of new technologies. They are witnesses, protagonists and analysts of that expansion. Through their engagement in interpreting contemporary social and cultural phenomena, they at the same time create new models of transfer and distribution of knowledge. Naturally, by “young author” we do not necessarily mean a biologically young person. Rather, we refer to the author whose work is in the initial phase and is subject to numerous changes and further development. Their research is expected to develop through further interactions with new materials, through contacts with experts and other participants in the global process of communication.

All the works have been published under the Creative Commons license, which implies free, non-commercial use of the texts or their parts for other purposes, along with accreditation to the author and the source. This form of openness creates an atmosphere for further development of research.

Although still in its infancy, the Note Book project has been designed as a long-term developmental trajectory aiming at the affirmation of the work by young researchers. It

is part of the publishing series "kuda.read" by The New Media Center_ kuda.org and it is dedicated to the exploration of critical approaches toward the new media culture, new technology, new relationships in culture and contemporary artistic practices.

The kuda.org collective would like to take this opportunity to express their pleasure and gratitude to Felix. His valuable work is the first research to be published within the Note Book project.

Branka Ćurčić, kuda.org
October 2005

Introduction by Felix Stalder

We are in the midst of a deep, long, muddled cultural transition, profoundly related to the incorporation of networked media technologies, wired and wireless, into virtually all aspects of our daily lives. And even for those who are not using such technologies (because they have no access to them, lack the necessary skills, or simply do not want to) the world in which they live is being transformed around them. Within this process of historical dimensions, I see two aspects being of particular importance to artists, cultural activists, and other creative producers, a group that includes an ever larger share of people in the information society. The first is the fact that more and more of our culture, by which I understand systems of meaning articulated through material and immaterial symbols, is becoming digital. Even physical objects, such as chairs, automobiles, and buildings, are designed digitally, and their production is coordinated through information flows. And digital information can be infinitely copied, easily distributed, and endlessly transformed. Contrary to analog culture, other people's work is not just referenced, but directly incorporated through copying and pasting, remixing, and other standard digital procedures.

This poses challenges to virtually all aspects of cultural production and consumption. Ranging from the de-centering of authorship, which moves away from individuals to groups, networks or communities, to the blurring of the line between artists and their audiences, the organization of cultural industries, the adaptation of intellectual property law, the future development of technology, and the status of a work of art itself.

Working through those challenges is a global process, with many distinct local flavors, that will take a long time and whose direction is uncertain. It is way too early to expect anything readily discernible in terms of the basic configuration of digital culture and it is of little use to make predictions. However, one area of cultural production has already been transformed more deeply than any others and thus offers partial insights into what kind of new patterns are emerging. This area is the development of software and the new practice of Free and Open Source Software (FOSS). A critical examination of how complex cultural goods of high quality are being created without someone owing it, based on free access and voluntary cooperation (some motivated commercially, some not) is of great interest to all cultural producers, not just programmers. The success FOSS is inspiring others to try to adapt some of the lessons learned from software programming to the writing of texts, as well as the production of sounds and images.

These collective experiments are developing a new grammar of digital culture, new ideas of what it means to be creative and how this process should be organized. These experiments, many of which are still producing more questions than answers, are challenging the established way of producing and distributing culture. This does not please everyone. Well-organized commercial interests are trying to shift the ground (legally, technically, culturally) to ensure that these experiments fail. The ensuing fight over the organization

of digital culture will not be won, or lost, tomorrow, but will continue for a long time. And artists, as the prototypical creative producers, are caught in the middle; thus, their work as never been as relevant before.

The second aspect that I see of crucial importance, which is only partially related to the first but also based on new communication technologies, is that more and more of the processes that we participate in, or are affected by, are organized as networks, rather than as traditional hierarchies. Social networks as such are nothing new, but for the first time ever, they extend beyond a relatively small scale and are capable of structuring major collective, or better, connective undertakings. We all understand hierarchies well (where there is one manager who takes the decisions and everyone else doing their little part in executing them) because they have dominated our culture for so long. Now their influence is waning; it is being replaced by informational networks which allow processes to be organized in real time, over distances large and small. This transformation, too, poses a series of complex challenges, ranging from the nature of collaboration (how we can relate productively our difference without a central authority) to the fragmentation of physical space through the simultaneous connection and disconnection places into new trans-local functional units. There is an urgent need to understand the nature and culture of networks in which one is more and more caught up.

This book brings together eleven of my shorter texts selected together with Branka Ćurčić (kuda.org). The first seven of these texts deal with various aspects of the emergence and critique of 'open cultures', which is, of new cultural processes inspired by the FOSS movement. While the recent practice of FOSS is an important reference, cultural practices that were open to being reconfigured by anyone are, of course, much older and the essay *Cultures without Commodities* traces them back to the Dada movement in the early 20th Century. The second group of essays deal with character of the network form of organization, often referring to the concepts of the *space of flows* (Manuel Castells), that is, the material infrastructure to organize translocality based on digital information flows.

These essays were written over the course of the last eight years, while I was living mainly in Toronto and Vienna. Each is independent of the others. The two major themes into which they are now organized emerged only retrospectively, because, it seems now, these issues keep producing interesting new questions. I hope my treatment lives up to that. Eight years is a long time, and both the context and the content of my writing has changed somewhat. Despite this I have chosen not to modify the texts beyond minor corrections, mainly deleting references to events that have passed out of the limelight. To re-establish their context would have been tedious. Nevertheless, I think these essays fit well together, in good part because there is an ongoing context for these texts (and for myself) over this period: the Nettime mailing list, where most of the texts have been published and discussed, and which has provided, and still does, an important environment for critical, connective thinking and writing about these (and a lot of other) issues as they unfold. So, instead of thanking individual people, I would like to express my gratitude to

the fellow Nettimers for a discussion that has been going on for more than ten years now. That these texts are now appearing in a bilingual publication, organized from Serbia, with a German co-publisher, is a testimony to the richness and endurance of the networks built through the feeble medium of a mailing list.

But distributed networks and amorphous communities are not everything. Some individuals stand out. Branka Ćurčić, from kuda.org, who initiated this publication and has, together with her colleagues in Novi Sad, produced this book in a process that was nothing but smooth and pleasurable. Once again, I have been very impressed by the quality of their work. Andrea Mayr is involved in every other aspect of my life and thus makes writing possible and Selma Viola makes me realize anew why future culture matters.

**THE COPYRIGHT INFRINGERS
IN THE SNOW (1565)**



Open Cultures

**THE FALL OF THE
COPYRIGHT POLICE (1562)**



The Stuff of Culture

Today, we are confronted with a strange, hard-to-categorize question: *what is culture made out of?* Our answer, I am convinced, will have a profound impact not just on future culture, with a capital C, but on the entire the social reality of the emerging network societies. Today, culture, understood broadly as a system of meaning articulated through symbols, can no longer be separated from the (informational) economy, or, thanks to genetic engineering, from life itself.

Historically, there have been two different approaches to culture. One approach to culture would be to characterize it as *object-oriented*, the other as *exchange-oriented*. The first treats culture as made out of discrete objects, existing more or less independently from one another, like chairs around a table, or books on a shelf. While such things can be arranged in relation to one another, their meaning and function remains the same regardless. One person can sit on one chair, no matter how many chairs there are in a room, or how they are arranged. The content of a book does not change when re-shelving it. The other view takes culture to be made out of continuous processes, in which one act feeds into the other, in an unbroken chain. Like “la ola”, the wave people do in stadiums when the game they are watching becomes boring. By looking at the individual act in isolation, one cannot differentiate between whether someone getting up to stretch their tired bones, or they are participating in collective entertainment. The function and meaning of such an act are not self-contained in the act, but in its relation to others. It is not only what people do, but also, perhaps even more importantly, what happens between them, what flows from one to the other. The two perspectives create different sets of concepts for understanding culture: the timeless work of art versus the process of creation, the individual inventor versus the scientific community, the statement versus the conversation, the recording versus the live performance, and so on. These two perspectives, and the practices through which they are expressed, are currently coming into deep conflict with one another, hence the new urgency to the question: what is culture made out of?

Of course, culture always consists of both, that is of stable objects (such as furniture, cloths, works of artifice, timeless tunes, written laws) and of ongoing, fluid exchanges (for instance spoken languages, values, customs and routines). The issue is not an “either/or”. We do not have to choose one over the other. The dichotomy just sketched is an analytical device to highlight the differences. The real issue is how these two aspects relate to one another. Put simply, is the fixed a local, temporary hardening of the fluid, or is the fluid nothing but a residual aspect of the fixed? These are not only philosophical questions, but also political and economic ones. How do we organize society, to facilitate the creation of objects, or the creation of exchanges? How do we value the work of keeping the conversation flowing, versus the work going into the production of discrete units?

It is no coincidence that this question is pressed upon us today because the issue is eminently technological. Before the invention of writing it was difficult to fix ideas on to material objects.

Culture was oral and the way of maintaining culture was to keep exchanging it, to re-tell stories far and wide. In the process story tellers, bards and other traveling performers, some more talented, others less, created infinite versions of the same basic material and these versions dissipated as quickly as the performers moved on. The technology of writing allowed for the first time the transfer parts of their fluid performances into fixed objects. The earliest work of Western literature, Homer’s *Odyssey*, is exactly that: an oral epic written up. The earliest written philosophy, Plato’s, is mainly dialogs.

Slowly, culture began to gravitate towards objects, both in terms of production and reception. Yet, until the development of print, the difficulties of (re)producing manuscripts put serious limits on the extent to which the object-orientation they contained could spread throughout culture. With print, and later with the mechanical recording of sound and images, the balance shifted decisively. Culture became re-made as a series of stable objects. With these objects came a distinct class of producers: artists. Now, one could think of speech without a speaker. Thus, the question of authorship became an issue. Who is speaking was no longer self-evident, as it was in oral cultures where speech and speaker were one and the same. At the same time, the new producers began to free themselves from the dependence of wealthy patrons who treated them as mere servants, like other talented artisans: cooks and gardeners for example. Instead they came to rely on dedicated apparatuses of specialized services to stabilize authorship and to organize the reproduction and distribution of the cultural objects they produced: texts, music, images, and the things in between. These organizers of (re)production and distribution were the cultural industries, born in the 18th Century, and coming into their own during the 20th century.

Initially, however, mechanical (re)production of culture, for all its improvements over manuscripts, was still cumbersome and its objects did not fully penetrate society for a very long time. An uneasy balance emerged between the new object-oriented and older exchange-oriented aspects of culture. Copyrights, turning fluid expressions into fixed objects, were introduced, but on a very limited scale. Most culture remained as fluid as its materiality allowed. One way or the other, this was an issue of relevance only to specialists. The lack of education restricted the number of producers and consumers of cultural objects and hence the size and influence of the cultural industries intrinsically tied to them; but not just that. The balance also reflected the fact that the movement from the exchanges to objects was strictly one way. Once fluid culture was realized as a fixed material object, for instance a book or a painting, it was almost impossible to convert it back into a fluid exchange because they are made to be passed around as objects. Of course, we still had exchanges about the objects. The question of interpretation and critical reading became important such as commentary upon original, unchanging texts. However, the texts themselves were always understood as objects: discrete, fixed, and final. During the 19th

and 20th century, an interlocking complex of legal, moral, and social practices was put in place to support and expand this view of culture. They managed to enshrine into common sense what was already in the material reality of objects: culture as a collection of discrete and stable objects. The most valuable of these were housed in museums, to be removed from the flow of time and context for good and frozen for eternity.

Now, today, all of this is changing. The old balance is no longer manageable and the common sense it embodied is challenged. We are in the midst of a struggle of how to establish a new balance. For one, media literacy has spread through societies at large, expanding the range of people able to consume cultural objects. Thus the markets, and the industries dedicated to serving them, have grown immensely. The spread of literacy has also enlarged the range of people able to produce culture accessible beyond their immediate environment. In fact, the self-conscious production of culture, high and low, is now an everyday activity of a large number of people, not just artists. Secondly, digital technologies have made cultural production cheap and distribution virtually free of costs. Equally as important, the materiality of many cultural objects has been transformed: from analog objects to digital flows. As an effect, the fixed and the fluid, the objects and the exchanges, are becoming harder and harder to differentiate. Email is blurring the distinction between spoken and written language, after centuries of hard work establishing the difference between the two. Copy and paste, remixing, sampling and other basic digital operations make it trivial to take fixed objects and reinsert them into fluid, ongoing exchanges. Just think of the difference between what a literary critic does (writing about literature to produce criticism) and the work of a DJ (using music to make new music). One is additive, the other transformative. One refers to the source material, the other embodies it.

The distinction between an object-oriented and the exchange-oriented conception of culture is not the same as the artificial and, from this approach, a useless distinction between material and immaterial culture. There are material objects defined by the exchanges they structure, and there are fluid processes rendered into distinct, immaterial objects. The first type is hard to imagine because it has been so thoroughly exorcised from our culture. Yet, there are still some remnants. One example is trophies, such as the ones given out in tournaments like the football World Cup, where the winner has only a temporary hold. These are, basically, objects made for circulation. Not even Brazil owns the World Cup (they have in their permanent possession only a replica). The value of the World Cup, then, is not in the cup itself but in the fragile and contested social relationships it embodies. It is valuable because it is so hard to get, and impossible to keep. If there were no more football world championships, the title would become meaningless and the cup reduced to the value of the gold it contains. Of course, the ultimate object made for circulation is money. We usually think of money as something sitting, or not sitting, in our wallets. However, it is much better to think of it as a means of communication. It moves and, like a rumor, it can shift its shape, form, speed, and direction at any time. Money is a very particular form of language; the more money you have, the louder speak your actions, at least in the markets. Its value is precisely its fluidity, that it can be translated into (virtually) everything.

The moment it can no longer circulate, it is reduced to its material value, which is close to nothing. In short, there are still several objects which are made for circulation rather than possession and whose value depends on the entire chain of circulation, as opposed to their value as objects alone.

The other case, immaterial processes treated as objects, used to be much harder to imagine, until quite recently. How can something as fluid as an idea be fixed, counted and owned? Much less, how can a tune that has already been sung in public be stolen? However, today, we are witnessing major attempts to establish exactly this conception of culture at the core of global, informational capitalism. The basic argument is simple: the immaterial and the material need to be treated in the same way. There is no difference. An idea is like a cow. In the same way that the owner of a cow can freely decide whether to sell the milk, the live animal or chunks of dead meat, the creator of an idea is free to do whatever she wants with it: license it for one time use, license it perpetually for certain uses, sell it altogether, keep it to herself, or give it away. As with cows, any use what is not specifically authorized is prohibited: clear and simple.

Crucial to maintaining the object-oriented view of the immaterial is to fortify the boundary between the fixed and the fluid. Fluid exchanges, the ongoing processes of telling, re-telling, changing and transforming are, almost by definition, uncontrollable. Objects, on the other hand, with their distinct form and shape, with their clear beginning and end, can be numbered, measured, and controlled. Only then can they be bought and sold in the markets. This seems to make sense when thinking of the immaterial in material metaphors. For example, the folders on a computer are deleted by throwing them into the trash bin. What such metaphors mask is that the immaterial and the material are very different in important ways. While it is possible to steal a music Compact Disc from a store, depriving the rightful owner of its possession, copying a song from someone's hard drive does not deprive the original owner. Digital technologies enable infinite, perfect copies. Within a digital system, moving a file is, in fact, always a process of copying (and later deleting), rather than of displacing.

An open, digital, networked culture is profoundly exchange-oriented. It is much less like a book, and much more like a conversation. That is, it is built upon a two-way relationship between the fixed and the fluid enabled by new technologies. No longer *all that is sold melts into the air*, as Marx famously put it, but now, digital air can be turned into solids any time. Yet, fortifying the boundary between the two makes precisely this impossible. A two way relationship, a give and take between peers, is artificially pressed onto a one-way relationship where one side does all the giving, that is selling, and the other does all the taking, that is, buying. Instead of the creation of culture, we have the culture of consumption.

This situation, per se, is not new and not bad. Rather, distinction between the creator and the audience is at the core of conventional cultural industries. Yet, there is a substantial

difference between the culture of consumption created by old media, and the culture of consumption to be enforced through networked media. There are two main differences. Firstly, one-way broadcast media were restricted to relatively few channels each in their own, self-contained medium: books, newspaper, radio, television. In other words, these media were pervasive, but still relatively isolated instances. A television was for watching television and not much else; it was the same with the radio and newspapers. Secondly, the analog quality of these media supported the object-character of the products. There was not much a television viewer could do with what he saw, based on the materiality of the broadcast. He could react to it, interpret it, but not really change it. So, there was no need to control the media user. Now, both of these aspects are changing. Networked communication technologies are expanding, creating a huge network of multi-media hypertext bringing together what used to be entirely separate communication universes. Private and public communication, work and play, business and social activism are all based on the same technological platform, the Internet. It becomes harder and harder to get away from the communication networks without abandoning some of the most fundamental tools of social participation. Today, turning off the computer is far more consequential than turning off the television. With the growth of wireless access and the connection of all sorts of objects (such as cars, refrigerators and implants) to the Internet, this is only getting more pronounced. This, by itself, is not necessarily a problem.

However, because of its digital, two-way nature, this new global communication platform does enable anyone to transform fixed cultural objects into fluid cultural exchanges, undermining a core aspect of contemporary capitalism, which, as we have seen, is tied to an object-oriented view of culture. Consequently the boundary between static one-way distribution and dynamic two-way communication needs to be reinforced where it is being eroded: at the level of the individual user. Given the pervasiveness of the communication networks, it means that all users need to be controlled, everywhere, all the time. Contrary to television channels, communication networks are used in all aspects of life. This means that control will have to extend into the capillaries of mediated communication, that is, into every aspect of social life.

So, this is what is at stake: a profound struggle over the stuff digital, networked culture will be made out of. Will it be a culture of fixed object, circulating through an infrastructure of control, where everything that is not authorized is prohibited? Lawrence Lessig called this a "permissions culture". Before doing anything permission must be asked for which may, for no particular reason, be withheld. This is a culture that continues to make a hard distinction between production and consumption, between sender and receiver. There are a small number of producers and a large number of consumers and access to the resources of future cultures (the culture of the past ready to be embodied in the new) is restricted to a few, and controlled by even less. To bring this vision about, copyright law is being strengthened, seemingly without limits. The desire to control is enforced technologically through digital rights management systems, and propaganda campaigns, which are mounted to teach children that copying files is unethical and evil.

This is the culture of the media conglomerates, and their global stars. In this culture, the place of artists is ambivalent. For most, it means difficult conditions, as independent production becomes more complicated due to the ever more stringent control controls being placed on source materials. But ensuing practice of cold, hard media capitalism is counterbalanced by a warm, soft story: the artists as the gifted individual and also the special social status that this position confers. To the lucky few, the capital accrued is not just social, but includes wealth and fame beyond imagination of artists of earlier generations.

The alternative is a culture based on free access to the raw material of creativity, other people's work to be embodied in one's own. This is the culture of collaborative media production, of free and open source software, of reference works such as the Wikipedia Encyclopedia, of open access scientific journals and music that is being made and remixed by the most talented of artists (rather than those whose legal departments manage to clear all the necessary rights). Free access to the source material of culture is a precondition for creativity to flourish. Nobody knows this better than the creators themselves. It is not a coincidence that most writers have substantial personal book collections and spend much of their time in libraries. Not even writing is a solitary process. The promise of open access is matched by the promise of free distribution and of being able to actually reach the audiences who value what one is producing. This promise is particularly important for those who produce for audiences too specialized to be of interest to the commercial cultural industries.

However, free distribution of works is a double-edged promise to artists and other creative producers. On the one hand, it enlarges the range of people who can appreciate the works; this is good in terms of reputation-building. On the other hand, it undermines a potentially important income stream: the sale of their works. As a result creative producers are forced to find new ways of generating income, and thus making their work sustainable. In the field of software, there are two ways this is being done. One is the growth of service companies which create customized adaptations of existing packages to fit particular client needs. Thus, programmers are paid to change existing software to make it better work for their clients. In the processes, they create code that released back onto the open source project, thus contributing to the advancement of the project as a whole. The other is that programmers are paid by their companies to contribute to a project, either because the company wants to use the software internally, or because they want to create a service based on that software. In both cases, the code thus produced remains open source, but paid-for services are derived from it. In the arts, a somewhat similar process can be observed. Artists are less and less "autonomous producers" who create the works by themselves and then seek to sell it (say, as painters do). Avant-garde art, throughout much of the 20th century, was moving away from the production of artifacts (see the essay *Culture Without Commodities*). Rather, artists are becoming providers of specialized services (or performances). Particularly in the field of new media art, most work is being done as commissions. Artists have to apply with a project and some form of jury decides which is

being financed and which not. Such works are not dependent on markets where objects are sold, but are, again, becoming directly dependent on wealthy patrons, public or private institutions, that decide which art is going to be financed. This enables artists to produce works that are not in a sellable format (stable objects that can be passed around), but also creates new kinds of dependencies potentially undermining the freedom of art so crucial to the culture of modernity. As culture is infusing more and more aspects of contemporary life, and the range of producers is widening but the special status of the artist and the social capital attached to this position, is being eroded. Artists are becoming, again, artisans, not fundamentally different from others creative producers.

The controversy between the object-oriented and the exchange-oriented visions of culture is currently being fought on all levels, legal (expanding versus narrowing copyrights and patents), technical (digital rights management versus distribution and access technologies), and economic (exchange of commodities versus provision of services). Crucially, however, it is also fought in the field of culture itself, in ongoing experimentations on how we can produce, reproduce, and interpret new forms of meaning. This is the native environment of artists and other creative producers, whose everyday practice puts them at the heart of this epic struggle.

Open Source, Open Society?

Free and Open Source software (FOSS) is of importance not “just” the developers who collaboratively create the software. It also affects the end-users and society in general which relies more and more on software-based processes. The following article will focus on two aspects – the heterogeneity of the developer base, and the FOSS licensing – of the collaborative process and draw out some of the broader non-technical ramifications by contrasting it with conventional proprietary software.

FOSS is the result of a voluntary collaborative effort of a large number of people who each pursue diverging personal and collective agendas when participating in this process. By “agenda” I mean simply someone’s motivation to do a certain thing. Some of the reasons for engaging in open source development are peer recognition, efficiency, aesthetic pleasure, financial gain or a particular social or political belief. Some of them are mutually conflictive and they do not add up to a single, coherent motivation or overarching perspective.

Proprietary software is also developed by a number of different people, who arguably work on it for many different personal reasons, being paid is but one of them. However, there is (and this is the difference to the open source process) a single dominant collective agenda: the agenda of the company that owns the software and hires the programmers. For a publicly traded company, this agenda has to be to maximize value for its shareholders. This is its legal obligation and at the end of the day, this single collective agenda overrides all others.

The combination of a single agenda that lies outside of the software itself and hiding of the source code makes it easy to build features into the software that are controversial, or even unpopular, but serve the agenda which dominates the developmental process. If, for example, Microsoft (or Sun, or Oracle, or Apple) reaches the conclusion that its interests are best served by entering into a secret partnership with, say, the NSA (US National Security Agency) then the terms of this partnership will be implemented by the programmers, no matter if they personally believe this to be a good thing or not. Examples of controversial, hidden features are abound: back doors in encryption software, such as the controversial “NSA key” that was discovered in the late 1990s in Microsoft NT stations, or the audio software RealPlayer which sends data about the user back to the software company, real.com. Both features reflect overarching agendas of the companies which are unchecked, and cannot be checked, by outside developers or users. Such features are hidden for a good reason: people do not want them.

FOSS is very unlikely to contain such hidden features. Not only because it is open would such features be visible to literate users, but also because the agendas of the people working on the development of the software are very diverse. Their consensus rarely reaches beyond the goal of developing technologically elegant, functional software. As a result, the

software tends to be clean and free of hidden features. In the FOSS development process there is no mechanism by which someone could force someone else to adopt something against their own personal conviction, no matter what these convictions are. It relies on the voluntary participation of many different people who will not accept instructions that they do not agree with. Given the impossibility of imposing an overarching agenda it is unlikely that there will be features embedded in the code that clearly promote any particular non-technical goal, such as gathering data for marketing purposes, or improving relations with government agencies. The reason why FOSS developers can not be forced to write code they do not like, is not just because their contributions are voluntary, but also because of the FOSS license, the code remains accessible to everyone. Hence the project leader (or anyone else) cannot take anything away from the developers. Thus, FOSS represents an original model of common ownership, based on a particular way of licensing.

The most widely used licenses is the GNU General Public License which mandates *that anyone who redistributes the software, with or without changes, must pass along the freedom to further copy and change it.* ⁽³⁾ Effectively, this guarantees that once a piece of software is protected by this license, its current code and its later versions cannot be taken out of the common pool anymore. Rather, it stays accessible to all; both in the sense that everyone can look at it on the code level, where it matters, but also that it is available to anyone who wants to use it for further development.

The result of the open source license is not only that many different people can work on the software for many different reasons, but also that the software becomes much cheaper because it is impossible to produce an artificial scarcity. With the Internet as the distribution mechanism, this software tends to become gratis because one single freely available copy is infinitely reproducible at basically no extra cost. These two characteristics of the FOSS development process tends to result in software that is cleaner and cheaper than proprietary software.

Does this matter to normal people? It does. Software needs to be clean. Computers and software can be thought of as amplifiers. They amplify the user's agenda by giving them access to means of, for instance, communication that they would not otherwise have. But, computers and software also amplify the agendas of their makers. For example, RealPlayer allows millions of users to listen to whatever they personally find worth listening to; the software amplifies their power to gain access to recorded sounds that are stored on-line. On the other hand, all these millions of players also promote the agenda of their developer, real.com, which now has millions "agents" in the field reporting back in the users listening habits. Effectively, RealPlayer amplifies millions of user's agenda once, and one company agenda millions of times. Hence it empowers each user a little bit and the owning company tremendously. The same can be said of the Windows operating system. Open source software reduces this imbalance. The various agendas of the developers cancel out one another as they meet on a relatively restricted common ground: the development of technically superior software. Consequently, open source software empowers the user

vis-à-vis the developer for the simple reason that the non-technical motivations of each individual developer become less important because they are checked by others who can not be assumed to share these motivations. Checked from a wide range of angles, the software becomes not only more stable, but also cleaner or more neutral.

Paradoxically, this political neutrality is a radical political feature in a context where software is usually biased towards the developers. Transparent software addresses the imbalance of amplifying power between the developer and the users. But software needs not only to be transparent, but also to be cheap. If software has a low price or better yet, no price it allows more social groups to use that power. Imagine if all the servers used on the Internet had to pay thousands of dollars for software licenses: the Internet would become a deserted shopping mall.

At the centers of technological development this is not such an important issue because the connection between knowledge and money is more direct. The situation is different in developing countries where knowledge is more abundant than money. Open source software, because it is much cheaper, allows more people to use the amplifying power computers. It is no coincidence that many developing countries, such as Brazil, are keen supporters of FOSS.

For the time being, the low costs which increase its accessibility are offset by the still rather high barrier of technical expertise necessary to make use of the much of the software. However, this is changing. In the last few years, FOSS has become lot more "user-friendly" and the required amount of specialist knowledge is decreasing and, therefore making FOSS more widely available. A great deal of progress has been made in this regard and many FOSS projects are specifically aimed at non-specialist end users.

The more ubiquitous computing becomes, the more important is it that the software is clean, that is, free of unchecked special interests. The best way to achieve this is to make very diverse interests have access to the same code. At the same time, the more essential computing becomes for the conduct of everyday life, the more is it important to widen access to the basic tools. Making the software freely available, and opening up its code for inspection and change, transforms the character of software from a commodity into something more like an environmental resource of the Internet, similar to air in the physical environment. Everyone has access to it and everyone is allowed to check its contents. Such a transformation is, in itself, positive as it helps to reduce the imbalances of power between the developer and the user, and between the rich and the comparatively poor.

However, what the effects of this leveling of the playing field will be on other areas of society is still more ambiguous. What seems likely is that it will contribute the acceleration of a much more general shift from a commodity to a service-based economy. Those who focus on services can do well, even if they do not own the software which they service, as the case of Red Hat, Inc. indicates. In a limited sense, open source code is a bit like

legal code. The code is openly published and accessible to everyone. Nevertheless due to its complexity, most people do need to rely on professionals who can interpret the general rules in the light of their own unique situation. What seems unlikely though, is that open source software would represent in itself a production paradigm which can transform the fundamentally capitalist character of the informational economy.

Further reading:

Weber, Steven (2004). *The Success of Open Source*. Cambridge, MA, Harvard UP.
 An early working paper by the same author on the political economy of open source:
<http://e-conomy.berkeley.edu/publications/wp/wp140.pdf>

Culture Without Commodities: From Dada to Open Source and Beyond

Only a handful of movements in the West's recent cultural history were innovative enough to actually disrupt the status quo. Exploding out of their normally small niche they threatened, for a few short moments, the established (symbolic) order and thus opened spaces of unforeseen possibilities. Greil Marcus, in his wonderful *Lipstick Traces* ⁽¹⁾, connects the subterranean links among some of these movements. In particular he made audible the resonances between the blast of Dada at the end of WWI in Zurich and Berlin, the gust of the Situationists on the Rive Gauche in Paris in the 1960s, and the explosion of Punk Rock in London and New York City in 1976 and 1977. To this list, we can add the Internet in the mid 1990s.

Suspending all Rules

As Marcus tells it, these movements achieved, at least briefly, what is usually unattainable: they suspended all rules. Suddenly everything was up for grabs; nobody held any authority over the future anymore. Each of them, in their own way, fought a heroic guerilla war to liberate the future from the oppression of the past. Or, as the Sex Pistols screamed, *there is no future in England's dreamland*. With the bourgeois dreams exposed as a sham, the emperor was stripped naked and authority voided: *God save the Queen, she ain't no human being*. Everything was to be reinvented, here and now. The emptiness and absurdity of the spectacle was revealed. Reality imploded and the void was teeming with the promise of the new.

These were short-lived moments, though, not only because of the (self-) destructive potential of the vacuum they created. More importantly for the purpose of this essay, they were short-lived because they were torn apart by a tension that characterized much of the Western cultural production during the 20th century: the conflict between "commodity cultures" and "cultures without commodity."

Commodity Culture

Cultural innovation was driven by the uneasy coexistence of two modes of production. Commodity culture was dominated by powerful cultural industries ⁽²⁾ which created and packaged media objects to be sold in national, and later global, mass markets. The operational motive of these industries was, quite naturally, profit. The basis of their power was the oligopolistic control over the means of production and distribution. Whereas the control over the means of production began to erode with the spread of cheap but powerful microelectronics in the last quarter of the century, the control over the means of distribution increased during the same period of time. The cultural markets became dominated by an ever dwindling number of integrated media conglomerates. This process of concentration occurred first on a national and later on a global scale ⁽³⁾.

While the power of these corporations grew vast, their creativity became ever more constrained. The need to predict profits - what economists call "rational investment", i.e. investment in ventures that have a high certainty of positive return - made the cultural industries (or any other established industry, for that matter) adverse towards hard-to-predict, real innovation⁽⁴⁾. In other words, the profit imperative, intensifying under the pressures of the global capital market, turned the cultural industries - and mainstream culture - more and more conservative. The ideal Hollywood film is not the surprise hit, but the well-planned sequel, or, if the story line has been exhausted, prequel. The most valued form of the cultural industries is the franchise: anything to reduce risk.

Culture Without Commodities

Cultures without commodities⁽⁵⁾, on the other hand, have always organized themselves quite differently. Their operational motive was not primarily selling of media objects - although that sometimes played a role, too - but recognition by an often small number of *people who matter*, usually members of the same cultural niche. This recognition rewarded the creator's skills in experimenting with the means of expression, rather than the skills to command large audiences and deliver a positive cash flow. The vitality was based on the free exchange among (relative) peers, on which both experimentation and reputation depended. The producer/consumer distinction was blurred, with fans producing their own magazines - fanzines. After all, Dada praised the creativity of children and punk tried to destroy the myth of the artists as specially gifted by claiming that anyone who can play three chords on a guitar can create a band. Indeed, some of the greatest icons of punk had very limited musical talent. Sid Vicious barely knew how to hold a bass.

However, the lack of access to efficient means of communication kept these cultures in the margins, that is, in a small niche of dedicated enthusiasts. Sometimes, this was highly valued, a kind of self-marginalizing, sometimes not. The unequal access to means of communication of commodity and non-commodity cultures created the paradoxical perception that the former, despite its strict internal controls, was open, i.e. accessible to everyone, whereas the latter, despite its relatively free flow of information, seemed to be closed because it was difficult to access for most people.

These two cultures were often opposed to one another. Mainstream culture labeled the non-commodity producers elitist, obscure, "l'art pour l'art", or ivory tower, whereas from the other point of view, crossing into mainstream was often condemned as "selling-out," i.e. producing media objects that could be sold easily.

Despite their somewhat antagonistic relationship, both cultures were, to some degree, dependent on one another. Marginal cultures provided the space for innovation that was absent from the highly controlled commodity culture. The cultural industries, on the other hand, provided the means to reach beyond the relatively small niches that non-commodity cultures were locked into. For the cultural industries, this was a very lucrative arrangement.

As long as they controlled the means of communication between creators and large audiences, they could ensure that nothing could reach the mass markets that would upset their lucrative position as gatekeepers. The price for radical culture to reach large audiences was, most often, a toning down of the message, the transformation of politics into fashion. Punk, in the hands of the industry, became New Wave: the celebration of rebellion was turned into a cult of depression.

Bypassing the Gatekeepers

The explosion of the Internet in the mid 1990s can be understood as another of these rare moments in our cultural history. A new space of unforeseen possibilities was opened up, the future, once again, liberated from the past. The old dreamland - meat space, as it was now derisively called - was unmasked, like the Sex Pistols' England, as a dead end. The great powers were stunned. Everything was up for grabs and values characteristic for cultures without commodities. Personal freedom, free flows of ideas and innovation over perfection suddenly ruled the day.

The slogans of those years are of an ecstatic beauty worth remembering, even as we might now cringe at their naïveté. They are a testament to the sincere excitement over opening of a new cultural space. In early 1996, Barlow wrote famously in his *Declaration of Independence*: "Governments of the Industrial World, you weary giants of flesh and steel, I come from Cyberspace, the new home of Mind. On behalf of the future, I ask you of the past to leave us alone. You are not welcome among us. You have no sovereignty where we gather"⁽⁶⁾. Barlow turned the Sex Pistols upside down. Instead of *no future*, he declared, there is nothing but future.

However, in important ways, things were radically different this time. The cultural explosion was no longer contained in a few isolated places, a theater here, or a performance there. The Internet's open cultures were no longer locked into small niches. On the contrary, its practitioners were highly advanced producers and users of a communication medium that could rival, and even exceed, the global reach and efficiency of the distribution mechanism of the cultural industries. The new radicals no longer needed to pass gatekeepers to reach large audiences, they could simply bypass them. The iron grip of the cultural industries was broken and culture seemed to be liberated from the commodity dictate - information wants to be free, another slogan from these heady days.

This, in turn, not only rattled the established order symbolically, but, for the first time, seriously threatened its economic foundations. Thanks to the World Wide Web, it was no longer difficult to distribute information to global audiences. Thanks to newsgroups, email lists and other collaborative platforms, programmers could work together without having to organize into hierarchical firms. They could develop software codes outside of the commodity structures of the traditional market place. Their codes were just as good, sometimes even better, than ones developed by the industry. Thanks to Napster, a super-

efficient distribution infrastructure was available to everyone. Any kid could share his music with his two million closest friends, for free!

This does not mean that overnight the playing field was leveled. There was, and still is, the question of how to get attention from world wide audiences. Indeed, capturing the attention of oversaturated audiences has become so critical - and difficult - that some saw the emergence of an "attention economy" in which products are abundant but attention from consumers is scarce ⁽⁷⁾. There are many aspiring celebrities, many lonely web sites and un-requested .mp3 files.

However, one of the most important assets of cultural industries - the infrastructure for connecting cultural producers to large audiences - had slipped out of their control. The established cultural industries had to realize that they could no longer simply repackage real innovation as fashion statements, like they did so successfully with Rock Music. They were no longer in the position of gatekeepers.

Freedom of Creation vs. Control of Consumption

The old tension between the open cultures and the cultural industries no longer appears as a trade-off between small, isolated but innovative cultures of freedom on the one hand, and large, ubiquitous but stale cultures of consumption on the other. Both now have powerful means of connecting to global audiences, users and contributors. The old superficial tension has been, almost overnight, rendered obsolete and has revealed a much more fundamental division: The conflict between open and closed cultures, between an emphasis on freedom of creation and one on control of consumption.

After a few years of being blinded by the glare of the new, the cultural industries have recognized the threat that they are facing. They buckled up and are now engaged in a ferocious fight to put the genie of free distribution back into the bottle of controlled consumption.

Central to this fight is the attempt to criminalize what used to be legitimate, or at least tolerated, behavior central to innovation and creation: the appropriation of existing cultural objects either for purposes they were not intended to (for example non-commercial distribution), or as raw material for the creation of new cultural objects. As long as the cultural industries controlled access to mass audiences, these practices could be tolerated because they happened at the economic margins and could only enter the mainstream with the approval of the gatekeepers.

This is no longer the case and, consequently, the cultural industries, if they want to keep their dominance, have to outlaw any and all unauthorized use of their content. They have to get into the nooks and crevices of even the marginal cultures, because they too, can have global reach now. Having lost control over the means of production a long time ago

and over the means of distribution with the Internet, the last area they still control is the content that they own. Within a framework of cheap and efficient means of world wide distribution accessible to millions of users and producers, the control of content needs to be airtight, since once released into the open, content is very difficult to bring back under control. IP is the new gate which the cultural industries want to erect in order to regain their strategic and highly profitable position.

We see, almost daily, how the new gates are being fortified. New laws are being proposed and passed in the USA and in the EU, leading the way to a worldwide extension of intellectual property regimes in which copyright periods are becoming longer and longer, and an ever growing range of ideas may be removed from the public domain via patenting. For example patents are places on business methods, software and even organisms.

But laws alone are not enough. In some areas, new technologies are introduced - under the name of Digital Rights Management (DRM) - that restrict what users can do with their digital content. While there are some legitimate applications of such systems, due to the efficiency of the Internet as a copying machine and distribution channel, these new systems not only have to ensure that there are no copies being made for illegitimate (i.e. commercial) purposes but that there are no copies being made under any circumstances. This not only goes against the expectations of users who assume that they own the content they paid for, but it voids long established and socially important fair use provision that ensured that even copyrighted content could be used freely for educational or artistic purposes. As Lawrence Lessig argued, this threatens innovation across the board. It stifles the new in favor of the old ⁽⁸⁾.

In the paranoid vision of the industry, pirates and thieves are multiplying, as are the areas in which they need to be battled. Listening to the pronouncements of lobbyists - some are even trying to connect what they call piracy to terrorism - we almost seem to be engaged in the Internet version of Huntington's *Clash of Civilizations* ⁽⁹⁾, with barbarians (users and independent creators) crashing the gates of civilization (the walled gardens of protected content). To win this battle an increasingly invasive and repressive regime is being installed in which all actions of individuals that are not expressively sanctioned are made illegal. The result is mass criminalization not seen since the USA's prohibition of alcohol during the 1920s.

Of course, these increasingly totalitarian tendencies of the content industries are not unchallenged. There is a growing coalition of cultural producers - artists, scientists, engineers etc - who realize their common interest in opposing this trend. They understand that the cultural industries' approach is motivated by nothing other than the narrow self-interest of a small but powerful group. It becomes clear that it constitutes a dead end in which everyone loses, this, again, is similar to the USA's prohibition. Criminalizing behavior that seems natural to the large majority is incompatible with a democracy and ultimately disastrous for a civil society.

However, the cultural industries are vetted to a business model that is, by and large, obsolete due to social and technical changes in society at large. Rather than adapting, the industries are trying to fight these changes. They are slow and, given their investment in the old, unwilling to see that the new offers chances also on an economic level.

In order to free the new from the old and allow new models of open production of cultural objects to mature, two things are vital. On the one hand, the emerging repressive legal regimes must be fought; otherwise they will suffocate the new before it has a change to grow. This is slowly, perhaps too slowly, happening. It is a good sign that the discussions over copyright have moved from legal departments into the mainstream.

At the same time, however, it will be necessary to develop new modes of production that encourage cultures of freedom which are sustainable in the long term and through high growth. This means that they have, in some way or another, to intersect with the existing money economy without falling into the trap of the commodity culture. Open Source and Free Software is a good example that this can be done. By abandoning the commodity model (one time sale of fixed products) in favor of a more open service model that supports Do-It-Yourself freedom as well as professional reliability. A new mode of production and maintenance of cultural objects (a software code) is emerging that combines elements of the culture of freedom with production efficiency, hence making them are sustainable for the long term and on a very large scale, while keeping it open at the same time.

We need, however, time and freedom to experiment much more. It is precisely this freedom that threatened by those who profit from the *status quo*. One may be optimistic that, if - and this is a big if - the repressive hammer yielded by the cultural industries does not come crashing down too soon, the experience from the field of free software can be transported into other sectors of cultural production.

Writer's note: Thanks to Brian Holmes for a substantive critique of an earlier version of this essay.

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Cultural Innovation Between Copyleft, Creative Commons and Public Domain

In the last ten years, a new worldwide movement has appeared which does not only demand fundamentally new models of production and use of digital goods but already applies them. Within these frameworks, scientists, authors, artists, musicians, programmers and other “immaterial producers” use the existing copyright in a completely new way. Copyright guarantees authors of intellectual works (in the fields of literature, art, science, design, computer programming, etc) exclusive and very comprehensively defined rights of control over their creations. These rights come into existence automatically with the creation of the work, without having to register it in any way. Authors can (almost) freely decide who, when, how and under which conditions can use their works. In contrast to the conventional use of these rights, the new models aim to make access to intellectual work easier by allowing their free copying. The possibilities for treating these works creatively are thus greatly widened.

Conventionally, copyright is transferred from an author to a third party, which may be a publishing house or a music label. Consequently, these institutions make sure that in most cases works can only be used for a single purpose and in a limited way. For example, when we buy a book, we acquire the right to read it, lend it to friends or sell it again. On the other hand, we are forbidden to copy the whole book, hold readings of it, adapt it to film or alter it. These rights are usually sold individually by the copyright owner. Essentially, on such an understanding of copyright, which is based on the possibility of exclusion and exclusive control of use, rests not just the media industry (publishing houses, music labels, film and television production), but also the conventional software industry and the greatest part of other forms of commercial production of non-material goods.

Although the above is the dominant, it is not the only way to use the opportunities created by copyright. These days, there is an alternative approach which does not use copyright to exercise exclusive control over the uses and processing of copyright work. On the contrary, the crucial intention here is to secure free and unhindered access to works and to explicitly encourage their processing. This idea was first formulated in the field of software development under the name of “free software”, and since the end of the 1990s it has been known among the general public as “open source”. At the same time, experimenting with such an approach, which hinges on guaranteed free access, was started in other fields of non-material production. Today, the above two approaches to copyright fundamentally differ from each other in almost all fields of scientific and cultural creation. This conflict has been taken the furthest in the software industry, where there is a constantly hardening competition between proprietary software manufacturers (e.g. Microsoft) and open source producers (e.g. that of the Linux operating system). They differ not only in various uses of the existing copyright, but also in their opposing conceptions about how new knowledge and new culture are created and how production, be it commercial, scientific or artistic, should be socially organised most effectively.

In the following, I am going to concentrate on the new access and innovation-friendly models in the fields of knowledge and cultural creation. First, I am going to shed some light on their technological, social and legal basis, and then move on to the cooperative but also the individual creation within this new framework. In the last part of this chapter the current problems of these models and their future potential will be focused on.

The Technological, Social and Legal Basis of Open Models

The technological changes in information processing and telecommunication (“Internet revolution”) allow for a completely new treatment of intellectual works, which are being more often produced, distributed and consumed in a digital form. While the production and sale of analogue copies (e.g. printed books or films on celluloid) is a complex and expensive business, today it is possible to make digital copies and distribute them worldwide using web servers or peer-to-peer (p2p) networks almost for free. These new distribution channels are not any less efficient than the existing ones, often they are even better. This makes it possible to create new relationships between the producers and users of digital contents, and they do not depend on middlemen and vendors in the same way as they used to. This is the first change related to the new ways of communication. The second one is somewhat subtler, but similarly far-reaching. In the context of digital media, it is impossible to differentiate between the end product of one process and the source material of another. “Copy & paste” is one of the basic functions daily used by most computer users to insert material from one context into another. What was a relatively marginal practice in the analogue culture (e.g. the making of photo collages à la John Hartfield or Klaus Staeck) is today a central cultural technique. Thanks to sampling and remixing, totally new genres have appeared in the music world. In other words, the processing of existing works as part of the creation of new works has become everyday practice in our digital culture.

The copying, distribution and processing of intellectual work belong to the main domain of copyright. According to the conventional approach to copyright, which allows the above uses only with the explicit consent of the copyright owner, consent must be obtained for each of these uses. The practical difficulty of obtaining consent each time (which may be connected with high costs) is in stark contrast with the simplicity of the normal, everyday use of the works. Due to this discrepancy between legal status and everyday practice, a huge grey zone has been created in which a great number of legal offences are committed, some of which are subjected to strict criminal prosecution (e.g. by the music industry) while others remain without consequences.

The new, open models take the possibility of free copying, the easy worldwide distribution of each product and the processability of digital materials as a starting point for developing a fundamentally different approach to intellectual products. The argument goes like this. Why should someone be excluded from using a work when there is an unlimited number of perfect copies and the additional users do not create additional costs? The usual answer to that is that only the copyright given to authors is a good enough incentive to invest in

the creation of the first copy. Without the general exclusion, which allows most uses only with permission, it would never be possible to return the initial investment. This argument is rooted in a very specific conception of the character of intellectual works. The underlying assumption is that intellectual works represent relatively clearly separable entities, which can always be attributed to a single, clearly definable author, just like books in a library. The books rest together on the same bookcase, but it is easy to determine where one book ends and another begins. On each book spine the name of an author, or occasionally a group of authors, is indicated. The authors may refer to each other but this is clearly of secondary importance when it comes to the individuality of their work.

Open production models start from a different assumption as to how intellectual works are created. They do not see the creation of new works as the end result of the labour of relatively isolated authors, but as the end result of processing and altering already existing works. The authors are defined by the context in which they work. This is where they find their source material and this is where their work is used. The analogy drawn here is not with a static book in a library but with a dynamic, open discussion. Naturally, a discussion is led by individual speakers, but a discussion as such can neither be ascribed to a single speaker nor can it be seen as the sum of independent statements. A discussion takes place *between* speakers, who continuously refer to and influence each other. The whole is much more than the sum of its constituent parts. For an interesting discussion to take place, ideas must be given unimpeded flow. Free access to what someone else has already said is a crucial condition for a discussion to progress and new ideas to be created. If one had to ask permission for each use of an already uttered thought and if permission could be denied by the speaker, then the discussion would quickly reach an impasse. This would not only be unpractical and absurd, but also unnecessary as the conclusions drawn from the discussion are available to all participants.

Ideas and other non-material goods cannot be used up. On the contrary, they multiply when used. On this understanding of intellectual production rests also academic science, in which there is not only the obligation to quote one's sources, but also to publish one's work. This means that existing works have to be integrated into new ones and new ones have to be made accessible to the scientific public. In other words, intellectual production is considered a cooperative (there is exchange between authors) and transformational (new is created from existing) process. It is important to point out that the aim is not to subordinate individual achievements to an amorphous group. The obligation to quote one's sources entails that one has to do it accurately (and by doing so one appreciates them). More importantly, free access to knowledge is essential to the emergence of new knowledge. The history of science has proven this approach to be extremely useful in facilitating innovation.

Open Licences

The traditional application of copyright law, which makes almost all uses subject to permission, contradicts the above perception of creative processes. But it does not have

to. Because, as already mentioned at the beginning, copyright law invests an author with almost absolute control over his work. This can be used to facilitate the abovementioned cooperative and transformational processes instead of disabling them. And this necessitates a licence which explicitly allows free uses of works.

The first and still most important open licence is the General Public Licence (GPL). Its first version dates back to the mid 1980s, while the current one was drawn up in 1991. In this licence, the legally binding conditions for free communication flow between software developers are laid down. The central points are the so called "four freedoms" guaranteed by the GPL: 1) the freedom to use a programme to any end the user likes. There are no restrictions on uses. 2) The freedom to copy a programme as many times as one likes and pass it on to others. 3) The freedom to modify a programme at one's discretion. Thus everyone is allowed to develop programmes further. 4) The freedom to pass on a modified programme. In contrast to these four freedoms, there are only two obligations. The people to whom the programmes are given (no matter whether they are just copied or modified) have to enjoy the same rights, and the previous authors have to be acknowledged. This practice is also called "copyleft" to underline its opposition to copyright. The GPL guarantees developers that they will be able to integrate existing code blocks into their own work without any risk, or that when they develop a programme in cooperation with others, the work of others will be accessible to them without any limitations. This is an enormous advantage, and it is contrasted by a disadvantage – if this is, indeed, a disadvantage – namely, that one's own work has to be made accessible to others, which is too low a price to pay for the advantage. To put it roughly, an individual profits from the community more than does the community from an individual. Importantly, "profit" here can be understood both economically and normatively depending on what one's preferences are, and similarly to a discussion, which can help someone solve a work-related problem, or it may serve someone else as a welcome opportunity to put one's knowledge to the test, or just presents an intellectually stimulating experience. The different motivations of the speakers do not change the character of the discussion, which is that it works best when proceeding openly and that the results are accessible to all.

With hindsight, it is not surprising that this form of licensing appeared in the area of software development. Here, the digital characteristics (the copyability and reusability of products) have been clearly present from the beginning, and the conception of software as a proprietary product has a relatively short history – at the beginning of the 1970s no one thought of selling software. Moreover, the complexity of modern software programmes makes it impossible for a single person to write a programme on their own. Thus there is always the necessity to work together, and everything that facilitates cooperation is positive as such because it aids problem-solving. On proprietary software people also work in greater teams, but behind closed doors. With the spread of the Internet at the end of the 1980s and beginning of the 1990s, more and more programmers started using it and found the GPL practical for their own work (e.g. Linus Torvalds, who put the Linux kernel under the

GPL at the beginning of the 1992). The new possibilities of global communication gave the free software movement an enormous push because it made the exchange between programmers much easier.

In the second half of the 1990s more and more people who had very little or nothing to do with programming were going online. Naturally, the Internet offered them the very same possibilities of free exchange of digital content. Since the GPL (like other similar licences) had been fitted for the needs of software development and usage, many people started thinking about how cooperative and transformative innovative processes could be facilitated and legally secured in other fields as well. The most important project that stems from these efforts is Creative Commons (CC). It was launched in December 2002 and led by Lawrence Lessig, a jurist teaching at Stanford University and a prominent supporter of the “free” culture, and its main aim is to give authors a simple means for publishing their work in a way which allows free copying and distribution. While CC intentionally follows the ideas and principles of the GPL, some modifications were made to the licence model to take into account the peculiarities of cultural creation (music, texts, paintings and films). CC offers authors a simple, web-based formula, through which they can adapt the licence conditions to their individual needs. The permission to freely copy and distribute works and the obligation to indicate the author are in all CC licences mandatory. Authors can then decide whether they want to generally allow commercial uses of their work or not. They can also decide whether to allow the processing of their work or not. Especially the last point, the one regulating the transformation of works, touches upon a crucial difference between the production of “functional” works (e.g. software, user manuals or reference books) and “expressive” works (e.g. literary and artistic works). While in the case of the former it is usually quite clear which alterations are improvements and which not, in the case of the latter there are no clear criteria. Often it is their individuality, rather than their conforming to certain norms, that adds a special quality to such works. In this case, claims for preserving the integrity of works may be totally legitimate. Therefore, CC does not allow the general processing of works, but hands the choice over to each author.

CC licences, which can be created over an intentionally user-friendly interface, come in three different versions. The first one is a simple, colloquial text, which comprehensibly describes which uses are allowed. The second one is a legally binding licence text, which was written and checked by leading lawyers. If there should ever be a legal battle over the rights laid out in the licence, it can be presumed that it will stand the test of judicial scrutiny. The third version is a computer readable data, which makes it possible for search engines to select results based on legal status. This makes it possible, for instance, to search for pictures which can be used in a non-commercial work using a key-word.

CC licences have become a standard in open cultures, but also in scientific projects, in the shortest of times. Within a year, more than one million works: texts (among others two

books by the Heise Publishing House), pieces of music, but also entire feature films, were published under such licences. What started out as an American project, and reflected the hallmarks of the US legal system, was in the meanwhile internationalised. The legally binding part, the licence text, has been adapted to many different legal systems all over the world. The standardisation of open licences, which was created by the CC project, contributes greatly to the fact that today open production models enjoy greater popularity and that they can be easily and safely used even by artists, programmers and scientists who are reluctant to go thoroughly into copyright issues.

Open Production in Practice

With the spread of these licences appears a new *de facto* “public domain” in the sense that works are freely accessible to the public, even if *de jure* they are subject to copyright. The projects that are published under these conditions can be classified into two groups. The first one is comprised of big cooperative projects that use open licences to facilitate cooperation between contributors. Here the focus is on the development of a single resource. The difference between producers and consumers is, at least optionally, less pronounced. The other is comprised of a lot of works from individual authors, musicians, filmmakers, etc whose objective is not cooperative development but enabling long-lasting access to their works to as wide an audience as possible. Here, the classic division of roles between author and audience remains relatively intact. The classification of free works into these two, partly overlapping categories has to do with the fact that not all works are suitable for being created in cooperation. The difference between “functional” and “expressive” works has already been touched upon.

Moreover, it has been proven that cooperative projects function best when they possess certain characteristics. The possibility to modularise and parallelise production is especially important. Modularisation means that many parts of the project can be done independently from each other. Each part can be treated and improved upon individually. Its content will not be significantly altered by the other parts of the project. Parallelisation means that a lot of parts can be worked on at the same time, so that the first part does not have to be finished before work on the second is started. The fact that a lot of people can work independently from each other within a single, relatively open project creates two marked advantages. Firstly, people who are interested can decide for themselves on what they want to work. This is crucial not only for maintaining self-motivation but also for enabling contributors to make the best out of their talent, which they themselves know best. And since work is almost always done in smaller or bigger groups, people are quickly, but not necessarily kindly, told if they have overestimated their abilities. Secondly, such a structure allows a great increase in the number of contributors. There are often thousands of people working on greater, successful projects, even though the core group, which works on the project constantly and for a long time, is usually much smaller. The best way to clarify these dynamics is through the example of the free Wikipedia encyclopaedia, one of the most successful open projects.

Cooperative Knowledge Production: Wikipedia

Wikipedia was started in January 2001 as an English-speaking project with the aim to create a free access encyclopaedia which should surpass the best commercial encyclopaedia, the *Encyclopaedia Britannica*, both in volume and quality as soon as possible. Contrary to the Nupedia project, which has failed in the meanwhile, the task of writing entries was not given to a group of selected specialists, but the general public was invited to contribute to the project. For the publication format a “wiki” had been chosen (from which the project name was derived), a platform that allows every Internet user not only to read entries but also to alter them. Wikipedia follows this open concept very strictly, which means that it actually allows everyone, even users who have not registered themselves on its website and therefore are identified only through the IP-address of their computers, to change texts. The thus created new version is immediately turned on and thus visible on the Internet without being proofread or checked. The previous entry is saved and can be seen using the “versions/authors” function. This way, changes made to an entry can be traced, and vandalism, which occurs in significant numbers, can be eliminated (by reverting to a previous version).

Wikipedia rests on two assumptions. Firstly, a lot of people are specialists in a certain field, either because they deal with it professionally or because they have studied the subject matter closely. If the different specialities of a great number of people are combined, then the entire existing knowledge can be covered. The second assumption is that readers who spot a mistake or an omission in an entry are willing to correct it, and thus become co-authors. This way, with time, the entries should become better and more comprehensive until they accurately reflect the current state of knowledge. In order to make collaboration easier, some guidelines were created at the beginning for describing what a good contribution should look like. The most important criterion is adopting a “neutral standpoint”. This entails that an entry should present all possible explanations and aspects of a topic equally and should not propagate a single interpretation, perceived by the author as the only “correct” one. This makes it possible to present even controversial topics, about which there is no consensus, in a way acceptable to different sides. The existence of guidelines also makes it possible to deal with users who behave counterproductively. In extreme cases, the Wikipedia community, i.e. the inner circle of the most active contributors, can decide to deny a person their right to alter entries. But in practice, this seldom happens.

In the last four years, Wikipedia has been developing rapidly. In the same year when the English-speaking version was started, German and French Wikipedias were added. In June 2005, there were active Wikipedia projects in as many as ninety different languages. The greatest is the English-speaking version with approximately 600 000 entries, followed by the German with more than 250 000 and the Japanese with about 130 000 entries. Wikipedia is one of the most popular Internet resources overall and currently registers about 80 million hits a day.

Even though the project is not without problems, which will be dealt with later, it is obvious that Wikipedia functions relatively well. Even in comparison to conventional reference books, one such comparison was made by the German newspaper *Die ZEIT* (No 43/2004), it was shown that it can keep abreast with them when it comes to the scope and quality of entries, while in being up-to-date, it is clearly superior to both printed reference books and their traditionally edited electronic versions.

Obviously, a lot of people are prepared to invest time and energy in such a project since they find it motivating to take part in such a big and widely appreciated enterprise. The extreme modularisation and parallelisation, which are typical of such reference works, make it possible for a large number of people to work simultaneously and with a minimum of coordination problems. The simplicity of editing allows everyone to be active and step out of their role of pure recipients. The relatively loosely formulated but all the same existing rules and the consistent form of the interface secure the unity of the project. Although today Wikipedia is run using only voluntary, unpaid work, the technological infrastructure, which is necessary for running a project of this size, necessitates considerable financial means. These means are not generated by introducing advertisements, because, it is feared, they would change the character of the project. Rather, regular calls for donations are published on the website, which have so far been extremely successful. At the beginning of 2005, approximately US \$75 000 were generated in this way in only ten days, and this sum was invested in new hardware and the broadening of bandwidth, which are used by all Wikipedias. Other parts of the infrastructure are financed through sponsorship. With the Wikipedias, a resource was created which does not only serve the public for a long time, but, due to the permission to process its content, which is laid down in the licence, it also delivers source material for the rapid development of future projects.

Free Cultural Production: Netlabels

The crisis of the music industry is common talk. Peer-to-peer (p2p) file sharing has made it clear that music can be distributed very effectively outside the traditional channels. The established industry, above all the labels connected to major concerns, reacts with panic and calls for new laws and punitive measures to safeguard their so far commanding position. To evade this pressure, always new networks are created with the aim to make prosecution as difficult as possible.

In the shadow of this great conflict, the last few years have seen the advent of a lively group of music producers who have been trying out new ways – the *netlabels*. These are music labels which do not offer their products primarily on CDs or vinyl, but as data in a network. In most cases the decision behind this is not ideological but pragmatic, and now and then netlabels bring out music on vinyl or CDs (e.g. “best of” compilations). The great majority of the tracks published online are under a CC licence. Most netlabels cater for relatively small niche markets, like techno, drums ‘n’ bass, or other genres of electronic music.

In these niche markets, according to the netlabel pioneer Björn Hartmann (textone.org), new models offer a threefold advantage: promotion, community and durability. Most musicians outside the radio mainstream do not make their living from the sale of audio media, or just a very small proportion of it, but from earnings for live performances in clubs. In the case of electronic music this means DJ-ing. For these people, making their work available to audiences primarily serves the purpose of becoming popular in the scenes relevant to them and thus securing live performances. It is much easier to reach one's audience through free distribution because the distributive potential of the Internet is much higher than that of specialised music stores. Netlabels create new, bigger audiences and therefore can become more effective in making artists popular. Moreover, the arising costs are much lower, thus much more music can be published. But this does not result in a flood of bad music. Instead, it causes inspiration to flourish within a music scene, in which more exchange can take place than ever before. The limitations of the so called attention economy (there is more of everything than one could ever listen to) lead to bad music becoming forgotten quickly. On the other hand, music which the community appreciates will spread unimpeded.

Exactly how the exchange between musicians should be channelled is very much subject to debate within the culture scene, as well as in the wider cultural practice. As the reputation gained through songs (or through other works of art) is the cornerstone of an artistic career, a lot of authors approach the transformation of their work with mixed feelings. To see one's own song distributed in a bad remix is not necessarily in the interest of an artist. That is why most netlabels use licences which do not allow remixing. Cooperative music communities, like the *opsound.org* platform, are still in their infancy, and it will be more difficult for them to establish themselves than it was for Wikipedia, whose very nature makes cooperation necessary. But there are prominent examples of open collaboration. Rap superstar Jay'Z, for instance, allowed the free remix of the A-Capella-Version of his *Black Album*. Some remixes, above all DJ Dangermouse's *Grey Album*, a remix with the Beatles' *White Album*, have reached worldwide cult status. Even though such experiments are (still) the exception rather than the rule, and usually the direct remixing of songs is not permitted, the simple availability of highly individual music strengthens connective creativity and supports the community as a whole. The third way in which new models offer an advantage is the possibility to keep music available over a long time. The availability of music (or other works) produced in small number of copies is limited from the beginning. And availability decreases with time, not only because the copies are sold out and there is not enough money for a new release, but also because the labels that released them are often short-lived and disappear. If the rights are owned by a label (which perhaps will not exist in a few years) and it is not possible to find out which musician stands behind a pseudonym (or if they have died, who their legal successor is), it is impossible to make the work available in any conceivable way. Often, a work gets lost due to legal claims which cannot be settled, which is a disadvantage to all. The use of open licences guarantees that works will remain available for a long time due to, among other reasons, organisations, like the Internet archive (*archive.org*), offering long-lasting storage facilities for free works. Thus, a continuously growing basis is created in which future

authors can look for material or at least inspiration.

These models are still limited to relatively small niche markets, but invaluable experience in new, open knowledge and cultural production is being accumulated. It has already become clear that for artists community-orientation is very significant as a source of inspiration. When it comes to sales, non-copiable achievements (e.g. live performances) are the most important. The element which connects both aspects is the artist's reputation, which can be facilitated through the unrestricted availability of works.

Problems and Potentials of the New Models

These new forms of knowledge and cultural production are in the early phase of their development. Although no final judgement should be passed yet, both problems and great potential for further development have become evident. The problems can be classified into two categories. One type of problems is caused from the outside as the result of incompatibility between proprietors and open paradigms. But there are also problems which stem from the new production forms themselves and point to them being not yet sophisticated enough. Firstly, as already explained, the new production models are based on an innovative treatment of copyright law and on the free availability of an open communication platform (a standard PCs and the Internet). Both pillars are exposed to great pressure by the classic industries based on exclusion and control. On the one hand, there are attempts to greatly reduce the openness of the communication platform using Digital Rights Management Systems (DRM). This is a condition for realising existing legal claims in their usual form. This could result in free, not certified content being difficult to play or process using new DRM infrastructure. On the other hand, more and more aspects of cultural production are being made unavailable to the public using the instruments of intellectual property law, and are subjected to the control of single owners, usually great corporations. Especially problematic is the broadening of patentability. In contrast to copyright, which protects specific expression, ideas can be controlled through patents irrespective of their implementation. While it is impossible to infringe copyright without being familiar with the original, protected work, in the case of patents, this can easily happen. In the software industry, where products are very often comprised of numerous single modules (each of which may be patented), patenting could question the survival of many small and middle-sized development teams, who are often active in open source fields. They do not have the means to go through the complex and expensive process of patent registration, through which they could obtain the necessary rights, and thus protect themselves from later legal actions. These external threats against open models have led to the marked politicisation of diverse scenes in the last few years. In the field of software patents, the open source community has managed to gain significant influence over the European legislative procedure and prevent the introduction of software patents for the time being. But this will have hardly been the last conflict in this issue.

The "internal" problems lie elsewhere. In the case of Wikipedia, it is becoming increasingly clear that the two basic assumptions (the diversity of the contributors ensuring the width of

knowledge and the entries improving with time) are very productive but only conditionally reliable. To put it better, Wikipedias reflect that, on the one hand, Internet users are still not representative of the (world) population, on the other, what is moving the online population at any moment is not always related to the long-term relevance of a topic. For instance, certain world languages (e.g. Arabic) are poorly represented, or the entry on television host Thomas Raab in the German version of Wikipedia is four times longer than that on Giorgio Agamben, one of the leading contemporary political philosophers. The question whether Internet users' own motivation can ever be enough to meet the need of an encyclopaedia to cover all fields of knowledge equally remains open. Who can at all determine which the relevant fields of knowledge are? Thus far, this was left to specialists and the public simply had to accept the choices made by these gentlemen (and a few ladies). Is the aggregate choice of many better or worse than the selective choice of a few? The comparison of different encyclopaedias still gives no clear answer, but this "draw" is a notable success for the still very young Wikipedia.

Since it is not a far away vision anymore to establish Wikipedia as one of the standard online reference sources, the reliability of the information offered, which can be freely changed by anybody, is subject to great debate. The problem is the following: How can users check whether the entry they are currently viewing contains correct information or not? Perhaps the entry is still at the beginning of its development and mistakes, or omissions, have not yet been sorted out, or the entry may have been intentionally falsified just a minute ago. Single users see little benefit from the overall tendency that entries improve with time and that vandalism is quickly eliminated, because for them it is all about a single entry in a single moment.

The solution which is being worked on at the moment is based on something which is common practice in free software development. There, stable and current versions are differentiated between. Stable versions have been intensively tested and contain no serious mistakes. Once this state is reached, they are no longer changed. On the other hand, the current version contains the latest features and software codes which are being worked on, and therefore, it has been tested less. Users can decide if they would like to use the current or the stable version. Similarly in Wikipedia: entries should be checked, edited and then "frozen" as stable versions. Users can then decide if they would like to see the stable or the current version of an entry. This would make it possible to enhance the reliability of the information on offer and keep it freely editable, which is the heart of the project, at the same time. While this idea seems very wise, it is not easy to put it to use, among other things because validating information in an encyclopaedia cannot be compared to testing software. The greater the number of users testing a computer programme the better, because more configurations and uses are put to the test. Moreover, each can detect the existence of a bug: the programme crashes! In the case of a fact-orientated entry, there is no such unambiguous test. The participation of many people in the process is not necessarily helpful either. There is a danger that the opinion of the majority, which is not necessarily the correct one, will prevail. The relevance of this problem cannot yet

be foreseen. It is to be expected that even the "stable" version of Wikipedia will contain mistakes. The decisive question is whether it contains more mistakes than conventional reference works. If mistakes are detected, it will be easier to correct them than in a traditional encyclopaedia.

In the field of free cultural production, the challenges are again different. Netlabels, and similar initiatives in other fields, are today still limited to niche markets. Whether and how these models will become mainstream culture is still an open question. Perhaps never. It might be possible that two spheres will be formed. One will be determined by DRM and the market power of great companies, while the other by open models, niche markets and specialisation. But it is impossible to predict to what extent these two models can rest on the same legal and infrastructural basis.

But this is not all. Open models also spell a few hazards for artists whose work cannot be performed live. So far, the sales of their works have secured them some degree of autonomy from employing parties and funding committees. This could now disappear. Giving up their autonomy and looking for new financing schemes questions the basics of artists' position, paradoxically, especially with respect to their artistic freedom.

One attempt to seek a solution to the problem of rewarding artists who are involved in the free exchange of cultural goods is called cultural flat rate. The core idea is to indirectly compensate the authors whose works are distributed through the Internet. Instead of enforcing DRM-based pay-per-use models, a generic fee should be introduced, for instance by raising broadband Internet charges. Authors could then be compensated from the thus created pot in proportion to the degree to which the public uses their works. Similar systems already exist. A levy has been incorporated in the prices of so called empty media (blank CDs, tapes, etc), which is passed on to authors by collective societies representing authors (in Germany: Gema, VG Wort, etc). This indirect system is in today's practice tainted with problems (lack of transparency, questions about the fairness of distribution) and extending an improved system to the Internet could only be achieved with very strong political will. Such a will hardly exists on a national or international level, at least at the moment. But the discussion indicates the diversity of new models of free culture which are being considered.

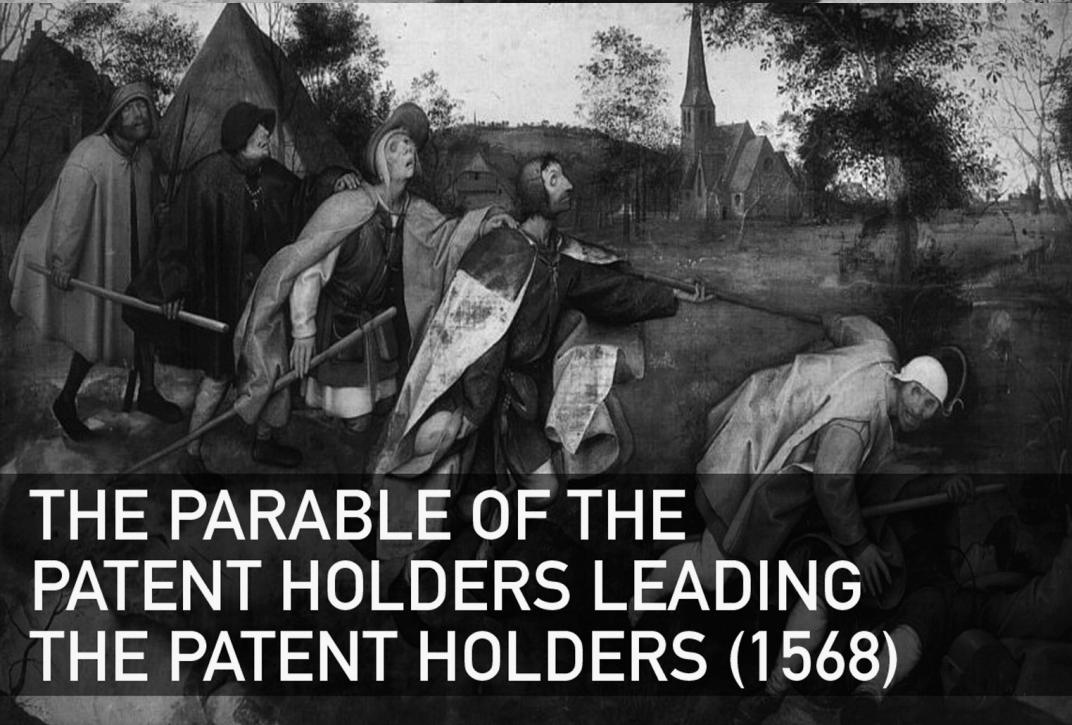
All these difficulties also contain creative potential as long as the legal and technological frameworks do not deteriorate. And, as the attempts to develop a stable version of Wikipedia show, innovative solutions are being sought. The potential of these new forms of cultural innovation has not yet been exhausted. Now, that it has become extremely simple to make perfect copies and distribute them worldwide, there are no more excuses for denying people access to knowledge, information and culture. There is demand. There are no obstacles to distribution. What has to be reorganised is the creation of the "first copy". Free licences have created a solid legal basis for that. The free cooperation of thousands guided by their own motivation and talent has proven to be highly productive and will probably become

even more productive as organisational experience increases. Individual artists have the opportunity to reach a worldwide audience without having to conform to the sometimes limiting expectations of global users, which is an improvement much greater than the risks and open questions that stem from new models. A paradigm shift in the creation and distribution of knowledge and culture is making itself felt, which is by no means limited to non-commercial areas. The first models using the new paradigm are already operational although their survival is not yet secured in the long run.

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(Translated from German into English by Ákos Gerold)

THE SLAUGHTER OF THE MOVIE PIRATES (1566)



THE PARABLE OF THE PATENT HOLDERS LEADING THE PATENT HOLDERS (1568)

Sharing and Hoarding: Are the Digital Commons Tragic?

A common is a shared resource that is not owned by a private individual or the state but managed by a community and accessible to all members of that community. During the Middle Ages most agricultural land in Europe was cultivated as common land by local communities of farmers. Only later on, during the enclosure movement at the beginning of the modern age, was it turned into private property. For a long time, commons were regarded as a pre-industrial concept that had little relevance to developed societies. However, in recent years, the idea of the common and common ownership has made an extremely significant comeback. The basis for this empirical observation is that a new class of informational goods has been created, above all Free and Open Source Software (FOSS), which is not owned by any private entity, such as a company, but managed by a group of developers and made accessible to all. This resource, the software source code, constitutes a new kind of common, the digital commons of the Internet. In the last couple of years, these digital commons have been growing significantly, including not just software, but all kinds of digital material such as songs, texts, and videos, which are distributed freely.

However, we should not think of the common as a kind of idyllic place, where all people contribute equally to a noble, shared goal. Rather, as to be expected, there are a lot of people who do not really contribute much of anything, but are avid consumers of the resource. In 2000, a study called Free Riding on Gnutella⁽¹⁾, revealed how much taking and how little sharing there was among users of the file sharing system Gnutella. Studies into other types of digital common have revealed a similar picture. Conducted by researchers of the "Information Ecology Area" at Xerox's Palo Alto Research Laboratories (PARC) this study was based on a 24 hour traffic analysis of a single node in the Gnutella Network. Through this traffic analysis, the researchers *established that 70% of Gnutella users share no files, and 90% of the users answer no queries*. Effectively, this means that only 30% of the users contribute any files to the common resource base. The study goes on to say that even among those who do contribute, the concentration at the top is heavy. The top 10% of hosts contribute 87% of all files, with close to half of all files (40%) provided by the top 1%. Furthermore, 90% of all users either provide no files or the files they provide were never requested. The files that were actually of interest, hence downloaded by others, were concentrated on only 10% of all hosts.

This data questions some general assumptions about the nature of a distributed file-sharing system such as Gnutella. Firstly, distribution of the system is much less than the number of hosts indicates. A relatively small number of hosts constitute, in effect, a central repository for a large part of all files, particularly the popular ones. Second, this concentration (re)introduces into the system a number of vulnerabilities that were thought to be avoided by its supposedly distribution based nature. The system is more vulnerable to censorship or hacking (Distributed Denial of Service attacks, for example) than typically claimed because it is possible to identify the relatively small number of hosts that contribute

the majority of resources. 40% of the resources, as the study shows, were contributed by a mere 314 hosts. While this is significantly more than the single central directory of Napster, it still might not be too difficult to enforce copyright, intellectual property and censorship laws against most of them. This is exactly what the music industry is trying to accomplish with the massive wave of law suits it has launched over the last few years in the USA and Europe.

This heavy concentration of resources might introduce another weakness: the unequal use of bandwidth throughout the system. If only 10% of hosts contribute those files that are actually downloaded, then this small number of hosts will have to carry 100% of the bandwidth used in the system. Potentially this may introduce bottle necks, slowing down transmission, and burdening the most valuable contributors with the lion share of the bandwidth costs. Hence the system punishes those who contribute the most.

The researchers conclude that These findings have serious implications for the future development of Gnutella and its many variants. In order for distributed systems with no central monitoring to succeed, a large amount of voluntary cooperation is required, a requirement that is very hard to fulfill in systems with large user populations that remain anonymous. Consequently, they argue, an open file sharing system is likely to be affected by the tragedy of the digital commons.

It is here, in the interpretation of data, that things really get interesting. Are the digital commons really a tragic story? The tragedy of the commons refers to an alleged tendency of freely available resources to degrade over time. In his classic 1968 article, Garret Hardin argued this the following way:

Picture a pasture open to all. It is to be expected that each herdsman will try to keep as many cattle as possible on the commons (and) the inherent logic of the commons remorselessly generates tragedy. As a rational being, each herdsman seeks to maximize his gain. Explicitly or implicitly, more or less consciously, he asks, "What is the utility to me of adding one more animal to my herd?" This utility has one negative and one positive component.

1. The positive component is a function of the increment of one animal. Since the herdsman receives all the proceeds from the sale of the additional animal, the positive utility is nearly + 1.

2. The negative component is a function of the additional overgrazing created by one more animal. Since, however, the effects of overgrazing are shared by all the herdsmen, the negative utility for any particular decision-making herdsman is only a fraction of - 1.

Adding together the component partial utilities, the rational herdsman concludes that the only sensible course for him to pursue is to add another animal to his herd. And another...

But this is the conclusion reached by each and every rational herdsman sharing a commons. Therein is the tragedy. Each man is locked into a system that compels him to increase his herd without limit -- in a world that is limited. Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. Freedom in a commons brings ruin to all. ⁽²⁾

The difficulty of this example, apart from assuming a rather limited, short-term rationality, is that it is not clear how it applies to the sharing of digital goods, if it applies at all. Rishab Ghosh, in his *Cooking-Pot Markets* ⁽³⁾, was one of the first to argue that it might not apply: With a cooking-pot made of iron, what comes out is little more than what went in, albeit processed by fire; so a limited quantity must be shared by the entire community. In contrast the cooking-pots of the Internet take in whatever is produced, and give out their entire contents to whoever wants to consume. The digital cooking-pot is a vast cloning machine, dishing out not single morsels but clones of the entire pot. Each user can take as much as they want, without reducing what is available to others.

Economists call this feature of "non-rivalrous", meaning that taking from the digital resource does not reduce what is available to others. The resource cannot be used up. An everyday example of a non-rivalrous resource is the streetlight. It brightens the street the same manner, no matter how many people are on it. It does not get darker if more people "use" the light on the street. Since digital data is as tangible as the light, giving it away to others does not imply being disposed of it. As a consequence digital commons can tolerate a much higher degree of consumption without contribution than physical commons; where everything that is consumed needs to be replaced before it is available again.

The fact that none of the file sharing systems have been negatively affected by the "tragedy of the commons" suggests that it does not apply to digital goods. On the contrary, every increase in diversity of the files available is an increase in the attractiveness of the system for all users, even if the number of users grows quicker than the number of files. In fact, pure consumers can be seen as also contributing something indirectly, namely, public recognition that a resource is valuable. Software programmers and other cultural producers take, quite naturally, considerable pride in the fact that their creations are sought after by a large number of people around the world. After all, most creations are attempts to communicate something and being heard and appreciated is an important aspect of communication. This is motivating them to continue to produce, particularly since these users do not create any additional costs.

While the digital commons are unlikely to collapse under the weight of users who do not directly contribute, the study does indicate that the centralization, introduced by the extremely unequal distribution of resources throughout the network, makes the system vulnerable to hostile attacks, both on a technical as well as on a legal front. This shows that even cleverly designed systems cannot guarantee the free flow of information in an environment that is either not willing to support this goal or downright hostile to it. Thus,

for the moment, the gravest danger to the digital commons is not internal, but from external factors, those who want to defend their established business models.

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The Age of Media Autonomy

Collaborative media is emerging as an alternative form of media production uniquely suited to the Internet. Whereas broadcast media is becoming more and more homogenized and closed, collaborative media is filling an existing void and experiments with the still largely untapped possibilities of new forms of media production. Central to their development is the task of creating models of openness that can facilitate collaboration within a broader environment which may be quite hostile.

Background

Over the last decade, the landscape of mass media has been profoundly transformed. There has been a massive consolidation in the hands of less than ten transnational giants (most importantly, AOL Time Warner, Disney, Bertelsmann, Vivendi Universal, Sony, Viacom and News Corporation). Together these companies own all of the major film studios, cinema chains, and music companies, the majority of the cable and satellite TV systems and stations, all television networks in the USA and the bulk of global book and magazine publishing. Barely 20 years ago, most of these companies, if they existed, didn't even rank in the 1,000 largest firms in the world. Today, despite the recent decline of their market evaluations, these large media firms rank among the 300 largest corporations in the world.

Meanwhile there has been a significant technological convergence; previously distinct production environments and delivery channels have collapsed. It is now normal to listen to the radio on a computer and receive news headlines and images on a cell phone. Single companies now commonly control the entire chain from production to distribution across various media channels. Consequently, the content delivered to consumers has become increasingly bland. The dependence of all mass media, private or public, on advertising revenue creates the need to attract the one market segment most interesting to advertisers: the young, affluent, predominantly white middle-class.

The result is a homogenized and self-referential mass media space as parochial in its content as it is global in its form. Largely closed off to issues that are not attractive to its narrow target audience and opinions critical of its structure, mass media has become a powerful reinforcement for conformity on all levels, emphasizing stereotypes of normality and marginality. Only those who profit from the current system – the small number of parties among whom power rotates – are allowed to speak.

This latter point was addressed a gear deal during the 1990s. Minorities tried to get “fair” representation of their particular identities in mainstream media. To some extent, this has been successful as some of groups, for example the homosexual communities, were discovered as profitable market segments and easily integrated into the advertisement-

driven logic. Television became more “colorful” at the same time as the diversity of opinions it aired diminished. The “politics of representation”, by and large, failed as a progressive strategy. The other approach, mainly in the USA, to construct alternative information channels on cable TV or radio has been only slightly more successful, not least because these channels could reach only relatively small local audiences (with the exception of NPR and PBS in the USA) and also because the economics of mass media production are not favorable to low-budget projects. In Western Europe, independent radio and TV has been even less successful in creating alternative public discourses.

Against this background of homogenization and a mass media system that is more closed than ever and controlled by powerful gatekeepers, able to restrict what can be transmitted through it; some key new media forms are emerging. Central to their development is the facilitation of new forms of collaborative production and distribution. In most cases, these media forms are enabled by the structure of the Internet – the “network form”.

Internet: Architecture and Code

The Internet's potential as an open media space, in which access to the means of production and distribution are not controlled centrally, is based on the particulars of its design (architecture) and its implementation (code), as Lawrence Lessig has argued extensively. On the level of architecture, the Internet's “end-to-end” principle has traditionally pushed “intelligence” to the periphery, ensuring the routing of traffic from one end to the other and treating all traffic indiscriminately. Only the machine at the periphery, for example where someone is watching a video stream, does the critical work of differentiating between different kinds of data. To the router responsible for getting the content across, it is all the same: an endless stream of packets where only the addresses of destination and origin are of interest.

These features, key elements of the TCP/IP (Transfer Control Protocol/Internet Protocol), are now under contestation. IPV6 (Internet Protocol, Version Six), allows for the creation of “intelligent” routers providing for a distributed regulatory environment – a danger given the fact that ownership of the Internet's physical layer is also in the hands of relatively few corporations. A powerful coalition of business and security interests is working hard to gain control over this open infrastructure and to, effectively, close it off. So far, they have not been successful and end-to-end delivery still guarantees equality of transport, if not equality of expression, across the Internet. This applies to content within a given format (an “Indymedia” web page versus a CNN web page, for example) but also across formats (an email message versus an mp3 file) and, very importantly, extends to currently unknown formats.

In order to take advantage of this it is important that the protocols (the language in which machines speak to one another) are freely accessible. The Internet's early engineers understood this and consciously placed the key protocols (for instance TCP/IP, SMTP, and

HTTP) in the public domain so that anyone could build applications based on them. It is the combination of a network that does not discriminate about which content it transports and the free availability of the key protocols that has allowed many of the most interesting innovations of the Internet to be introduced from the margins without any official approval or any central authority; be that a standard-setting body like the W3C or ISOC, or a governing body like ICANN.

Some Prototypes: Open Publishing

Among the first and still the most advanced projects for media infrastructure are those focused on open publishing. The bulk of the published content is provided by a distributed group of independent producers and users, who follow their own interests, rather than being commissioned and paid for by an editorial board and created by professional producers.

There are a great variety of open publishing projects, a few of which will be discussed later on, but they all have to contend with a fundamental problem: on the one hand, they need to be open and responsive to their users' interests, or the community will stop contributing material; only if users recognize themselves in the project will they be motivated to contribute. On the other, the projects need to create and maintain a certain focus. They need to be able to deal with content that is detrimental to the goals of the project. In other words, “noise” needs to be kept down without alienating the community through heavy-handed editorialism.

The strategies of how to create and maintain such a balance are highly contextual, depending on the social and technological resources that make up any given project.

Email Lists: Nettime

The oldest and still most widely used collaborative platforms are simple mailing lists. Among those, one of the oldest and most active is Nettime, a project I know intimately as a co-moderator since 1998. It was started in 1995 to develop a critical media discourse based on hands-on involvement in and active exploration of emerging media spaces. Its original constituents were mainly European media critics, activists and artists. Over the years, this social and regional homogeneity was somewhat lost as the list grew to some 3500 participants, as of mid 2005.

An email list is, fundamentally, a forwarding mechanism. Every message sent to the list address is forwarded to each address subscribed to the list, and consequently, everyone receives the same information. This is a broadcast model, with the twist that everyone can be a sender. Unless the participant base is socially homogeneous and more or less closed, noise will be an issue, be it only because different people have different ideas of what the project should be. However, for individual subscribers there is no effective way to modulate the flow of messages to make it conform to their idea of the project. The issue

of moderation, in some form or shape, is fundamental to all community-based projects, as it raises the question how to enforce community standards. The platform of the email list offers an extremely limited set of choices of how to create moderation. The only way is to have all messages sent to the address placed in to a queue. The moderators who have access to this queue can then decide which message gets forwarded to all subscribers and which does not. The platform differentiates only between two social roles: normal subscriber and moderator. There is nothing in between. Subscribers see only those messages that moderators approve. Due to the broadcast model of the information flow, the moderation process needs to be closed.

Of course, this creates conflicts over what the community's standard is, often expressed as an issue of censorship. Nettime, rather than upgrade the platform, opted to deal with this problem by creating a second, un-moderated channel, also archived on the web, to serve as a reference, so that everyone who wanted to could see all messages. The social sophistication of this technological choice was low. It addressed only a single concern – the lack of transparency in the moderation.

In the end, the lack of technical sophistication can only be compensated socially, by trust. The community needs to trust the moderators to do their job in the interest of the community. The “blind” trust is checked by the need of the moderators to keep the community motivated to produce content.

Collaborative News Analysis: Slashdot

Slashdot – founded in September 1997 – is a web-based discussion board, initially populated by the softer fringes of the US hacker culture, but now with a global appeal, though still clearly US-centric. Unlike most such projects, it is owned by a for-profit company, OSDN, and has a small, salaried staff, mainly for editorial functions, management, and technical development. Slashdot's culture has been deeply influenced by two of the central preoccupations of (US) hackers: hacking, that is making technology work the way one wants, and a libertarian understanding of free speech. The two interests are seen as heavily intertwined and are reflected in the still ongoing development of the platform.

There is a sort of implicit consensus on the Slashdot community, but this also has consequences. Firstly, not all contributions are of the same quality and most people appreciate having a communication environment where noise is kept at a sustainable level. Secondly, different people have very different ideas as to what constitutes quality and what level of noise is sustainable.

The phenomenon of “trolling” (posting comments just to elicit controversy) is highly developed on Slashdot and has fostered several subcultures with their own particular charms.

The first factor requires some moderation facility; the second requires that individual users can modify the results of the moderation to fit their own needs.

Like the good hackers they are Slashdot favored practical solutions over ideological debates, such as still hamper most “Indymedia” sites, when dealing with the free speech versus quality control and community standards issues. They set out to create what is today one of the most sophisticated moderation mechanisms for open discussion environments. Basically, there are two rating mechanisms, one performed centrally on site, and one “decentrally” by each user. A team of moderators, selected automatically according to the quality of their previous contributions, rates each comment multiple times. The resulting average constitutes the rank – expressed as a value between -1 and 5.

Each user can define individually what rank of messages to display, for example, only comments rated 3 and above. In addition, each user can white- or blacklist other users and so override the moderation done on site and publish what is called a journal where she or he is in full control over the content.

Slashdot is highly user-driven. Not only in regard to the content, but also as to giving the users the ability to determine what they want to see and how, without affecting what others can see. While one user may choose to see nothing but the most highly ranked comments within a particular category, another user may positively relish seeing all posts in all sections. Slashdot has managed to create a forum with more than 500,000 users in which rarely a comment is ever deleted (usually a court order is necessary for this) without it becoming the kind of useless mess into which the un-moderated Nettime channel declined. This is largely due to the greater social sophistication of the platform and its flexibility in modulating the flow of texts.

Peer-to-Peer Networks

The particular openness of the Internet allows not only applications, which can be freely introduced within the framework of existing architectures, but also the creation of alternative structures either above or below the TCP/IP level. Collaborative distribution platforms take advantage of that by turning a de-centralized client-server structure into a truly distributed peer-to-peer network. Changing the architecture that resides on top of the TCP/IP level is the approach taken by peer-to-peer (P2P) file sharing systems, such as Edonkey or Bittorrent. The problem of the file sharing systems is less one of signal to noise, even though one of the counter-strategies of the content industry to disrupt these systems is to flood them with large junk files, hence introducing noise into a system that otherwise has been remarkably noise-free.

The hostility to the environment of file sharing systems, then, is on the level of legality. Two key strategies are emerging to deal with this. The mainstream approach is to develop a system that keeps so-called illegal content out. Napster Inc., after losing a series of court

trials, was forced to go into this direction, developing a system that would reliably keep out copyright-infringing material. Given the complexity of the copyright situation, this was a nearly impossible task; Napster was unable to satisfy the court order and completely disintegrated as a technical system and a company. Others have stepped up to assume Napster's mantle but suffered either a similar fate, or are likely to do so in the future. At this point, it seems simply impossible to create an open distribution system that can co-exist with the current restrictive IP regimes.

Consequently, most commercial interest has been refocused toward building closed distribution systems based on various digital rights management systems (DRMs). This does not mean that there are no more collaborative, peer-to-peer distribution channels anymore. However, their approach to surviving in a hostile legal environment has been to devolve to such a degree that the entity which could be dragged to court disappears. Without a central node, or a company financing the development, it is less easy to hold someone responsible. Truly distributed file sharing systems like Gnutella are one approach, though there are still significant technical issues to be solved before the system becomes fully functional on a large scale.

Freenet, the peer-to-peer network for anonymous publishing, has chosen another strategy. Here content is never stationary, in the way that URLs are stationary, but it moves around from node to node within the network, based on demand. Consequently, its location is temporary and not indicative of where it has been entered into the system. With all content encrypted, the owner of a Freenet node can reasonably claim not to have knowledge of the content stored on her node at a particular time, and thus avoid the liability of an ISP which is required by law to remove objectionable content when it becomes aware of it. So far, the strength of this strategy of shielding the owner of a node from liability for the content stored has not been tested in the courts, as the entire system is still embryonic. However, it is at least an innovative conceptual approach to keeping the network open and robust against (legal) attacks.

Community Architectures: Bottoms Up

Changing the architecture that resides below the level of TCP/IP is the approach taken by the slowly developing wireless community networks such as London's Consume. Wireless community networks substitute the infrastructure of the commercial telecom firms as the basis of data flows with a distributed infrastructure of wireless points that route traffic across a chain of nodes maintained by a (local) community. This allows, at least theoretically, the creation of local networks that are entirely open (within the community) and have fewer of the traditional constraints, legal or bandwidth wise, which characterize conventional network architecture.

Consume's bottom-up approach, in which individual community members are encouraged to maintain their own nodes, has not yet come to full fruition. Technical hurdles have proved

substantial for all but the most dedicated geeks. In an environment already saturated with connectivity, this has been nearly fatal. Consume has not yet managed to gain the critical mass to sustain a real community.

A different approach was taken by Citywave in Berlin. The groups involved in this structure chose to rely on a commercial provider to plant and maintain the wireless nodes, using the community as free beta-testers. However, in the prevailing harsh economic conditions, the willingness of the provider to support a non-commercial project with only limited advertisement potential dried up quickly and the project collapsed.

It is too early to say whether or not wireless community networks are doomed to become entries in Bruce Sterling's dead media list or if they will take off under the right circumstances. What they demonstrate, however, is the possibility of generating autonomous infrastructures at the hardware level. Such structures will be especially important in the environment of micro-control generated by IPV6.

Outlook

The potential of autonomous media is substantial. The mainstream media landscape is bland and excludes such a significant range of the social, cultural, and political spectrums that there is an extensive need to have access to a different means of producing and distributing media content. There is, now, real potential for the creation of a new model of media production and distribution not subject to the traditional economic pressures. The combination of collaborative, distributed modalities and autonomous infrastructures can allow new subjectivities and composing communities to emerge.

But such non-hierarchical collaboration, based on self-motivation, needs new strategies to reach a scale in which the output can really match those of traditional media production. The open source movement has already made steps towards this strategy, and certain "open" publishing structures have achieved a wide-scale success. Slashdot as a point of publication has achieved the same, or even a higher level of visibility than traditional technology publishers.

However, the need to sustain openness in a hostile environment demands further innovation in social organization and technological tools. The danger is that openness becomes increasingly (and paradoxically) related to closed groups, fragmenting the collaborative media landscape into self-isolating sects whose cultural codes become increasingly incommunicable. The potential, however, is to give meaning to the somewhat vapid notion of doing the rounds of late, that civil society should become the "second super power". This will not happen unless we have a media infrastructure that provides a structural alternative to the media dominated by the powers that, currently, are.

One-size-doesn't-fit-all

Particulars of the Volunteer Open Source Development Methodology

The Free and Open Source Software (FOSS) movement has been spectacularly successful. In barely 20 years, it has grown from a dream of a small band of programmers to a worldwide reality involving tens of thousands of people, producing advanced informational goods which are used by millions of people. As such it has been the first collective effort to successfully harness the potential of the Internet, where information can be infinitely reproduced and communication is virtually without cost.

This success has been inspirational, and many artists and activists are looking for ways to apply this approach to goods beyond software. The development model is based on communal management and open access, modularization of production, openness to contributions from a diverse range of users and producers, flat hierarchies, and a fluid organizational structure.

To some degree this model has been applied successfully beyond software, in projects such as the free encyclopedia, Wikipedia; collaborative sites writing and publishing projects such as koro5hin.org; and the Distributed Proofreading Project, connected to the Gutenberg Project.

However, the FOSS model is not a one-size-fits-all solution to open production of informational goods via the Internet, and is not suitable for application to many areas of cultural and scientific production. Why? Because its social organization, the particulars of its development methodology, reflect the unique character of the problem – software development – for which it has been created. Other creative problems have different characteristics and will need a different form of social organization to be produced “openly”; these are still largely missing. Hence, it is not a coincidence that we have not yet seen an open source novel, and that open source music remains restricted to a small niche (the models that do exist are analyzed in a different essay in this volume).

There are at least six aspects that are characteristic of software production and are reflected in the social organization of the FOSS movement. In other contexts, some of them may be very different and when thinking about how to develop “open cultures” we need to keep in mind how the difference might affect the social organization of their production.

1) Producers are not Sellers

The majority professional, i.e. highly-skilled, programmers do not draw their economic livelihood from directly selling the code they write. Many work for organizations that use software but do not sell it, for example as system administrators. For them the efficient solution of particular problems is of interest, and if that solution can be found and maintained

by collaborating with others, the sharing of code is not an issue. For others employed in private sector companies, for example at IBM, a major supporter of FOSS, the development of free software is the basis for selling services based on that code. The fact that some people can use that code without purchasing the services is more than off-set by being able to base the service on the collective creativity of the developer community at large. From IBM's point of view, the costs of participating in open software development can be regarded as “capital investment” necessary for the selling of the resulting product: services.

For members of academia (staff and students) writing code, but not selling (which is often explicitly prohibited), contributes to their professional goals, be it as part of their education or as part of their professional reputation-building. For them, sharing of code is not only part of their professional advancement, but an integral part of the professional culture that sustains them also economically, in form of salaries for the faculty and stipends for the students.

Last but not least there are all those who use their professional skills outside the professional setting, for example at home on evenings and weekends. Having already secured their financial stability, they can now pursue other interests using the same skill set.

2) Limited Capital Investment

Particularly the last, and very important, group of people, who work outside the institutional framework on projects based on their own idiosyncratic interests, can only exist due to the fact that the means of production are extraordinarily inexpensive and accessible. Materially, all that is needed is a standard computer (often even a substandard one would suffice) and a fast, reliable connection to the communication forums of the community. Of course, the computer and the network rely on a level of infrastructure that cannot be taken for granted in many parts of the world, but for most people in the centers of development, they are within relatively easy reach.

Once this access to the means of communication is secured, the skills necessary to participate in the development of code may also be acquired collaboratively, free of charge. The number of self-taught programmers is significant. Since no expensive diplomas are necessary to become active, the financial hurdle is, indeed, extraordinarily low.

3) High Number of Potential Contributors

Programming knowledge is becoming relatively common knowledge, no longer restricted to an engineering elite, but widely distributed throughout society. Of course, truly great programmers are as rare as truly great artists, but average professional knowledge is widely available. This has quantitative and qualitative dimensions. Quantitatively, the number of able programmers is in the millions, and rising. Qualitatively, the range of people capable of being programmers is also unusually wide, not the least because the material hurdles are so low and the learning can take place outside of institutions with entry exams and tuition fees. This large and diversified pool of talents makes it possible to create the critical mass of contributors out of only a fraction of the population.

4) Modularized and Incremental Production

A large software program consists of many smaller code segments (libraries and plug-ins for example), some of which can be appropriated from other programs. This makes it possible to break down the production process into many small steps which can be carried out by distributed contributors. If the act of integration is relatively straight forward, it allows the amount of work that each has to contribute to remain highly flexible and also make use of smaller contributions (bug reports, patches). Furthermore, the modularity of the production process allows a high number of people to work in parallel without creating significant interferences.

5) Producers Are Users

According to Eric S. Raymond, a good open source projects starts with a programmer scratching his own itch and finding out in the process that there are many others with the same problem. Wanting to use a program is a great motivation for contributing to the program and developing it; often it is much more efficient that waiting and hoping that someone will write and sell a program that will address one's particular need. Most sciences work differently. Imagine if the development of drugs was dependent on the initiative of people who are ill.

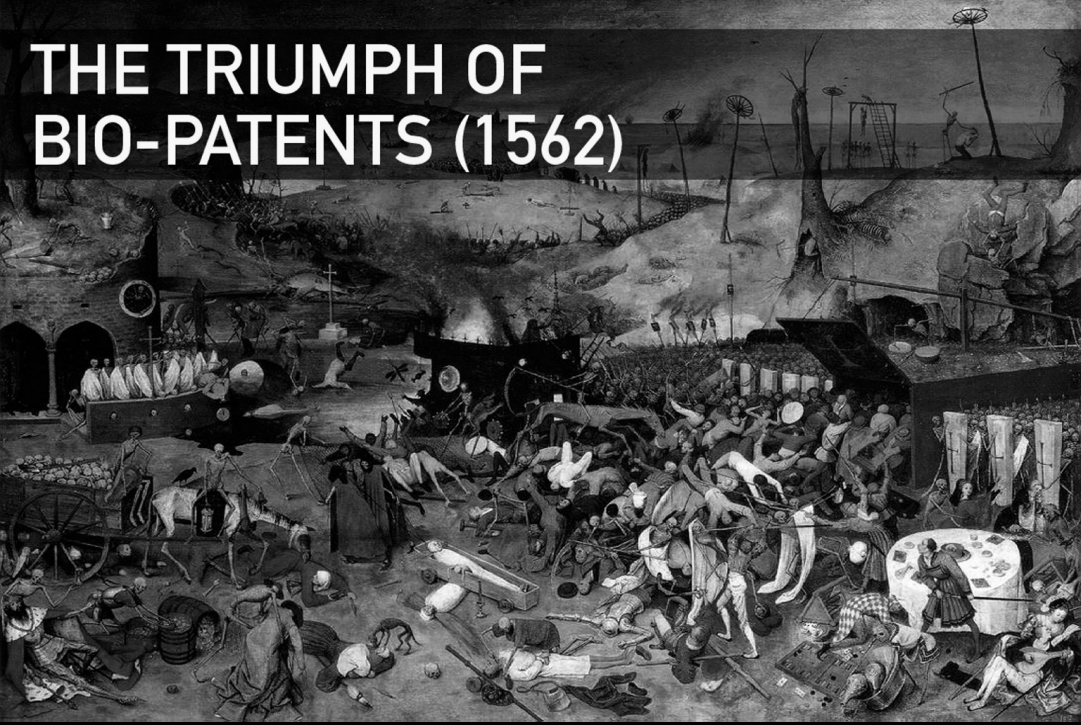
6) No Liability

Last, but not least, software, (proprietary as well as free) has no product liability. Paragraph 11 of the GPL states, similar to most other licenses, that *the copyright holders and/or other parties provide the program "as is" without warranty of any kind, either expressed or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose* (GPL, v2). The absence of liability makes it possible to produce a program without having to assign clear ownership of the entire program (as supposed to attribution of parts of the code to individual contributors), or other markers allowing to determine liability. We can be relieved that cars are not built like this.

This is not a critique of the FOSS movement or its development methodology. It works well and represents exceptional social innovation. But, to extend this innovation, we need to innovate more. We must think productively what it would mean create open access to other informational goods, such as music or medical drugs. For these areas, FOSS can be an inspiration, but not a model because the conditions and requirements are different for each type of informational good. There is reason to be optimistic. New models are being tested, or at least seriously discussed. The growth of "Open Access Journals", fully peer-reviewed scientific journals published online without access restrictions or discussions around "compulsory licensing" for medical patents are good, though very early examples. Much remains to be done and there is still a lot of room for experimentation.



**WORLD INTELLECTUAL
PROPERTY ORGANIZATION (1563)**



**THE TRIUMPH OF
BIO-PATENTS (1562)**

The Nature of Networks

Information Ecology

New media are not bridges between man and nature: they are nature.
Marshall McLuhan, 1969

Digital media builds an integrated environment based on flows of information. Increasingly, this environment provides the primary setting for human agency, we talk to our friends over cellphones, we collaborate with people near and far via email, we even look up maps and physical places online. This does not imply that people are somehow becoming virtual, but virtually all human actions rely, in varying degrees, on digital information networks. Information ecology aims at understanding the properties of this environment in order to use its potential, avoid its dangers and influence its development positively.

The basic elements of this environment are not materials – soil, houses, or any other tangible form of atoms – but intangible flows of information produced by and processed through media: Information to communicate among people, to control processes across time and distances, to check and re-evaluate existing information, and to produce more new information. At the interconnections of such flows nodes arise. Nodes are structures built by the recurrent intersection of different flows which they, at the same time, process and direct. Nodes can have the form of large institutions, such as banks or government agencies that depend on the constant input of information which they process and feed back into the flow as new information. At the other end of the scale, personal identities are shaped by flows of information; built upon past experience and maintained and changed in the constant reshaping through the exposure to new information in everyday life. Nodes are intensifications and consolidations of flows in which they constitute structures that process the information and by doing so maintain themselves and the continuity of the flows.

These two elements, flows and nodes, are mutually constitutive, one builds upon the other. Flows without elements of structure would be noise and nodes without flows would be dead. The interconnections between the nodes constitute the patterns in the flow of information. They provide the stabilization within the potentially fluid environment enabling navigation and purposeful, systematic action.

While the nodes stabilize the flows of information and endow a certain consistency and continuity to the environment, they are themselves subject to the dynamics of the environment. These dynamics, which are produced by the interactions of the nodes and shaped by the media that channel the flows, are themselves not reducible to any single node but are the result of the combination of all flows, of the interaction of all nodes at the given time reflecting their different capacities to influence. The dynamics, however, are not random; they have discernible patterns in which they develop.

These patterns are the four basic dimensions of an information ecology:

- interdependency
- change
- time-boundness
- differentiation

Interdependency

All nodes are connected to other nodes through communicative processes. Other than mechanical machines that are isolated from one another, the very nature of the ecological environment is its connectedness. The uniqueness of each node, the fact that every node embeds a singular combination of connections to other nodes, ties them into one large shared environment in which all elements are interdependent. What makes this interdependency so vital is the “material” of the flow: information. Information is not objective data, however, information is the relation which arises within the environment, and it is the difference that makes difference (Bateson, 1972). Information results from relationships between two otherwise meaningless pieces of data, it relates both sides of the flow to each other. Marshall McLuhan saw this very clearly when he wrote: *The ‘meaning of meaning’ is relationship.* (McLuhan; Nevitt, 1972)

The economy in an integrated environment does not produce isolated products, such as soybeans or rolled steel, but local groupings of products that support each other. Companies exist in mini-ecologies structured by strategic alliances and synergetic partnerships. The decline of Apple Computers has been caused by locking in its operating system instead of licensing it to other manufacturers and profiting from the increased variety (Arthur, 1996).

Change

The flow of information does not simply connect two sides; by being connected they change. A bridge does not simply couple two independent villages across a river but it creates a new city (or a new war).

The flows of information are infinitely malleable. It is their intrinsic property to change their direction and quality instantaneously, a characteristic which is greatly accelerated by electronic media. Out of such changes new relationships arise which bring supposedly independent nodes into a sudden interdependency. Mergers and outsourcing are but one of the results of changes in information flows.

However, change is neither additive nor subtractive in an integrated environment; it is ecological. One significant change generates total change. If a species is removed from

a given habitat, what remains is not the same environment minus that one species, the result is a new environment and the conditions of survival within it have been reconstituted. This is also how the ecology of information works. New flows of information can change everything (Postman, 1992). The interdependence of the nodes means that information can travel through the whole environment and, according to the way it is reshaped in each node, it grows or decreases in relevance and speed.

In an ecological environment where change is ubiquitous and sudden, the mode of survival is adaptation instead of optimization; as has been paramount under linear development during the industrial age. The newest version of a piece of software is not better because it has less bugs but because it incorporates new capabilities, adapting to the fast-paced changes of the Internet.

Time-boundness

In an environment where information flows very quickly, at the speed of light through computer networks, and the new interrelations are born as fast as old connections die time is a supreme factor. Apart from the fact that there is continuous change, nothing is fixed. Quick moves in the capital markets can wipe out institutions that were once the foundation of global empires, as demonstrated impressively by the fall of the Barrings Bank in London. Information, the means to act upon the flows of information is only a resource as long as it is timely. The time span in which information really makes a difference is neither intrinsic in the information itself nor in the flow upon which it intends to act; but is determined by the relation between the node and flow, and by the purpose of action. For dealers in the capital markets fifteen minute old quotes are worthless, for the journalist who prepares the daily summary for a newspaper they are valid. And, for the analyst who tries to develop models for predicting the future movements, the quotes of the last couple of years may be of crucial importance as a testing-ground for his models.

Differentiation

Information is difference and the nodes survive as long as they can make a difference, which is for as long as they can produce information that is valid for others. In information ecology the basis for cooperation and survival is differentiation and not similarity. This is the difference between a network and a collective. Highly differentiated nodes can group together in order to respond to newly arising opportunities and dissolve once their mission has been achieved.

Differentiation is the reduction of complexity. Vast amounts of data are reduced, according to the inner structure of the node, in to specific information. This information, the difference between the node and the flow and among the nodes, is the basis upon which the flows are redirected, new connections are established and old ones maintained.

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Fragmented Places and Open Societies

Human life unfolds simultaneously in three environments, biological, built, and informational. Analytically, they can be distinguished, but in practice they are inseparable. The way we construct our houses reflects as much our bodily as our cultural determination. The relationship among these environments is, however, unstable. They mirror and penetrate each other in historically specific ways. Much of the turmoil of our present period can be understood in terms of a realignment of these three environments, driven by a profound expansion of our cultural capacities as information technology is expanding into an all-connecting Internet. In the following, I will to look at how physical space is affected by this process and the challenges that this poses to the future of society as an open political system.

Time and space are the fundamental dimensions of human action. One way of reading historical development is as an acceleration and expansion of society (interrupted by periods of deceleration and contraction). Over time humans have learnt to manage more space in less time. Technology played a major role in enabling this “time-space compression”. Cities grew into metropolises, a world economy emerged, the whole planet became interconnected from the 17th century onwards, in close relationship with advances in communication, transportation, and, not to forget, accounting. As profound as this development has been, it did not touch the basic definition and characteristics of space. Following Manuel Castells ideas, we can define space as the material basis of time-sharing. In order to interact in real-time, one has to be in the same space which has always been a single place. Space, then, could be thought of as a series of places; one next to the other. Indeed, time-space compression meant that the relative distance between places was shrinking, yet their relationship remained characterized by just that, a distance which always expressed itself as a time lag in interaction. The assumption that entities which are in closer proximity can interact more quickly and that the time lag grows linearly with distance remained basically correct, despite the capacity to span time and space more extensively, quickly and reliably. Some time in the 1980s, this changed. The quantitative development of acceleration reached its limit. Yet, rather than space disappearing, which some postmodernists predicted as the “terminal condition”, what we have been witnessing is the emergence of an entirely new kind of space, aptly termed the “space of flows” by Castells, the first and still most perceptive analyst of this historical discontinuity.

The concept of the space of flows points to the emergence of a new material basis for time-sharing based on instantaneous electronic information flows. This has been long in the making, starting with the telegraph in the mid 19th century. Its real foundations, however, were laid in the 1970s when the development of the micro-processor coincided with capitalist firms restructuring themselves in order to escape a deep economic crisis. This created the push and the pull to incorporate into social institutions technology capable of

generating and processing information flows. The space of flows expanded massively. In the process, the physical environment in which these institutions operated became restructured, too, by the logic of the space of flows. The key to this logic is that it is placeless, even if its physical components, quite obviously, remain place-based. Even a data-center is located somewhere. And the people who operate it have their homes somewhere as well. It is therefore not a coincidence that the major financial centers are still located in New York, London, and Tokyo, yet the dynamics of the global financial markets can not be explained with reference to these places. The same logic also infuses, for example, the production of clothing. Designed in Northern Italy, produced in Sri Lanka, marketed in New York, it is sold around the world in franchise stores which are locally managed, but globally controlled. What is emerging is a new social geography, highly dynamic and variable, which is no longer based on physical proximity, but on logical integration of functional units, including people and buildings, through the space of flows. The physical location of the various units is determined by the unequal ability of different places to contribute to the programs embedded in the various network. Whether production is located in China, Sri Lanka, or Bulgaria is, from the point of view of the overall operation, irrelevant, as long as the factory is capable of providing the required services competitively. In short, the connection between functional and physical distance has been broken. Yet, this is not the death of distance. Rather, it is being reconfigured into a non-linear pattern.

Thus, we have certain areas within, say, Sofia, whose developmental trajectory does not follow that of Bulgaria as a whole, but is determined by other free trade zones in emerging economies. Indeed, the very concept of free trade zone indicates that certain locales have been decoupled from their geographic environment. In a legally binding way, they are governed by a different set of rules than their “host countries”. This, in itself, is not entirely new. Shipping harbors have always enjoyed certain exemptions from taxation, a freedom granted to stimulate trade and commerce. Yet, traditionally, these pockets of extra-territoriality have been located at the borders of territories, facilitating the transition between them. Now, these zones are sprinkled across territories, severely undermining national sovereignty and territorial integrity. This was the story during the early 1990s, the result of commercially driven globalization. If one fast forwards to today it is possible to see the ability to operate trans-locally in real-time has diffused through society at large, though quite unequally. Small firms, criminal organizations, social movements, and even individual people can network globally with relative ease. Thus, more and more places on which the social actors in these networks rely are becoming decoupled from their local environments and determined by trans-local flows of people, goods, money, and culture. These networks are highly specific. In the first instance they can easily adapt their components as changing demands or self-selected goals require. Thus, they only need to cooperate with those who match their own shared culture. Secondly, cultural specificity is not an option, but a functional requirement for networked organizations. Relying on adaptation and co-operation, rather than command and control, they need to establish a distinct internal culture in order to build trust and facilitate communication. Corporate mergers, apparently, fail so often because the managers cannot fashion a new “corporate culture” out of the two existing

ones. In the process, the cultural differentiation between the networks is growing. From within the network, this appears as a process of integration and “community” or “team” building. From the point of view of physical space, which none of the network actors ever escapes, this appears as a process of fragmentation and of increasing isolation of social actors from one another, despite the fact that they might share the same physical space. This process has advanced to such a degree that it applies to the highly connected as well as to the disconnected. In fact, the two groups mirror each other. In many ways, people are not “more connected” than before, but rather, the connections which characterized dominant processes (even within the counter-culture) are increasingly made and maintained in the space of flows. The flip side of this ability to forge trans-local connections is that those connections made in the space of places are becoming weakened. There is no need to relate to others just because they are physically present. Rather, places (and people) can be bypassed and rendered invisible from the point of view of those operating through the space of flows. This new form of exclusion applies to whole regions, but also to particular neighborhoods; it works on all scales.

In cities, this expresses itself through the twin processes of global homogenization and local diversification. We have a McDonald’s in virtually every city of the planet. Yet, increasingly, there is no way to predict what will be located right next to it. On the ground, the many “globals” and “locals” mix in seemingly random ways. The result is a kind of a patchwork of cultures and their physical expressions jumbled together in agglomerations, sprawling metropolitan regions held together by fast transportation networks. These regions emerge without much planning. Many times, they do not even have a name. How are we to call the region, which can be traversed in either direction within a few hours, comprising of London, Paris and Amsterdam? The people who live on, or travel between, these patches (the connected as well as the disconnected) are, quite naturally, building their own cultures that enable them to deal with this new fragmented reality, increasingly without reference to the geographic place as whole. Consequently, the focus of this new “community” or network-centric culture lies on internal, rather than on external communication. Community-building becomes an end, rather than a means, to the degree that “community” is one of the few concepts that nearly always carries positive connotations.

This situation poses a great challenge to the projects of “open societies”, understood simply as political system in which those in power are accountable for their actions to the public and the fundamental rights of all individuals are respected. Historically, the institutional foundations for open societies have been liberal democracies. These are built on the assumption that people who live in one territory share certain values, or, at least, certain experiences. This communality is the glue that holds together the body politic. It served as the ultimate frame of reference in the endless game of compromises that characterizes the open political processes. This communality, however, is eroding as space fragments. Contributing to this erosion is the retreat of the state from the life of citizens, leaving them to fend for themselves. Thus people migrate, sometimes voluntarily, sometimes forced, into new communities, making

them increasingly unresponsive to compromise and consensus; without which liberal democracies do not work.

This is where we stand today. At the precise moment when democracy has established itself as the only legitimate form of government world wide, its actual institutions face a deep crisis. There are two trends which can be understood as a reaction to this crisis. One is the re-emergence of authoritarianism, which does away with compromise and consensus, justifying its power with reference to security instead. It operates across fragmented spaces; indeed, the ability to selectively alter the rules governing particular places is a key technique of this new form of power. Its most extreme case is the zone outside the law established in Guantánamo Bay in Cuba. But also more mundanely, special administrative zones are being established where civil liberties are curtailed, for example, with regard to drinking, public assemblies or just the presence of “suspects”, say, around schools. These zones are multiplying in cities around the world. Within these zones, which can spring up anywhere, the state of exception is being made permanent. This tendency severely undermines the openness of society by deepening fragmentation in the service of power. The other, more hopeful and difficult, reaction to the crisis of the democratic practices aims at reinventing the local. This time not from the point of view of territorial and cultural unity, but as a ground on which differences can be negotiated. What are needed are cultural codes that can not only circulate within particular networks, but that can travel across all of them. A renewal of fundamental rights could serve as a starting point for this project to reinvent democracy in the space of places, using the space of flows to expand the range of cultural expression, rather than diminishing it.

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The Status of Objects in the Space of Flows

The social reality of the space of flows is neither immaterial nor self-contained. Rather it deeply affects the material world from which it is inseparable. This text addresses three interrelated questions in order to investigate the status of material objects within the space of flows and to consider some ramifications for their creation within this new environment.

- What is (a working definition of) the space of flows?
- How is this space different from the space of places?
- What does this mean for material objects which are always physically located?

What is the space of flows? The recognition of the importance of flows goes back to the Greek philosopher Heraclitus (c.540 - c.480) who famously summed it up as: *panta rei*, everything flows. He was referring to a general condition of nature, where everything is in a constant process of transformation. It is impossible to step twice into the same river and even the most solid elements in nature are not entirely static. As we know today, even Mount Everest grows at a continuous rate of about 3-5 millimeters each year. Therefore, in a strict sense, it is not even possible to climb the same mountain twice.

The contemporary concept of the space of flows, however, is quite different from this. Following the ideas of Manuel Castells (1996), who introduced the term, it refers to a specific social condition, rather than nature in general. The space of flows has emerged into centrality for contemporary life only quite recently, arguably in the mid 1970s (Harvey 1989). The space of flows, as a working definition, is that stage of human action whose dimensions are created by dynamic movement, rather than by static location.

The operative words here are movement and human action. Without movement, this space would cease to exist and we would fall back into the space of places, defined by mountains, buildings and borders. Equally important, the movement takes place through human action and it creates the specific social conditions for our everyday lives. In this sense, the drifting tectonic plates for instance, even though they move, are not part of the space of flows. They drift no matter what we do, causing much headache and the occasional humbling experience to Californians.

Only recently has the space of flows become the predominant stage on which our world is shaped. This is most visible in the increasing importance of the global financial markets and in the ever expanding network of air travel. But, of course, there have always been social spaces that were created by human movement. In many places, for example old port cities such as Amsterdam, an earlier version of the space of flows, the maritime world of long distance trading, is still very present.

The space of flows - now and then - consists of three elements:

- the medium through which things flow,
- the things that flow, and
- the nodes among which the flows circulate.

In regard to Dutch long distance trading, the medium was the ocean. This medium was characterized by a specific density of water, currents, storms and many other conditions that favored certain kinds of flows over others. Oceans and sailing ships were unsuitable for carrying fresh fruits, but highly suited to transporting dried spices. This point can be generalized: there is always a close relationship between the medium of the flows and their contents. One of the first messages that came through the transatlantic telegraph cable when it opened in the mid 19th century was *The Queen has a cold*. This factoid became newsworthy only under the conditions of instantaneous transmission (Winston 1998).

The third elements in the space of flows are the nodes, the harbors and trading posts, that the Dutch established around the world. Flows always go from one node to an other. In a world with only a single harbor, ships are mere entertainment. Nodes focus movement into flows. Nodes, like the harbor where goods are loaded into ships, are membranes that connect various flows to one another and flows with places. A node is a type of interface, and like all interfaces, they shape profoundly what they interface to. Flows are created by a subtle interplay of similarity and difference among nodes (Stalder 2001). People who do not speak the same language have a very hard time communicating. People who know the exact same stories have nothing to tell to one another. We have all seen old couples who sit silently next to one another, they know each other so well that they have nothing to exchange anymore. Despite similarities, maritime flows are also very different from today's information flows. Since the distance between ports and the currents of the sea are relatively stable, the dimensions of the maritime space of flows is fixed in ways our electronically-mediated space of flows is not. Rather, now the space, as a whole, can contract and expand.

The quintessential node in our contemporary space of flows is the office, the command and control centers for the flows of goods, people and information. In pre-industrial manufacturing, the function of the work bench and of the office were barely separated. Rather, they were one and the same. This was efficient was long as the flows were small and slow. As volume and speed of production increased, this model fell into a crisis. As a direct response to the growth of factory output over the previous 100 years, the office emerged into centrality during the second half of the 19th Century.

Flows and nodes began to differentiate. The office and its information processing technologies represented the attempt to better manage the flows of goods pouring out of the factories (Beniger 1986). These flows are constantly threatening to spiral out of control through over-production or runaway costs. The world of the office introduced a central theme to the culture of flows: the paradox that the practice of "hyper control" coexists

with the condition of "out of control". They do not simply coexist at the same time but, more worryingly, because of one another. The two conditions are not contradictions, but actually two sides of the same medal (Mulgan, 1991).

In the process of differentiation between flows and nodes, the office moved away from the workbench. First into a separate room within the factory, then into a separate building within the centralized factory complex. This approach to managing flows was epitomized in Henry Ford's famous Rouge Plant in Dearborn, Michigan. Here raw iron ore entered on one side and finished cars left on the other. This is a node in the world where information flows in the office circulate through the medium of paper.

Now that information circulates through digital media, nodes and flows are differentiating even further. As volume and speed increase, both are growing to the extent that producing something supposedly simple such as sneaker has become an incredibly complex process involving research labs, marketing firms and production facilities, all linked to one another around the world.

The important point here is that as volume and pace of the flows increases, nodes and flows are becoming more and more different logically, while functionally they are being integrated ever more tightly. For instance the world of the glittering Nike head offices and the pretty bleak conditions under which its sneakers are produced are much more separated than what differentiated Henry Ford from his workers, where they both worked and lived in more or less the same place (Klein, 2000). At the same time, the production cycle is becoming shorter and shorter to the degree that you can have a personalized Nike shoe. The cycle has shrunk to a single point of real time interaction.

By now one is already deep into the second question: what are the differences between the space of flows and space as it is known?

The space of flows comprised of movement which brings distant elements (things and people) into an interrelationship that is characterized today by being continuous and in real time (Castells 1996). Historically speaking, this is new. There have always been cultures that were built across large distances but now their interaction is in real time. One of the consequences of it being entirely digital in form is that space can expand and contract very quickly. The volatility of the stock market, for example, has a lot to do with the volume and speed of trading (Soros, 1998).

What is perhaps more important is that such changes are not only quantitative (changes in size) but also qualitative (changes in kind). As flows change their volume and direction, nodes change their characteristics. This is perhaps the most central difference between the space of places and the space of flows. In the latter, the characteristics of each element are less dependent on their internal quality than on their relationship to others. These relationships, of course, are created by flows.

In other words, function, value and meaning in the space of flows are relational and not absolute. Whether a node “works” or not, then, is not only determined within the node, but emerges from the network of which the node is only a part (Callon & Law, 1997). As the network changes, as old connections die and new ones are established, as the flows are reorganized through other nodes, meaning, functionality and values changes too.

How does this affect physical objects? The immediate question is: What is an “object”? If we take it seriously that things (and people) are less defined by their intrinsic qualities but more by their relational position to one another, then the unit of analysis – and action - can no longer be the single element, an individual person, a product or a company (Latour 1993, 1999).

Attention should be shifted away from the “within” on to the “in-between”. Rather than asking what is made out of, one has to ask, what does it interface to?

In a similar shift of focus, Scott Lash (2002) recently introduced the term “technological forms of life”. By this he does not mean anything like “cyborgian” man-machine connections or even artificial life, but something more simple and profound. If two people are engaged in a conversation and develop a new idea, the idea does not stem from one or the other, but from the association, or the form of life, that they created. What is “in-between” people, is “within” a “form of life”, in the sense of Wittgenstein’s original use of the term.

By adding the modifier technological to the concept of the “form of life” Lash puts the emphasis on the fact that these associations are made increasingly possible, and influence by technology, particularly information technology. It provides the medium through which information can flow among the participants. Again, there are the three elements of create a system of flows:

- the medium - digital communication technology
- the flows - information, and
- the nodes - hybrids of people and machinery.

The characteristics of any technological form of life are not simply the sum of their individual qualities, but how they emerge from their interaction. Importantly, as life becomes technological, technology, and to a lesser extent most objects, become life-like. Again, this means that either humans are becoming Terminator-like “cyborgs” or technology will be able to reproduce itself autonomously. Rather, the two stand increasingly in a dynamic ecological relationship to one another. Technology, continuously and in real time, adapts to people who seek out the possibilities of new technologies. Their relationship evolves through constant feedback, flows circulating among nodes rather than as cause and effect.

From the point of view of design of objects this creates a problem. It is very difficult to design technological forms of life since they are emergent. What can be done, though, is

to design some of its elements, in particular the objects. These elements, however, are complemented by elements outside of our immediate control. This brings us back to the theme of the co-existence of “hyper control” and “out of control”. Micro-management can be done ever more precisely over ever greater distances. At the same time, we become ever more affected by, and dependent on, things are outside of our individual reach. The emergent effects, that which gives ultimately meaning and value to the individual elements that we design, are even harder to steer.

This does not lessen the importance of design, or other forms of planning, but changes their characteristics. As meaning and functionality move from the material object of design into relationships created by flows, the object becomes, in itself, incomplete. One cannot know what the full shape of an object is before one tries it out by inserting it into a specific intersection of flows; there it takes on a kind of life of its own.

Therefore, material objects need to be generic so that they can become specific under the condition that we cannot fully predict. This is not because not enough is known. On the contrary in a highly integrated environment, in the medium of instantaneous digital data flows, our interventions to manage, or design, one little instance within the large space of flows is part what creates uncontrollability of the overall environment. Unintended consequences, filtered through the entire space, will sooner or later come back and surprise us by reconfiguring the conditions for the object that has just been so consciously put together.

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WHAT IS THE DIFFERENCE BETWEEN DIGITAL RIGHTS MANAGEMENT AND CENSORSHIP?

WHY IS A SOCIETY THAT IS OWNED BY RIGHTS HOLDERS STILL CALLED A DEMOCRACY?

GOOD QUESTION.

GOOD QUESTION.

WHY IS COPYING CALLED STEALING EVEN THOUGH THE ORIGINAL DOES NOT DISAPPEAR?

IF INTELLECTUAL PROPERTY IS JUST BORROWED FROM THE PUBLIC DOMAIN THEN WHY CAN'T THE PUBLIC CLAIM IT BACK?

GOOD QUESTION.

GOOD QUESTION.

Global Financial Markets and the Bias of Networks

Media are never neutral. They have biases which deeply affect the cultures that create them, and which, in turn, they create. Harold Innis described the most basic type of bias in communication media. ⁽¹⁾ Hieroglyphs and stone, he observed, have a bias towards time, whereas the alphabet and paper – among other media – have a bias towards space. Ancient Egypt, a culture built on media with a time bias, was primarily concerned with the organization of time and governed by a religious bureaucracy. Ancient Greece, a culture using media with a space bias, was more concerned with the organization of space and privileged secular, state or military, bureaucracies. The printing press joined the alphabet and paper together in a new medium, the printed text, unleashing the full power of their combined space biases. This new medium provided the catalyst for phenomena such as the rapid rise of the nation state, the unfolding of scientific rationality, and individuation. Communication media and culture have a close interrelation in which the media provide the environment in which the social dynamics develop. This environment, however, is not just a simple container, but is a set of distinct processes that reconfigure to a varying degree everything that is carried out through them. Taken together, these processes form the particular character of a medium.

To understand the kind of bias introduced into our current culture by the spread of computer networks as communication media, the best place to investigate is not the Internet, but, rather, the financial networks. In contrast to the Internet, which is still relatively young as a mass medium, the financial networks have been fully functioning for several decades. Furthermore, money itself is a pure medium in the same way than light is a pure medium: all medium, no content, as Marshall McLuhan once noted. A similar observation was made by Karl Marx, who wrote in his *Grundrisse* (1857) that the circulation of money *as the most superficial (in the sense of driven out onto the surface) and the most abstract form of the entire production process is in itself quite without content.* ⁽²⁾ Being without content, money can have any form and still be money. It can be a coin in one's pocket or it can be an option traded back and forth between London, Tokyo and New York. Monetary value can take on any form that is supported by the medium in which it circulates. Competitive pressures and the relentless chase for profits under the logic of post-industrial capitalism push monetary value into ever new forms, exploiting the full potential of the new media spaces. This process has consistently expanded the possibilities of technology to tap into new opportunities for trading. The current financial markets are therefore the most advanced and most media-specific electronic space yet created.

Financial markets have a network-based history of some 30 years. In 1973 Reuters started its screen service, which provided dealers with information and a shared environment to execute the trading in. In 1979 it had already connected 250,000 terminals into the increasingly global markets. ⁽³⁾ At this time the Internet was still in an embryonic state with

little more than 100 hosts. Huge investments have been poured into the expansion of the financial networks. The ten largest US investment banks, for example, spent in 1995 alone some \$17 billion on new technologies: amounting to more than \$400,000 per employee in just one year. ⁽⁴⁾ Over the last two decades such massive expenditures have turned the financial markets from a relatively peripheral, supporting phenomenon into the central event of the mainstream economy. This development is driven by capitalistic competition, not the technology; there cannot be any illusions about that. Nevertheless, the development of the financial markets is enabled and deeply affected by advanced network technologies which create three self-enforcing dynamics:

1. The automation of the financial markets made it possible to dramatically increase the volume of money and transactions. By the mid 1990s about 500,000 people had been working worldwide in the institutions which make up the financial markets. ⁽⁵⁾ They have managed the circulation of more than \$1,500 billion per day. By far the biggest single market is the foreign currency exchange which amounts to more than \$1,300 billion per day. In the early 1980s, the foreign exchange transactions were ten times larger than the world trade; in the early 1990s they were sixty times larger. ⁽⁶⁾ Circulating in ever expandable networks the markets could pick up speed without material friction. As the markets have grown beyond any limitations, more money has become concentrated there. And with deeper markets, the opportunities to make money have expanded, further increasing the incentive to employ the most advanced technology.

2. Automation of the markets makes it possible to provide ever more customized services at ever lower rates, allowing for an increased participation of small investors: the middle class concerned about their pensions becoming insecure in crumbling state pension plans. Not only has the volume of transactions handled in the markets increased, but also the number of market participants and the demographic profile of those participants have changed. It has shifted from highly educated professionals to the upper and middle class segments of the general public. Information technology provided the means for putting an easy-to-use interface in front of extremely complex processes. Mutual funds and other previously exotic financial products have become advertised heavily in mass media in recent years and access through home computers has been created.

3. Increased computerization and increased volume lead to a simultaneous integration and fragmentation of the markets. On the one hand, more and more abstract, complex and entirely computer-based products – such as derivatives – greatly expand the number and types of tools available to brokers and their customers. On the other, the markets fragmented into a plethora of submarkets. New submarkets create new possibilities for arbitrage ⁽⁷⁾ which are based on the real-time processing of information.

Pushed to the extreme by these self-enforcing dynamics, the fully integrated financial networks offer the clearest picture of the bias of networks, a bias which affects in one way or another everything that is done through them.

Reconfiguration 1: Content and Context

The financial markets have become their own integral environment which not only communicates, but also produces the events communicated: the rise and the fall of prices. As such, these networks are content and context at the same time. The surrounding larger social and economic environment is structurally separated and its relevance is assessed according to whether it has to be translated into the closed universe of the financial market or not. News, for example, is evaluated primarily from the vantage point of whether it is going to influence the fever curve of the market. The importance of information is decided *within* the markets and is only indirectly connected to the content of the information as such. The context of the market defines the content of the information. If everyone expects a company, or a country, to report huge losses, then the news of merely moderate losses boosts the price. In contrast, if everyone expects the opposite, the same piece of information can have a devastating influence on the market value of the asset.

As an integral environment, the financial networks are fully self-referential. Everything that matters happens within the networks. The single most important question is: what are the other participants doing? Since the direct connection to other environments is broken, the ultimate determination of the (immediate) future takes place within the markets themselves. Evidently, the markets react very fast to new information and the consequences of political and economic events are almost immediate. Nevertheless, the connection is indirect. The markets as a closed system react to news because the dealers, or the artificial intelligence systems, expect each other to react and each tries to react before everyone else. It is the expectation of a reaction to an event that drives the development, not the event itself. John M. Keynes described this structure in his famous beauty contest analogy:

Professional investment may be likened to those newspaper competitions in which the competitors have to pick out the six prettiest faces from a hundred photographs, the prize being awarded to the competitor whose choice most nearly corresponds to the average preferences of the competitors as a whole; so that each competitor has to pick, not those faces he himself finds the prettiest, but those which he thinks likeliest to catch the fancy of the other competitors, all of whom are looking at the problem from the same point of view. It is not the case of choosing those which, to the best of one's judgment, are really the prettiest, and not even those which average opinion genuinely thinks the prettiest. We have reached the third degree, where we devote our intelligence to anticipating what average opinion expects average opinion to be. And there are some, I believe, who practice the fourth, fifth and higher degrees. ⁽⁸⁾

Evidently, Keynes described that tendency long before the advent of computer networks. Because it was such a perfect match of the general dynamics of financial markets and the

bias of networks the technology proved to be such an explosive catalyst when they were combined in the early 1970s.

The merger of content and context became expressed most clearly in the infrastructure. Reuters, which started in 1849 as a pigeon carrier for sending stock exchange data from Brussels to Aachen in order to bridge the gap between the Belgian and the German telegraph lines, is today's leading provider of news to the financial markets, a service that is delivered over a proprietary network. It brings news and prices directly to customer screens, providing data-feeds to financial markets, and the software tools to analyze the data. This data covers currencies, stocks, bonds, futures, options and other instruments. Its main customers are the world's leading financial institutions, traders, brokers, dealers, analysts, investors and corporate treasurers. However, Reuters not only provides the news for the market, Reuters is also the environment of the markets themselves. It provides the tools for dealers to contact counterparts through a Reuters' communications network in order to do the actual trading. Through proprietary instruments Reuters enables traders to deal from their keyboards in such markets as foreign exchange, futures, options, and securities. Consumer of news and producer of news merge and the network displays instantly to everyone what everyone else does. Reuters, in other words, produces (parts of) the news itself which are then sold back, stimulating the production of further news. In a way, one could call this a form of collaborative media space.

Reconfiguration 2: Co-operation and Competition

The self-referentiality of the network environment creates information which has to be taken at face value. Its reality is as flat as the screen on which the data is displayed; its only relation is to other information of the same flatness, other screens to which every screen is connected. This radical decontextualization permits the speeding up of its circulation, which again eliminates the possibility of checking the veracity of the information. In such an environment news and rumors become equally important. Sometimes rumors become even more important than news, since they hold the promise of predicting for the insider what might be news tomorrow for everyone. What will be, accurate speculation into the future, is the most valuable information and can actually become the cause of tomorrow's news. If some of the major dealers expect a currency to lose value, they will start to sell it, which will be seen by others as a sign that the value of this currency is falling. The result is that, if many start to sell, the value of the currency is actually sinking: George Soros' *reflexivity*.⁽⁹⁾ This has been staged over and over in the recurrent currency crises, be it the European in 1992-1993 or the Asian in 1997.

Jean Baudrillard has put this reversal of the relationship of expectation and event, of sign and object, at the core of his thinking. *We are in the logic of simulation*, he declares, *which has nothing to do with the logic of facts and the order of reasons. Simulation is characterized by "a precession of the model", of all models around the merest fact - the*

models come first, and their orbital (like the bomb) circulation constitutes the genuine magnetic field of events. Facts no longer have any trajectory of their own, they arise at the intersection of the models.⁽¹⁰⁾

Not anticipated in the gloomy metaphors of Baudrillard is the effect of that reversal in the network environment: co-operation. Since networks are tools and environment at the same time, everyone who uses the tools is dependent on the maintenance of the environment. Since the environment is closed, there can be no outside position for anyone who wants to participate. It is not incidental that the game metaphor is dominant in the financial markets. Every market player co-operates to uphold the rules, the parameters of the game, but within these limited bounds, each tries to kill the other.

Financial markets can only function efficiently at high speed when information can actually be taken at face value. To guarantee this they have to be structurally separated from other environments. Crucial for this is the institution of the clearing house. A clearing house functions as a "middleman" who acts as a seller to all buyers and as a buyer to all sellers: it is the guarantor of the ultimate fulfillment of the contract. Thus contracts can be exchanged impersonally between numerous parties on both sides without any having to worry about the others' ability or willingness to carry out their obligations. The largest private sector payments network in the world is Clearing House Interbank Payments System (CHIPS) in New York City. About 182 000 interbank transfers valued at nearly \$1.2 trillion are made daily through the network. This represents about 90 percent of all interbank transfers relating to international dollar payments.⁽¹¹⁾ A clearing house can be understood as an outsourced and institutionalized system of trust designed to cope with an anonymous and chaotic environment. It is a communal insurance institution for guaranteeing that the constant flow within the networks is not interrupted by external events, such as the default of one of the participants. Without the clearing house, such a "real life" event would be translated directly into the network. The possibility of such a direct impact would destroy the face value of the information. The clearing house, then, can be read as a buffer that prevents the direct, un-cushioned impact of the external environment from breaking open the closed circuits. Without this buffer, the exchange of information would slow down considerably because the value of the information would have to be verified outside the network itself.

In the network environment, then, the condition of staying a member of the network is to provide information that can be taken at face value. Networks are based on trust, those who violate that trust are expelled, otherwise the networks would collapse. Inside the network, the position of a player is determined by the information they deliver to the other players. The faster and the more accurate the information is, the more relevant the source becomes. Since everyone is connected with everyone, reliable information gets delivered to the environment as such. Even in the most competitive environments this

“connectiveness” forces a certain form of collaboration. What seems paradoxical is a characteristic of the network media: they configure communities defined by a distinction between inside and outside. The distinction is maintained by co-operation to build the communal environment, even if it is then used to stage fierce competition.

Reconfiguration 3: Control and Unpredictability

A network’s connectiveness is not only defined by its ability to connect people across time and space; a second characteristic is a tendency to integrate formerly independent elements on a higher level of abstraction. Abstraction allows the construction of larger areas of control, in the financial markets through instruments such as options. Options are the right, but not the obligation, to buy or sell an underlying asset for a predetermined price in the future. This allows traders to speculate much more extensively on the movements of the markets independent from the direction of this movement. However, since options permit speculation on the movement of the asset rather than on the asset itself, these instruments become more volatile and, at the same time, the environment less predictable. There are simply too many factors to exercise real control. Increased abstraction and its possibilities to extend influence over ever greater area create a paradox of control. *When a multitude of different and competing actors, as Geoff Mulgan notes, seek to improve their control capacities, then the result at the level of the system is a breakdown of control. What is rational at the micro level becomes highly irrational at the macro level.*⁽¹²⁾ The unpredictability is a result not of too little but too much control.

With the number of connections and the speed of communication rising, the predictability and controllability of the system as a whole is decreasing. The reconfiguration of control and unpredictability is similar to the reconfiguration of co-operation and competition: which aspect is fore-grounded depends on the position of the observer. From the inside, the cooperative structure of the financial networks provides the invisible environment for deeply chaotic and intense competition. From the outside, this competition turns into a zero-sum game and the markets represent a single cooperative logic, the *commodified democracy of profit making* (Castells), executed in a tightly controlled framework dominated by a very small number of global financial giants. These fundamental differences, based on an inside or outside position of the observer, illustrate how closed the financial networks are and how self-referential their logic is.

In general, networks reconfigure not only aspects of control with unpredictability, co-operation with competition, and content with context, but they also connect action with reaction, event with news, into the continuity of flows. The dealers see instantly what others do, which creates the basis of their actions, which are fed back to the other dealers building their decisions upon them. This constant feedback eliminates the separation of events and news, action and reaction, before and after, and merges them into a constant presence. *The space of flows*, as Manuel Castells observes, *dissolves time by disordering the sequence of events and making them simultaneous, thus installing society in an eternal ephemerality.*⁽¹³⁾

The Bias of Networks

Global financial markets are to computer networks what the Reformation was to the printing press: the first major social event enabled by the new technology. Financial markets have not been created by the new technology, they existed long before. However, new technologies have been the catalyst which connected heterogeneous trends into a self-enforcing dynamic. Because those trends fit the bias of the medium they could expand out of all proportion, creating new social conditions which reflect the impact of this bias in the specific historic context. Every single element of the financial markets existed independently for decades. The first clearing house, for example, was founded by the Chicago Board of Trade in 1874, but only the network conditions raised this institution to its current, central importance. As the Reformation was not caused by the printing press, the financial markets are not the fate of the networks. The new technology has been a catalyst which has hugely augmented the impact of a series of economic and political decisions taken in the last thirty years. However, it did not simply augment the impact of these decisions, by reflecting them through their own bias the new technologies have deeply shaped outcome. The bias of networks lies in the creation of a new space-time condition of binary states of presence or absence. In the network environment everything that is the case is here and now (inside the network). Everything else is nowhere and never (outside the network). The translation from one state to the other is instantaneous and discontinuous. The experience of any sequence is introduced by the user, that is, from outside the network, and is arbitrary from the point of view of the possibilities of the network.

While this newly created space-time is the ingredient added by the technology, the result of its catalytic potential is deeply affected by the conditions under which it is brought to bear. The financial markets grew not only because the technology provided the grounds for it, but also because regulatory restrictions have been removed under the increasing influence of neo-liberalism. While the bias of the medium largely lies outside social influence, the quality of the culture incorporating this bias is, and has always been, shaped by society itself.

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New Media Center_kuda.org

New Media Center_kuda.org is an organization which brings together artists, theoreticians, media activists, researchers and the wider public in the field of Information and Communication Technologies. In this respect, kuda.org is dedicated to the research of new cultural relations, contemporary artistic practice, and social issues. The Center is established in the year 2001.

kuda.org's work focuses on questions concerning the influence of the electronic media on society, on the creative use of new communication technologies, and on contemporary cultural and social policy. Some of the main issues include interpretation and analysis of the history and significance of the information society, the potential of information itself, and the diffusion of its influence on political, economic and cultural relationships in contemporary society. New Media Center_kuda.org opens space for both cultural dialog and alternative methods of education and research. A social question, media culture, new technologies art, and the Open Source and Free Software principal are areas in which kuda.org is engaged.

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