The Need for Open Design

How Changes in the 21st Century Create the Conditions for a Collaborative Practice in Design

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Open design appears as one in a row of similar expressions of ‘open X’ – open access, open data, open knowledge, open cities, open hardware – most of which were coined in the early years of this century and modelled after Open Source in software. They denote a departure from presumably ‘closed’ practices of dealing with academic publications, data, knowledge, hardware, cities, innovation, and indeed: design; all key areas of the knowledge economy.

Elsewhere in this publication, open design is described as a participative method which invites users to modify a design; the design process then becomes dynamic and iterative. As a social process, open design evolves from a self-reflective to a collective-reflective practice, which makes use of social artistic practices “focused on enhancing the quality of life of individuals or groups within society, by raising their awareness, educating them, or contributing to their sense of identity. In other words: helping people to improve themselves in their relationship with their surroundings.” [[1]](#footnote-1)

What are the principal drivers for this development? Is it merely ‘the digital turn’ – the shift from material to digital media, which has reduced the copying of design artefacts to a few mouse clicks, while bringing media production to everybody’s and anybody’s desktop? Or is there a broader underlying current at the core of a societal change that questions the fundamentals which our (Western, industrialised) society is built upon?

The ‘digital turn’ – the computerisation and increasing use of the Internet in so many aspects of daily life, from communication to entertainment, from retail to banking, from relationships to education – has profoundly impacted on how we engage in these everyday activities. It has created new qualities of interaction, for example by replacing slow but immediate face-to-face relations with instant but mediated transactions, facilitated through a variety of intermediate digital systems.

Digital systems are not normally designed to be open and transparent; indeed, recent revelations have shown how they are actually being employed for quite opposite purposes. The Internet is not immune to surveillance and restrictions by the military-industrial complex, despite the fact that it was built on the principle that “nobody owns the Internet, there is no centralized control, and nobody can turn it off.” [[2]](#footnote-2)

Yet the vision of the absence (or at least reduction) of centralised control, and of a society which attributes more authority and responsibility to the individual, is still alive, not only in (internet and software) technology, but more generally in debates that question some of the effects of industrialisation, including its consequences for society at large. These debates span a whole spectrum of disciplines – history of technology, sociology, social psychology, economics, law, management – and indeed also: the arts and art education.

# Overview

I shall begin this essay by tracing some of the changes which industrialisation – the industrial revolution – has brought to society, and which were reinforced by a second revolution of automation and computerisation, leading to a socio-economic paradigm of central control and technological determinism.

I shall then present different strains of critique of this paradigm: technology is not a choice, but rather offers choices; value is not purely economic, but is a much more complex concept; humans are not primarily competitive but collaborative; and indeed in Internet times, central control must give way to lateral structures. These critiques, and the alternative paths for development which they provide, offer the promise of a society which is better aligned toward individual needs, and toward the greater benefit of all: more cooperative and less fixed on competition, and more laterally structured.

As one example of how some of these strands have found their way into practice, I shall describe the field of Free and Open Source Software (FOSS); software which can be freely shared, copied, modified and distributed. I shall consider the two most important facets of Free and Open Source Software: the legal facet of sharing, which sets a fervent counterpoint to the privatisation of intellectual assets, and the social facet of collaborative practices for the production of software.

Another example, shaped by recent developments, is the creation and manufacture of physical artefacts. Ideas such as ‘open hardware’ mimic the principles of Free and Open Source Software in this respect. The ‘maker movement’, exemplified particularly by the development and spread of fabrication laboratories (fab labs) marks an emergent collaborative practice in the creation of artefacts, and in the development of new local economies.

I shall then trace the development of art education which, at least in Europe and its colonies, was historically an elitist affair, in the tradition of the Italian arts academies of the 15th and 16th centuries. In the 19th century, art education was repositioned to serve the needs of industrialisation. More critical and transformative aspects are a recent development, becoming widespread only in the late 20th century. Art and cultural production can equally be seen as rather utilitarian, following the 19th century approach and serving a market for scarce cultural goods. Only a few developments, notably Dada, Situationism, Punk Rock and the artistic Internet experiments of the mid-1990s have disrupted the status quo; and now open design can be added to this list.

Finally, I shall turn to open design, which in the past decade has moved away from the outer peripheries of design and design education, and closer to their core. As with Open Source Software, there are many aspects to open design, the most important being the legal aspect of sharing versus protecting a design, and the aspect of open design as a collaborative practice. Both, I shall argue, are still ‘under development’, as design, designers, and artists are only now starting to get to grips with the underlying changes in contemporary society.

To conclude, I shall argue that open design has not yet achieved the level of maturity needed to develop its full potential in dealing with an increasingly complex and ambiguous social environment. Recent developments, as our society continues to evolve beyond its industrial past, will only add to this complexity and ambiguity. However, I am convinced of the necessity of further developing open design; to fail to do so would be a lost opportunity, not only for the discipline but for society at large.

# Industrial heritage

The term ‘industrial heritage’ usually brings to mind images of red brick factory buildings, factory owners’ villas, and workers’ housing, characteristic of the industrial revolution of the late 18th and early 19th centuries – and perhaps also the machines, particularly the coal-powered engines and locomotives which were the workhorses of that period. But of course the first industrial revolution was more than just a collection of architectural features: it brought mechanisation, centralised factories, and industrial capitalists; its iconic machine was the steam engine, its social effect was the division between labour and capital.

The industrial revolution also triggered what James R. Beniger has called a “control revolution” [[3]](#footnote-3) – the development of information processing and communication technologies (including rationalisation and bureaucracy) for controlling the energy and flows of materials within industry. Beniger argues that “a society’s ability to maintain control – at all levels from interpersonal to international relations – will be directly proportional to the development of its information technologies.” [[4]](#footnote-4)

Various authors refer to different sequences of later industrial revolutions (for example, Peter Marsh counts five: steam engine, railway, electricity, computer, customisation and complexity[[5]](#footnote-5)) but there seems to be a general convergence in thought, that there has been at least one more industrial revolution, somewhere between the 19th century and today. This second industrial revolution brought automation and later computerisation of manufacturing, as well as scientific management and management consultants; in this sense it can be seen as a continuation of Beniger’s control revolution. Its iconic machine was the conveyor belt as a tool for rationalising and controlling assembly. Its social effect was the division between white-collar and blue-collar work, and the struggle by managers to gain control over workers, based on a “military thrust toward total control [that] indulged technical enthusiasms while it ratified managerial propensities.” [[6]](#footnote-6)

While the technical means of automation and information technology create new options for the design of industrial and working conditions, they do not determine which options are chosen and to what end; technology is always an option. Moreover, technology creates intrinsically new qualities of experience, but also contingent possibilities as to how the often conflicting demands of social, political and economic interests engage with technology to produce a ‘choice’.[[7]](#footnote-7)

# Third industrial revolution: societal changes in the 21st century

Technology does more than offer choices. Zuboff and Maxmin[[8]](#footnote-8) argued, some 20 years after Beniger described the control revolution, that it is necessary to make choices other than those of the centralised control paradigm. This is one of the drivers behind what is also called the third industrial revolution. They argue that the second industrial revolution’s managerial capitalism is in urgent need of an overhaul. Today’s society of individuals seeking self-determination is in fundamental conflict with corporations, which leads to “frustration, mistrust, disappointment, and even rage” [[9]](#footnote-9) – a “transaction crisis.” [[10]](#footnote-10) “The new individuals [...] insist on self-expression, participation, and influence because they share the certain knowledge that the singularity of their own lives cannot be deduced from the general case. No longer born to a biography, their identities must be invented as they go – cobbled together from personal initiative and private judgment.” [[11]](#footnote-11)

Zuboff and Maxmin call for a new model of capitalism, which they call “distributed capitalism”, a paradigm that serves the needs of individuals and treats them as the source of all value. They conclude by quoting Peter Drucker: “It is the customer who determines what a business is. For it is the customer, and he alone, who through being willing to pay for a good or service, converts economic resources into wealth, things into goods. What the business thinks it produces is not of first importance [...] What the customer thinks he is buying, what he considers ‘value,’ is decisive [...]” [[12]](#footnote-12)

Similarly, Umair Haque[[13]](#footnote-13) argues that our economic institutions with their sole focus on economic value are obsolete, and that competition at any cost is a model from the past. He calls for a constructive capitalism which builds on five elements for the benefit of society at large: value circles instead of value chains, value conversations instead of value propositions, a move from strategy to philosophy, completing a marketplace instead of protecting it, and making a difference with the products and services offered, which he calls “from goods to betters”.

Legal scholars, of whom Yochai Benkler is one of the most outspoken, offer another critique of the current industrial/market system, as well as scientific and experimental analysis and evidence of the fundamentally non-competitive, cooperative instinct of humankind. Benkler theorised the peer-production model[[14]](#footnote-14) and collected evidence from science, industry and other experiments to demonstrate that there are “more effective collective action practices that are decentralized but do not rely on either the price system or a managerial structure for coordination.” [[15]](#footnote-15)

Economists have also found that people indeed exhibit social preferences beyond their own material self-interest, and that mainstream “economists fail to understand core questions in economics if they insist on the self-interest hypothesis and rule out heterogeneity in the realm of social preferences.” [[16]](#footnote-16)

Jeremy Rifkin’s analysis is not so much a critique of incumbent industrial society, as a tale of new opportunities emerging today from the coincidence of transformations affecting communication media and dominant energy sources. Such coincidences, according to Rifkin’s hypothesis, are what trigger industrial revolutions. The first industrial revolution was made possible not only by coal, but also by newspapers printed on the rotary press; the second industrial revolution depended not only on electrical energy from a grid of fossil-fuel power plants, but also on telephone and radio. The third industrial revolution is now being triggered by the Internet and by renewable energy sources, which both share an important characteristic: they do not require heavy central investments and central management, but rather allow for decentralised, lateral structures. Therefore this third industrial revolution will promote lateral power – in energy, the economy, and the world.[[17]](#footnote-17)

All these narratives have a few points in common. They all name the Internet as a driving enabler for people to connect laterally, as peers. They all leave behind technological determinism, understanding that technology in fact offers more choices than those presented by the incumbent powers of past and current industrial societies. And they all paint a picture of a future industrial society different from what we know today – better aligned with individual needs as well as the greater benefit of society at large, more cooperative and less focused on competition, and more laterally structured.

Interestingly (or rather, disturbingly) the poster boys and ‘renegade’ innovators proposed as examples by Zuboff and Maxmin as well as Haque are in fact the big proponents of consumerism: Apple, Google, Walmart, Nike – not brands one would associate with a shift toward the self-determination of individuals (certainly not beyond corporate-proposed choices) or the benefit of society at large. These examples do not in fact live up to the analysis in the works of either Zuboff and Maxmin or Haque.[[18]](#footnote-18) Meanwhile, well-known (and endlessly referenced) examples of ‘working anarchies’ [[19]](#footnote-19) are Wikipedia and Free and Open Source Software.

# Open Source freedoms

Free and Open Source Software (FOSS)[[20]](#footnote-20) is by now an established fact, a thriving industry. Almost two thirds of web servers run on Linux, while three quarters of web servers use Open Source Apache to respond to browser requests. 70 percent of web browsers are either completely Open Source (Firefox) or share large parts of their codebase with Open Source products (Google Chrome), and use an Open Source layout engine for rendering HTML – Gecko in the case of Firefox, WebKit in the case of Google Chrome and Apple’s Safari. Other notable examples include server-side programming languages (such as PHP) and content management systems (Drupal, Joomla, WordPress). Contributors to FOSS are not just loony coders; Benkler notes that “just under 40 percent of firms engaged in software development report spending development time on developing and contributing to FOSS software.” [[21]](#footnote-21)

Free and Open Source Software is built on two propositions; a legal proposition which obliterates legal defaults of ‘intellectual property’ protection, and a social proposition which creates a practice for peer-to-peer collaboration.

The ‘four freedoms’ described for Free and Open Source Software[[22]](#footnote-22) form a radical counterpoint to the software industry’s narrow end-user license agreements (EULAs). EULAs are based on the assumption – readily confirmed by legislators and judges – that software code is a form of artistic expression, and stipulate that users may only use a copy of the software for defined purposes; they don’t own it and are not allowed to share or copy it, often not even to re-sell it. Free software licenses on the other hand allow users to use the software for any purpose, to study it, copy and spread it (gratis or paid), and also to ‘fork’ it, i.e. to build new derivative software on top of it.

The freedoms of Open Source clearly state that any piece of code may be used for any purpose whatsoever – even commercial purposes. Therefore Open Source is diametrically opposite to incumbent business models of mass production, which are based on the concept of scarcity and on the assumption that only the owner of intellectual property should be allowed to exploit it commercially. Scarcity is a natural given for original paintings in oil on canvas; a business model based on selling the original makes a lot of practical sense here. Additionally, the value of works of art can be ‘oligarchic’ or ‘positional’, drawing their value from social scarcity: any multiplication of the work of art would destroy that which made it desirable in the first place.[[23]](#footnote-23) On the other hand, in the case of anything digital – where the copy is absolutely identical to the original, to the extent that the two cannot be distinguished, and where the original remains unaltered by the copying process – scarcity as the basis for a business model simply does not work, unless this scarcity is created by artificial means.

In this sense, free software fundamentally breaks with the scarcity-based business model, effectively separating the code – as the part that is easy to copy, and hence hard to protect – from the whole product of a software package, which also includes packaging, installation, maintenance, documentation, training, configuration and customisation. Similar approaches have been developed in the field of cultural production, with the set of Creative Commons licenses which reverse the content scarcity created artificially by copyright. Yet not all Creative Commons licenses actually make the content freely available according to the spirit of free culture (which would mirror the software freedoms); particularly clauses prohibiting commercial use or derivative works make the corresponding Creative Commons-licensed work actually ‘non-free’.

# Open Source practice

A portrait of Open Source Software which discussed only copyright issues would of course be utterly incomplete. Eric S. Raymond – a chronicler of the Open Source approach – studied the development of Linux and found that “the Linux community seemed to resemble a great babbling bazaar of differing agendas and approaches (aptly symbolized by the Linux archive sites, who’d take submissions from *anyone*) out of which a coherent and stable system could seemingly emerge only by a succession of miracles.” [[24]](#footnote-24) Earlier Open Source development had been much more centrally orchestrated, according to Raymond.[[25]](#footnote-25) In an Open Source project, programmers contribute what they want to contribute, not what they are ordered to contribute. Design decisions are debated within the community, although there is typically a very small core of maintainers – in small projects, only one – who make the final decisions regarding design and the inclusion or rejection of patches, fixes and new features.

The ‘four freedoms’ of Open Source Software are a necessary vehicle for enabling this social practice. If the maintainer would have to negotiate a contract with all other contributors in order to use their contributions, releasing new versions of the software would be extremely problematic.[[26]](#footnote-26) In order to attract people to a project and allow them to contribute, maintainers have to adopt an Open Source style of development which Raymond describes as “release early and often, delegate everything you can, be open to the point of promiscuity.” [[27]](#footnote-27) These principles have become the distinctive characteristics of Open Source Software development.

The core of an Open Source project typically consists of a small number of maintainers who are in charge of a project that, as Raymond notes, “scratches a personal itch” – they are involved because they want to solve a problem which is highly relevant to them. In the Open Source tradition, many (early) users are able to write code as well, so it is easy to turn them into co-developers, or as Raymond states: “Treating your users as co-developers is your least-hassle route to rapid code improvement and effective debugging.” [[28]](#footnote-28) Since debugging is an essential feature of development, this is an important factor for speeding up this development. Thus Open Source development is more than just a matter of sharing end results; it is a fundamental practice of co-creation.

# Open hardware and the maker movement

The ideas of Open Source and peer production have spilled over from the purely digital domain of software, into the material domains of hardware and manufacturing. Open source hardware has developed a strong foothold in niche markets, for example the educational Arduino microcontroller board which is also widely used for art projects, or the development of highly specialised time-measurement hardware for particle accelerators at the CERN laboratories and elsewhere.

Peer production in manufacturing began manifesting itself seriously during the past decade, in facilities known as ‘makerspaces’ and ‘fab labs’ – a development which has been termed the ‘maker movement’.[[29]](#footnote-29) Fab labs (fabrication laboratories) first originated as an outreach programme of the Center for Bits and Atoms, Neil Gershenfeld’s research centre at MIT which explores new ways of bringing together computer science and physical science. A subset of the digital fabrication equipment, tools and processes used by the research centre – CNC milling, laser cutting, microcontroller programming and electronics – was made available to communities worldwide through the fab labs. Beyond mere community outreach, however, fab labs are meant to allow participants to understand and review “the implications, applications, and enabling [sic] research for access in the field to prototype tools for personal fabrication.” [[30]](#footnote-30) The first fab labs were established in the United States, Costa Rica, India, Ghana, Norway and South Africa; other countries soon followed.

After the publication of Gershenfeld’s 2005 book *FAB: The Coming Revolution on Your Desktop – from Personal Computers to Personal Fabrication*, the spread of fab labs went viral; from a handful of fab labs in 2003, the network has grown to some 200 active labs, with almost as many currently in preparation.[[31]](#footnote-31) Some of the labs are part of an educational institution, such as a high school or university; some act as business incubators for inventors and tinkerers; many serve as catalysts for artists, designers and other creative minds.

What sets fab labs apart from just another shared machine shop, however, is the fact that they explicitly subscribe to a common charter proclaiming fab labs as a global network of local labs, stipulating open access, and establishing peer responsibility for safety, learning and development as a core feature. The charter requires that “designs and processes developed in fab labs must remain available for individual use” while allowing intellectual property to be protected “however you choose.” It explicitly permits the incubation of commercial activities in fab labs; yet it cautions against potential conflict with open access, and encourages business activity to grow outside of the lab. Successful businesses are expected to give back to the inventors, labs, and networks that contributed to their success.[[32]](#footnote-32)

Local user communities have developed around individual fab labs; yet the larger promise of a global network still needs to materialise, beyond a few token projects. To this end, fab labs will have to focus less on machines and making, and wake up to the challenges of “the social engineering and the organizational engineering” [[33]](#footnote-33) of the larger network. In other words, fab labs will have to start working on how to organise their ecosystem if they are to fully realise the promise of peer-to-peer collaboration.[[34]](#footnote-34)

The maker movement and specifically fab labs are potentially much more significant than simply letting people make stuff. The Institute for the Future, an influential think tank based in Palo Alto, California, recently stated that the maker movement is in fact prototyping new forms of citizen-led governance, experimenting with new forms of community, and establishing new ways to create and measure value in local economies.[[35]](#footnote-35) Under the categorical imperative of the 21st century – “consume less, create more” – the maker movement may already be putting into practice some of the developments identified above.

# ‘Open’ in art education and practice

Academic art education, particularly drawing and design, underwent a utilitarian reorientation during the industrial revolution. A famous example is the Government School of Design in London which was founded in 1837 and eventually became the Royal College of Art, located in London’s South Kensington district. The ‘South Kensington system’ in art education was part of a general drive toward the “development of human capital to produce art goods and manufactures that could expand both economic and symbolic capital for nation-states.” [[36]](#footnote-36)

The curriculum of art education has since undergone many changes: an emphasis on creative self-expression in the 1920s; an emulation of scientific method, focused on making art education more rigorous, since the 1960s (particularly in the United States, as ‘discipline-based art education’); and a more critical, socially reconstructionist or issues-based approach since the 1990s,[[37]](#footnote-37) moving towards what Dennis Atkinson calls a “negotiated and transformative curriculum.” [[38]](#footnote-38) However, even in this negotiated approach, Eve Harwood argues that the voice of the student is still notably absent, and teaching at times lacks concern for students’ aspirations.[[39]](#footnote-39) Art education in Europe and North America has followed the development of industrialisation, the rise of capitalism and the emergence of the middle class; economic and cultural imperialism and globalisation have led to an almost worldwide dissemination of this utilitarian mode of art education.[[40]](#footnote-40) Following Greil Marcus’ line of argument, there have been only a few movements in Western art – Dada, Situationism, Punk Rock – that were innovative enough to break with this status quo.[[41]](#footnote-41)

Felix Stalder adds to this list the artistic Internet experiments of the mid-1990s. As “cultures without commodity” these movements challenged the utilitarian “commodity culture”; Stalder argues[[42]](#footnote-42) that intellectual property law needed to be adapted (or rather: dealt with differently), and that the organisation of cultural industries needed to be challenged. Traditional artistic production and monetisation always emphasised individual authorship and the production of unique objects, treating creativity as a scarce resource – hence the need to render the ‘intellectual property’, the product of creativity, equally scarce.

However, “cultures without commodity” treated creativity as an abundant resource. Authorship moved away from individuals and toward groups, networks and communities. Boundaries between artists and audiences became blurred, the (creative) processes were organised as networks rather than as traditional hierarchies. These networks extended beyond the relatively small, personal scale and became “capable of structuring major collective, or better, connective undertakings.” [[43]](#footnote-43)

# Open design between sharing and protecting

Open design can be understood as extending the tradition of Dada, Situationism, Punk Rock and the artistic Internet experiments of the mid-1990s. Also, it purports to be to design what Open Source is to software.[[44]](#footnote-44) Accordingly open design, like free software, has two important facets. On one hand it is often primarily discussed in terms of licensing: how can the protection of rights be overturned to allow use, study, sharing and ‘forking’ of designs? On the other hand, open design also denotes a certain strand of practice in the field of design: how can the design process become more collaborative?

When discussing the legal facet of design, in terms of licenses to ‘free’ design, it is often naively assumed that design, like software, can (only) be covered by copyright. Yet design is more diverse than software, and falls under various types of intellectual property protection – even varying from country to country.[[45]](#footnote-45) The pragmatic approach is to distribute blueprints of open designs (which presumably are indeed covered by copyright) with Creative Commons licenses – typically requiring attribution, often with the share-alike requirement, and customarily prohibiting commercial use and reuse (known as the CC BY-NC-SA license).

Crucially, such distribution licences are quite the opposite of ‘free’, as they severely restrict the ‘free’ use of the corresponding designs. Open Source fundamentalists may well accuse such practices of taking a free ride on the Open Source bandwagon, as the Open Source label certainly confers a certain degree of ‘coolness’ within some circles of our gadget-crazy world. Designers would argue that they simply want to get their fair share if somebody else makes big money with their designs – hence the ‘non-commercial’ clause.[[46]](#footnote-46) It seems then that these designers adhere to the incumbent model of physical and artificial scarcity – of a producer buying their design, selling it to the masses, and paying the designer a ‘fair share’ in the form of royalties.

Finally, it is important to note that not all design disciplines have a strong tradition of intellectual property, and that not all designers cling to protection of intellectual property rights – much to the disdain of policy makers as well as the intellectual property lobby.[[47]](#footnote-47) In fashion design, for example, copying appears to promote rather than deter innovation;[[48]](#footnote-48) other examples include hairstyles, perfume, magic tricks and fireworks displays.[[49]](#footnote-49) In these cases, there seems to be no need for ‘opening’ design, at least not in legal terms.

# Open design as collaborative practice

Collaboration in design, particularly between designers and laypeople, is in itself nothing new. Participatory design started in Scandinavia in the 1970s under the name ‘collective resource approach’, in the context of industrial democracy[[50]](#footnote-50) – a system which allowed workers and their unions to take initiative in systems design, rather than merely responding to management initiatives. Gradually, the concept (now known as co-creation[[51]](#footnote-51)) gained acceptance in the fields of human-machine interaction, mass customisation[[52]](#footnote-52) – and eventually mainstream business, when Coimbatore K. Prahalad and Venkatram Ramaswamy popularised the term.[[53]](#footnote-53)

In co-creation, Prahalad and Ramaswamy attribute an important role to the customer regarding value creation; this idea has led to an “explosion of interest in co-creation from a marketing perspective. This view appears to be focused primarily on digital forms of co-creation that takes advantage of the social networks in harnessing enormous amounts of input at a low cost.” [[54]](#footnote-54)

Co-creation has also been applied in the field of design, where it is aptly termed co-design. Co-design as a design practice means “collective creativity as it is applied across the whole span of a design process from beginning to end.” [[55]](#footnote-55) The “landscape of human-centered design” as described by Elizabeth B.N. Sanders and Pieter Jan Stappers extends between “the user as subject” and “the user as partner”, and between research-led and design-led practices.[[56]](#footnote-56) With co-design, they argue, design is moving “from the design of categories of ‘products’ to designing for people’s purposes.” [[57]](#footnote-57) Professional designers, they assure us, will still be needed – not only as design researchers whose main function is to guide users, but also for their highly developed skills in dealing with complexity, for making generative tools needed by non-designers to express themselves creatively, for keeping track of technological developments, and for their expertise in specific fields (interior design, interaction design, graphic design).[[58]](#footnote-58) Equally, Paul Atkinson asserts: “It is a short step from co-creation or co-design to a position where users take on the responsibility for creative and productive acts in their entirety”. [[59]](#footnote-59) Still, he believes that in the future, professional designers will increasingly design systems, which will provide end users with the tools they need in order to be creative.[[60]](#footnote-60)

However, design is destined eventually to move even beyond this model of designer-led participatory co-creation, in which final decisions remain the privilege of the designer. As Carolien Hummels aptly remarks, “open design is based on a libertarian relationship between designers and potential users, and not on a rational one in which the designer is seen as superior.” [[61]](#footnote-61) Just as society is expected to become better aligned to individual needs, more laterally structured, so will design – at least, open design – eventually do away with the designer as the guardian of the holy grail of design. As businesses are expected to focus increasingly on the greater benefit of society at large, becoming more cooperative and less fixed on competition, so also design will have to develop new practices which eschew individual perfection but rather foster the achievement of common outcomes – which rise above the lowest common denominators as well as individual limitations. Open design is thus a process for enabling design literacy (strategic vision, tactical competence, operational skills) in everyone.[[62]](#footnote-62)

A real, functioning practice in open design has yet to emerge. There have been a few interesting experimental projects. The (Un)limited Design Contest was held in the Netherlands, nationally in 2009 and open to international submissions in 2010. The concept was replicated in France in 2011, and in Austria in 2012-13. So far these contests have generated a few interesting submissions, primarily in the more mainstream categories such as ‘form’ and ‘fashion’; however participation in the category ‘fusion’ which was supposed to attract remixes of existing designs did not live up to expectations. Another example is a collection of furniture and accessories called Design for Download and curated by the Droog design studio for the Salone del Mobile in Milan in 2011, which included eight open designs by two design studios. Some authors also cite services such as Ponoko and Shapeways as examples of open design – however, the focus of these services is on manufacturing (with rather limited capabilities[[63]](#footnote-63)) and distribution of designs that are uploaded to (and occasionally also sold through) their websites; there is no real collaborative approach here to any new form of industrial production.

# Conclusion

In this essay, I have outlined the legacy of earlier industrial revolutions, and reviewed how observers from various disciplines interpret current signs of change in society as leading to a new industrial revolution. This revolution is supposed to generate lateral rather than hierarchical power relations, as well as businesses that truly serve individual needs as well as the needs of society at large. I have used the example of Free and Open Source Software to illustrate how legal instruments can be used to foster lateral structures – even though the default assumptions of intellectual property, on which legislation is based, are often adversary to the freedoms of Open Source – and how a collaborative practice has evolved in Free and Open Source Software (FOSS). Similar developments can be found in (open) hardware and the maker movement. I drew some parallels with art education and practice: the move from a utilitarian approach in art education in the late 19th and early 20th centuries, toward experiments with networked practices, particularly the artistic Internet experiments of the mid-1990s. Finally, I examined the roots and the current state of the ‘open’ paradigm in design, and concluded that the discipline is cautiously experimenting with this new paradigm.

Design and designers still have a long way to go to, if open design is really to move into the arena of collaborative production as exemplified by Free and Open Source Software development. There are many lessons that can be learned from the early fundamentalist practitioners of FOSS. Developing software is in many respects quite similar to developing a design – there are strategic directions to be set, tactical choices to be made, operational skills required for fine-tuning. Problems must be identified, solutions must be found, decisions must be made – all of which requires negotiation in a collaborative setting. Experts and novices will have to work together: if people can be taught (and can learn) how to develop software and how to write code, there is no reason why they can’t also learn to develop and execute a design.

However, it would be a mistake to blindly mimic the developments in software. There are also important differences: for example, argumentation in software development is mainly informed by logic, while argumentation in design is mainly informed by artistry. A logical discourse is not the same as an artistic discourse; still, there is room within design to develop this artistic discourse, so that it takes place in a peer-to-peer setting rather than a master-disciple setting. The evolution of this artistic discourse is at the core of open design: it must develop into a collective-reflective practice which empowers people, especially when designers lose their privileged position of automatically being the sole experts in a crowd of novices.

If open design as a practice is indeed still far from mature, then the question arises: is open design actually desirable? Is it worth the effort? Wouldn’t it be more sensible to leave open design to a few eccentrics, or maybe just go on using the ‘open’ label for a while, as long as it provides an advantage of coolness?

I strongly believe that the changes observed by Zuboff & Maxmin, Haque, Benkler, Fehr & Fischbacher, and Rifkin will have a strong impact on society in the 21st century. While I do not expect these changes to supersede all incumbent industrial practices, they will certainly add substantial new paradigms (such as collaborative peer production with lateral relations) to an increasingly complex and ambiguous society. Design as a discipline is particularly well positioned to deal with more ‘fuzzy’ circumstances; it could and should play an important role in helping society and individuals get to grips with this fuzziness. However, as these new paradigms become increasingly influential, neither an expert-led nor a purely participatory approach will suffice. ‘Ordinary’ people will expect (and demand) to be accepted as peers, as they follow the categorical imperative of the 21st century – “consume less, create more”. It is a noble duty for design, to fully develop this new field of open design into a mature discipline; and I strongly feel that it would be a loss to us all if society were to miss out on the contribution which design can make toward a more cooperative future, for the benefit of individuals as well as society at large.

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2. Brian Carpenter (ed.), *Architectural Principles of the Internet, RFC 1958*, online at: <<http://tools.ietf.org/html/rfc1958>> (Accessed September 11, 2013), 1996, p. 3. [↑](#footnote-ref-2)
3. James R. Beniger, *The Control Revolution: Technological and Economic Origins of the Information Society*, Harvard University Press, 1986. [↑](#footnote-ref-3)
4. Ibid., pp. 8-9. [↑](#footnote-ref-4)
5. Peter Marsh, *The New Industrial Revolution: Consumers, Globalization and the End of Mass Production*, Yale University Press, 2012. [↑](#footnote-ref-5)
6. David F. Noble, *Forces of Production: A Social History of Industrial Automation*, Transaction Books, 1984, p. 192. [↑](#footnote-ref-6)
7. Shoshana Zuboff, *In The Age Of The Smart Machine: The Future Of Work And Power*, Basic Books, 1988, p. 389. [↑](#footnote-ref-7)
8. Shoshana Zuboff and James Maxmin, *The Support Economy: Why Corporations Are Failing Individuals and the Next Episode of Capitalism*, Viking Press, 2002. [↑](#footnote-ref-8)
9. Ibid., p. 3. [↑](#footnote-ref-9)
10. Ibid., pp. 171-213. [↑](#footnote-ref-10)
11. Ibid., p. 93. [↑](#footnote-ref-11)
12. Peter Drucker, *The Practice of Management*, Harper & Row, 1954, pp. 37-41; quoted by Zuboff and Maxmin, op. cit., p. 248. [↑](#footnote-ref-12)
13. Umair Haque, *The New Capitalist Manifesto: Building a Disruptively Better Business*, Harvard Business Press, 2011. [↑](#footnote-ref-13)
14. Yochai Benkler, *Coase’s Penguin, or Linux and the Nature of the Firm*, in: *Yale Law Journal*, Vol. 112, No. 3, Dec 2002, pp. 369-446. Yochai Benkler and Helen Nissenbaum, *Commons-based Peer Production and Virtue*, in: *Journal of Political Philosophy*, Vol. 14, No. 4, 2006, pp. 349-419. [↑](#footnote-ref-14)
15. Yochai Benkler, *The Wealth of Networks: How Social Production Transforms Markets and Freedom*, Yale University Press, 2006, p. 63. Yochai Benkler, *The Penguin and the Leviathan: How Cooperation Triumphs over Self-Interest*, Random House Digital, 2011. [↑](#footnote-ref-15)
16. Ernst Fehr and Urs Fischbacher, *Why Social Preferences Matter: The Impact of Non-selfish Motives on Competition, Cooperation and Incentives*, in: *the Economic Journal*, Vol. 112, Issue 478, pp. C1-C33, March 2002. [↑](#footnote-ref-16)
17. Jeremy Rifkin, *The Third Industrial Revolution: How Lateral Power Is Transforming Energy, the Economy, and the World*, Palgrave Macmillan, 2011. [↑](#footnote-ref-17)
18. Zuboff, Maxmin and Haque may be excused by the nature of their publications – as business books, these are required to provide practical guidance for the upper echelons of the management, marketing and executive worlds; such a forced relationship with the professional practice may well lead to intellectually less satisfactory shortcuts. But the authors might also be trying to fix the system ‘from within’ which is perhaps not possible after all. [↑](#footnote-ref-18)
19. Yochai Benkler, *Practical Anarchism: Peer Mutualism, Market Power, and the Fallible State*, in: *Politics & Society*, Vol. 41, No. 2, pp. 213–251, 2013. [↑](#footnote-ref-19)
20. In this text I use the terms free software, Free and Open Source Software (FOSS), and Open Source Software (OSS) interchangeably; although I am well aware that there is a fundamental difference between FOSS and OSS, insofar as FOSS will always remain free whereas OSS is indifferent to reprivatisation. [↑](#footnote-ref-20)
21. *Usage of operating systems for websites*, W3Techs, August 2011, <http://w3techs.com/technologies/overview/operating\_system/all> (accessed October 29, 2012). Benkler, op. cit., p. 221. Charles M. Schweik & Robert C. English, *Internet Success: A Study of Open Source Software Commons*, MIT Press, 2012. Josh Lerner and Mark Schankerman, *The Comingled Code: Open Source and Economic Development*, MIT Press, 2010. [↑](#footnote-ref-21)
22. Richard M. Stallman, *The GNU Manifesto*, 1985; Richard M. Stallman, *Why Software Should Be Free*, 1992; both reprinted in Richard M. Stallman & Joshua Gay, *Free Software, Free Society: Selected Essays of Richard M. Stallman*, second edition, CreateSpace, 2009, pp. 43-56. [↑](#footnote-ref-22)
23. Roy F. Harrod, *The Possibility of Economic Satiety: Use of Economic Growth for Improving the Quality of Education and Leisure*, in: *Problems of United States Economic Development*, Vol. 1, 1958, pp. 207-213. [↑](#footnote-ref-23)
24. Eric Steven Raymond, *The Cathedral and the Bazaar*, www.catb.org, 2000, p. 3 <http://www.catb.org/~esr/writings/cathedral-bazaar/> (Accessed September 11, 2013). [↑](#footnote-ref-24)
25. This is not to say that there were or are no hierarchies in Linux development: Linus Torvalds is well known for (and proud of) his Finnish culture of cursing and outspoken “management by perkele”, see e.g. <<http://marc.info/?l=linux-kernel&m=137391223711946&w=2>> (accessed July 24, 2013). [↑](#footnote-ref-25)
26. In the traditional software industry, this problem is covered by employment contracts stipulating that any code an employee produces belongs to the employer. [↑](#footnote-ref-26)
27. Raymond, loc. cit. [↑](#footnote-ref-27)
28. Ibid., p. 6. [↑](#footnote-ref-28)
29. The ‘maker movement’ is named after the ‘Maker Faires’, a franchise of O’Reilly’s *Make* magazine, a monthly publication dedicated to Do-It-Yourself enthusiasts and tinkerers, founded in 2005. [↑](#footnote-ref-29)
30. *Fab Lab User Group Meeting, January 18, 2005*, online at: <http://cba.mit.edu/events/05.01.fab/index.html> (accessed July 13, 2013). [↑](#footnote-ref-30)
31. Figures at the time of writing, autumn 2013. [↑](#footnote-ref-31)
32. *The Fab Charter, draft: October 20, 2012*, online at: <http://fab.cba.mit.edu/about/charter/> (accessed July 13, 2013). [↑](#footnote-ref-32)
33. Neil Gershenfeld, *Unleash your creativity in a Fab Lab*, TED talk, February 2006, online at: <http://www.ted.com/talks/neil\_gershenfeld\_on\_fab\_labs.html> (accessed September 20, 2012). [↑](#footnote-ref-33)
34. Peter Troxler, *Making the Third Industrial Revolution: The Struggle for Polycentric Structures and a New Peer-Production Commons in the Fab Lab Community*, in: Julia Walter-Herrmann and Corinne Büching (eds.), *FabLab: Of Machines, Makers and Inventors*, Bielefeld: Transcript, 2013, pp. 181-194. [↑](#footnote-ref-34)
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36. Mary Ann Stankiewicz, *Capitalizing Art Education: Mapping International Histories*, in: Liora Bresler (ed.), *International Handbook of Research in Arts Education*, Springer, 2007, pp. 7-34, p. 15. [↑](#footnote-ref-36)
37. Lynn Butler-Kisber, Yi Li, D. Jean Clandinin, and Pamela Markus, *Narrative as Artful Curriculum Making*, in: Liora Bresler (ed.), *International Handbook of Research in Arts Education*, Springer, 2007, pp. 219-233. [↑](#footnote-ref-37)
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40. Stankiewicz, op. cit., p. 25. [↑](#footnote-ref-40)
41. Greil Marcus, *Lipstick Traces: A Secret History of the Twentieth Century*, Harvard University Press, 1989. [↑](#footnote-ref-41)
42. Felix Stalder, *Open Cultures and the Nature of Networks*, Futura publikacije, Novi Sad, 2005, pp. 24-29. [↑](#footnote-ref-42)
43. Ibid., pp. 7-8. [↑](#footnote-ref-43)
44. Bas van Abel, Lucas Evers, Roel Klaassen and Peter Troxler (eds.), *Open Design Now: Why Design Cannot Remain Exclusive*, BIS publishers, Amsterdam, 2011. [↑](#footnote-ref-44)
45. Besides copyright, these include registered and unregistered design rights, and sometimes trademark rights; in some cases it may also be possible to patent a design. A discussion of such possibilities would fall outside the scope of this text. [↑](#footnote-ref-45)
46. See e.g. Ronen Kadushin, quoted in: Peter Troxler, *The Beginning of a Beginning of the Beginning of a Trend*, in: Bas van Abel, Lucas Evers, Roel Klaassen and Peter Troxler (eds.), *Open Design Now: Why Design Cannot Remain Exclusive*, BIS publishers, Amsterdam, 2011, pp. 108-115, p. 112: “I am saying: please copy. But if you want to make a business out of it, then please call me and we’ll discuss royalties. It is my intellectual property, after all; that’s the bottom line. If you want to use it, I would love you to use it; we can talk about it. But if you’re making money out of it, then I would like a share of it also.” [↑](#footnote-ref-46)
47. See e.g. the memorandum jointly presented by the Dutch Ministry of Economic Affairs and the Ministry of Education, Culture and Science, *De waarde van creatie: brief cultuur en economie 2009* (*The Value of Creation: Memorandum on Culture and Economy 2009*), Ministerie van Economische Zaken, Ministerie van Onderwijs, Cultuur en Wetenschap, Den Haag, 2009, p. 40. See also the European Commission’s staff working document *Design as a driver of user-centred innovation (Brussels, 7.4.2009 SEC(2009)501 final)* or the newsletters of the European IPR Helpdesk. [↑](#footnote-ref-47)
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56. Ibid. [↑](#footnote-ref-56)
57. Ibid., p. 10. [↑](#footnote-ref-57)
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59. Paul Atkinson, *Orchestral Manoeuvres in Design*, in: Bas van Abel, Lucas Evers, Roel Klaassen and Peter Troxler (eds.), *Open Design Now: Why Design Cannot Remain Exclusive*, BIS publishers, Amsterdam, 2011, pp. 24-31, p. 28. [↑](#footnote-ref-59)
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62. Dick Rijken, *Design Literacy: Organizing Self-Organization*, in: Bas van Abel, Lucas Evers, Roel Klaassen and Peter Troxler (eds.), *Open Design Now: Why Design Cannot Remain Exclusive*, BIS publishers, Amsterdam, 2011, pp. 152-158, p. 157. [↑](#footnote-ref-62)
63. Ponoko offers laser cutting, 3D printing and electronics, the latter two only in the US; Shapeways is a 3D printing service. [↑](#footnote-ref-63)