Wide Open

Open source methods and their future potential

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Tom Steinberg
with Omar Salem

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1. Introduction

On 25 August 1991 a second-year computer student at the University of Helsinki sent an email to an internet newsgroup. After greeting his fellow readers, he made a small announcement:

> *I'm doing a (free) operating system (just a hobby, won't be big and professional) . . . this has been brewing since April, and is starting to get ready.*

By 2002 Linus Torvald's hobby claimed a 25 per cent share of the global market for server operating systems,[1] and had consumed an estimated 8,000 person years of development time.[2] It had done all this off the voluntary labour of a large and far-flung community of people who shared only one goal – to build a better operating system, Linux.

In January 2001 Jimmy Wales launched Wikipedia, a web-based encyclopaedia. It wasn't the first attempt to build an encyclopaedia online, but it did mark a radical change in approach. Wikipedia was to be an encyclopaedia where any visitor could edit any page, regardless of their qualifications, their motivations or their relationship with the management of the project.

By late 2004 Wikipedia had grown larger than the Encyclopaedia Britannica and Encarta combined, and, like Linux, had been built almost entirely by volunteers. It now features over a million articles in

over more than 100 languages, and is rapidly becoming the default place to search for information if you can't find it quickly using Google.

The stories of Linux and Wikipedia have become well known. Their success is founded on their 'open source' methods of development: volunteer powered, internet enabled and geographically dispersed. They embody a new way of creating knowledge that combines an open and democratic ethos with an extraordinary ability to produce work of high quality and on a huge scale.

For centuries the pursuit of knowledge has been undertaken in ways that involve widely dispersed groups commenting on each others' work. The evolution of the Talmud in Judaism is one example, and the tradition of interpretation in Islam is another. Modern science has developed through critical peer review in an open, expert and increasingly global community. Each shares the principle of making thought open, and using structured commentary to advance knowledge. Each operates more like a gift economy than a market economy.

Open source methods take these principles in a radically new direction. The advent of the internet has made it possible for new knowledge to be developed, shared and refined in ways that emphasise its character as a common good, rather than as something to be owned and enclosed. Open source methods are just the latest in a series of major innovations founded in the fertile pasture which is the internet.[3]

Our primary interest in this pamphlet is with the wider applications and potential of the open source idea. In recent years 'open source' has been applied to many areas that have nothing to do with software. There are now important new organisations involved in biosciences and pharmaceuticals that describe themselves, or are being described by others, as open source. There are also open source news organisations, political campaigns, betting organisations, markets and employee campaigns.[4]

The application of open source methods to wider areas of social and economic life is understandably attractive to many. The promise for the casual observer is of huge returns from relatively little

investment, as well as a sense that non-professionals outside big corporations now have an unprecedented chance to beat the 'big beasts' at their own games.

The actual picture is much more complex. This paper looks at these complexities, and concludes with a series of recommendations for the wide application of open methods to areas including law, media, academia and social enterprise among others.

Some of the most important innovations will be in and around the state. Government has started to open up its data sources and more open methods of policy formulation should make it possible to draw on much more of society's intelligence when decisions are being made. Politics is likely to remain dominated by mass communication – but open methods are already beginning to transform the ways in which citizens organise, and even mainstream parties and media organisations are having to learn how to use them. More broadly, as has happened with the web – those cities, organisations and nations that move fastest to embrace open methods in appropriate fields are likely to benefit in all sorts of ways, both economic and social.

However, in all of this we try to strike a balance. Achieving the full potential of wider applications depends on clarity about what 'open source' really means, awareness of its limits as a detailed working model and rigour in thinking through which aspects of it are applicable in new areas.

Definitions

So what exactly is open source? Open source software is any computer software distributed under a licence which allows users to change or share the software's source code. Source code is the human-readable version of a computer program – in order for a computer to understand a program it must be converted to a 'binary' format, which is not human readable. Most commercial software packages, like Microsoft Windows, do not make the source code available; in fact they strive extremely hard to keep it away from prying eyes. Instead they ship only binaries – useful for the computer, useless for anyone wanting to know how the program works (as some have put

it, it's rather like being sold a car with a sealed engine that you cannot inspect or repair).

While there are many different kinds of open source software, they all have one core similarity: they insist that the source code be made available whenever a piece of software is used, distributed or modified. In this way, open source is almost the opposite of traditional intellectual property systems like patents and copyrights, which seek to keep knowledge restricted to the creators and people they choose to sell the knowledge to. In defiance of much conventional wisdom within the economics of intellectual property, open methods and open standards have led to the creation of many of the main underlying innovations around the internet.

Not surprisingly, the new model has fuelled intense controversy and struggle, with new dividing lines in business as some (like IBM) partially side with the open source movement against Microsoft. Even on a geopolitical scale there appear to be countries falling broadly into 'for' and 'against' camps. These contests over ownership and intellectual property look set to have a profound influence on how our economies will innovate and operate in the next few decades.

Open source is, by definition, about source code. Nothing else except computer programs actually has source code to be made freely available, and in a strict sense nothing except computer code can ever be open source. As we will show, some recent uses of the phrase have stretched it beyond any useful meaning. Nonetheless, we argue that other fields have much to learn from open source methods – because they bring into focus principles and working methods which can be combined in a range of settings to produce better knowledge, goods or services, or make them available on more widely beneficial terms.

Chapters 4 and 5 try to bring some clarity to the language used to describe these different projects, focusing on the characteristics of open source working, and the distinct new forms of output they have created.

The greater potential, and challenge, lies in adapting and applying these principles to other sectors and institutions. In Chapter 5 we

examine and propose a dozen new areas of application for open source methods.

They are challenging because they offer alternative methods of validation, improvement and knowledge sharing to those currently used by the professions, policy-makers, universities and media organisations. Realising the potential of such applications depends on some disruptive innovation, and on the willingness of such institutions to engage in open dialogue.

The Young Foundation, in earlier incarnations, was closely involved in attempts to open up previously closed worlds: the Open University and the Open College are just two examples. The technologies available for organising innovations of this kind now offer radically more possibilities than were dreamt of 30 or 40 years ago. We hope that this pamphlet provides a useful guide to where open source methods could be applied in the future – it is part of a work in progress as we explore a radically new way of organising human knowledge.

2 Characteristics and strengths of open source

The story of Linux

Linus Torvalds built Linux because he couldn't get hold of the kind of operating system he himself wanted. As a computing student he wanted something with the characteristics of UNIX, the expensive industrial-strength operating system originally produced by Bell Labs. But apart from being prohibitively expensive, the source code (the human-readable version of the code which runs computer programs) was jealously guarded and kept away from public eyes. This meant that for someone like Linux, a student interested not just in using operating systems, but also in understanding how they worked and making improvements, UNIX was not an option. If he wanted an operating system he could get inside the guts of, he was left with really only one option – MINIX.

MINIX was written by Andrew S Tanenbaum, a computing professor who had put it together in order to help his students understand how a real operating system worked. Its source code was open for perusal and improvement, but at heart it was a teaching tool, rather than something aiming to be a fully fledged operating system ready to be used outside the classroom.

So Linus decided, as many students had before him, that he'd have a go at writing an experimental operating system of his own. But instead of starting like a normal amateur IT project, where intellectual property is the last thing on someone's mind, he made a crucial

decision. He released his code under a licence commonly known as 'Copyleft' or, more specifically, the GNU Public Licence (GPL). The GPL is a curious innovation which has been around since the mid-1980s. When something is licensed under the GPL the author is effectively saying 'Please feel free to use my work, but if you do, you have to release your own work in the same public way that I've done'. It's like putting something in the public domain, encouraging people to build on it, but insisting that if they do make changes, they are legally obliged to publish their work in the same fashion as the parent project.

About a month after Linus sent out his August email (quoted on page 7), he sent a follow-up, announcing both that the code for Linux 0.01 was available for free download, and, crucially, asking for people to make contributions in the form of bug fixes, new software tools, and so forth. Immediately, other readers of this newsgroup, predominantly people with then-rare university internet accounts, starting doing as he'd asked. They sent improvements, which Linus vetted; if useful, they became part of the next 'build' of Linux. Over the next few months and years Linus's 'hobby' evolved from an experiment, to a workable system, to a system that some people were claiming was the best ever built. In order to do so he had to expand his management somewhat, through a system of dedicated 'lieutenants', but despite this he was always at the heart of the project.

As it has grown Linux has diversified in use. No longer just the tool of highly skilled technology experts, Linux is now found powering set-top boxes, personal digital assistants, even wristwatches. Even Google runs on a stripped down, customised version of Linux. By the time this pamphlet is finished and in your hands, it will probably have passed through dozens of machines running Linux. One of the conventional wisdoms of the software industry was 'Brooks' law', which stated that adding programmers to a job increases the time to complete it.[5] Linux turned this law on its head.

The story of Wikipedia
The following is an edited version of the history from Wikipedia itself

(and is licensed under the GNU Free Documentation Licence).[6]

> *Wikipedia was founded as an offshoot of Nupedia, a now-abandoned project to produce a free encyclopaedia. Nupedia had an elaborate system of peer review and required highly qualified contributors, but progress on producing articles was very slow. During 2000, Jimmy Wales, founder of Nupedia, and Larry Sanger, who Wales had employed to work on the project, discussed various ways to supplement Nupedia with a more open, complementary project.*
>
> *The impetus for the creation of Wikipedia came from a dinner conversation between Sanger and computer programmer Ben Kovitz, in San Diego, California, on the evening of 2 January 2001. Kovitz, who was a regular on 'Ward's Wiki' (the Portland Pattern Repository), explained the wiki concept to Sanger.*

Wikis are websites that can be edited by any user, using nothing more than their current web browser. They are one of the very easiest ways that people can leave their own words and pictures on the internet.

> *Sanger saw that a wiki would be an excellent format whereby a more open, less formal encyclopaedia project could be pursued. Sanger easily persuaded Wales, who had been introduced to the wiki concept previously, to set up a wiki for Nupedia, and Nupedia's first wiki went online on 10 January.*
> ***Project beginnings***
> *There was considerable resistance on the part of Nupedia's editors and reviewers to the idea of associating Nupedia with a website in the wiki format, however, so the new project was given the name 'Wikipedia' and launched on its own domain, wikipedia.com, on 15 January (now humorously called 'Wikipedia Day' by some users). The bandwidth and server (located in San Diego) were donated by Wales.*
>
> *The project received large numbers of participants after being mentioned three times on the tech website Slashdot – two minor*

mentions on 5 March and 29 March 2001, and then a prominent pointer to a story on the community-edited technology and culture website Kuro5hin on 25 July. As well as these relatively rapid influxes of traffic there had been a steady stream of traffic from other sources, especially Google, which alone sent hundreds of new visitors to the site every day.

The project passed 1,000 articles around 12 February 2001, and 10,000 articles around 7 September. In the first year of its existence, over 20,000 encyclopaedia entries were created – a rate of over 1,500 articles per month. By 30 August 2002 the article count had reached 40,000. By 20 November 2004 the English wiki had 400,000 articles, and by 18 March 2005 the count was 500,000.

The motivations of the authors of Wikipedia pages are numerous. Some want the world to know about issues; others like to ensure that the site remains fair and balanced; others just see a gap that they can fill and feel an urge to fill it.

Each of these stories is remarkable in its own right, but they are far from the only examples. SourceForge.net, the main host of open source projects, now has over 91,000 registered projects. These range from tiny scripts performing very simple tasks to huge suites of software.[7] The open source project Apache is the market leader in the internet server market and most email traffic travels via Sendmail. Their success has forced the big players to respond, whether (like Microsoft) they see it as a threat,[8] or (like IBM) as an opportunity.

The characteristics of open source development which have made Linux and Wikipedia successful

In order to examine projects that use unorthodox applications of open source methods, we must first understand the defining characteristics of open source. This is not an entirely straightforward task. Open source methods sit at the cusp of familiar tools: they are at times like conversations, at times like formal research teams, at times

like university scholarship, at times like DIY. They combine some of the properties of markets (with strong incentives for improvement) and some of the properties of communities (with non-monetary exchange, gift relationships and reward through recognition). They have some of the properties of knowledge in many communications networks – with zero marginal cost, non-rivalry, value that grows with the numbers of users – but take these principles in a new direction. The following is our list of the characteristics that seem to be shared by most major open source projects:

- transparency
- vetting of participants only after they've got involved
- low cost and ease of engagement
- a legal structure and enforcement mechanism
- leadership
- common standards
- peer review and feedback loops
- a shared conception of goals
- incrementalist – small players can still make useful contributions
- powerful non-monetary incentives.

Transparency
Visibility and transparency are central to the most well-known open source initiatives. A project like Linux can grow only if potential contributors understand what it is that they're contributing to. While the standard approach to ensuring innovation in competitive industries has been to keep ideas secret as long as possible, and then copyrighted or patented thereafter, the open source model turns this on its head. From the very start projects like Wikipedia have been extremely open about how they work, who's in charge and what's expected of contributors.

Vetting of participants only after they've got involved
Traditional organisations erect sophisticated barriers to involvement;

systems of recruitment, appraisal and promotion are designed to ensure that only people with adequate qualifications and experience get to work on important projects, or to exercise power. Open source projects work on a very different principle. They allow absolutely anyone to get involved; all that matters is whether or not they deliver high quality work. This is clearly an attribute which is not universally replicable – open source surgery is not something most of us would want to go through. Finally, in nearly all open source projects a majority of the participants have never met.

The lack of initial vetting does not, of course, mean that there is not substantial vetting of work once it is submitted. This can be done by a project leader, like Linus Torvalds, or by members of the general project community. Within Wikipedia nearly all the vetting of work is done by other members of the community, guided by a very simple set of editorial principles, rules which have themselves been informally agreed on by members of the Wikipedia community.

This vetting process leads to an interesting form of power assignment, where the amount of voluntary work done by members of a community is directly correlated to the power and respect they garner from the rest. This arrangement doesn't yet have a name (such as democracy or aristocracy), signifying its novelty as an organising principle.

Low cost and ease of engagement

Genuine openness in any activity depends on cheap and easy ways of taking part. The important cost characteristic of both Wikipedia and Linux is that many people can get involved at no additional outlay beyond what they already spend on their computing. If you have already bought a computer and leased an internet connection for other purposes, the cost of adding an article to Wikipedia or installing a distribution of Linux is, apart from your time, zero. In this respect open source projects are different from, for example, round-the-world yacht racing, another large, friendly, geographically dispersed and well-defined community of common interest, but not the cheapest to get involved with.

It has become a truism that in the modern economy people who are cash rich tend to be time poor, and vice versa. The opportunities for time-rich people with access to the internet are enormous – all the information you could possibly require to teach yourself anything about how to make computers and software work is available for free, and the best documentation often surrounds the most open projects. Once a budding, self-taught coder has acquired the basic skills required to program, nothing is so appealing as the thrill of getting their code incorporated in software that will be spread across the face of the world (and perhaps, over time, across others).

A legal structure and enforcement mechanism

Open source does not mean a free-for-all. Instead it depends on a clearly defined legal framework which shapes the incentives for participation. If open source licences were not legally enforceable, especially with regard to derivatives, then companies would more or less be able to appropriate the code that was produced and give back nothing in return. This would hugely dent the incentive for programmers to get involved. All open source projects release their data for free, but control its use through licences that ensure that the improved work remains available for public use.

Leadership

Most open source software has some centralised element of leadership or control. This concentration of power may be around an individual, such as Linus Torvalds, or an organisation, such as the Apache Foundation. Whatever the particular structure there is usually a leadership that sets the general direction and ethos, assigns tasks and acts as an editor, approving changes to the source code. It is important that the leadership maintains the trust of contributors in order that they remain involved in the project. Although theoretically anyone can develop the source code as they see fit, if the project 'forks', which occurs when more than one version of a program gains wide usage, the original leadership usually has an in-built advantage over 'fork' projects because of their reputation and access to infor-

mation. In the case of reputation, users (and programmers) will generally trust the originating project more than others. In the case of information the central core will generally have information that others do not, and so be more effective (and hence more trusted). When a new version of Linux is released programmers send their suggested improvements to Linus Torvalds and his team who then filter them.

So, contrary to the assumptions of anarchic, emergent behaviour, we find that most open source projects normally have charismatic leaders who help motivate a more dispersed group of developers.

Common standards

Common standards have always been an essential part of successful projects. You can't preach a religion if your people can't understand your language, and you can't build a useful photocopier if you don't know what size your next box of paper will be. Successful open source projects like Linux and Wikipedia deal with standards in two successful ways. They rely on open, free-to-use standards, and they create new, open, free-to-use standards for their users.

The standards they rely on consist of things like the Internet Protocol (IP) which holds the internet together or UTF-8, the standard for international language alphabets. If they had chosen not to use any of these standards, the number of potential users would have been in single figures, rather than hundreds of millions, and the cost of building the services would have rocketed immediately out of the realms of feasibility.

The standards they have created benefit the mother projects in a number of different ways. Linux's freeness and ubiquity has created strong incentives to develop applications that work on it. These applications have created more reasons to use Linux, and so forth in a virtuous circle. But it is not just the fact that these standards exist that matters – it is the fact that they are free to use, and open for scrutiny. There are many standards available for which royalty fees must be paid. Even where these are modest, they can simply kill any chance

that the standard might spread organically – instead it must be expensively sold through consortiums and manufacturers, like the standards underpinning VHS or DVD formats. Furthermore, the fact that standards like HTML are open for scrutiny and bug correction by anyone with the time has helped to explain why they are better quality and more widely adopted. This characteristic is examined more closely below.

Peer review and feedback loops

The principle by which the open source collaborative approach manages to produce such high quality work is most famously summed up in the words of coder Eric Raymond: 'Given enough eyeballs, all bugs are shallow.'[9] By this Raymond means that even complex code, millions of lines in length and of huge complexity, can be debugged reasonably quickly when there are enough people looking at different bits of it. The reason that Wikipedia manages to retain such high quality on average is that there are so many people reading it. Most obvious factual mistakes or breaches of editorial guidelines are corrected by users passing by. The reason it works is trivial – there are simply enough people out there who are willing and able to keep the site well ordered, and to do so for free. This leads straight on to the question – why?

A shared conception of goals

Like any big projects, both Linux and Wikipedia must deal with internal dissent about particular choices and directions. But what has made them successful is that there is enough of a common conception of the good to make each project thrive. Linux coders may not agree about the merits of the profit motive, or the effectiveness of the GPL, or even why they are contributing.[10] But they do all agree that fixing a bug or adding a feature is worth it for at least themselves, and that the vetting they can get from peer review is a valuable resource if they want their creation to be as good as possible.

Incrementalist – small players can still make useful contributions

Improvements to the source code of Linux or to a Wikipedia page can be modest, but still be valuable. In many other fields of development, the minimum threshold above which it is possible to make any valid contribution is very high – years of background work, gaining of a PhD or other advanced qualifications, and/or high capital costs. Both Linux and Wikipedia get a bit better every time someone makes a tiny change – and tiny changes are therefore sought and accepted, alongside major contributions.

Powerful non-monetary incentives

The baseline assumption of most major projects, technological or otherwise, is that in order to get lots of work done, you must pay lots of money to the participants – the Channel Tunnel didn't cost £10 billion for nothing. Even this most basic assumption seems to be challenged by the new methods of working. For all the characteristics listed above contribute to an economic phenomenon – the ability of open source methods to replace traditional cash incentives with non-monetary ones. People working on Wikipedia and Linux do so almost entirely for non-monetary reasons. Some may be operating indirectly out of economic self-interest – open source programming allows a developer to signal their abilities to peers and potential employers. But programmers are more commonly driven by motives of social or personal fulfilment[11] including the desire to be respected for their work. Sometimes open source coding can be done for immediate self-interest – I really want a program that does X, and the easiest way is to modify this pre-existing open source application. If the licence says that the program is open source, though, I have to publish my code in order to remain on the right side of the legal terms and conditions. So my pure self-interest can result in me building better code for others to use.

To summarise, then, open source methods are built around these ten characteristics. The principles are relatively simple, mutually

reinforcing, and add up to a powerful new way of organising activities and mobilising large numbers of minds towards common goals. However, there is no inherent reason why all of these principles need to coexist. There are many possible evolutions of open source methods that do not use one or more of these principles; and some of these directions of evolution are likely to be influenced by the weaknesses of pure open source methods.

3. Drawbacks of open source

Open source ways of developing software projects are exciting and powerful, but they are by no means universally applicable, or without downsides even when applied successfully. They share some of the more general limitations of networks, which tend to be relatively poor as a means of raising capital, concentrating resources, or sustaining themselves through crises. In this section we discuss the main limits on these methods.

Minority capture

Any project which opens itself up without any limits on access and engagement by outsiders is also opening itself to the risk of minority capture. Well-organised but relatively small groups can co-opt a project for their own ends, often distorting the original intention. This happens commonly among political parties, voluntary organisations and public meetings. The media are now experiencing how easy it is for small but organised lobby groups to mobilise thousands of complaints.[12] Open forums on the internet are notoriously vulnerable to capture and one can easily imagine that if a national newspaper decided to open up its front page to contributions from the public, well-organised minorities would soon be able to completely change the whole purpose of the paper. This is why so many open projects of all kinds have found the need to retain some central editorial and control function, backed by a clear set of rules.

Diversion and dissension

Open source works well where there is a broad consensus on what counts as quality or common purpose among the contributors. Where this is heavily contested the model breaks down. This is another reason why many higher profile internet forums involve central control, whether light or heavy: without it the risk of the noisy, intemperate or simply foolish crowding out the good is too high. In most forums there is sufficient consensus about what counts as a good contribution that these controls are legitimate. But fissures are a common feature of collaborative organisations of this kind, particularly where moral questions are concerned. A small example of this issue is the page on George Bush on Wikipedia which had to be locked to stop it turning into a battleground, at odds with the dispassionate tone of the rest of the site.

Restricted access to funding[13]

Because they give away their secrets, open source projects cannot easily generate investment capital. Furthermore, they often require non-open-source infrastructure and foundational research to function. For example Linux is ultimately an open source version of UNIX, an operating system developed largely as a result of large DARPA grants,[14] one of many examples of how the modern communications world is the unintended legacy of the very secretive Cold War defence funding in the US. Moreover, some types of innovation require large investments of capital which are impossible in an open source environment. Where major investment is unavoidable – for example to design and manufacture chips or develop drugs with thorough public trials, and so on – pure open source methods are usually (although not always) unworkable. Open methods of working are always pushing these boundaries – until two years ago nobody thought that you could write an encyclopaedia without very substantial initial investment, but there are likely to be many places where the fixed costs simply cannot be circumnavigated or distributed widely.

'Necessary' monopolies

It has long been assumed that temporary monopolies are essential to making new products or services worth investing in. This is the starting point not only for copyright and patent law, but also for the economics of innovation. As a principle it is often exaggerated – remarkably few of the decisive innovations of the last century were successfully protected by patent or copyright law. But there are many areas of economic life where the absence of temporary monopolies would reduce investment and innovation. It is hard to imagine, for example, what incentive structure would make individuals or companies collaborate in a fully open, transparent way on a new drug, especially one which required high investment spread over many years. An example might be the use of orphan drug patents.[15]

Rival goods

Open source works because the output is non-rival; that is to say one person's use does not diminish what is available to others (indeed in software the opposite is usually the case). In areas where the output is rival, cooperative methods are less effective (and there is a long history of 'tragedies of the commons' where individual self-interest has destroyed common goods). For the same reason open methods of decision-making tend to be poor at coping with issues involving stark trade-offs, conflicting interests or sacrifices.

Ideas that need to be isolated to thrive

The peer review process which boosts the quality of open source software so much may have a less creative side. Ideas which have a kernel of quality, but which are not well developed, may be killed off by fierce directed criticism. There is evidence that many radical new ideas need a protected environment – protected either from immediate market, political or professional pressures – in order to gain the solidity to compete (this is also a reason why an excessively hyperactive 24/7 media may fuel conformism rather than originality). Open source communities have every bit as much potential to

become conservative and hidebound as any others and may on occasion be ill-suited to truly radical innovation (for the same reason many original ideas come from quiet reflection rather than from group brainstorms).

Innovation that thrives on ambiguity

One of the striking features of most successful innovation is that it rarely happens as a straightforwardly analytical process of testing and improvement. Most descriptions of innovation describe the clashing and merging of different perspectives – its unplanned quality, the cross-boundary links. Open source methods are fairly tightly defined in terms of their boundaries; this may be another reason why they are inherently better suited to incremental improvement than to pure creativity.

Private or sensitive information

Open methods will clearly be inappropriate when the content of the project involves information whose publication would be offensive, embarrassing or dangerous. A government trying to build a new weapons system using fully open development methods would be roundly criticised for allowing extremely dangerous information into the public domain, as well as giving valuable secrets to a potential enemy.

Whenever a new organisational model emerges – whether it's the multidivisional corporation or the public enterprise – a period of experiment follows when its potentials and limits are explored. We are now entering just such a period with open source ideas. Some of the limitations set out above may be circumvented, but the likelihood is that open source will find a limited, but important, number of niches rather than becoming a wholly new way of organising economic, social or political life.

4. The widening horizons of open source methods

Musings about the applicability of open source methods in new fields have appeared in *The Economist*,[16] *Newsweek International*,[17] the *American Prospect*[18] and the *NewScientist*.[19] Questions have been asked whether open source biotechnology, drug development or politics will bring cheaper crops and drugs to the developing world or a new politics to the developed world. We now hear of 'open source' trade unionism,[20] biotechnology[21] and even religion.[22] South Korea's OhmyNews is widely cited as leading the way for fully open news reporting.[23]

While open source may be the inspiration for new ways of thinking about politics or religion it does not follow that an initiative launched under the banner *is* open source. As discussed above, strictly speaking it is incorrect to call anything open source that doesn't have source code. Given that 'open source' is a relatively recent term with a clear and useful definition set up by an eponymous organisation, we feel that muddying the waters by applying it in non-software areas is unhelpful for all involved. We therefore need new terms which acknowledge the growing diversity of open methods.

In this pamphlet we suggest three broad categories of activity observed in projects inspired by open source ideas. In some cases all three can be found in the same project, and all are at least partially transferable to non-software areas:

○ **Open knowledge**. These are projects where knowledge is provided freely, and shaped, vetted and in some cases used by a wide community of participants. In these cases the common value of the knowledge being created is the primary concern.

○ **Open team working**. The loose communities of interest that work together through the internet to build projects like Wikipedia and Linux merge into a wider family of semi-open teams rooted in organisations. These generally have a clearly defined end goal.

○ **Open conversations**. These extend traditional forms of public discussion by constructing online conversations capable of handing more participants in more effective ways than previously possible. In these cases the process is as important as any goal.

All can be very open, but most will rest on the quality of their leaders as well as their participants. Like most networks they depend on some people's willingness and ability to act as guardians of their values and qualities. In the following section we will look at this three-part schema and see how it applies to current non-software projects that are using the term open source.

Open knowledge

One of the most enthusiastic adopters of open source nomenclature is bioscience. 'Virtual Pharmaceutical Companies' (or 'Virtual Pharma') are increasingly being used as a mechanism to organise drug discovery. Examples include the Medicines for Malaria Venture (MMV), the Global Alliance for TB Drug Development (TB Alliance) and the Institute of One World Health (IOWH). These have been referred to by commentators as open source.

Virtual Pharma does little or no development in-house but develops possible drug candidates through agreements with partners (academic, commercial, government and non-profit). In many ways this forces the Virtual Pharma organisations to be quite unlike open

source projects. Minimum costs are huge, individuals can't participate without institutional assistance (unless they are multimillionaires), and the feedback process from peers is wholly secondary to the feedback process from clinical trials. Virtual Pharma is innovative, but only in the same way that a shoe company outsourcing labour and emailing new designs from creatives around the world is innovative.

The Tropical Disease Initiative (TDI) has been framed by its creators as fully analogous to open source projects. By restricting activity to computer-driven disease research, for example identifying particular proteins, the TDI fits more neatly under open teams in our schema.

A new area of innovation within bioscience (and science more generally) is that of organisations that are trying to transfer the benefits of open source licensing systems to non-software spheres. There are now two initiatives, the CAMBIA BIOS initiative and the Science Commons, that are using open source techniques to offer new kinds of licence which are more flexible and conducive to collaborative work than traditional copyright and patenting systems. These aim to provide common knowledge for use globally, and to mobilise a wide community of participants. These innovative approaches to the creation of new knowledge share a variety of open characteristics, while in many ways being blocked from true open source status by their high barriers of capital and qualification requirements. However, depending on their exact criteria for participation, most of these projects do fall under our definition of open teams and open knowledge.

Open team working

The internet has created a huge number of new ways for people to work together. Some examples mobilise citizens and consumers to speed up innovation. Recent examples include the role of users in shaping Lego's games software and car companies' much more active use of consumers in the design process. Richard Jefferson and Eric von Hippel have written recently of the 'democratisation of

innovation' that arises when user networks are much more closely linked into the design process.[24]

Within government, open methods are just beginning to transform the business of policy-making. At a global level huge communities of experts are now involved in decision-making and assessment. The International Panel on Climate Change is one particularly striking example (involving reputation, incremental knowledge and a huge community of participants). The Manhattan project was a very large-scale secretive example (though one that turned out to be much more open than it had intended), as was the landing on the moon. By contrast much of the work done on developing telecoms standards over the last few decades was rather similar to open source in bringing together thousands of experts from around the world in a combination of online and face-to-face dialogues. A much smaller, bottom-up example is the story of Lorenzo's oil. In 1983, Lorenzo Odone, aged 5, was diagnosed with adrenoleukodystrophy (ALD). ALD is a rare inherited metabolic disorder. Lorenzo's parents were told that he was unlikely to survive for more than two years and that there was no hope of a cure. Lorenzo's parents dedicated themselves to finding a cure. They invited and paid for an international conference of experts, encouraging them to share information. The conference led to the identification of a possible cure, now known as 'Lorenzo's oil'. Lorenzo's oil has since been proved to significantly reduce the chances of developing ALD among those carrying the gene that causes it.[25]

Governments and public organisations are beginning to be more open about their data and internal processes, partly spurred on by freedom of information laws and by the advent of much more ubiquitous data. The UK's Strategy Unit for example often publishes detailed work plans, working papers and analyses, alongside open consultations. In many countries, smarter governments are seeking ways to introduce open methods which will add value to public data and services that they provide. Strictly, though, openness of this sort is not related to open source derived methods. The government's commission on sustainability has employed a wiki, but the public

sector is only just starting to get the hang of these extremely new and sometimes challenging approaches.

For examples of real open methods in the public sector, we have to look at the new interface between government and voluntary groups, like the open volunteer team which built TheyWorkForYou.com, the annotated, open knowledge version of Hansard, the UK's parliamentary record. On a smaller scale, the TalkEuro project is building an annotated version of the European constitution, to improve its intelligibility, and to attempt a better quality of debate over its clauses than could be managed through traditional media.[26]

All of these methods discomfort some politicians and officials since they appear to reduce control. But as in the case of open source development projects on the internet, the involvement of more players tends to improve the quality of what is done, without necessarily reducing the room for leadership.

Some have also applied the term open source to fairly conventional open methods of innovation: for example public services that give some autonomy to frontline units to develop different ways of organising themselves, and then try to capture and share the insights these bring. Such methods are helpful, and are advances over tightly constrained hierarchy. But they are better understood as ways of opening up processes – and they rarely, if ever, open up decision-making power.

Another set of innovations apply some open source principles within organisations. Within private companies or public organisations there are obvious attractions in establishing open knowledge sites on intranets to encourage collaborative problem-solving. For example, developing a new marketing campaign for a toothpaste could involve a site with:

○   visibility to anyone within the organisation, or to a subset of employees (though with obvious limits because of the risk of competitors learning about plans)
○   no vetting beyond these constraints (ie not restricting contributions to the marketing department)

    ○   low cost of contributions
    ○   a commitment to acknowledge ideas (but not to offer any legal protection)
    ○   peer review from marketing experts, sales teams etc
    ○   shared goals of maximising market share
    ○   some non-monetary incentives (recognition) combined with indirect monetary ones (the prospect of promotion).

The open company is also becoming a possibility – where shareholders see themselves, and are treated, as members, sharing in discussions about corporate priorities and ethics. This model is likely to spread primarily in fields where there is a clear sense of common purpose (for example fair trade, or environmental companies) and where there is less threat of competitors taking advantage of inside knowledge.

These examples illuminate both the potential and the limits of open source ideas. In competitive for-profit environments there are bound to be significant limits to how much good ideas can be aired and shared. But just as business hierarchies have learned how to make use of networks in a myriad of forms so is it likely that pyramidal business organisations will also find some ways to make use of more open methods of collaboration.

Open conversations

The internet has made all sorts of open conversation possible: linking people together, and managing reputation and usefulness. Many newspapers and broadcasters now support varying types of conversation on their websites. The British Labour Party attempted through its 'Big Conversation' to organise a mix of face-to-face and web-based conversations to shape its election manifesto.

The BBC's iCan project is an innovative infrastructure which makes it easy for citizens to form common projects and campaigns. Its software is not open source, but its approach combines open knowledge (for example, collaboratively authored guidance to achieve local goals) with local conversations (with people discussing local

issues). Like other kinds of social software it provides a space in which a myriad of open conversations can be undertaken according to some reasonably flexible shared rules. And the Office of the Deputy Prime Minister has funded a series of 'Issues Forums', bringing local people, most of whom don't know each other, together on mailing lists to discuss local issues. These lists are free to join, and open to anyone prepared to obey the simple rule structure.[27]

These various methods for organising large communities in a single conversation overlap with the traditions of scholarship and peer review in academia and with interpretation in religion. They also potentially overlap with the more challenging idea of open decision-making methods which involve large numbers of people in taking decisions (for example participative budgeting, deliberative polls and citizen's juries). Achieving legitimising levels of representativeness in decision-making processes using open methods, though, is a challenge which should not be underestimated. Constantly asking 'What can we learn from Big Brother?' does not actually shed any light on the real potential for open conversations.

5. Possible new applications of open methods

We earlier identified ten characteristics usually found within open source projects:

- transparency
- vetting of participants only after they've got involved
- low cost and ease of engagement
- a legal structure and enforcement mechanism
- leadership
- common standards
- peer review and feedback loops
- a shared conception of goals
- incrementalist – small players can still make useful contributions
- powerful non-monetary incentives

We then asserted that 'open source' as a phrase should not be stretched too loosely to cover new areas – it already has a clear and tight definition that can and should apply only to software. Instead, we suggested three broad headings to cover other applications of some of the same ideas:

- open knowledge
- open team working
- open conversations.

We now turn to the new areas where these could be applied. We have categorised these under the following headings: media, public sector, law, academia, arts, health, finance and social innovation. The 12 examples described are meant to be catalysts – prompts for wider thought and experiment rather than definitive solutions, although several already exist, at least in an early form.

Media

The competitiveness of the modern news media economy has led to some well-documented distortions to news values: poor ethics, inaccuracy, abuse of power. One result is that print journalists command even lower levels of trust than politicians. Another is that the public have systematically distorted views of many important facts and issues.

The traditions and principles of free speech mean that no government can or should have any influence over what is published in the press. Yet the main alternative of self-regulation has consistently failed to improve standards. Open methods are ideally suited to providing non-government, non-self-regulation-based pressure on news media. By allowing large numbers of non-vetted, voluntarily involved members of the public to engage with the process of adjudicating media complaints, cases could be resolved with the dual advantages of higher-quality evidence, and higher legitimacy from broader public involvement.

The Open Commission for Accuracy in the Media

Imagine for example if the dockets of cases considered by the Press Complaints Commission (PCC) were run as an open system. This would mean that anyone could submit evidence, or create public annotations to evidence, relevant to a certain case. This would immediately improve the quality of evidence involved, as well as make the public feel more engaged in cases concerning the truthfulness or otherwise of their news media. This could coexist happily with an adjudication process that remained entirely closed and undemocratic. Despite this, the improved evidence and the changed understanding

about who had a stake in the result of a certain case could transform the legitimacy and the effective power of the PCC.

For a much bolder idea of where this openness could go, we present the idea of an Open Commission for Accuracy in the Media (OCAM).[28] OCAM would be funded out of a tiny slice (perhaps 0.5 per cent) of the BBC licence fee (which is paid by all television owners to contribute to 'information, education and entertainment'). Its brief would be to promote accuracy across all mass media that are depended on by British citizens (not just BBC outputs).

One of its major tools would be a web-based open system listing journalists, publications, news channels and other websites, which would keep track of:

- formal complaints and rulings made by traditional adjudicators (like the Press Complaints Commission)
- complaints by members of the public who believe that a newspaper or broadcast report has been inaccurate
- structures and tools to allow all parties involved in both types of complaint to submit evidence, to discuss, and to escalate to adjudication panels.

Even the adjudication panel and processes could themselves be determined by the participants. The art and science of 'reputation systems' has been rapidly growing in line with the success of sites like eBay and Slashdot.org, and now allows communities to show their collective sense of respect or distaste for individual members. A highly respected, trustworthy member of eBay is a more attractive person to buy goods from, and so reputation has a real value.

In the case of OCAM we can imagine a reputation system based on the value of contributions made to the site, as judged by peers. Once reputation was high enough, a user might become eligible to take a seat on an adjudication panel, just as a highly enthusiastic Linux coder might one day be made one of Linus Torvalds's lieutenants, and have a material impact on the direction that Linux takes. Over time

such a site could subtly but powerfully change the culture of the media and, through it, of government and politics.

Open newspapers

Newspapers are beginning to experiment with open source. OhmyNews in South Korea is the best known example, and played an important part in the election of the current president and his successful defeat of an attempted impeachment. It draws on some 50,000 contributors, while maintaining central editorial control.

Within existing newspapers open source methods could eat in section by section. One of the odder parts of modern newspapers is the restaurant review, sometimes about a single restaurant reviewed by a single critic, which will almost certainly be far away from the great majority of readers (and usually well beyond their price range). It is easy to imagine newspapers deciding that this function could be delivered both more cheaply and more attractively for readers by creating an open system for restaurant reviews. These already exist on non-newspaper websites, and they are already highly popular among web users (as measured by Google rankings) for most restaurant review search queries.[29] Travel pages and arts reviews could quickly move in the same direction.

While the problem of minority capture means that parts of the paper like the front page are unlikely to become affected by open source approaches, there are many functions that newspapers fulfil which may translate well.

Open neighbourhood news media

The lack of highly local media is a notable gap in the UK. A potential model for filling this gap would be open systems which make the collection and sharing of local news extremely easy. There are already thousands of local community websites around the UK, but they are normally not what we would consider open because they offer few facilities for local people to instantly create and share information about local happenings.

The roles that such community sites could play are numerous, and

are already seen in sites such as UKVillages.co.uk. These already gather local news, comments, run discussion groups and help with mutual support (for example babysitting circles). By and large, news can be added by anyone (without pre-vetting); there is normally some clear leadership.

The challenges for open approaches to local news include a lack of interoperability between current local systems, the lack of well-known brands, and the lack of highly usable, freely available software platforms with a geographic dimension to adding public data.

Public sector
Open legislation

Many governments have moved towards the use of pre-legislative scrutiny as a tool to improve the drafting of legislation. Laws are already published in draft on the web, mainly so that experts can discuss and comment on them (although all too often they are published in such obscure ways that they may as well never have been put online). There is clear potential for breaking down the barrier between publishing legislation and debating it through the use of open systems. TheyWorkForYou.com, the volunteer built, publicly annotatable version of the UK parliamentary record is by far the best pointer to how powerful this approach could be. A few other nascent projects of this kind (like TalkEuro.com) are under development, but thus far none by state institutions.

A collaborative system needn't be a complete free-for-all – contributions could be categorised, allowing citizens, academics, judges, politicians and so on to comment and have their contributions clearly marked. If it were to achieve sufficient scale and legitimacy, one can even imagine parliamentary processes being adapted to make consideration of the contributions via the open system obligatory before a vote was permitted to take place.

A parallel innovation could apply open principles to by-laws. By-laws are very local rules, that are usually determined by local elected bodies. With very high levels of internet penetration it is entirely conceivable that these could evolve in a semi-open source way,

enabling anyone living in the area to propose changes, and subject to structured discussion, amendment and voting protocols, to have new by-laws agreed. As with many kinds of very local democracy there would need to be some backstop powers to prevent abuse, discrimination or rules that directly threatened the competence of higher level bodies. But there is no inherent reason why these very local rules could not be opened up to popular ownership.

Open public learning collaboratives

The public sector has been experimenting in recent years with new ways of organising learning. A good example has been the health service collaboratives. The heart disease collaborative, for example, notionally brings together the 50,000 or so people working on heart disease throughout the NHS (and beyond as well). The original idea was to bring groups of people from different parts of the system for regular conferences backed up by websites collating recent research and good practice. Some of these proved very effective both at sharing information and motivating people. But no-one has quite cracked how to give sufficient incentive to the front-line staff or managers who may come up with a radical idea to improve treatments (or for that matter to cut costs). A public open source collaborative that went a stage further might work like this:

○   It would provide an entirely open space on the web for ideas, and potential improvements in, for example, health service, training, policing or social care.
○   There would be no limits on who could contribute.
○   Peer review and feedback loops would be central to any collaboration and would involve feedback not only from professionals and researchers but also from practitioners and users.
○   There would be visible recognition and sometimes reward for ideas that are widely taken up.

Some of the infrastructure for these kinds of collaboration already

exists. For example the recently launched Teachers TV channel could, in combination with other web-based communities, act as an interactive directory for observation and exchange. Networks of schools, subject associations and academic institutions all potentially have an interest in joining and supporting open collaboratives, as long as the focus of problem-solving is sufficiently relevant and the interfaces used for communication and exchange relatively easy to operate.

Going in this direction would involve some major practical issues, in particular in relation to incentives and the cultures of professional development and cooperation.

Law

Open law

Knowledge about the law was in the past shared through publications, professional networks and legal training. Legal databases such as Lexis have existed for two decades, but traditionally they have been extremely expensive, as well as requiring a great deal of training for the user to be able to extract any value from them. In many areas of law, including civil and criminal law (rather than commercial law) the complex knowledge about patterns of cases, likely judgments and interpretations of the law is not organised in ways that are either very efficient or very useable.

Where there is a widespread need for information traditionally only accessible by restricted groups of users, open projects can and do flourish. This suggests that the legal world is highly likely to see the creation of open knowledge projects, built using open team working.

Indeed, the first have already started to appear, albeit dealing with relatively niche legal issues. Groklaw.net and the Openlaw projects have been running for two years already.[30] A more wide-reaching approach can be seen in the nascent Australian Law Wikipedia project, trying to create a truly broad and deep database of Australian law.[31]

An interesting and perhaps decisive question for the legal world will be whether the open knowledge systems grow with the help of

the professional legal world, or despite it.

Academia

Open review in academia

Peer review is at the heart of both academic practice and successful open source projects. Both produce results that tend to be of higher quality than non-peer-reviewed work but the differences between the two types of peer review are striking.

Peer review in academia is usually the gateway to publication in a journal – peer review is a one-off test; publication is the reward. In open source, peer review is a continual process – a piece of code is submitted, and it may or may not be reviewed by a gatekeeper. Whether or not it is, it is still always available immediately for anyone to try installing and testing. Instead of the project leaders or lieutenants controlling whether the code has any chance of seeing the light of day, they can merely decide whether to include it in their own approved version of the software. And if it is a useful piece of code and they choose not to use it, it may well become widely used regardless of their decision. In short, not only do gatekeepers exist less often than in the world of journals, but where they do exist they are much less powerful.

The rewards for making peer review gatekeepers less powerful can be striking. Wikipedia's predecessor Nupedia tried to peer review each entry, and ended up struggling to attract critical mass. When Wikipedia lowered the barriers to authorship, the usefulness of the site rose massively, but the guarantee of quality of each article vanished. The debate about the trade-off between rigour and usefulness is just starting, and will probably haunt the internet and academic communities for many years to come.

What we can say with some confidence is that it would be well worth some universities experimenting in opening up their peer review processes in a Wikipedia fashion. Such open knowledge peer review systems would take unreviewed work, and publish it online in formats that were easy to comment on, and entirely open to the public.

The online version of the *Diary of Samuel Pepys*[32] is an extant

example of how this can work. Every day it publishes a new day of the diary online, and a dedicated community of fans and experts annotate the text, discuss its meaning, and generally add context. This shows a wholly new way of experts and amateurs working together daily to analyse and discuss aspects of this historically significant journal.

There is no reason why such joint annotation and discussion should not happen across a wide range of documents and research programmes. This would break the model of peer review (where one anonymous academic makes a full critique before sending it back), but enhance it at the same time.

It is not hard to imagine many areas of academic life which could return closer to the pre-twentieth-century norm where there was no firm barrier between professional paid academics and independent scholars and thinkers. There are certainly many areas of economics, history and computing where much of the most advanced thinking does not take place in formally academic institutions.

One possible evolution of the Research Assessment Exercise (the peer review system which determines the allocation of a large proportion of academic research monies in the UK) would be for it to become a partially open knowledge and open discussion system, allowing for continuing comment on academic work both by peers within universities and by other experts and users outside.

This sort of 'triangulation' – which enables a community of third parties to contribute to the dialogue between a profession and its funders – has great potential in many fields, and could be a considerable advance on the closed and secretive system of peer review.

In relation to academia there is another crucial point. In the past, academic journals provided the best way to disseminate work. Today they have become a barrier. As any user of Google Scholar soon discovers most work produced in public universities has to be paid for by ordinary citizens – often at very high rates in comparison with other information. These prices primarily exist to cover the direct publishing costs of journals. Yet in a web era academic journals have

become largely obsolete – articles are searched for by search engines not by journal title, and peer review can be organised in many ways other than through a journal. We expect that within a few years it may become a rule that all publicly funded research should be made available to all, free of charge, on the web.

Arts

Open walls

There are many possible applications of open methods in the arts: collaborative composition of all kinds is now taking off over the web, helped in some cases by the more flexible legal provisions of Creative Commons licences pioneered by Lawrence Lessig and his colleagues. Another emerging application is the idea of 'open walls': large screens in public spaces which can be accessed, adapted and shaped by the public according to simple rules. These open walls would adopt some of the principles of speakers' corners or 'democracy walls' but adapted to the electronic era, providing a space for a city to speak to itself unmediated by professional writers and journalists.

Health

Open mutual help groups

The world of health has been transformed in recent years by two trends. One has been the growing availability of online information about diseases, conditions and treatments, which has made patients much less dependent on doctors. The other has been the growth of self-help groups, often organised around particular conditions. The next stage in the evolution of these two trends will be for webspaces to systematically bring together people facing similar health problems, using open principles to validate a wider range of types of knowledge, so that the experience of having been through a mastectomy or chronic alcoholism would become as valuable as the professional knowledge of a trained doctor.

Finance

Open mutual and venture funds

The combination of advanced network technologies and finance is making possible some radical new models for funding projects and for organising companies. Many countries have long experience of mutual credit organisations which depend on knowledge within a network to assess investment possibilities. A model that would take these ideas a stage further would involve commitments of money by members of a community who would then use open discussion techniques to decide how to spend it, including appraisal of investment possibilities, development of those possibilities, and then commitment. These models would not be wholly open: membership would depend on commitment of money – either a community of investors or a community of small firms in the same sector (the model used in many of Italy's most successful industries). However, many of the other elements of open source would apply.

Variants of this idea are beginning to emerge around some social enterprises. Shareholders in these enterprises tend to want a combination of commercial returns and social impacts; defining this balance tends to draw them into the company's strategic decisions far more than in pure for-profit organisations.

Social innovation

mySociety

For the last five years a small group of British volunteers has been building various civic and social websites including the multi-award-winning FaxYourMP.com and TheyWorkForYou.com. Some of these sites (the former, for example) are open knowledge systems, and all have been developed as open team working.

Founded by one of the authors of this pamphlet, mySociety is a charitable project which has emerged from this community, with the goal of building sites which deliver simple, tangible benefits to the civic and social sides of people's lives. It operates an open team working model of software development, releases code under open

source licences, and is building some open knowledge sites, for example PledgeBank.com, and some open discussion ones, for example NotApathetic.com. mySociety is an interesting model in relation to social innovation because it shows the power of using open knowledge tools to gather project ideas, and open discussion tools to vet and improve project specifications.

The benefits from this combination of approaches have been numerous. mySociety was able to start with a high calibre of project proposals thanks to wide public engagement. It is able to minimise costs through virtual open team working with no fixed office costs and a high level of volunteerism mixed in with public funding. It uses open source software, which helps keep costs down, and delivers projects it hopes will flourish based on their open knowledge approaches.

The Launchpad

The social innovation collaborative being developed by the Young Foundation applies these principles in the field of social enterprise. In the past the Young Foundation's predecessor, the Institute of Community Studies, used methods which are quite like those of open source. Under Michael Young, its modus operandi involved research and conversations which uncovered unmet needs – for example the lack of opportunities to go to university for working-class East Londoners, the absence of appropriate funerals for ethnic minorities, or the lack of representation for grandparents. Michael Young and his collaborators would then develop a possible organisational solution to this need and broadcast it – sometimes through newspaper articles, sometimes through letter-writing campaigns and the like – in order to bring together a community of interest to develop the idea. Then potential leaders were identified, finance was sought, and buildings were provided until a new organisation could be launched.

The advent of the web makes it possible to formalise some of these processes by:

○   using wikis and other database driven, annotatable

> websites to bring together research on changing patterns
> of need
>
> ○ developing possible organisational models
> ○ involving widely dispersed interested groups ranging from
>   experts to members of the public
> ○ mobilising support.

The Launchpad has been developed by the Young Foundation to take forward these older methods of social innovation in the somewhat different environment of the twenty-first century. Initially, it will not use all of the open source principles, though it will use many of them. In particular there are practical difficulties in the way of using a licensing regime for intellectual property. The legal protection of business models is in its infancy (it is recognised in the US but not in Europe), and the cost barriers to protecting ideas, as well as the ambiguities likely in any application of a new idea, are probably prohibitive. But a possible evolution of this concept would involve the formal licensing of business ideas, making models available for use by any non-profit or for-profit organisation but requiring that any future evolution was put back into the pool in some way rather than treated as proprietary.

6. Conclusion

The examples listed above range from the highly speculative to the immediately deliverable. Some, such as the need to try radical new approaches to peer review in universities, should be trialled immediately. Importantly, all of these new applications have some shared qualities: they are all forms of open knowledge, open team working, and/or open conversation approaches. We believe that this new triumvirate of categories adds a useful lens through which to examine the often complex proliferation of new methods, few of which have to be run on actual open source code.

All of the methods described share the characteristic of being tools, rather than ends: tools for the evolution of useful things, to use Henry Petroski's resonant phrase.[33] They make the process of evolution quicker, and potentially share the benefits more widely.

Perhaps their fundamental property is that they give people back forms of power that they have either lost, or never had. They make things – like the law, the media and processes of social change into common properties, and they make social interaction explicit.

What is needed is a period of experiment and argument: finding out what works, finding out more about comparative advantages and limits, and trying to define more precisely a new nomenclature for the organisational forms of the twenty-first century, rather than labelling them all blandly as open source, simultaneously confusing potential beneficiaries and infuriating the coding community.

The systematic testing out of new open models will be an important shared theme in the work of the Young Foundation and of Demos as we play our parts in the broader process whereby innovation is being opened up and to an extent democratised.

For existing organisations the issue will be how to respond: some will face intense competition from new and impossibly agile competitors; others may completely convert to open methods; others may absorb aspects of open knowledge and teams within what are otherwise traditional structures. In this respect the impact of open methods may mirror the impact of the internet and the rise of a networked economy. None of these has been quite the revolutionary democratising tool that their proponents hoped: old power structures didn't crumble and many parts of the old economy and old society proved adept at using the new tools for their own ends.

But as anyone living in 2005 knows, the tone of daily life and the fabric of social interaction has changed irreversibly, and just as it is now impossible to think about getting things done without at least considering the role that could be played by the internet, so will it soon be impossible to think about how to solve a large social problem without at least considering the role of methods originally and unintentionally pioneered by volunteer programmers just trying to build a better program.

Annex 1 Defining open source

Open source software is software where the 'source code' is made available to all. Access to the source code of a computer program allows alteration of it so that anyone can make improvements. This software is released under an open source licence requiring users in turn to allow free access to the source code for any alterations they may make, and so avoiding appropriation. Open source does not mean free.[34] It is possible to charge for software and release it under an open source licence, but anyone else is able to do the same. Open source licences are those that qualify under the 'open source definition'[35] and are approved by the open source Initiative (OSI).[36] OSI licences are now generally accepted as the standard for the open source movement. The precise licence used may vary and the OSI approves over 30 different licences.[37]

Free Software licences are those approved by the Free Software Foundation,[38] started by Richard Stallman (or RMS), who is considered the founder of the open source movement. These licences differ from those approved by OSI in that they are 'viral'. This means that they require all code bundled with open source software to also be open source. The OSI open source definition specifically prohibits placing such conditions on software distributed with open source software and only requires that the source code be made easily available. Some of the OSI approved licences (the Berkeley System Distribution (BSD)[39] and Apache Licences[40]) allow programmers to

privatise their modifications, and sell them without distributing the source code.

The success of the open source software movement is partly a result of the innovative licensing system. Drawing on the 'open source definition', seven key principles of open source software licence can be identified. All these principles are legally enforceable.[41] Although users and programmers may be ideologically motivated or otherwise incentivised to adhere to them they are not optional for those who wish to use open source software. The licence creates an incentive structure within which open source programmers act. Without this legal framework it is very unlikely that the open source movement, or something comparable, would have been so successful.[42] The core principles of open source licences are:

- transparency
- non-appropriation
- return of derivatives
- non-discrimination
- open input
- credit
- non-revocability.

Transparency means that the source code is freely accessible. In the case of open source software this is the source code and binary. Freely accessible does not mean free but simply that everyone should have the freedom to access the source code.

Non-appropriation means that the source code cannot be appropriated for the sole use of one individual or group. Proxy methods (eg technology bias) cannot be used to appropriate the source code.

Return of derivatives means that derivatives of the source code must be made available on the same basis as the original source code. However, in the case of a minority of licence varieties derivatives can be appropriated.

Non-discrimination means that access to the source code should be on an equal basis to all with no discrimination between groups or ends.

Open input means that everyone should be able to alter the source code as they wish, so long as they act within the terms of the licence.

Credit means that those who have contributed to the development of the source code must be acknowledged.

Non-revocability means that the licence cannot be revoked after software has first been released (although individual users may have their licence revoked if they break the licence terms). Non-revocability also means that developers can make investments while being sure that their right to use a program cannot be withdrawn in the future.

Annex 2 Open source examples

Linux is the operating system that was developed by Linus Torvalds. He posted a request for help with improving his program on an email list and made the code available on the internet. He received a huge response and incorporated changes into the so-called 'Linux Kernel'. Linux use has been growing ever since and in December 2004 an IDC report indicated that Linux was expected to register a 26 per cent compound annual growth rate over five years, reaching US$35.7 billion by 2008.[43] Although anyone can alter the Linux kernel to suit their needs there is a centralised aspect to the development process. Linus Torvalds, as a trusted developer, oversees suggested changes to the Linux kernel and releases Linux updates containing those that he approves of. Due to Linus Torvald's reputation and access to information (in the form of suggested improvements from programmers) this version of Linux becomes the *de facto* standard.

Apache is an http server based on that originally used by the National Center for Supercomputing Application (NCSA). It now comprises over 67 per cent of the internet server market, more than competing proprietary products produced by Netscape and Microsoft.[44] The development method for Apache differs from that for Linux in that it is more consensual. The Apache Software Foundation (ASF) oversees the Apache project and comprises 800 'committers'. Committers have access to the code repository and have signed a licence agreement. Changes to Apache are generally made on the basis of consensus but there is also a voting process that applies when there are substantial differences of opinion. Usually only members of the Project

Management Committee (PMC) can vote. Voting is by majority except where code modifications are concerned, when all PMC members have a veto. Members are selected on the basis of contributions made to the project. The ASF believe that this represents a meritocratic system for software development. Although there is an element of central control this method is far more open than that used to develop Linux.

The Apache example is instructive as it is a case in which those collaborating were users aiming to solve problems that they themselves faced. The initial set of contributors comprised, in the main, system administrators who were frustrated with the staff at NCSA's reluctance to respond to suggested changes to the source code. They decided to collaborate independently of NCSA to solve the problems they were struggling with on the systems they ran, and so developed Apache. Due to the closed nature of the NCSA, and the lack of adequate feedback loops, the project forked.

SendMail, a program designed to reconcile networks using different communication protocols, was developed by Eric Allman in the late 1970s. It still runs on 42 per cent of the world's email servers, despite being in a heavily competitive market.

OpenOffice.org includes more than 20 public projects and has been downloaded at least 720,000 times.[45] As the name suggests it aims to develop an open source Office Suite. The source code used for OpenOffice.org originates from StarOffice, an office suite that was made open source by Sun Microsystems. The current version of OpenOffice.org offers desktop applications similar to Microsoft Office, such as word processing, spreadsheet and drawing programs. OpenOffice.org is governed by an elected body named the community council. Individual projects are largely self-governing although the community council may interfere to settle disputes.

Firefox is an open source web browser that claims more than eight million users[46] and is considered to be more secure than its main

competitor, Internet Explorer. The Firefox source code was donated by Sun Microsystems and is a development of Netscape. Firefox is supported by Spread Firefox, a community of 35,000 that aims to publicise Firefox and expand its user base. Spread Firefox recently raised US$250,000 through donations to buy an advert in the *New York Times*.[47] Spread Firefox has the feel of a political campaigning website, except that instead it aims to promote a piece of software. Supporters can buy Firefox t-shirts, join a rapid response press team or become a college rep. Websites that 'affiliate' by linking to the Firefox website benefit if they direct enough people to the Firefox website by being featured on the Firefox homepage. Firefox has used fundraising techniques to fund improvements in certain areas of the program. For example, it is using donations to run a 'Security Bug Bounty Program' where those who find security bugs receive US$500 dollars.[48] This indicates that Firefox recognises the importance of incentive structures to its success.

Annex 3 Other examples of open methods

Biosciences

New methods of cooperation and information sharing in the biosciences are being used and developed. The application of methods based on open source principles is still in its infancy. Bioscience 'open' cooperation currently tends to fall into five categories:

- collaboration by industry in areas considered to be pre-competitive
- use of distributed software to aid research
- research areas where markets are insufficient to interest commercially funded research
- research areas where it is considered that commercial research would lead to the extraction of unfair rents
- to place and maintain publicly funded research in the public sphere, generally in areas considered to be pre-competitive.

The bioscience community is currently in the process of mapping out the use of open source-based methods in its field of research. Janet Elizabeth Hope, at the Australian National University of Canberra, is currently working on a doctorate exploring the applicability of such methods to biotechnology. She believes that such methods may help

mitigate the so-called 'tragedy of the anti-commons'. This is the result of fragmented ownership of complementary intellectual assets and the high transaction costs of exchanging such assets. She believes that such structural problems mean that barriers to entry are raised, incentives to innovate reduced, especially towards small markets (or by small players such as developing countries).

Public–private partnerships (PPPs) based on the concept of 'Virtual Pharmaceutical Companies' (or 'Virtual Pharma') are increasingly being used as a mechanism to organise drug discovery. Examples include the Medicines for Malaria Venture (MMV), the Global Alliance for TB Drug Development (TB Alliance) and the Institute of One World Health (IOWH). Virtual Pharma does little or no development in-house but develops possible drug candidates through agreements with partners (academic, commercial, government and non-profit). Although barriers to entry are still high, in comparison with open source software, they are relatively low in relation to proprietary biochemical research. By operating in the public domain PPPs can minimise the cost of purchasing intellectual property rights or patenting discoveries. The 'Virtual Pharma' dealt with here is the Drugs for Neglected Diseases Initiative (DNDi) because it is most focused on placing research in the public domain.

The Drugs for Neglected Diseases Initiative (DNDi) is a collaborative not-for-profit organisation comprised of Médecins Sans Frontières, five research institutions[49] and the Tropical Disease Initiative (TDI). DNDi hopes to move drugs stuck in the drug development pipeline through it and into production. DNDi does not itself conduct research but stimulates and coordinates research activity, and manages drug development projects. It is estimated that by 2014 DNDi will have registered six to eight new drugs.

The 'open source drug discovery' practised by DNDi aims to combat two major problems facing world health. The first is market failures due to either patients having limited purchasing power or potential drugs being out of patent. Patients may have limited purchasing power due to being very few or very poor. In both cases

the private pharmaceutical industry has little incentive to invest in R&D when it is unlikely to reap returns sufficient to cover costs. Between 1979 and 1999 only 1 per cent of chemical entities marketed were for tropical diseases and tuberculosis, despite these diseases accounting for 11.4 per cent of the global disease burden.[50] Of these drugs less than a third (0.3 per cent of chemical entities marketed or four of the drugs) may be considered the direct result of R&D by the pharmaceutical industry.[51] The other drugs are updated versions of previous products and the result of military or veterinary research. The second problem faced by those suffering 'rare' or 'neglected' diseases is that even where drugs have been developed they may not be able to access them due to prohibitive price or lack of production. As an indication of resource differences between developed and developing countries, public health spending in OECD countries amounts to around $239 per head per annum, while most developing countries spend less that $20 per head per annum.[52] The World Health Organization (WHO) has made reducing the cost of drugs and increased research into R&D key parts of its Medicines Strategy 2004–2007.[53] Additionally, the Copenhagen Consensus recently identified combating HIV/AIDS as the world's top priority, with combating malaria as the fourth.[54]

Open source methods are being suggested as one way of dealing with this 'innovation deficit'. Other possible methods are based on altering the costs, risks and returns that pharmaceutical companies can expect as a result of investing in research or increased regulation requiring pharmaceuticals to conduct certain research activity. The UK's recent pre-commitment for vaccines is an example of how government can intervene in reshaping the market through both push and pull. Push factors are those that reduce the cost of R&D while pull factors are those that address the lack of a viable market. A 'push' factor would be a public subsidy of R&D (eg through tax credits or basic research) and a pull factor would be a purchase pre-commitment.[55] One concrete example of a pull factor is the US Orphan Drug Act, which gives market exclusivity for rare diseases in the US. Whether strengthened intellectual property rights will result

in increased innovation is questionable. In the 1980s and 1990s the effective patent life of drugs was extended by six years as a result of 'patent term restoration' but innovation did not increase. Further, even if patent protection is strengthened it is unlikely to spur increased R&D by the pharmaceutical industry because a market will still be lacking due to the low purchasing power of patients in the developing world.

Besides increasing drug development, open source methods also aim to reduce the price of drugs by releasing drugs on an 'open source' basis meaning that no producer can command monopoly profits. Other methods of reducing drug prices centre around differential pricing, compulsory or voluntary licensing and parallel importing.

DNDi currently has nine projects in its portfolio aimed at treating visceral leishmaniasis, sleeping sickness, Chagas disease and malaria.[56] It will build a network of contracted collaborators according to specific project needs, and collaborate with partners including:

- ○ public and academic research institutions
- ○ governments of disease-endemic countries
- ○ individual pharmaceutical and biotechnology companies
- ○ NGOs, foundations and other actors involved in R&D and/or advocacy for neglected diseases.

Although DNDi will deal with intellectual property rights on a case-by-case basis the aspiration is for rights to drugs developed by DNDi to be treated as a public good. In some cases DNDi will patent drugs in order to prevent appropriation by the pharmaceutical industry, raise income or gain bargaining power. However, DNDi believes that patenting will likely be the exception rather than the rule. DNDi plan to base patenting decisions on the pursuit of equitable access to DNDi outputs for those patients who need them. Where DNDi obtains the rights to license the general policy will be to grant non-exclusive licences for targeted indications.[57]

The SNP Consortium Ltd is a non-profit foundation organised for the purpose of providing public genomic data. Its initial mission was to develop up to 300,000 single nucleotide polymorphisms (SNPs) distributed evenly throughout the human genome and to make the information related to these SNPs available to the public without intellectual property restrictions. SNPs are common DNA sequence variations among individuals and have great significance for biomedical research. The project started in April 1999 and was expected to continue until the end of 2001. Eventually, many more SNPs, 1.5 million in total, were discovered than was originally planned. Members of the consortium include the Wellcome Trust and 11 pharmaceutical and technology companies. Additional members can join the consortium, so long as they make a financial contribution equal to other members. The research is carried out on a contracted basis by research institutions and members gain no advantage in terms of access to the data gathered.

The SNP Consortium came into being because a number of pharmaceutical companies and the Wellcome Trust recognised the potential benefit to biomedical research of a widely accepted, high-quality, extensive, and publicly available SNP map. The rationale for companies coming together to work on SNPs was that even if SNPs contribute as expected, it will only be very early in the product development pipeline. The consortium members recognise the contribution of a SNP map as a pre-competitive research tool. This, and the belief that a freely available SNP map will spark innovative and important work throughout the research community, resulted in the conclusion that the resource should be publicly available.

The Alliance for Cell Signaling (AfCS) performs comprehensive experimental analyses of selected signalling systems and provides resulting data to the research community. It does this via the Data Center of the Signaling Gateway, a website run with the Nature Publishing Group. Data is provided as soon as individual experiments have been replicated and is available for any purpose without

obligation. The AfCS currently has around 800 members. These members are chosen for their expertise about specific molecules, and their job is to be authors of Molecule Pages – the core elements of the Molecule Page database.

The Intel-United Devices Cancer Research Project is run by Oxford University using distributed software to analyse proteins determined to be possible targets for cancer therapy. The software identifies molecules that interact with these proteins, and determines which molecular candidates have a high likelihood of being developed into a drug. Members of the public can download the software from a website and set it up as a screensaver on their computer. When in screensaver mode the computer analyses the molecules and then sends results back the next time participants connect to the internet (it will also collect new data for analysis). The intellectual property rights to the results of the study belong to Oxford University.

The Tropical Disease Initiative (TDI) is a suggested decentralised community-wide effort based on open source principles. The TDI would aim to exploit computation technology to drive collaboration in early phase drug discovery. Researchers are now often able to identify promising protein targets and lead compounds using only computation. TDI would be based around a website where volunteers could examine and annotate shared databases. Individual pages would focus on different aspects of drug discovery tasks and discoveries would be discussed in a chat room.

The CAMBIA BIOS Initiative aims to create a mechanism that allows collaboration under an open access regime. BioForge will be a cyberspace meeting place combining debate, 'peer co-development', 'curated and stewarded contributions' and 'public-good binding norms'. Participants will be able to use BIOS as a mechanism for collectively inventing and securing biological technology in a publicly accessible commons, protected from private appropriation but available to all. Participants will have cost-free access to any BIOS

technologies provided that they:

○ grant back to BIOS rights to any improvements made
○ collectively defend the protected commons of BIOS technologies
○ share regulatory and biosafety information with all other participants.

The Human Genome Project was a 13-year international effort to sequence the human genome coordinated by the US Department of Energy and the National Institutes of Health. The results of the sequencing were not patented and instead placed in the public domain.

The International HapMap Project is a multi-country effort to identify and catalogue genetic similarities and differences in human beings. Using the information in the HapMap, researchers will be able to find genes that affect health, disease and individual responses to medications and environmental factors. The Project is a collaboration among scientists and funding agencies from Japan, the United Kingdom, Canada, China, Nigeria and the United States. Project participants will have access to data on the same basis as all others.

All data generated by the Project will be released into the public domain. Initially data will be released under a date access policy described as 'click wrap'. It is so described because it is agreed to by users clicking on an 'I accept' button. Users must agree not to reduce others' access to the data and to share the data only with those who have made the same agreement. Once the mapping is dense enough to define regions of strong association the data will be released publicly without restriction. At the end of the project (late 2005) data not fully released will be made public. The aim of 'click wrapping' is to prevent appropriation of data and ensure access remains available to all. Where a 'specific utility' can be shown for a SNP or haplotype then patenting will be possible by other groups.

Open intelligence

Open intelligence refers to the 'collaborative gathering and analysis of information'.[58] Prominent examples include Wikipedia, a collaborative encyclopaedia, and OpenLaw,[59] a website for collaborative crafting of legal arguments. Open intelligence might comprise the sharing of information, collaborative learning and/or information filtering (often through the use of reputation systems).

OpenLaw is a project developed by the Berman Center at Harvard University. It is an experimental collaborative approach for crafting legal argument. The Berman Center is using OpenLaw to craft legal argument relating to copyright extension legislation passed by the US Congress. Anyone can register on the website and contribute to bulletin boards discussing possible legal arguments.

Wikipedia is a 'copyleft' web-based multilingual encyclopaedia and a 'wiki'. It currently hosts over one million articles in 105 languages. A 'wiki' is a website that can be edited by anybody with a few exceptions (some users can be blocked). Although Wikipedia does suffer from vandalism this is usually fixed by a self-healing system where users deal with damage resulting from vandalism. Research by IBM indicates that most vandalism is corrected extremely quickly.[60] Content on Wikipedia is released under the GNU Free Documentation Licence. In order to limit the level of disputation on Wikipedia there are a number of policies that regulate contributions. The most important of these is that articles should be written from a 'neutral point of view' (NPOV policy), meaning that all views on an issue should be fairly presented. This is an example of the use of constitutionalism to reduce the chance of factionalism. In addition to content being available under the GNU licence the software that runs Wikipedia is itself open source. As a result, rival sites using wikipedia software can be set up and one such site, **Enciclopedia Libre**, currently exists.

The success of Wikipedia is in marked contrast to its predecessor,

Nupedia. Nupedia was meant to be a 'copyleft' encyclopaedia but with an extensive peer-review system for articles prior to posting on the web. The format proved too cumbersome and only 24 articles completed the review process before Nupedia ceased operating.

The Global Ideas Bank (GIB) is a web archive of ideas for social invention. Anyone can submit an idea and it joins the bank so long as it passes criteria to prevent abuse (eg attempts to advertise products) and is not a repetition of an idea already in the GIB. Registered users can rate ideas and express interest in those they particularly support. The inventor of the idea can contact those who express interest to keep them updated on the idea or involve them in helping to implement it.

Connexions provides a framework for collaboratively developing, freely sharing and rapidly publishing scholarly content on the web.[61] Their 'Content Commons' contains educational materials ranging from primary to academic level organised in modules. All content is free to use and reuse under the Creative Commons 'attribution' licence.

The Journal of New Democratic Methods (JNDM) is a suggested web-based journal that uses a reputation system to rate both articles and reviewers.[62] Machine learning is used to understand which reviewers represent the views of journal users and so give those reviewers' opinions more credence. The website for the journal is currently at Beta testing stage.

The BBC iCan website aims to create a platform for cooperation between people to get information about and address 'issues that concern them'. Members can start campaigns on almost any issue and there are local noticeboards on which members can post. The campaign section allows those involved in a campaign to post onto a common diary and has a mechanism for the democratic running of campaigns. There are various restrictions on the use of the website. It

cannot be used for fundraising or for explicit partisan campaigning for candidates or political parties. Further, libellous content cannot be posted and personal attacks are banned meaning that iCan moderators have a fairly broad remit to remove content, especially considering the extent to which 'personal attacks' comprise part of modern political discourse. iCan is one of many examples of a model that allows individuals to pursue hobbies of intrinsic interest or in order to develop social capital.[63]

Meetup.com aims to bring together people who share common interests so that they can meet up and pursue them together. Interest groups range from knitting and Elvis to the environment. Members can join meetups that interest them and then get involved in running them. The main role of the website and associated software is to act as a mechanism by which groups vote about when and where to meet. Additional services to support groups can be bought on a commercial basis. Meetups played a role in organising support for candidates in the democratic primaries and the 2004 elections. Meetups supporting a particular candidate would be held simultaneously across the US and candidates would make videos specifically to be viewed at the Meetup house parties.

MoveOn.org was started as an online petition in response to the Monica Lewinsky affair. The petition asked the US Congress to censure Bill Clinton, drop impeachment proceedings and 'Move On'. Since then MoveOn has built electronic advocacy groups around issues such as campaign finance reform, the environment and the Iraq war. It now claims a network of 2,000,000 online activists[64] and its 'MoveOn Member Endorse' raised over US$4.6 million for individual candidates in the 2004 US elections. The MoveOn Political Action Committee, a sister organisation of MoveOn.org, raised over US$31 million,[65] most of which was spent on anti-Bush ads. During the run-up to the 2004 US elections MoveOn Voter Fund ran a competition to select an ad attacking President Bush. Over 1,000 ads were submitted for consideration. The winning ad was then shown

during the week of President Bush's 2004 State of the Union Address and released (along with other entrants to the competition) under a Creative Commons licence (allowing copying and distribution but not commercial use or derivative work).

MoveOn uses ActionForum software that allows members to propose issue priorities and strategies. After discussion among members issues that rise to the top of the priority list are adopted as campaign priorities. However, the system is not wholly democratic. The MoveOn organisers say they will 'take the initiative to organise quick action on other timely issues as they arise' and much of the campaign strategy is at their discretion.

Alliance@IBM was the result of disgruntlement among IBM workers about suggested pension cuts.[66] It has used online methods of collaboration extensively in organising and updating union methods for the twenty-first century. This approach has come to be termed 'open source unionism'. However, strictly speaking, it is not open source but uses internet-based methods for collaborative action. Such methods have allowed organisation even where workforces are geographically dispersed and among white collar workers who traditionally are not heavily unionised. One significant advantage of the internet, in terms of union organisation, is that it allows anonymity to employees wishing to organise (although this allows greater scope for infiltration). In the case of Alliance@IBM, such collaborative methods were used to organise phone and email campaigns protesting various terms of employment. Alliance@IBM uses its website to provide information and collect funds, discussion boards to build a unionised community, and email lists to maintain contact with members.

Your Party is a new British Political Party that aims to use the internet to engage with its members in policy formation and candidate selection. It is in the process of developing software to aid it in this end but so far has been using email surveys of members to make decisions. The basic idea seems to use the immediacy of the

internet to make the current representative democracy operate as a direct democracy. Elected 'Your Party' candidates would be required to vote in a manner as directed by Your Party policy, which will be decided by members.

OpenStrategy 'is a commons-based peer production system for multi-stakeholder planning, which captures and liberates the collective wisdom of all stakeholders to enable individual actions to evolve in a collaborative community framework'.[67] It uses on and offline methods to provide a new planning system to 'liberate collective wisdom'. OpenStrategy aims to provide a framework for organising information concerning community planning and the prioritisation of particular action pathways.

Friendster is a friends' connection site based on linking people with mutual friends (or friends of mutual friends). Friendster is particularly innovative because it catalyses existing social networks to build new and stronger links between people. Friendster has over five million users and was named as one of *Time Magazine*'s coolest inventions of 2003.[68]

OhmyNews is a collaborative online news service. Originally launched in Korean it now has an English version. Readers can tip contributors in recognition of their work and 'top stories' earn writers around £10. The Korean version currently has 35,000 contributors or 'citizen reporters'. Although anyone can submit a story they are subject to 'strict editorial review'.[69]

Creative Commons aims to provide flexible copyright for creative works. The 'Creative Commons Licence' allows those releasing information to choose what rights they will give users and tailor conditions to meet their requirements. There is a searchable registry of creative works. The variants of the licences endorsed by Creative Commons are:

○   **Attribution**. Others can copy, distribute, display and perform work – and derivative works based on it – but only if credit is given to the original author.

○   **Noncommercial**. Others can copy, distribute, display and perform work – and derivative works based on it – but for non-commercial purposes only.

○   **No derivative works**. Others can copy, distribute, display and perform only verbatim copies of work and not derivative works based on it.

○   **Share alike**. Others can distribute derivative works but only under a licence identical to the licence that governs your work (this can only apply to licences where derivative works are allowed).

Only the 'Share alike' licence is truly 'Copyleft' but the overall aim of the project is to extend the use of licences that are based on the principles of open source software (OSS) licencing, to new spheres.

Miscellaneous

Freenet is an anonymous peer-to-peer (P2P) file-distributed data store. Freenet pools distribute bandwidth and storage space to allow users to publish and retrieve information anonymously. The biggest area of use has been sharing of music but it can also be used for sharing other digital information such as pictures and video. Although slower than other P2P networks it allows a significant level of anonymity meaning that copyright holders have little recourse to the law. The network allows users to share copyrighted music illegally with little chance of being caught. It also allows other illegal activities such as the sharing of child pornography.

Peer-to-peer file sharing appears to lack many aspects that help make open source software successful. First, unlike OSS, it is illegal. It still works because this illegality goes with the grain of technology. Unlike in the case of software the 'source code' cannot be hidden. Second, there is little incentive for users to make music on their hard disk freely available. It is less clear how P2P overcomes the free-rider

problem. One explanation may be that the cost to a user of making their hard disk available in the broadband age may be negligible and there may be sufficient group 'ethic' to allow the system to function.

Popbitch is a weekly celebrity gossip email newsletter. It has a subscriber base of roughly 36,000,[70] many of whom contribute stories. Their website also hosts a discussion board, although it is now heavily moderated following the threat of libel action. Popbitch, prior to the threat of legal action, allowed almost unfettered exchange on its discussion boards. Much of this gossip was untrue and the ability for contributors to be largely anonymous allowed celebrities little recourse to the law (although they were able to target Popbitch itself). It is unclear what could be done if Popbitch were set up 'offshore' and out of the reach of British libel laws.

Betfair is an internet betting exchange and the UK's largest betting company. It allows individuals to offer odds and mediates bets that are taken. Betfair has won the Queen's Award for Enterprise in the innovation category and its founders won the Ernst & Young Emerging Entrepreneur of the Year Prize. Concerns exist that Betfair may aid corruption within sport by allowing lay bets (eg that a horse won't win a race). Lay bets are thought by some to make it easier to fix races. On the other hand Betfair may be useful in creating a prediction market. Studies on American elections indicate that such markets may be more accurate at predicting the election outcomes than polls[71] and therefore could have a useful role in improving the ability to predict the likelihood of future events.

eBay is an online marketplace that connects buyers and sellers. eBay estimates that it has a 'community of users' numbering 100 million.[72] A reputation system is used to rate sellers and although there have been cases of 'gaming' it is generally considered a success. Indeed, during the US presidential elections Dick Cheney asserted that the exclusion of eBay-related sales meant that true economic activity was underestimated by economic indicators.

National E-Marketplaces (NEMs)[73] are a suggested enabler for micro-businesses in service sectors such as tourism, security and storage. NEMs would allow more sophisticated methods for the purchase of time-based services than those currently available (eg classifieds), incorporate a reputation system and provide significant market information to both purchasers and suppliers. Government legislation would be required to ensure appropriate legal infrastructure (eg to create a fully automated relationship with the lower courts to allow speedy settling of disputes) and to regulate providers.

PledgeBank is a suggested mechanism for solving collective action problems. Individuals would pledge to carry out a certain action, on the condition that a certain number of others do likewise.

Notes

1   An operating system is the underlying software or foundation a computer needs to function, on top of which all other tools or programs are run. Windows is the most famous operating system in the world.

2   DA Wheeler, 'More than a gigabuck: estimating GNU/Linux's size' (30 June 2001; updated 29 July 2002), www.dwheeler.com/sloc/redhat71-v1/redhat71sloc.html (accessed 5 Apr 2005).

3   Annex 1 gives an overview of open source software and licensing arrangements; Annex 2 gives examples of open source software.

4   Annex 3 provides a full overview of these.

5   S Weber, *The Success of Open Source* (Cambridge Mass: Harvard University Press, 2004).

6   http://en.wikipedia.org/wiki/History_of_Wikipedia (accessed 5 Apr 2005).

7   http://sourceforge.net/index.php (accessed 6 Dec 2004).

8   www.opensource.org/halloween/ (accessed 5 Apr 2005).

9   E Raymond, 'Cathedral and bazaar' (2000), www.catb.org/~esr/writings/cathedral-bazaar/cathedral-bazaar/ (accessed 5 Apr 2005).

10 J Lerner and J Tirole, 'The simple economics of open source' (2000), www.hbs.edu/research/facpubs/ workingpapers/papers2/9900/00-059.pdf (accessed 5 Apr 2005).

11 K Lakhani and RG Wolf, 'Why hackers do what they do: understanding motivation and effort in free/open source software projects', MIT Sloan Working Paper No. 4425-03 (Sep 2003), http://ssrn.com/abstract=443040 (accessed 5 Apr 2005).

12 A rapid rise in the US from 350 yearly complaints to the Federal Communications Commission about television programming to over 240,000 was discovered to have been engineered 99.8% by a group called the Parents Television Council.

13 See Raymond, 'Cathedral and bazaar' on this.

14 http://en.wikipedia.org/wiki/DARPA (accessed 7 Apr 2005).

15 Orphan drug patents are explained in the Biosciences section in Annex 3.

16 'An open source shot in the arm?' *The Economist* 10 June 2004.
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20 RB Freeman and J Rogers, 'Open source unionism: beyond exclusive collective bargaining', *Working USA: the Journal of Labor and Society* 5, no 4 (2002).
21 See the Open Source Biotechnology Project: http://rsss.anu.edu.au/~janeth/home.html (accessed 6 Dec 2004).
22 www.opensourcejudaism.com (accessed 5 Apr 2005).
23 http://english.ohmynews.com/ (accessed 5 Apr 2005).
24 www.abc.net.au/science/news/stories/s999733.htm (accessed 7 Apr 2005); E von Hippel, *Democratizing Innovation* (Cambridge, Mass: MIT Press, 2005).
25 D Concar, 'Lorenzo's oil really does save lives', *NewScientist* 176, issue 2363, 5 Oct 2002, p 7.
26 http://talkeuro.com (accessed 7 Apr 2005).
27 http://forums.e-democracy.org/brighton-hove/groups/bh/messages/ view_threads (accessed 7 Apr 2005).
28 A quiet reference to Occam, one of Britain's greatest ever thinkers and a fighter against obfuscation and distortion; for further information see: http://en.wikipedia.org/wiki/William_of_Ockham (accessed 5 Apr 2005).
29 www.london-eating.co.uk/ (accessed 5 Apr 2005).
30 http://cyber.law.harvard.edu/openlaw/ (accessed 5 Apr 2005).
31 http://en.wikipedia.org/wiki/Wikipedia:WikiProject_Australian_law (accessed 7 Apr 2005).
32 www.pepysdiary.com/ (accessed 5 Apr 2005).
33 H Petroski, *The Evolution of Useful Things* (New York: Vintage, 1994).
34 R Stallman, 'What is free software?' (1996), www.gnu.org/philosophy/free-sw.html (accessed 7 Apr 2005).
35 http://opensource.org/docs/definition.php (accessed 6 Dec 2004).
36 http://opensource.org/index.php (accessed 5 Apr 2005).
37 www.opensource.org/licenses/ (accessed 5 Apr 2005).
38 www.gnu.org (accessed 5 Apr 2005).
39 http://opensource.org/licenses/bsd-license.php (accessed 6 Dec 2004).
40 http://opensource.org/licenses/apachepl.php (accessed 6 Dec 2004).
41 Although there has only so far been one test case, tried by a court in Hamburg, Germany.
42 This is not to say there would be no public domain software. There still could be incentives to freely reveal information voluntarily and a public domain software movement could still exist as a result.
43 *Worldwide Linux 2004-2008 Forecast: moving from niche to mainstream* (IDC, Dec 2004; not available online).

44   http://news.netcraft.com/archives/web_server_survey.html (accessed 5 Apr 2005).

45   www.openoffice.org/about_us/accomplishments.html (accessed 5 Apr 2005).

46   www.mozilla.org/products/firefox/ (accessed 2 Dec 2004).

47   www.spreadfirefox.com/?q=node/view/6291 (accessed 02 Dec 2004).

48   www.mozilla.org/security/bug-bounty.html (accessed 2 Dec 2004).

49   Oswaldo Cruz Foundation (Brazil), Indian Council for Medical Research, Kenya Medical Research Institute, Ministry of Health Malaysia and the Pasteur Institute (France).

50   P Trouiller, P Olliaro, E Torreele et al, 'Drug development for neglected diseases: a deficient market and a public-health policy failure', *Lancet* 359, no 9324 (2002): 2188–94.

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