

The Public Service Internet: a Blueprint for a Responsible Open and Sustainable Next-generation Internet.

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1. Introduction

There can be no doubt that the development of the Internet and the associated World Wide Web has been one of the major technical and social advances of the late twentieth and early twenty first century, fundamentally affecting society, academia and commerce at all levels. The distinguishing characteristic of the Internet is that it has people, members of the general public, at its nodes, acting as both users and generators of content and services. This has enabled the Internet to have major transformational effects on global economic and social life. To a very large extent these effects have been beneficial, providing widespread access to knowledge and information and revolutionising social and commercial behaviour in many areas. However, there are issues about the use of the Internet that concern people and governments. These concerns could, if not properly addressed, affect people's trust in the Internet and lead to unwanted or sub-optimal developments and regulation. We feel that if proper attention is given to these concerns now and moderate and appropriate reforms put in place there would be a greater chance that the Internet Would continue to develop positively and become an even greater source of innovation and benefit for people and society at large.

2. Current Internet Issues and Problems

a. Privacy and Data Loss

A major concern of people using the Internet is the trust they can have that the personal data they provide will not be misused to their disadvantage. People are discovering that a too relaxed an attitude to providing data on social network sites, intended only for friends and colleagues, can lead to it ending up in unexpected and unintended places with unforeseen and embarrassing consequences. There have also been many episodes where personal data, collected for commercial or official purposes, has been physically lost or mislaid, providing manifold opportunities for identity theft and fraud and, again, dramatically lowering the public's trust in the Internet.

Members of the general public may also be unaware of the extensive commercial use that is being made of their Internet material: personal pages, e-mails or Web click patterns, by Internet service providers, such as Google, who, in return for offering apparently free Internet services, mine this personal data and extract commercially valuable knowledge that they monetise, largely through Internet advertising. Even if people are unconcerned about this intrusion into their

privacy it could be argued that, if they were aware of the commercial value of their data, they could very well take the position that, as it is their data that created this value, they should be entitled to a share in the proceeds of its exploitation.

The fundamental characteristic of the Internet, that once data is released in an unprotected form, it cannot be recalled nor its downstream uses controlled, still sits badly with peoples' desire to use the Internet, its social networking and commercial opportunities, to the full.

b. Inappropriate Material and Rights to Access and to Publish

What material is published on the Internet and who can view it is still almost totally uncontrolled. Even the most libertarian observer must concede that some material, for example videos of beheadings, crime advice sites and certain types of pornography, are unsuitable and would be illegal if carried out under any physical jurisdiction. Similarly, certain Internet-enabled behaviours such as cyber bullying and stalking are socially undesirable but hard to control in the current regime. It is held to be a tenet of the Internet that 'the Internet is free' and that everyone has a right to access and that there should be no restriction on what people should be able to publish or what people should be able to view. Certain countries, for example, China, have attempted to restrict what their citizens can view and have made deals with ISPs or Internet operators to achieve this blocking. However, this has been only partially effective and held by many to be against the spirit of the Internet and a breach of faith by the Internet operators concerned. At the basis of much of this is the fact that people can operate anonymously on the Internet. As with many aspects of the Internet there are two sides to this. No one would argue that a blogger, living under a repressive regime, should not be able to publish his or her views anonymously but the same does not apply to a sixty year old paedophile masquerading as a teenager in a chat room.

c. Government Monitoring

The fact that using the Internet or mobile telephones now leaves a very substantial electronic trail has encouraged governments to view this as a very valuable source of information in their fight against terrorism and crime and to bring forward proposals that would require ISPs and mobile operators to store this data for long periods of time and to make it available when requested. In the UK there are currently proposals for the creation of a "Super Data Base", to hold information on the source and destination of all e-mails and mobile 'phone calls, to be maintained by a commercial agency operating for the government []. While not denying the effectiveness of such information in solving or preventing crime the fact that this information is to be recorded for everyone, guilty or innocent, has once more led to concerns about intrusion into privacy and breach of human rights. Again the electronic nature of the material on the Internet has encouraged the development of an all-encompassing behaviour that, in the physical world, would be viewed as an outrageous intrusion into personal privacy and a violation of fundamental human rights.

d. Demographics.

While it is true that the Internet is available to and used by all ages, genders and races, it is a fact that the most consistent users and the ones who view the Internet (and mobile telephony) as a natural and intrinsic part of their life are the young. This is only natural as they are the generation that grew up with the Internet and which is most likely to find the social networking and communication facilities an indispensable part of their lives. Also this is the generation that is attractive to advertisers and network operators as having the largest disposable income. Other demographics, of course, use the Internet but it is perhaps the case that they do not view it in quite the same way as a natural adjunct to and indispensable part of their lives. We believe that this is largely due to the fact that current Internet services do not address matters of concern to the elderly as much as any disinclination or inability to use the Internet. More of the elderly person's life is generally concerned with interaction with government agencies, especially the NHS, and with family rather than open social networking. Developments in these areas (see below) that would have a direct impact on the way the elderly conduct their lives and the quality of these lives could have a major impact here.

e. Business Models for Commercial Community or Peer-to-Peer Services.

It is undeniable that the Internet has evolved to be a very substantial economic arena. Enterprises such as eBay, Amazon and Google are multi-billion pound businesses and much personal entrepreneurship has been carried out, either independently or through these major oligopolistic organisations. However, this economic and commercial development has been very patchy and uneven and it is held that the Internet in general "lacks a business model". For example Google, with a ??? annual turnover, acquired YouTube in ??? for ???. However, despite marshalling a very considerable and enthusiastic community Google's accounts for ?? record that revenue for YouTube was too small to be recorded.

Many enterprises on the Internet involve social networking or peer-to-peer and file sharing activities and while it is gratifying to see how much people will participate and contribute for personal, altruistic or community reasons the Internet still lacks lightweight, easy-to use methods that support the development of commercial, paid for, peer-to-peer or community services. For example in the realm of file sharing, particularly music distribution, it is proving hard to develop methods that allow the widest discovery and dissemination of material while still rewarding the original content creators. Free system such as Napster or Bittorrent work very well for consumers while commercial DRM-based systems are considered awkward to use and against the Internet principles of free and open access. Even with the success of iTunes it is still a fact that 95% of music downloads are illegal []. If this situation were to persist there is every likelihood that copyright owners will pursue ever more draconian

attempts to sue individual downloaders or file-sharing operators with potentially damaging effects on Internet usage.

The success of the first, information, Web was based on the fact that the architectural primitives, HTML and HTTP, were simple enough that the intelligent layperson, without particular computing experience, could create and deploy personal Web pages. Web 2.0 augmented this with data sharing and social networking primitives. If we could develop similar simple primitives that would allow the creation of commercial community or peer-to-peer Internet services, supporting revenue generation and distribution, there would be every hope that the personal individual dynamic that drove Web1.0 and Web2.0 would drive the next wave of Internet development (Web3.0⁺).

f. Engagement with Public Sectors.

Much of the activities of citizens of the UK and other countries consist of interactions with what can be called the public sector: health services, education at all levels, taxation services, art galleries and museums and local and national government. The Internet has enabled many developments in these areas that have dramatically improved the efficiency and effectiveness of the citizen's interaction with these services. However, we would contend, many of these advances have been on the provider side, allowing more efficient and informed access to existing services or improved internal practices. We feel there are manifold opportunities to use Web2.0 social networking, community and data sharing mechanisms to build consumer-side communities for the constituencies of these services that would empower the citizen and provide a much broader, informed and proactive community that would eventually bring much greater involvement with and productive use of these services.

g. Law and Regulation

It is still largely the case that the Internet is terra incognita as far as law and regulation is concerned. The global reach of the Internet and the virtual nature of many of the services it provides make it difficult to legislate. Jurisdictions are generally linked to geographic, national, domains and laws to physical activities. Again, many would argue that this freedom has been essential for the Internet's success and that any attempt to legalise or regulate its activities would be counterproductive. Against this we could point to the fact that many activities on the Internet that would be illegal under any physical jurisdiction and which most people would agree should be illegal. Also organised crime is active on the Internet and many countries conduct covert spying and hostile activities on the Internet.

This lack of regulation, as ever, has two sides and there is currently no human right to have unfettered access to the Internet and, as we pointed out above, many countries try to block their citizens' access to what they regard as harmful or seditious material.

2. Who Controls the Internet?

It is a legitimate and interesting question to ask: "Who Controls the Internet?" By control we mean, not necessarily to have complete hegemony over the Internet, but to be in a position to materially affect how people use the Internet and determine what they can and cannot do.

Some people would answer "nobody" and again posit this as essential for the Internet's health and future development. Against this we would point out that certain organisations such as Google already have a dominant position on the Internet and many transactions go through them, giving them the commercial opportunities discussed above. There is every sign that Google, with Google Docs and the anticipated G-Disk, are seeking to broaden this dominance.

Another answer could be "governments". Governments have, of course, a key part to play in Internet regulation, both national and global, but we think most people would react negatively to proposals for governmental control at the level that would give them access to and control over peoples' use of the Internet.

A third answer could be "commercial organisations such as Google or Microsoft". It is clear, as we discussed above, that Google is seeking to entrench its position as "gatekeeper to the Internet" - the service most people choose to use to interact with the Internet. Such a position would, of course, convey much power and commercial advantage and it is also clear that other organisations have realised this and are manoeuvring to try and attain such a position. Microsoft's attempt to acquire Yahoo can be seen as a realisation that commercial dominance in the next-generation Internet will come through operating services and attracting as many people as possible to your service thus monetising that throughput, not via sales of monopoly protected software.

It is clear, however, that whatever organisations achieve this dominance, given the current business models; there will be a monopoly or, at least an oligopoly, of such organisations. In such a situation people may be wary of entrusting their material to organisations whose business model relies on examining this material and passing this information on to commercial third parties. As the Internet becomes, as it must, more and more a vital platform for social, commercial and political interactions, so peoples' concerns about these interactions being controlled by a commercial origination may increase.

There is a contradiction here. Many of the characteristics of the Internet, its low barriers to entry, and instant global communication, equate to those of an idealised free market and it is the case that much activity of the Internet is driven by small-scale individual enterprises. However, the role of gatekeeper to the Internet is a substantial enterprise requires large-scale investment and complex technologies that can only be provided by large sized organisations. Here the dynamic of the Internet leads to domination. The current "best" service at any

point in time is easily recognised, e.g. Google. This leads people to use the best and provide such an operator with large-scale revenues with which to entrench this domination.

The position of Internet gatekeeper is therefore a natural monopoly. This means we should think seriously about this role and how to provide it and not, necessarily, just allow events to take their course. We have much sympathy with the liberal or libertarian stand point on the Internet but the fact remains that the current Internet is not a community of equals, it is dominated by some very large and well funded oligopolistic operators and their continued or increased domination will not necessarily deliver an optimum Internet, one which provides the open, innovative, trusted and responsible platform most people seek.

There is also the possibility that governments or commercial organisations, faced with real or perceived misuses of the Internet: crime, terrorism, stalking, data loss, copyright infringements, piracy, will enact or obtain regulations or judgments that will irrevocably damage the Internet and impair its ability to support innovative and socially useful enterprises. In our view, it may be necessary to consider proper and responsible moves now, which would anyway enhance the Internet, rather than be faced with ill-thought out and damaging restrictions imposed later.

3. Trust

If we analyse the situation the key attribute that needs to be provided to ensure that maximum advantage is taken of the opportunities the Internet provides is trust. Trust, that people can be confident their data will not be stolen, misused or lost; trust, that peoples' privacy or the confidentiality of their personal information will not be unnecessarily infringed; trust, that third-party services will be reliable and do what they say they do; trust that credit cards or payments will be secure; trust that parents may require that their children are not encountering dangerous or harmful services.

Trust, of course, acts both ways. It could well be that well run services, e.g. chat rooms, could require some assurance that potential users of their service are what they say they are. Not necessarily requiring complete identification but some validation of their claimed characteristics, e.g. age.

It is our fundamental point that such deep-seated trust cannot be provided by any of the mechanisms or organisations discussed above, that there is a major opportunity for a service whose sole business model is that it will supply trust and that Public Interest organisations may have an important role to play here.

4. Public Interest Organisations

Perhaps one of Britain's most widely admired contributions to world culture and society has been the development of Public Interest institutions. These are institutions, like the BBC, that are state funded but not state controlled, nor are they commercial. Their remit is to serve the public interest as best they can.

From such a position the BBC has developed a reputation that most people trust as to the honesty and independence of its reporting.

Closely allied to notions of public interest are the ideas of consumer-side economics. Galbraith, in his influential book [], introduced the idea of countervailing power: the notion that the power of monopolistic or oligopolistic producers would, in turn, be balanced by organisations that would combine consumer interests to provide countervailing, or balancing, market power. Such consumer-side consolidation, however, has proven difficult to realise in physical markets. The Internet, however, has exactly the characteristics needed to facilitate their emergence. Indeed the success of price comparison sites such as uSwitch or confused.com is clear testimony to the practicality and attractiveness of such consumer support. What is still not clear in the current setting is how such sites can generate revenue while still retaining their independence and trustworthiness that are their *raison d'être*. The move of uSwitch from financial independence to taking a commission from services recommended and chosen to us seems to compromise their perceived independence and hence they're perceived utility or value to a consumer.

5. A Public Service Internet

We therefore propose the development of a Public Service Internet. This would be accomplished by the creation of a Public Interest service that would bundle together a series of consumer-support services that naturally complement each other and benefit from the public interest stance. The business model would be that of providing trust; all the component services would guarantee to operate in the interest of the user or consumer with no obligations or commitments to governments, beyond agreed legal requirements, or to commercial interests. We feel that opportunities exist for Public Interest organisations, such as the BBC, that currently have the required brand recognition and trusted reputation together with the necessary technology and user-base, to develop comprehensive and pioneering services in this space. This way seems the most natural, perhaps even the only, way to strike a balance between an unregulated but untrusted Internet and a secure but overregulated one.

Below we outline a series of complementary component services such a service could provide.

a. Data Archiving.

The growing availability and ubiquity of broadband presents opportunities for the development of a service to archive and safeguard peoples' data, not just desktop data and digital material; e-mail, documents digital material, music film etc, but also important personal data; health records, financial information and legal documents. This is certainly the way Google is going with Google Docs and the G-Disk and Microsoft with its Health Vault, but, as discussed above, we have concerns with their business models and their long-term attractiveness to consumers. In our model the service level agreement is simple: "we will

endeavour to keep your data as secure as possible and only use it in your best interests, as decided by you". We feel that in the long-term a majority of the public could come to see the security advantages of entrusting their data to such a well provisioned service and the advantages of having ubiquitous and coherent access to this data and being able to use it, again securely, in interactions with third-party, added-value services.

b. Data and Identity Proxies and Access to Third Party Services

Technologies already exist to provide a more secure and trusted infrastructure that would enable users to make use of their data and to organise transactions with third-party services while avoiding many of the disadvantages, both social and economic, that come with unguarded use of these facilities. The question is more social and regulatory; can we provide organisational structures that would support this controlled use while retaining all the positive advantages that accrue from the current free and open nature of the Internet. Public Key Infrastructure and Authentication technologies provide means by which users could encrypt their data and control how it is to be used and enable trusted interactions with third-party services or individuals. A detailed discussion on how encryption and authorisation technologies can be used to achieve these goals is contained in [].

We would propose the principle that users own their data and do not necessarily relinquish this ownership or control when they provide this data to third parties. In "users' data" we would include not only explicitly generated data, such as personal data or Facebook profiles, but also indirectly generated data such as Web clicks or 'phone usage patterns. Users should have the right and the means to attach policies to their data such as: "For your use only do not pass on", "Must be kept encrypted", "If monetised I would like a share"!

We differentiate between inadvertent misuse or data creep and deliberate fraud. Once data is released and used it may be hard to stop positively malevolent misuse but much of public disquiet seems to arise from accidental loss (memory sticks) or from legal but unanticipated use (Google mail and Web searches data mining and monetisation, government data sharing). DRM applied to documents seems more realistic than when attached to entertainment material as the recipients have less obvious incentive to try and circumvent these protections.

Each activity in the cyberspace requires two or more entities to trust each other; thus all participating entities need to identify themselves properly to establish this trust. The Proxy Identity Server would provide protection for communicating entities. Again this obligation is two-way and need not necessarily require disclosure of full identity. For example, a responsible chat room, catering to young children, could justifiably require all users to validate their age, similarly a customer at a commercial site, if they know that there exists a legal way of finding the true identity of traders if fraud is committed, would have more confidence in using the site. In the case of NHS patient records (EPRs) we could visualise a two-way interchange: patients controlling the use of their data for, for example, medical trials and differentiating between commercial

pharmaceutical trials and basic research, and doctors releasing parts of a patient's record for his/her use external to the NHS, with rights and obligations going both ways.

Similarly in many arenas: government voting, reputation scoring, Wikipedia editing, there is a legitimate need to prevent people assuming multiple personae. Thus a token that does not disclose identity but is equivalent to all other tokens for the same individual would act in the same manner as a physical ballot card and prevent fraudulent multiple representation.

As we have observed the issue of anonymity is central to the most positive and negative aspects of the Internet. A controlled approach to identity (or characteristics) disclosure would enable this issue to be finessed. Legitimate and reasonable uses of anonymity could still be allowed but more malevolent uses challenged or discredited.

We therefore see a major role for a Public Interest service that is neither government controlled nor commercial to provide this IDM and Proxy server and to keep the keys that reveal peoples' real identities. Again this could be a way of finessing governments' rights or desires to know what people are up to on the Internet and these people's right or desire for privacy. A legal framework could be established, governing the relationship between government and the Public Service, so that properly sworn and warranted requests for identity disclosure would have to be complied with but accumulating and analysing personal data without proper reason would be disallowed. Trust and transparency are again key.

The concept of a Public Service supporting the Internet also gives an interesting perspective on the problems pertaining to a governing law for the Internet and the question of who controls the Internet. At the moment we are considering these ideas in a UK context but they could easily be extended to the idea that cyberspace becomes an international domain, under the control and regulation of, say, the United Nations. Thus the governing laws would be international with no territorial aspect and citizens' would have universal human rights (and obligations) of access to the Internet that all countries and Internet service providers would have to respect.

c. Public Service Internet

The Web2.0 development of social networking and data sharing mechanisms has provided new and exciting ways for people to collaborate and develop thriving mutually beneficial Internet communities. We feel this model could be used to develop more productive and engaging Public Services that would carry this public involvement and empowerment into areas central to peoples' lives; healthcare, education and government.

For example community services could and should be developed for the care of suffers from chronic diseases such as diabetes. Such a service would combine

aspects of Web2.0 social networking, electronic monitoring and analysis of vital signs and two-way information exchange gateways into the official NHS GP and hospital patient information systems. In this way patients would be encouraged and empowered by association and sharing data with like individuals (Weightwatchers effect). Continual electronic measuring and monitoring of vital signs, not just blood sugar but other clinical and life-style data such as blood pressure, cholesterol, weight, diet and exercise, would enable trends and correlations to be calculated and displayed, giving patients better insights into the factors affecting their condition and helping them manage their condition better. Sophisticated analytics could be used to process this data, spot trends or associations with other patients' profiles. Such comprehensive records would provide doctors and clinicians with continuous and accurate records of patients' blood glucose and other measurements, making it easier for them to discuss their diabetes management and monitor treatment.

We firmly believe that, properly developed and deployed, such services would provide many benefits, both in improvements in the health, well-being and quality of life of individuals and also in increases in the effectiveness and productivity of the Health Service and its various agencies.

We note that Google is intending to extend Google Health to allow people to share their medical records and personal health information with trusted family members, friends, and doctors in their care network. This is, of course, a positive development but again we would suggest that, in the long-term, people may be unwilling to make their health information available through a commercial company and the UK, with its unified public National Health Service, is better placed to develop a comprehensive, integrated and socially inclusive service.

We envisage that such a service could be a forerunner of any number of community/public services that extend public services or government agencies into the community via the Internet. For example, still in healthcare, we could envisage communities for a range of chronic conditions; PCT/patient communities or PCT-PCT shared data communities. With the advent of Polyclinics Internet doctor/patient communities could help restore the continuity of treatment that many feel could be lost in these new regimes. In education we could envisage teachers/parents/pupils communities developing information and inclusion mechanisms. Similarly in local and national government. In this way a hinterland would develop between the government, its agencies and the general public, again primarily designed to serve the citizens' interests, which would create an informed active and participatory citizenship. The support for such a platform and, particularly the interfaces with the official government agencies seems well-suited to a Public Interest organisation.

d. Consumer Support

One of the clearest examples of the success of consumer-side economics is the popularity and widespread use of price comparison sites such as uSwitch or

confused.com. We feel much more could be done both to extend the reach of these services and allow them to become more personalised through the availability of personal data and preferences. We envisage that these services could extend to provide comprehensive consumer support and advice across a whole range of activities and offerings. Again the business model is simple: “my advice or recommendations will be designed solely for your benefit and free of any third-party obligations or agreements”. Only with this guarantee will these services be trusted. The world and the Internet are becoming more complex and information rich. Left uncontrolled this information overload causes confusion and disquiet. A service that makes sense of this complexity and provides simple personalised advice (not information) is a requirement and would be a boon if people are going to operate effectively and harmoniously in these environments.

e. Life Planning

The model of personalised consumer advice and assistance can be extended to intelligent support across other parts of an individual’s life. The idea of the Internet Angel or Internet Life Management Service (ILMS) is to provide integrated planning and decision support covering all aspects of an individual’s activities and again shield him/her from the complexities of life but ensure that efficient use is made of the opportunities available in the way a human Personal Assistant is often able to do. The ILMS would assist individuals in organising their lives and making intelligent informed decisions, anywhere at any time. The system would combine and integrate e-mail, diary systems, project planning, mobiles and transport information to provide seamless and integrated planning and decision support.

This planning need not necessarily be restricted only to an individual’s working life. Advances in mobile technologies and collaborative working environments have undoubtedly increased worker availability and productivity, with employees now on call anywhere at anytime, and the term “Blackberry curse” has been coined to cover this phenomenon. However, this increased work productivity is very often at the expense of other aspects of an individual’s life: social, domestic and family. Rather than trying to un-invent collaborative technologies this balance could be restored by applying these same technologies to these other, equally important, aspects of an individual’s life. Thus the ILMS could be extended to incorporate information concerning an individual’s domestic and social activities and the planning activity conducted across all these components. Indeed, a user could be asked to articulate or quantify his or her goals in life and define what, for him or her, would constitute a balanced life. Stochastic optimisation techniques could then be used in the planning process to ensure that, over time, these goals were realised.

We could envisage this ‘life planning’ service also being linked to the healthcare services discussed above. Life goals would be extended to include health and life-style management and the planning system used to give ‘nudges’, in terms of suggested actions, that would, over time, contribute to the individual’s physical and mental well-being and good health.

6. Two-tier Structure?

The vision that emerges is therefore one of a National Public Service Internet: one that will provide more trust, certainty and security for its users and engage with all aspects of their lives in a more relevant, helpful and supportive manner. We have based our proposals on a UK perspective and we think the UK has much to offer in these areas but the concepts would apply to the global Internet. There would, of course, be no compulsion to use the services provided but we would hope that as more people come to see the advantages of the trusted services more people would use them. The “old” untrusted Internet would of course continue and many people, for good or bad reasons, would continue to use it. This would amount not so much to a two-tier Internet as an Internet world that more and less secure regions, very much the situation that pertains in the physical world. The hope is that the good will in the end attract users and grow in significance

7. Business Model

The key aspect of the Public Interest Internet Service is that its users would have a permanent and persistent relationship with it. Only in this way can its comprehensiveness and the personalised support be achieved. Thus the business model would be one of subscription payment (or licence fee?). The service would also broker access to third-party added-value services and perhaps take a royalty for each transaction. In this way the prime promise of independence from all other parties could be guaranteed. From such a basis a whole nexus of trusted services could be developed. We, personally, would also reject advertising as this could be seen as raising possibilities of conflicts of interest. We would also envisage that the Public Interest service would have legal or constitutional agreements with government and other public agencies, such as the NHS, to govern it and its users' interactions with the these entities.

A Simple Peer-to-Peer Method for Music Distribution Supporting Revenue Generation and Sharing

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The very nature of electronic media make them easy to distribute on the Internet but this very nature also makes it difficult to find an economic model that will, in the long-term, fund their creation and distribution. This case is particularly true for digital music.

Digital music has two essential properties that make its electronic sale particularly problematic. Firstly, in economic terms, electronic music behaves as *a public good*⁵. Thus the ease with which digital music can be copied and distributed makes it difficult for music creators or owners to prevent illegal copying or piracy. Secondly music, even when non-digital, is an *experience good*. This means that consumers generally take a while and many listenings before they know whether they like a piece of music or not and, therefore, what utility, in terms of the price they would be willing to pay, they should ascribe to it.

These two properties reinforce each other to produce reluctance on the part of consumers to pay up-front for something they may not like and an incentive to copy illegally. However, the vast popularity of free file sharing sites such as Napster, BitTorrent etc., demonstrates that the Internet is an ideal mechanism to support, at least, the discovery and distribution of music. Attempts to stop or limit piracy by DRM technology or by suing transgressors for copyright violation seem doomed to failure. Not only does DRM protection seem futile for a good that has to be played in clear to be experienced these actions go against the social and technical nature of the Internet that is, per se, a sharing and social networking infrastructure.

There are, however, other aspects of music that give it further unique characteristics. Once a piece has been experienced and found to be enjoyable it is remarkable how this pleasure is *maintained* over many years of listening. Indeed, most music fans have a set of favourite tunes that they listen to almost endlessly. Secondly, listening to music is a *social activity*. Fans group around particular genres of music and form strong affiliations with musicians and other like-minded individuals. Thirdly, music, particularly popular music, is strongly

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⁵ Economically digital goods are non-rival (consumers can make copies of digital goods and thus many consumers can enjoy the same unit of digital goods at the same time) and since they are non-rival, they are indirectly non-excludable (producers are able to exclude consumers directly but cannot prevent consumers from copying the good from other consumers).

connected with social changes or fashions and new bands or artists are being introduced or discovered continually.

We feel these latter, more positive, social aspects of music can be harnessed to provide a method for its distribution and payment that goes with the grain of social support and networking but which, nevertheless, would be capable of not only generating revenue for music producers but also provide a mechanism to enhance the social and sharing aspects of popular music culture.

The method introduced in [1] by Thierry Rayna and Ludmila Striukova, directly addresses the first problem; that music is an experience good which makes potential consumers reluctant to pay up-front for something they may not like. However, Internet experience shows that consumers are not opposed to revealing information and giving up some privacy, as long as they are rewarded for this (e.g. Google mail). Thus the Rayna and Striukova method turns DRM on its head. Rather than making it a negative mechanism to stop copying here the only requirement is for consumers to allow their music usage to be monitored and this information shared. Thus consumers can freely download any music they want to, their usage (listening patterns) is then monitored. After an agreed time, sufficient for their appreciation or utility to be evaluated, a price is struck. For items enjoyed this price is guaranteed to be not more than the “market price” that would have been paid anyway. For music not enjoyed nothing is paid – *own everything, only pay for what you like!*

As well as neatly sidestepping the experience good hurdle this method has other appealing characteristics. In most markets with a single price mechanism (no price discrimination) there are generally untapped funds that could be utilised for the benefit of producers and consumers alike. The *consumer surplus* is the money people would be prepared to pay, below market price, for items that they still assign a positive utility to and the *producer surplus* is the money producers could gain by selling goods at a price that is below market price but above the marginal cost of production. In terms of music distribution this produces a Long Tail effect – music that is still appreciated but not to the full market price can still be sold to the benefit of both producer and consumer – a mutually beneficial realisation of first-degree price discrimination. For example, large volumes of back catalogue material could be redistributed to enable fans of earlier eras to restock their music library and, at the other end of the spectrum, new bands could use this to provide an easier entry into public acceptance.

This is of particular relevance for policymakers. Maximising social welfare requires that the price of music to be equal to its cost of reproduction, so that anybody who values a song at least as much as what it costs to produce it can consume it. However, in the case of music, this means that the initial investment to create a song or album is never recovered, which is not acceptable. The traditional solution to this problem has been to artificially maintain a high price for music so to provide enough incentives to produce it. This is socially wasteful, though, as less music content is purchased and consumed: for consumers some of the songs they would otherwise consume are simply not worth the market price. This new method is the first to reconcile these two social imperatives:

maximising social welfare and providing enough profits to producers. Consumers gain because they are able to consume much more and only at a cost related to what they actually value. Producers gain because they sell much more and even if it is at a lower price, it is still profitable because the price paid by the consumer always exceeds the reproduction cost.

The beauty of this method is that it also seems to sit very nicely with Peer-to-Peer discovery and distribution methods and therefore go with the grain of Internet social community and data sharing mechanisms. An owner of a music track is in the same position as the originator. Such an owner could make his music available for discovery and download by others. In this case the same deal could be struck. In return for allowing his usage to be monitored the new user would be guaranteed that he would never pay more than his discovered utility. However, these payments could then be shared, a proportion back to the music creator but a proportion to the intermediary as a reward for his part in the music discovery and distribution process. In this way sharing and copying would become not only a socially beneficial activity but a profitable one as well.

Thus music communities could be created that would naturally marry revenue generation and revenue distribution to the positive aspects of music discovery and sharing, already well-observed in file sharing systems.

To guarantee that a positive share of any new revenue makes its way back to the music originator and to ensure that it is immaterial where a new user joins in the music distribution chains, the proportion of additional revenue accruing to new joiners will need to decrease as the total revenue grows. This has the desirable effect that it is beneficial to be an early mover and spot new talent that turns out to be popular early, again reinforcing the discovery and sharing aspects of music communities.

For music creator intending to inject material into such a community there are two parameters that they can adjust. The *pricing formula* would realise the Rayna, Striukova algorithm and show potential consumers the prices they would potentially pay (or not) and the *pass-on formula* would indicate to consumers what benefit they could hope to gain by acting as distributors of the music. New bands, hoping for discovery, could set their prices low and the pass-on share relatively high while established bands could do the reverse. In this way the Internet would directly support social and cultural interaction between musicians and their fans and between the fans themselves.

Traditionally in the music industry there have been three classes of players: the musicians or bands, their customers or fans and intermediary distribution organisations or record companies such as Sony and Warner Brothers. Indeed, the advent of electronic retailers, such as iTunes or Spotify, means that there are now often two intermediaries, the record company and the electronic retailer, between the musician and his or her fans. In the past these large, generally very profitable, organisations were deemed necessary, indeed were necessary, to support music creation and distribution. As with other physical intermediaries the Internet and modern methods of music creation have rendered these

enterprises redundant. The two fixtures that are needed to support, in the long-term, a viable music industry are simply creators and consumers. It is surely the case that, for their long-term survival, musicians need to be paid for the fruits of their talent and labour. Other, indirect, revenue generation methods, such as concerts or merchandise sales, seem laborious and only suited to popular, well-established bands. Personal appreciation has always been a feature of music and this has become more not less pronounced with the advent of Walkmans and iPlayers. Our method supports and monetises this natural mode of use. (It would also provide a mechanism to accurately record the appreciation of music, past and present, and rejuvenate music charts as a source of reliable and useful information).

As we have said our method is suited for electronic goods that have value, are experience goods and can be easily copied. Music fits these characteristics ideally. Interestingly, sister goods such as films and videos are not such a good fit, being generally not experience goods; you tend to watch a film or video all the way through before deciding whether you like it or not and do not repeatedly re-consume, even for well-liked films. However, software and computer games do have all these characteristics and it would be interesting to study the application of these methods to these sectors. Our method is basically a compromise between fixed-price selling, where you may pay for something you may not like or use, and pay-per-use, where you may end up paying a lot for something you really like and use, married to the advantages of Peer to Peer as a discovery and distribution mechanism.

There are three *roles* in our model; music creators, music consumers and a treasurer. The last, treasurer role, is needed to track music distribution and usage, to calculate revenue and shares and to organise payments. This role could be played by a third-party organisation which music creators and fans would join. However, more in keeping with the Peer-to-Peer democratic nature of this model, the music creators themselves could take charge of distributing their own music and organising the dynamic social and cultural interactions with their fan base.

References

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