Innovation, Open Standards and Democracy

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Abstract: This paper explores new dimensions of how open standards in ICT can have not only an economic impact through driving new innovation models and creating new business ecosystems but also a social impact through influencing the way European citizens are able to interact in social communities as well as with government. While there has been quite significant research and publications on open standards and innovation, the relation between open standards and democracy and the idea of "ICT civil rights" is still unexplored in a European context. Open standards policies in Europe need to take the democratic effect of open standards into account in the same way as economic effects.

1. Introduction

The breakthrough of the Internet is attributed to two main factors, the first being the fact that the industry universally agreed upon and adopted HTML, an open standard, rather than competing at this level of technology. Instead, competition takes place on top of the standard, web browsers being early examples of technologies developed to exploit HTML. The second factor, that HTML (and HTTP) are available on a strictly royalty free basis rather than as proprietary software, was an additional driver for stakeholders to develop on top of HTML rather than compete on alternative technologies. The concept of the Internet as a royalty free environment provided an early forerunner of the notion an "open standard". It was of course a crucial factor that the core Internet standards were and continue to be royalty free. This helped to create the momentum for the Internet, which was intended for uptake by the information and communications technology (ICT) industries. Had standards been subject to royalties, the new technology might not have been adopted as rapidly and competing standards might have been developed.

One of the most widely quoted definitions of an open standard [1] is from the European Commission's European Interoperability Framework (EIF), which defines an open standard as being open in terms of its development, open in maintenance, implementable by third parties and available on a royalty free basis. The question of royalties in standards is controversial, however, and also varies from industry to industry, with some being highly accepting of royalties and others increasingly as averse to adoption of standards encumbered by payment obligations. Within the ICT industry itself, most standard setting organizations (SSOs) have intellectual property rights (IPR) policies that nominally tolerate (F)RAND ((Fair)Reasonable and Non–Discriminatory) terms. However, in SSOs with a focal area on web standards and software interoperability standards a clear tendency towards a Royalty-free policy (in most cases Royalty-free on (F)RAND terms) can be

noted. Moreover, also in other areas of ICT working groups within SSOs increasingly strive to avoid including payment-encumbered patent claims to the evident range of license terms and conditions. It is therefore more useful to determine an open standard in terms of "degrees of openness" on a sliding scale between fully open and proprietary than to have a one size fits all model.

As an infrastructure based on open standards, the Internet has driven change and stimulated innovation in a manner reminiscent of how steam power fuelled the industrial revolution in the 19th Century – and how electricity brought about similar change in the 20th Century. Each enabled a services revolution, and startling arrays of new business models emerged to take advantage of these new network-enabled opportunities. Attempts to take ownership of core Internet standards by owning the browser or modifying the technology behind the browser that enable web services have so far been unsuccessful – although standards wars over what the next generation of the Internet will be based upon are already taking place. These threaten the future openness of the Internet, adding urgency to achieving consensus about what precisely "openness" should mean in this context.

2. Objectives

The Internet Governance Forum, an outgrowth of the United Nation-sponsored World Summit on the Information Society, has identified openness as one out of five priorities for "Future Internet" development, together with security, access, diversity and critical Internet resources. Having stated that objective, however, open standards policies need to address three fundamental questions:

- From a technical perspective, which technologies, or technology layer(s), should be kept open?
- From a process perspective, in which phase(s) of technology development cycle must "openness" apply? [2]
- From a civic perspective, "openness" is important – but how do you define it?

This paper attempts to answer these cross-disciplinary questions and subsequently makes several overall policy recommendations in the European context.

3. Methodology

The methodology used is case study based. Recognition that the key to the success of the Internet lies in its openness [3] and recent attempts to define open standards for interoperable government services [4] are the starting point. Further case-based observations rely on the recent ISO/IEC JTC 1 standardisation process of the OOXML Document Format.

4. Technology Description

4.1 Open Standards – but which technologies, or technology layer(s), to keep open?

The first question is which specific technologies have to be kept open in the largely complex Internet technology stack. This needs to be answered with respect to both the application and the services that the standards must inevitably both constrain as well as enable.

The recent example of document format standards, the Open Document Format (ODF) standard and Microsoft's Office Open XML (OOXML) provide an interesting example of the interplay between a proprietary de facto standard, offered for reformatting and expedited adoption by an SSO, and an open standard that, while based upon an existing software product, was extensively refined and further developed within an open standards process. It is also an example for the difficulties of a later phase move into an open

standards direction. ODF was formally accepted by the Organization for the Advancement of Structured Interoperability Standards (OASIS) as a standard in May of 2005, and was adopted by ISO/IEC in 2007, thereupon achieving the highest level of ratification for purposes of recognition as an International Standard. And, by international agreements[i] as an international standard it meets all necessary requirements for being formally recognised in the European standardisation system, as well. Microsoft responded by submitting its newly developed [5], XML-based Office format in a fast track process via Ecma International, which enjoys a Class A Liaison status with ISO. There were, however, substantial objections from ISO member countries in the first round of the approval process, not only on process and technical grounds, but on economic / social grounds as well.

Of special relevance to this paper, it was argued by many (especially in Europe and in emerging nations worldwide [6]) that with the widespread use of word processing, the high degree of commoditization which word processing software has reached, and the increasing transition of governments to providing information and services via the Internet, that restricting public access to such information and services to those purchasing proprietarily licensed software is no longer justifiable. Rather, governments should exercise their procurement power in support of approval and implementation of a standard that can be implemented on a royalty free basis, by both open source as well as proprietary software whenever possible, both for reasons of economic diligence (not wasting taxpayers' money) and on the grounds of not requiring citizens to purchase software for interacting with government, whether in interacting as a citizen, or tendering as a vendor.

The same argument applies both within national governments and on a pan-European level for G2G (Government-to-Government) communication: One government agency should not be required to purchase and install a particular vendor software for being able to collaborate and exchange information with another government agency, be it in the same country or cross-border.

Other reasons for opting for an open source / open standards model may not be necessarily based on economic considerations. The ability to change source code means that the ODF format is inherently more secure than closed source alternatives since the code can be examined and changed. This is a primary reason why the German Ministry for Foreign Affairs elected to use ODF and Linux as their standard platform for the worldwide embassy network. It is instructive to note that in response to such pressure, Microsoft has now announced that it will natively support document exchange within Office [7]. It has also, since the fall of 2005, made increasingly liberal commitments regarding the ability of independent software vendors to implement both ODF and OOXML without fear of infringement claims. Most recently (in July of 2008) it committed to permit implementation of OOXML even in software distributed under the GNU General Public License (GPL).

The increasing availability of royalty free, open standards based free and open source software (FOSS) has a positive societal impact. It is free for anyone to download. Online training materials and updates may also be free to individual users, even as full, fee-based commercial support may be available for enterprise users. This means that there is no cost for citizens to participate in important societal activities, whether these are related directly to local or national government actions such as voting by proxy or downloading and submitting income tax returns, or used for non-government purposes. Additionally the open standards based FOSS model opens up opportunities for micro and small businesses to offer services without being reliant on a large software vendor. For example, applications can be developed on top of free word processing software that are royalty bearing, either on a service basis or as licensed software. One recent example of this is the Firefox browser that has attracted a multitude of add-on developers. Rapid innovation by hundreds, if not thousands, of Independent Software Vendors (ISVs) is also proceeding rapidly in the mobile telephone and Internet device spaces, as carriers commit to open operating system

platforms that make such market participation both possible as well as mutually beneficial for carriers, ISVs and consumers alike.

The same applies for royalty free open standards that are used to enable the interaction of members of Internet-based social communities. Internet services such as Google Docs or Zoho Writer are re-defining office software as Internet services that allow multiple people to work on shared documents. Again, the documents that result from such collaborations should be freely re-usable by the author community without being locked into the data format of a single vendor or service provider, either in the long term, when they wish to reopen a document created, or even during the collaboration process itself.

Other standards are being developed which could have significance for innovation and for democracy. There has been particular concern about the implementation of content standards intended to enable "digital rights management" (DRM). That is, technology that restricts copying of content, thereby protecting authors and distributors, at the expense of preventing legitimate users from transferring music between different MP3 players and music distribution sites. Apple, an early proponent of DRM, has more recently announced that it would make music available without DRM protection.

Openness guarantees interoperability. It is, therefore, critical for all layers of technology as far as interoperability standards are concerned. It starts on the infrastructure with open standards ensuring technical interoperability, covers syntactical and semantic interoperability and, on the top layer, organisational and legal interoperability. Openness and Interoperability for the different layers are essential to preserve flexibility and choice on the users' and consumers' side; yet, they are equally essential to provide a solid and agreed base for implementers, innovators and service providers for developing competitive solutions on top, i.e. on the level of the implementation of the open standard. And with genuine openness both proprietary technology providers and the open source community have a chance to operate on equal footing.

4.2 Openness – but in which phase of the technology cycle?

The second question is in which phase of technology development – for a standard candidate – steps to ensure openness need to begin to be taken. It would be a mistake to postulate that all technology research should take place in the public domain and remain available on a royalty free basis. Similarly, it would be unnecessary to demand that all software related technologies should follow the open source model and be royalty free. Commercial opportunities as well as community zeal are both effective at driving innovation, with the former driving valuable investment in technology and technology diffusion. The economic rewards for innovation in early phases of technology development are often long delayed in receipt, necessitating license fees as a return for that investment.

Many early development paths are abandoned or forked later. Essentially, early technology development is a phase of exploration and exploitation while possibilities are still unlimited. Only once actual products are designed, taking into account real-world manufacturing, distribution, focus group, and other parameters and constraints can intelligent choices be made as among multiple available approaches, any of which might form an otherwise acceptable basis for a standard. As a result, the primary focus of early phases of technology development needs to be on preserving diversity and not needlessly constraining opportunities through early adoption of a standard that may lead to an avoidable dead-end in the marketplace. Similarly, only after the viability and implementation costs of a technology have been confirmed does it become possible to find viable business models. A standard that favours one such model over another may once again limit realizing upon the full potential of early innovation in a new technology. .

This is, however, not to say that openness does not have a strong role in early technology development. The market place is increasingly adopting methods and strategies

for open innovation. Leveraging the community approach and given the opportunities of global enterprise and business integration, industry is in the process of finding a new equilibrium between openness and proprietary, starting from the very early stages in research. So while early stage technologies clearly can and in the case of Free and Open Source Software - FOSS are developed in a fully open model, thereby ensuring diversity through the full range of contributions and community review, this is not the only worthwhile avenue. Innovation may also be supported in a proprietary way by multiple vendors or vendor teams, thereby ensuring diversity through competition. Whereas governments may choose to support selected open community developments around emerging technologies (e.g. on next generation mobile network standards) and thereby foster open standards developments at early stage, they should not do so in such a way as to restrict or discourage the continuance of proprietary developments in the early stage.

Regarding more specifically the standardisation process, openness is a key principle to be followed. Figure 1 below shows the typical development steps and phases of a standard. While for the preparation phase, i.e. the identification of a need for standardisation and the initial partnering, full openness does not necessarily have to be observed, the development phase, the moment of entering into the actual development of the technical specifications, marks the point for moving to full openness. In terms of the process, this means above all that direct participation in the standards development needs to be open for all interested parties, transparency of the entire process needs to be given, the process must not be dictated by a single party or single group of entities, and the decisions should be based on consensus. Public authorities have all rights to request this level of openness in standards development for standards they chose in support of regulation/legislation, other policies or as a base for services and products. In the public sector standards become a public good and therefore ought to be viewed in the appropriate way. Regarding the implementation, as defined by the open standards definition of the EIF 1.0, the standard should be available for free and IPRs possibly present in the standard should be available irrevocably and on a Royalty-free basis. This is a prerequisite for making the standard available for implementation in open source projects, as well, thus guaranteeing wide implementation and use of the respective open standard. Once again, this does not impact innovation or the voluntary business decision of technology providers to bring-in pieces of technology into a standard. Yet, it sets the notion of requiring an open standard as part of broader democratic principles in the light of societal needs regarding the increasing predominance of ICT technologies.
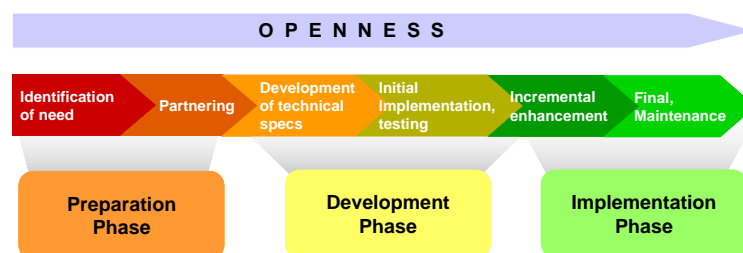

Figure 1: Development Phases in Standardisation

Returns on investment in the form of royalties or revenues from services are still an important incentive for industry to innovate and to invest in (for example) the fixed costs of providing needed fixed infrastructure. Consequently, especially in the case of technologies where other business models cannot easily lead to economic benefits or where upfront investments are significant, the proprietary model based upon royalties or other fees remains vital to healthy innovation, competition and diversity. However, as a technology becomes well established and dominant in the marketplace, governments may well conclude that there should be a public interest factor which reduces the actual "rent" that

providers can demand for the use of their technology towards zero. At this stage, basic technologies upon which society and government rely should move into the domain of public "commons". Indeed, this is the concept upon which the finite duration of patents has been based from the inception of the creation of patents themselves.
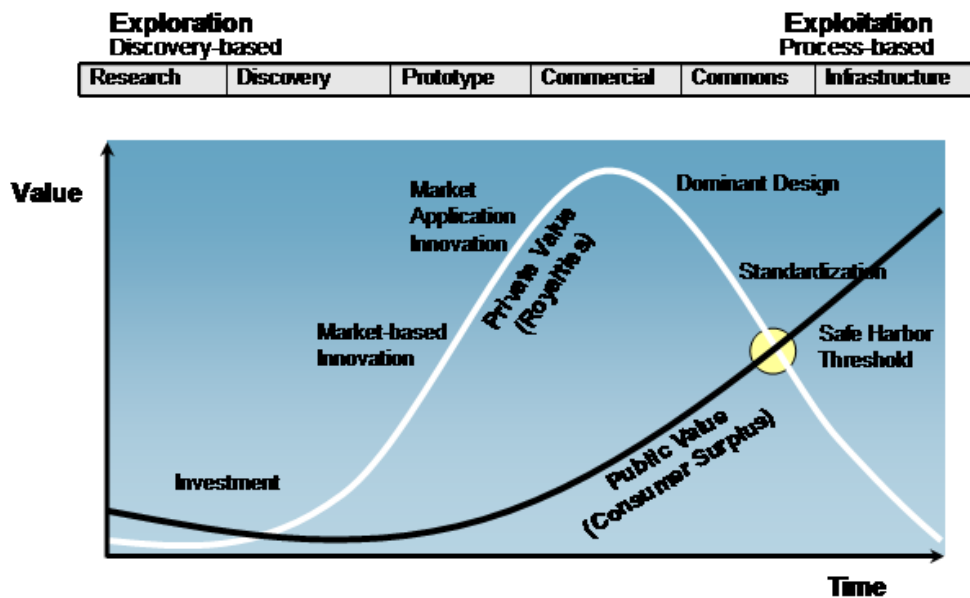

Figure 2: Optimal Markets in the Public Domain

5. Developments

5.1 *Public value of openness – but how to define it?*

This raises the question of how the public value of technology can be estimated. One way of reflecting public interest is to formulate and guarantee democratic rights. Technology and standards have become powerful tools that influence society – free expression, free access to information and civil rights are at play. As co-author Andrew Updegrove has previously observed:

> We are entering an era in which IT technology is to society as earlier very different modalities were to human rights. In this new interconnected world, virtually every civic, commercial, and expressive human activity will be fully or partially exercisable only via the Internet, the Web and the applications that are resident on, or interface with, these resources. And in the Third World, the ability to accelerate one's progress to true equality of opportunity will be mightily dependent on whether one has the financial and technical means to lay hold of this great equalizer.

> ...But as the world becomes more interconnected, more virtual, and more dependent on ICT, public policy relating to ICT will become as important, if not more, than existing policies that relate to freedom of travel (often now being replaced by virtual experiences), freedom of speech (increasingly expressed on line), freedom of access (affordable broadband or otherwise, and suited to the needs of those with physical disabilities), and freedom to create (open versus closed systems, the ability to create mashups under Creative Commons licenses, and so on).

> This is where standards enter the picture, because standards are where policy and technology touch at the most intimate level. [8]

But will the traditional standards development process be adequate to such a challenge? Sadly, the conclusion appears to be no, as once again the OOXML adoption process makes clear. On multiple occasions, those involved in that process noted that the existing *de jure* process does not regard itself as charged with responsibility for such questions, or even

with guaranteeing technical quality. Rather, its remit is limited to forming consensus around adoption of technical standards, based upon a process allowing all stakeholders to participate via locally created and administered National Bodies.

Governments, it would appear, must therefore step into this breach, because standards are a necessary part of protecting what may fairly be called "Civil ICT Rights." As noted in the same article quoted above:

> Much as a constitution or bill of rights establishes and balances the basic rights of an individual in civil society, standards codify the points where proprietary technologies touch each other, and where the passage of information is negotiated.

In this way, standards can protect - or not - the rights of the individual to fully participate in the highly technical environment into which the world is now evolving. Viviane Reding, the Commissioner for DG Information Society and Media [9], has expressed similar sentiments, explaining that:

> *"This notion of the Internet as a "public utility" must continue to be a central guiding principle as we seek to ensure that its benefits are available to all and that it is protected from capture by any particular stakeholder group, whether it is particular governments or specific private sector interests."*

As a result of the long progress of European nations towards greater unity, Europe has served as a unique test bed for integrating many types of interdisciplinary issues of which other countries are just now only becoming only dimly aware. Questions of social policy have become very important, since it is arguably not appropriate to allow market forces to dictate the future of European society. European leaders realize that technology standards have a direct impact on:

- Cultural heritage – because more and more of our cultural heritage is now stored on digital media which will not survive several generations, absent special precautions
- Access – as libraries and media content increasingly moves online, only the digitally literate will have access to this information unless the tools to provide that access are themselves affordable using available skills
- Accessibility – those who are socially or physically disadvantaged may lose their ability to access such information and services, unless such information is made available in formats implementing appropriate accessibility standards
- Privacy – owners of data risk losing their right to decide who has access to their personal information unless appropriate standards (and laws) are adopted – that they can control
- Convenience – government systems can serve the needs of bureaucrats first, or citizens. The EIF recognizes that the convenience of citizens should be paramount, and standards such as those that can provide federated identity are crucial to enabling this result.

In addition to Information Society Commissioner Reding, other European policy makers are beginning to recognise that leaving technology standards solely to market forces can lead to consumers being locked in to specific technologies and under certain circumstances, government intervention is important. EC Competition Commissioner Neelie Kroes said in a speech in Brussels in June 2008 that"

> "No citizen or company should be forced or encouraged to choose a closed technology over an open one, through a government having made that choice first. These democratic principles are important. And an argument is particularly compelling when it is supported both by democratic principles and by sound economics". [10]

What we can observe from these allied sentiments is that it is essential for us to recognize that there needs to be a transfer of democratic principles to a digital world, and that the existing standards development infrastructure has not been constructed, and cannot

be expected to deliver, this result. Nor will such a transfer naturally occur as a side effect of market forces or technology developments. It demands political intention as well as actions to ensure that the hard-won civil rights of the real world are not inadvertently sacrificed in the course of a convenience-driven conversion to digital technologies in a virtual world. Before we wholeheartedly embrace such an electronic conversion, we must first demand the careful completion of a different translation – of how public interest in the Internet can be expressed and how digital civil rights can be formulated.

According to the Internet World Stats, the Internet in 2008 reached approximately 20% of the world population. In recent study of the United Nations, mobile phones were estimated to be used by 50% of the world population in the same year. The convergence of both is ongoing – with the result that access to the Internet will quickly become equal to the majority of those living in the near future, in most cases via mobile phones and mobile Internet devices. However, whereas mobile networks are strongly regulated, the Internet is more fragile and potentially threatened in its openness and stability. This convergence offers another avenue by which governments can proactively protect the interests of their citizens, but bolstering the robustness of the Internet on these increasingly ubiquitous mobile devices. At the same time, mobile platforms are themselves becoming more open through market forces. One example of this opening process is the increasing momentum of the Open Handset Alliance that Google recently helped form, which provides both broader opportunities for innovation as well as rewards for such innovation..

Both the Internet and mobile networks are also still revealing significant digital divides and regional and social white spaces. It is crucial that governments act to narrow these divides as much as possible.

In a similar way as climate change or global energy consumption this leads to issues that can only be addressed through global collaboration and not only on a national political basis. As demonstrated above, influencing the choice and creation of open standards is one new political instrument in this context.

6. Conclusions - what to do next

The policy issues on open standards that we have been raising include the following:
- The identification of relevant open standards – from a society perspective
- The synchronization of regulatory intervention on open standards with the innovation process and technology development cycle
- The linkage to public value and the formulation of fundamental "digital ICT rights"

Clearly, though these issues are important, they can certainly not be linked to simple answers. However, we believe that these issues suggest the importance of opening three two interlinked fields of research in addition to current main stream research directions. These new areas of inquiry would explore a) the relation between open standards and open innovation, b) the relation between open standards, business models and economic effects, and c) the standards needed to ensure that vital civil rights are not prejudiced or lost in the transformation from a paper-based, face to face world to one based upon digital information and virtual interaction.

Embracing these conclusions also would demand a more multi-faceted view on how information and communication technologies are interacting with society, and not simply a traditional economic perspective. Here also mutual influence – e.g. with existing legal conditions, cultures or social networks - and the systemic effects that spring from need to be understood. As a result, the types of research suggested above into open standards policy areas will demand competences from different disciplines such as social, political, economic, legal and computer sciences.

Europe is uniquely positioned, and needs, to form inter-disciplinary research communities to address such issues – the Oxford Internet Institute is one first example from academia of such a community. The Service Research Institute at Karlsruhe University is another one that also includes a permanent industry partnership model.

One concrete way for Europe to address this is to use the new structure of the European Institute of Technology and Innovation (EIT), which will create knowledge and innovation communities from 2009 onwards on major society challenges for Europe. In the ICT domain, open standards should be one focal point. It is our hope that the questions identified in this paper can give a first hint towards priorities for this important research.

Finally, policy makers can and should become active now. For some ICT areas – and particularly those that are already in mature stages of development and that are often creating de-facto standards – a public push for open standards is needed that should begin immediately. One powerful instrument with demonstrated effectiveness in achieving such results is the exercise of public procurement. Another is public research and structural funding. And the final is the application of antitrust law. The European Union has already made impressive progress in proceeding in a coordinated fashion on all three of these fronts. Hopefully it will build upon this demonstrated competency along the lines suggested above.

References

[1] EIF is currently being revised in its second version. EIF version 2 is expected to be available late 2008. It is no surprise that the most controversial area of EIF remains the inclusion of the royalty free obligation in the definition

[2] **Error! Reference source not found.** below shows the typical phases and steps of the process of developing a standard. Figure 2 describes different phases in a typical technology research and development cycle. In the research and early development phase it is arguably too early to insist on an open standard development path since market for the standard may not yet exist. However there are important principles in research that encourage open standards development – see the Open Collaboration Principles developed by Georgetown University Kaufmann foundation in 2005, available at:

https://www.04.ibm.com/jct09002c/university/scholars/collaborativeresearch/docs/OpenCollaborationPrincipl es_2005.pdf

[3] Tim Berners-Lee

[4] IDABC EIF(European Interoperability Framework from the European Commission IDABC) published in 2004

[5] At the time, the current Microsoft office suite was still Office 2003, which, like its predecessor versions, is based upon binary formats. Office 2007 was the first product to implement OOXML in it's pre-adoption form. Microsoft has not as yet announced the release date for a version of Office that will implement OOXML as adopted by ISO/IEC JTC 1.

[6] Note, for instance, China, Brazil, India and Venezuela that voted against adoption of OOXML in the September 2007 ISO IEC ballot

[7] Announced as a Service Pack 2 upgrade to Office 2007, to take place in 2009.

[8] "A Proposal to Recognize the Special Status of "Civil ICT Standards," Standards Today, Vol. VII, No 2 (February – March, 2008), pp. 12 – 13, at http://www.consortiuminfo.org/bulletins/feb08.php#feature.

[9] Speech at the OECD ministerial meeting in Seoul 2008

[10] Neelie Kroes speech – 'Being Open about Standards' 10 Jun. 2008 | 07:55 GMT

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[i] Most notably the WTO agreement on Technical Barriers to Trade (TBT).