

Competing De Jure Standards, Good for Innovation?

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Abstract

There is a strong belief that competition between de facto standards stimulates innovation and benefits consumers because it drives down the costs of products. The tenability of this belief, its preconditions and limits have been widely scrutinized. However, little has been written about competition between negotiated, de jure standards. Are competing de jure standards a good thing? Blind (2008) equals de jure to de facto standards and concludes that competition between de jure standards increases social welfare. We disagree with him. In this paper we argue that it is important to distinguish between de jure and de facto standards and therefore that his basic assumption is incorrect. We illustrate our argument with the same example as Blind does, that is, with the standards war between the document formats of ODF and OOXML. In our view, the implications of condoning - and even encouraging - competition between de jure standards will have far-reaching consequences for public IT-procurement. It will hinder innovation and counteract supplier-independent information exchange between government and citizens.

Introduction

In the neo-classic economic line of reasoning competition is held to benefit consumers because it lowers the price of products, increases product supply and stimulates innovation. That is, it improves the price/performance ratio of products. Furthermore, through the workings of the free market the most innovative and competitively priced products will automatically drive out lesser products. The market has a self-regulatory capacity: by means of competition it will purge itself and stimulate innovation.

The neo-classic line of reasoning is temptingly clear. Its implications are relatively easy to handle by policy makers faced with non-transparent and complex processes. Moreover, in many situations this line of argument may hold. But in some important other situations it does not. As the current economic crisis shows, in the financial sector competition also leads to fraudulent financial innovations. The self-regulatory capacity of the financial market has failed for it does not address the quality of products and services, and currently cannot cope with long term societal values and interests.

At present much more is known about the conditions under which competition between products and de facto standards has a positive effect on innovation. For example, a market with many small competing parties is not necessarily innovative; an oligopoly generally appears to be more so (Scherer, 1992). Many case studies exist about extremely competitive situations and in particular about wars between de facto standards (Stango, 2004). But little is known about whether these insights also apply to de jure standards. Recently Knut Blind (2008), a German economist, addressed the topic in a EURAS paper called 'A welfare analysis of standards competition: The example of the ECMA OpenXML Standard and the ISO ODF Standard'. There, he concludes that market competition is a good thing and no less so for de jure standards: competition between de jure standards leads to technology innovation.

Looking at a classic example in standardization, the variety of national standards for electrical plugs and the impediments which this causes, Blind's conclusion is hard to grasp. The implications of his

conclusion are too far-reaching and the example he uses, that of two overlapping ISO-standards for document formats, is of too much consequence to gloss over our difference of view. The two ISO-standards are ODF, the Open Document Format, which was formalised in 2006, and a second competing standard, Microsoft's OOXML, which was approved in November 2008. Because document formats play a key role in, for example, the way governments exchange information with their citizens, the consequences of having two overlapping ISO standards will be felt by citizens globally. Moreover, the development of two overlapping ISO standards draws into question the fundamental purpose of de jure standardisation.

In this article we will argue that competition between overlapping de jure standards leads to unnecessary confusion. It adds to social and economical costs without offering anything in return – least of all innovation.

An ill-founded assumption

Blind's key question is how competing standards should be theoretically evaluated in particular in respect to their effect on innovation.¹ He identifies eight parameters² that are relevant to determine whether one should immediately choose between standards or prolong the period of competition before making a choice.

Our objections to Blind's view do not so much concern the arguments he uses, but rather the underlying assumptions and implicit shift in research question. Blind claims that it makes no difference whether we are dealing with de facto standards like Blu-Ray or formal de jure and consortium standards like ETSI's GSM standard and W3C's XML standard. In developing his argument he extensively uses the Anglo-Saxon body of economic literature on standardisation, which centres on de facto standards (Blind, 2004). In doing so, he confines his discussion to situations and problems which are typical for de facto standards and obscures answering the initial research question.

For example, a recurrent problem addressed by economic literature is the risk that consumers prematurely get locked into a certain technology whereas its quality is not yet evident. According to Blind such uncertainty calls for a prolongation of standards competition until the technologies have taken shape and it has become clear which is technically superior.³ We have two objections to this view. Firstly, in most standards wars technical superiority – which is hardly objectifiable in any case - is not at stake. Different technologies merely represent a different solution. Which technology 'wins' is primarily attributable to the availability of products, the forming of alliances and successful marketing. Prolonging the period of competition may even adversely influence the market. We may bear in mind here the war between Blue-Ray and HD-DVD in the market for High Density DVDs. This market stagnated for a long time because consumers feared to be left stuck with a 'losing' system and therefore postponed their purchases.

Our second objection, and the most important one for this article, is that what may possibly apply to de facto standards does not necessarily apply to de jure standards. The nature of both types of standards is too fundamentally different.

1 'How should multiple parallel existing standards, which exist in the same technological area, be fundamentally evaluated in terms of theoretical – static welfare, and most importantly with respect to their dynamic effect on innovation and competition?' (Blind, 2008, p.1)

2 The parameters are: 'preference for network effects, local network effects, heterogeneity of the preferences, cost of the development and maintenance of standards, uncertainty regarding the technical quality, length of the life cycle, development potential, uncertainty regarding future user preferences.' (Blind, 2008, p.7)

3 Blind (2008) frequently mentions the possibility of making the wrong decision ('wrong decision' p.6, 9, 'maintaining the standardisation competition' p.7, 'delay the market from committing' p.5), and draws comparisons with classic *de facto* standards (e.g., p. 1, 5, 9).

Difference between ‘de facto’ and ‘de jure’

The best-known international organisation for standardisation, the ISO, uses the following definition of ‘de jure’ standard:

‘a document established by consensus and approved by a recognized body, that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context’ (ISO/IEC, 2004, p. 8)

What is important in this definition is that standards are, whenever possible, accepted by consensus – and consequently without fundamental objections – and that democratic procedures are followed in developing them. The latter element characterizes a ‘recognised organisation’.

The ‘optimum degree of order in a given context’ offers ample room for interpretation. In principle, this order could include competitive standards. But given that the ISO generally rejects the development of overlapping standards, this does not seem plausible.⁴

De jure standards are meant for voluntary use, even though the term ‘de jure’ - Latin for ‘legal, according to the law’ – seems to suggest that such standards are used in the context of law and regulation and as such are compulsory.⁵ In general the term de jure standard is used for standards developed within committees of official standards organisations like the ISO.

In the ICT area increasingly standards are also being developed by committees of standards consortia. Three such consortia are particularly important for the standards war discussed here: the W3C (World Wide Web Consortium) that is in charge of the XML-standard to which the two standards for document format conform, and the standards consortia OASIS and Ecma International, which have initially standardised the two competing document formats.

A third important source of committee standards are umbrella organisations and public authorities. These fall outside the scope of this article. For the sake of convenience all committee standards are in the following referred to as ‘de jure standards’.

In daily life, the term standard usually refers to a de facto standard. De facto standards are products and services with such a large market share that ‘de facto’ (literally: in fact, in actual practice) they function as a standard. Their market share induces other companies to develop interoperable products and services. Clear examples of this are the Office products of Microsoft and Adobe's PDF.

For some de facto standards there is a demand to formalise them as a ‘de jure’ standard. In order to do so, the specifications of the de facto standard must be made public. From then on other companies will have the possibility to implement the specifications into their own products. This was, for instance, the case for Adobe's PDF which by now has been formalised as an ISO standard (ISO 32000).

Summarising, whereas the term de facto standard refers to a significant market share, a de jure standard is based on a collective agreement. As such they are innately different, as are their value and effect on the market.

Effect on the Market

De jure standards are points of reference. Referring to standards saves us the time and effort we would otherwise need to explain exactly what we mean. As such they reduce what economists term the *informational transaction costs* because ‘both parties to a deal mutually recognize what is being dealt in’ (Kindleberger, 1983, p. 395).

The characteristics of the standard-conform product are known, and therefore buyers are less likely to be disappointed (Reddy, 1990). Furthermore, the costs of finding the desired product are reduced because less time and money is needed to evaluate different products (Jones & Hudson, 1996). In other words, standards provide information which makes the market more transparent.

⁴ See par. 1.3.1, 1.16.1, B.4.2.1, C.4.6.2 in ISO/IEC Directives (ISO/IEC, 2008).

⁵ This makes the term ‘de jure’ a confusing one and is the reason why we usually prefer to speak about committee standards.

In the case of compatibility standards – among which document format standards – these standards allow products to interoperate and components to be replaced (compatibility, interoperability⁶, exchangeability). Especially in anonymous markets, where parties do not know each other, complementary products can be used together once the interfaces have been standardised. For instance, the ISO standard for paper formats (ISO 216) is an important design specification in the paper processing industry (e.g. printers, photocopiers and fax machines). Standards structure markets and thus can lay the foundation for new clusters of economic activity.

The important contribution of standardisation is that it reduces the type of variety which has little extra to offer to consumers. Here we may think of the many national electricity plugs and of the metrical and imperial systems of measurement. Reducing unprofitable variety not only results in a more transparent and smoothly running market – the functions of compatibility and information respectively. It also brings with it the advantages of large scale industrial production (economies of scale). The functions and their effects of de jure standards are summed up in table 1. They are typical of de jure standards and are, consequently, not automatically applicable to de facto standards.

Table 1. The main functions of de jure compatibility standards (Egyedi & Blind, 2008, p. 4).

Function of standards	Effect on the market
Information	Reduces transaction costs Corrects adverse selection ⁷ Facilitates trade
Compatibility	Creates network externalities ⁸ Avoids lock-ins
Variety reduction	Allows economies of scale Builds critical mass

In the example which Blind discusses and which we adopt as well, he initially addresses the competition between a formal standard and a consortium standard (ISO's ODF standard vs. Ecma's OOXML standard 1st edition, respectively). Later, he generalizes his initial findings to competition between formal standards (the situation in November 2008: ISO's ODF standard and ISO's OOXML standard).

Because ISO is a pre-eminent de jure standards organisation, its standards should in principle meet the above-mentioned requirements and have the said effects. However, both the way in which the OOXML standard came into being, its contents and its approval as a second standard seem to undo all market advantages of de jure standardisation.

⁶ 'Interoperability' and 'compatibility' refer to: 'the suitability of products, processes or services for use together under specific conditions to fulfil relevant requirements without causing unacceptable interactions.' (ISO/IEC, 1991)

⁷ Adverse selection takes place if a supplier of inferior products gains market share through price competition because the supplier of high quality products has no means to signal the superior quality of its products to consumers.

Quality standards support the latter in signalling activities, foster the co-existence of low and high quality market segments, and therefore minimise the likelihood that consumer selection is based on wrong assumptions.

⁸ The term *network externalities* refers to the situation that every new user in the network increases the value of being connected to the network (Farrell & Saloner, 1985).

How the Two Standards Came into Being

The key problem in the standards war between document formats is Microsoft's monopoly position in the software market. Estimations vary, but 90 to 95% of all digital documents may be presumed to be stored in 'old' Microsoft document formats. There is a danger to this.

'Monopolies are in a position to capture (or internalise) the value of network externalities – although this value is by definition not an attribute of an individual user's product or service, a monopoly or dominant player is in a position to raise the price of an individual user's access beyond its inherent value, based on the external value of the network effect.' (Ghosh, 2005)

In other words, it is hardly possible for individual as well as business consumers to change providers without high costs (high barrier to exit). They are, as it were, stuck with their provider (lock-in). In principle, standardisation puts a stop to this dependence. However, as we will see, some standards are more provider-independent than others.

The two standards for document formats, ODF and OOXML, aim to store digital documents made with word processors, spreadsheet programmes, or presentation programmes in XML.⁹

	ODF	OOXML
Originally submitted by	Sun Microsystems ¹⁰	Microsoft
Standards consortium	OASIS	Ecma International
XML-based	Yes	Yes
Aim of supplier independence	Yes	No
ISO/IEC standard	ISO/IEC 26300	ISO/IEC 29500
Year	2006	2008
ISO/IEC standard corresponds to	OpenDocument v1.0 Specification (OASIS, May 2005)	ECMA-376 2nd edition (Ecma, Dec. 2008)
Accelerated ISO/IEC JTC1 procedure	Publicly Available Specification (PAS): PAS submitter	Fast Track
• Access to accelerated procedure	Bureaucratic and recurring process	One-time application for A-liaison
• Ballot period	6 months	5 months
Year	2006	2008

⁹ '[XML] describes (...) XML documents. (...). Markup encodes a description of the document's storage layout and logical structure.' (chapter 1, W3C, 2006) Nowadays XML is used for very different purposes such as electronic invoicing and publication processes. Often a distinct XML-based standard is developed because each application area has different requirements. This is also applies for office applications. In the case of ODF and OOXML, software for making and reading texts, spreadsheets and presentations is at stake.

¹⁰ <http://lists.oasis-open.org/archives/office/200212/msg00003.html>

The big advantage of XML-adherence is that the standards thereby comply with widely supported international coding conventions for information structure and character set. Another advantage is that the documents are separated from the applications that created them, which then makes it possible to process documents with competing applications. This makes it easier to exchange documents between similar office applications. In addition, an important side-effect is that by encoding documents in compliance with a public standard it will also be possible to retrieve their contents in the future, regardless of any further updates to the software application. In short, the future accessibility of the contents of XML documents is better secured. Applying XML in software products thus enhances supplier-independence of citizen consumers and business consumers, and improves the digital sustainability of electronic documents.

There is a catch, however. For, whereas the scope of the ODF standards committee explicitly supports supplier independence¹¹, OOXML aims

'[to be] fully compatible with the existing corpus of Microsoft Office documents' (ECMA-376 Part 1, Introduction, p.X).

The large amount of already existing Microsoft Office documents (legacy) was the main justification to enter the competing OOXML standards trajectory. Allegedly, ODF did not sufficiently take this legacy into account.

Although Microsoft did not take part in the development of ODF in OASIS, the standards committee noted that 'transformability into potential Microsoft office XML formats could be sensible'. However, the committee agreed to refrain from making this a formal requirement in the standardisation process.¹² In fact, to do so would have been difficult because at the time Microsoft's doc-specifications had not yet been made public. This in itself is not very surprising because, in order to protect their market share, specifications of a de facto standard are seldom released.

The 'legacy argument' seems reasonable at first sight. However, the following qualifications can be made. First, the fast track JTC1 procedure that was used to formalise ECMA-376 is generally used to formalise specifications that are already widely accepted. Such specifications are usually mature and therefore undergo few changes. For the ECMA-376 standard, however, the situation was entirely different. This standard had many flaws. In other words, if the faulty ECMA-376 had been adopted without alterations, as it would normally be in a fast track procedure, the future of Microsoft's legacy documents would have been all but secure.

Secondly, the legacy argument could equally have been a reason for Microsoft to take part in the ODF process, and thus make ODF suitable for its document formats. Would it have been possible at the time to formulate the later OOXML specifications as an extension to the ODF standard? That question will unfortunately remain unanswered as Microsoft did not take part. At the time it did not seem to be in Microsoft's interest to release its specifications.

¹¹ <http://www.oasis-open.org/committees/office/charter.php>

¹² <http://lists.oasis-open.org/archives/office/200212/msg00003.html>

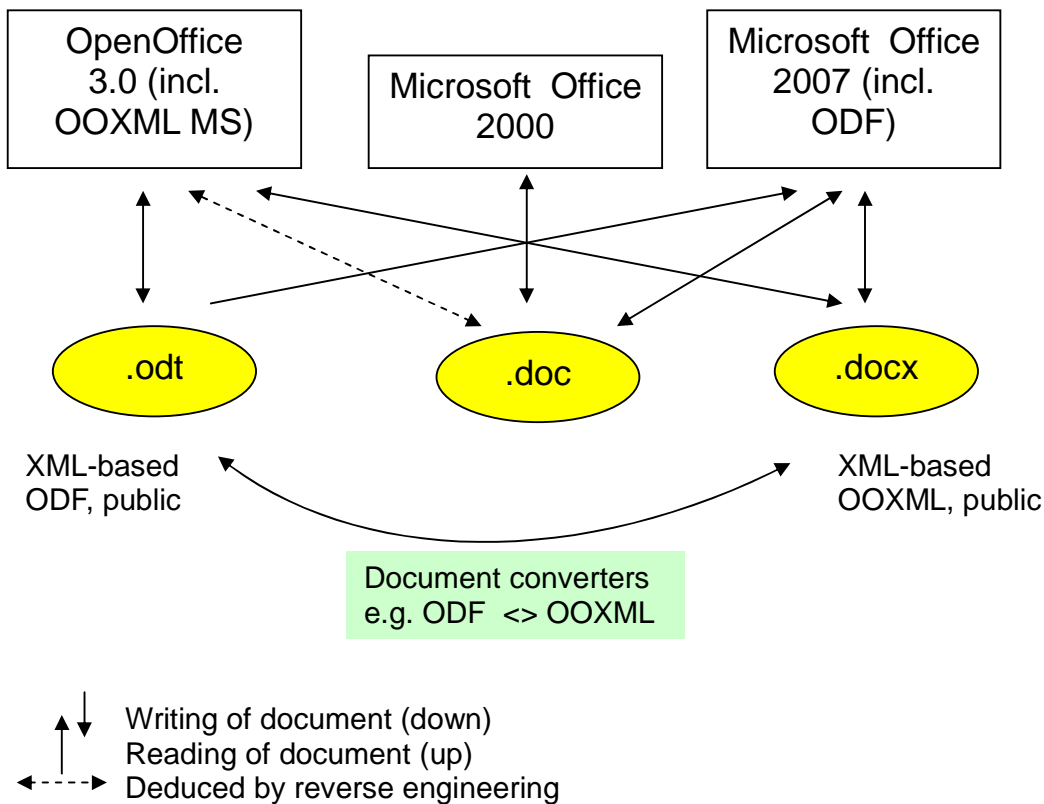


Figure 1: For the purpose of illustration the figure shows two recent office packages: OpenOffice.org 3.0 and Microsoft Office 2007. Note that the OOXML mentioned in the figure is the specification which served as input for the Ecma standardisation process and is as such not the outcome of this process (i.e. ECMA-376 edition 1) or the recently approved ISO OOXML standard (ISO/IEC 29500).

Currently Microsoft has indicated its willingness to actively support the ODF standard.¹³ This step might have been motivated by the fact that the legacy argument largely seems to have become a thing of the past anyway. For example, in principle OpenOffice.org can both read and write Microsoft's .doc documents. Furthermore, document converters are now able to translate between different document formats. Examples are those of Centric, one of the most important software suppliers to the Dutch authorities, and the open source converter of Xout. Moreover, OpenOffice.org itself includes converting functions for all current document formats. See Figure 1.

At first sight the ways in which both standards have come into being are quite similar. Both standards have passed from being a (product) specification to become a consortium standard and via an accelerated procedure an ISO/IEC standard.¹⁴ In the case of ODF, however, the standards process took place much more in the open and lasted much longer (3 years)¹⁵; the quality of the consortium process and the document was checked beforehand by JTC1 (PAS procedure¹⁶); and

¹³ December 16th 2008. <http://www.microsoft.com/presspass/features/2008/dec08/12-16DougMahughQA.msp>

¹⁴ JTC1 is as it were an organisation within an organisation has its own, partially different procedures: the JTC1 directives. JTC1 procedures result in ISO/IEC standards.

¹⁵ <http://lists.oasis-open.org/archives/tc-announce/200211/msg00001.html>

¹⁶ 'PAS Submitter gives a PAS originator the right to submit specifications into the transposition process for a period of two years with the possibility of further extensions of five year periods' (14.4.1) (JTC1, 2007)

the standards process proceeded without much ado.

In the case of OOXML, on the other hand, the initial specification increased in size during the Ecma process from roughly 1900 to 6000 pages over the period of December 2005 to December 2006; the due to a historic privilege the Ecma standard could enter the Fast Track procedure without impediment¹⁷; but the standards process caused much concern. Both the proposed standard content (ECMA-376 edition 1) and the JTC1 process were heavily attacked with over a thousand comments, accusations of attempts at bribery and changes to the JTC1 procedures during the process¹⁸ (Koppenhol & Egyedi, 2008). Eventually, the OOXML standard was approved as ISO/IEC 29500 in November 2008 and adopted unaltered a month later by Ecma as ECMA-376 edition 2 (7342 pages).

Although much more could be said about the JTC1 process, this falls outside the scope of the current article. Important for our research question in this article is the observation that two XML-oriented document formats have been standardised by the same standards body. Furthermore, it is highly unorthodox for JTC1, which champions implementation-independent standardisation, to have approved a standard which refers explicitly to a product supplier.

Stakes in the War

In a way the war between ODF and OOXML is similar to those between de facto standards for these, too, compete to set the standard for technology development and markets (Besen & Farrell, 1991). Where ODF and OOXML differ, however, is that they wage their war not merely in the market but have turned de jure standardisation into a battlefield as well.

What stake do the players have in de jure standardisation? The formalisation of product specifications in JTC1 generally serves to increase their visibility and acceptance worldwide. A de jure standard implies stability which increases its support. In addition it facilitates access to the considerable market of public IT procurement¹⁹ (Egyedi, 2001). ISO and IEC have a good reputation. They are international organisations with democratic procedures, in the sense that they and their national counterparts, the national standards bodies, aim to involve all parties concerned in the standards negotiations and encourage decisions to be taken in consensus. These are two important process characteristics of 'open standards'. They imply a fair process. ISO and IEC's good reputation earns JTC1, their joint technical committee, and therefore JTC1 standards much credit. In the case of public IT procurement a standard for document formats is especially relevant because government authorities will want to avoid implicitly forcing citizens, companies and other organisations to purchase software from a certain provider, for instance, in order to be able to read government websites. The only way to meet the need for document exchangeability, interoperable systems and supplier-independence is for all software providers to conform to a standardised document format. In the action plan 'The Netherlands in Open Connection' the Dutch government, for example, chooses JTC1's ODF and prescribes that from 2008 onward all public authorities are to support ODF-conform exchanges (EZ, 2007, 2008). Adding a second standard does not improve market transparency.

17 Ecma has a so-called A-liaison with JTC1, a status obtained in 1987 which allows Ecma standards immediate access to the Fast Track procedure. See also http://isotc.iso.org/livelink/livelink/fetch/2000/2489/186491/186605/Jtc1_Directives.pdf?nodeid=3959538&%2520vernum=0

18 For example, comments were grouped together for 'block-voting' to more easily deal with the large amount of comments.

19 Estimations vary from 16 up to 30% of the IT market in Europe.

Competition between de facto standards in the consumer electronics market is already problematic:

'There's no denying that consumer electronics format wars are a nuisance. The rules of engagement are particularly cruel for the buying public, asking them to make an expensive bet on a technology that could be obsolete in a few years time. They emerge with remarkable frequency: 78 rpm discs versus 45 rpm in the 1940s, 8-track versus cassette in the 70s, Betamax versus VHS in the 80s, digital audio tape versus the compact disc in the 90s. Not to mention, of course, the ongoing QuickTime versus Windows Media versus RealMedia struggle.' (Warner, 2008)

But in the case of ODF and OOXML public values are also at stake such as equal access for citizens to public information and free choice of software suppliers. Document formats determine how public authorities and citizens exchange information and the extent to which archived information remains accessible (digital sustainability). Having two largely overlapping JTC1 standards not only hinders information exchange and digital sustainability, it also flatly contradicts JTC1's own views²⁰ and to those of the World Trade Organisation.²¹

Standard as a Platform for Innovation

The essence of de jure standardisation is that the fight for the consumer is not fought in the market but in a standards committee. The agreed specification generally represents a compromise between the different parties concerned. No one will be entirely satisfied with the result, but an important aim of standardisation will have been achieved: the conditions are created for a market with interoperable and exchangeable standard-conform products. Standards create a level playing field for all parties. They lower the threshold for newcomers because interoperability and exchangeability issues have been taken care of by the standard. Competition can then focus on how best to implement the standard and other product features. As such de jure standards are a platform for innovation. All this leads to the consumer advantages mentioned earlier: a better price/performance ratio and a larger variety of products. The desired economic effect of a de jure standard is 'supporting full competition in the marketplace for suppliers of a technology and related products and services' (Ghosh, 2005).

By focusing competition on products rather than standards consumers also benefit from a lower barrier to entry and a lower barrier to exit. The purchase of standard-conform products reduces the risk of a bad bargain and cuts down the costs of switching providers precisely because the products are more easily replaceable and exchangeable. In other words, competition should not take place between de jure standards but between standard-conform implementations.²²

20 JTC1 seeks to avoid 'duplication of or conflict with the work of other ISO and IEC TCs' (JTC1, 2007, p. 13).

21 'Where international standards exist or their completion is imminent, the standardizing body shall use them, or the relevant parts of them, as a basis for the standards it develops, except where such international standards or relevant parts would be ineffective or inappropriate' (WTO, 1994, pp. 135, F).

22 Apart from this key point, the implementability of the Ecma-OOXML edition 1 standard is strongly questioned. This *de jure* standard therefore seems to have been published for political-economic reasons only and, as such, does not meet Ghosh's criteria of an open standard: 'If only one company -- or only that company's close partners -- can fully implement a standard, then the standard isn't really open, no matter how "reasonable" its licensing terms might be or how many people collaborated in its creation' (Ghosh, 2005).

Conclusion

Blind makes a plea for competition between ODF and OOXML because also in this case competition is to lead to innovation. He thereby assumes that de facto standards and de jure standards may be regarded as equal and accordingly fails to make a distinction between products and agreements. This ill-founded assumption leads to an equally ill-founded conclusion.

'De jure' and 'de facto' standards fundamentally differ. De jure standards for document formats aim to foster interoperability, create network externalities, prevent lock-in, cut transaction costs, create a transparent market and reduce variety. The impact of de facto standards on the market tends to be the exact opposite. Indeed, in the Office environment supplier-dependence and a non-transparent market are the main problem.

Competition between two de jure standards undoes all the advantages of de jure standardisation. It results in a non-transparent market, raises transaction costs and hampers interoperability. This also holds for the two ISO standards for document formats. The objective of ODF, the first ISO standard, was to ease interoperability between different office suites, increase supplier independence and improve accessibility and digital sustainability of documents. The approval of OOXML, the second standard, does not add extra value. On the contrary, it reduces it.

As noted, there are good reasons to question the sincerity of Microsoft's legacy argument, which was the main argument to justify the ISO OOXML standard. Furthermore, the argument appears to have been largely overtaken by recent developments. Nonetheless some governments will feel obliged to refer to both standards in their IT-procurement, and software vendors will have to anticipate on this situation by implementing both standards.

Converters may offer a fairly good solution for the legacy problem of *.doc* formats, that is, for making accessible the old static documents. But for a number of reasons they do not provide a systematic solution for the interoperability and conversion problems of the 'live' documents that are exchanged. The most important reason is that converters are built to translate between implementations of certain versions of different standards. However, in practice these standards are subject to changes. Consequently, conversion solutions are not a once and for all cure. They need maintenance and updates. Another important reason not to make light of having two overlapping standards is more complicated. As most computer users will have experienced at one time or another, conforming to a standard does not always guarantee interoperability of products. This is because - intentionally or unintentionally - standards are sometimes implemented differently (Egyedi). Therefore, not only conformance tests are needed to indicate whether a product complies to the standard but also interoperability tests. Where this causes problems with one and the same standard, the problem aggravates exponentially with two standards. Converters cannot offer solace for this problem.

In short, having two overlapping de jure standards merely creates extra costs for citizens, companies, government authorities and others without offering anything in return. It leads to frustration and waste, and certainly not to innovation, as Blind argues.

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