Telecommunications Policy 35 (2011) 373–381

Contents lists available at ScienceDirect

Telecommunications Policy

URL: www.elsevierbusinessandmanagement.com/locate/telpol

# An economic analysis of standards competition: The example of the ISO ODF and OOXML standards

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ARTICLE INFO

Available online 17 March 2011

*Keywords:*
Standardization
Standards battle
Document formats

ABSTRACT

The objective of this paper is to analyze economic efficiency considerations of standards competition, in order to thereby enrich the discussion about the transfer of the ECMA-376-1 (Office Open XML – OOXML) standard into the ISO/IEC 29500:2008 standard parallel to the already existing ISO/IEC 26300:2006 (Open Document Format for Office Applications – ODF) standard. Based on the available economic literature we identify parameters that need to be considered in the decision for or against a competition between competing standards. The characteristics in the specific case of competition between the ODF and the OOOXML standard clearly justify the decision for two documents standards.

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## 1. Introduction

During the last decade, the landscape in standardization has changed and diversified especially in the area of information and communication technologies (ICT). A huge number of consortia and industry fora have entered the ICT standards setting arena (Blind & Gauch, 2008). As a result, today's companies face an almost impenetrable web of standardization organizations with complex inter-relations. Each of these bodies has its own membership, works within its own environment, and has defined its own set of rules. The resulting fragmentation, together with the considerable overlap of the activities of individual standardization organizations, means that interoperability and compatibility between standards from different sources cannot necessarily be assumed. Accordingly, improving coordination in ICT standards setting has become a major issue. Here, it is focused on a specific case for coordination.

The starting position for the analysis of this case is that ECMA (the former European Computer Manufacturer's Association and since 1994 the European Association for Standardizing Information and Communication Systems) proposed that an ECMA standard should be transferred into an official standard to be published by the International Organization for Standardization (ISO). In particular, the ECMA-376-1 OOXML, an XML-based document file format developed by Microsoft that supports document storage and exchange between office applications, should be approved as an official ISO standard (ISO/IEC 29500:2008). However, this standard was to be published in addition to an open document format (ODF) standard, which was already specified in its version 1.0 by OASIS (Organization for the Advancement

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doi:10.1016/j.telpol.2011.02.007

of Structured Information Standards) and adopted by ISO as ISO/IEC 26300:2006 a few years earlier.[1] While there was a broad consensus for this proposal within ECMA, some ISO members had expressed serious reservations.

The objective of this paper is to analyze some of the fundamental economic efficiency considerations of parallel standards, in order to enrich the discussion with fundamental aspects and arguments rather than specific technical ones. The following questions are central to the analysis:

(1) How can multiple parallel existing standards within the same technological area be fundamentally evaluated in terms of theoretical static efficiency and with respect to their dynamic effect on innovation and competition?
(2) How can these effects be evaluated, in particular in the area of standardization of open document formats?

The results of the analysis will primarily help policy makers and standardization organizations to decide whether to stop, extend or even enforce standards competition. Secondly, the new insights could motivate companies involved in standards competition to adapt their standardization strategies and tactics. Thirdly, the outcome of this analysis could help users interested in implementing a new standard and confronted with the problem of deciding for one and against another standard regarding the timing of their decisions.

Since there is some confusion regarding the term standard, also caused by the increasing diversity, the applied terminology has to be defined. A standard represents an agreement in respect of the standardization of products, procedures or practices. Standards are published by formal standards organizations based on a strict consensus process. These formal standards organizations now also publish so-called specifications, which are not developed by consensus. Research now focuses on the difference between formal, industry or consortia and company specific de facto standardization (see Blind, Gauch, & Hawkins (2010) for the differences of their perceived economic impacts) . In this paper, the term standard will be used because the development process is of secondary importance for the performed general economic analysis.

The remainder of the paper has the following structure. Section 2 introduces a list of parameters for an economic analysis of competing standards. In Section 3, this analytic framework will be applied to the situation in 2007, when the transfer of the ECMA-376-1 OOOXML standard to the Fast Track Process at ISO was intensively discussed. Section 4 gives a concluding assessment.

## 2. Parameters for an efficiency analysis of competing standards

A general classification of a situation in which two incompatible technological standards compete with each other, and another situation, in which a competition arises within a technology or a standard after an agreement on one standard, first emerged in the theoretical literature in 1994 (Besen & Farrell, 1994).[2] In the industrial organization models upon which the theory is based, it is basically assumed that standards in competition are not compatible with each other, and consequently a market decision on one of the two standards for the complete development of the network effects, which mean the significance of other actors using a technology, which allows for collaboration or communication, is necessary.[3] The theoretical models do not address the coordination of standard setting processes or the economic efficiency assessment of the selection of a standard.[4]

These earlier models basically assume that it is not possible to achieve a stable equilibrium in the competition between two incompatible standards, and that by the forces of network effects a dominant standard would emerge, which would possibly capture 100% of the market in the long-term. The example of the success of the VHS format over the competing Betamax Technology is often cited, because the decision of a network is not only based on the actual number of users, but also on the expectations of market results. Consequently, within a short period of time the entire population of all users can decide on a specific standard. In effect, the rivaling standard loses its attraction very quickly and thus disappears from the market, if the users, who originally decided on it, do not incur high switching cost. Often not the technical advantage of a standard is decisive, but the expectations generated with respect to the future possibilities to use the technology or the equipment (Farrell & Saloner, 1985, 1986; Katz & Shapiro, 1986, 1992).

Ultimately, the proliferation of a standard is largely dependent on its path. This means that the actual market result is determined by the behavior and the preferences of customers and property characteristics of the current product generation and in particular by the users' decisions in earlier periods or in the phases in which the entire market selected

[1] Today the discussion of competing document standards such as ODF and OOXML is quite popular. For a more complete picture, it is important to note that ISO published another document standard, the "Standard Generalized Markup Language SGML" as ISO/IEC 8879-1986 several years ago.

[2] The overriding concept of technological dominance is not discussed, since the theoretical welfare aspect does not play a role in these investigations (Suarez, 2004; Gallagher, 2007).

[3] The decision is between direct network externalities, which occur in such a way that a telephone with the increasing number of communication partners gains in value, and indirect network externalities, which arise in such a way that the value of hardware, such as computers or DVD players, rises through the increasing diversity of software and DVDs.

[4] More management oriented literature, like Shapiro and Varian (1999) in general or Gallagher and Park (2002) in a specific case, concentrate on companies' strategies instead of general efficiency aspects.

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