Chapter 13

Factors Influencing the Lifetime of Telecommunication and Information Technology Standards

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INTRODUCTION

The dynamic technological changes in information and communication technology (ICT) influence the lifetimes of standards, an important dimension of the dynamics of standards. The need to change or adjust standards according to new trends in ICT has definitely increased in the last decade. Furthermore, some standards became obsolete, because new technologies led to completely new generations of standards. Consequently, standards have a life cycle defined by their publication and withdrawal dates, which represents a core element of the dynamics of standards.

Despite the high dynamics in ICT and the high relevance of standards for the development of ICT and the related sectors (Blind, Jungmittag 2008), there is no systematic quantitative analysis which tries to investigate the life times as one important dimension or indicator of the dynamics of ICT standards and their driving factors. An exception is the contribution by Egyedi and Heijnen (2005), who focus on the internal revision processes of ISO (International Organization for Standardization).

This paper presents results comparing different subcategories of ICT also taking country characteristics into account based on the data of the PERINORM database published by the national standard development organisations (SDOs) BSI (British Standards Institute), DIN (Deutsches Institut fuer Normung) and AFNOR (Association Francaise de Normalisation).

In contrast to the rather few quantitative studies, we can rely on a long tradition of conceptual...
analyses done by economists starting in the 1980s by the work of Arthur (Arthur 1989) applied in David’s study of the typewriter keyboard standard QWERTY (David 1985) and Farrell and Saloner’s game theory approach (Farrell, Saloner 1985; 1986). Based on network externalities, increasing returns but also information asymmetries these authors mainly explain the lock in effects of standardisation and the missing or insufficient dynamics of standards. Another kind of evolution of standards is discussed and illustrated by Swann (2000), who analyses the interplay between innovation and standardisation. Starting with a basic standard, which defines the specifications of some platform technology, the field for further innovation is set in using this basic technology for various applications.

Besides these very conceptual or theoretical approaches to deal with standards dynamics, several case study analyses exist, which focus on the standard maintenance and succession (Egyedi, Loeffen 2002) in order to answer the question how to deal with heritage relations between standards and on standard integrity (Egyedi, Hudson 2005) and in order to discuss control mechanisms that safeguard the integrity of (de facto) standards. This paper adds an additional methodological dimension to the analysis of the dynamics of standards by a strong focus on the life times of standards. The contribution of this paper to the emerging research on the dynamics of standards is twofold. First, the descriptive presentation of life times of standards focusing both on average publication years and survival times reflects on the one hand the historical development of ICT over time and on the other hand its dynamics in the various subfields. So far other indicators like scientific publications or patent applications are used to describe the development especially of new technologies, e.g. biotechnology or nanotechnology. The analysis of publications of standard documents extends the former exercises by a new more market and diffusion related dimension. Second, the characteristics of standard documents are used to explain their life times. Here we borrow for the first time general approaches from bibliometrics and patent analysis in order to explain life times of standards as indicator for their value by documents’ characteristics.

The remainder of the paper is structured as follows. First, we analyse the average lifetimes of standards in a quantitative manner, taking into account differences between countries. Since the simple approach of calculating the average lifetimes of historical standards does not allow us to include standards which are still alive, we have to apply a more sophisticated methodology, the so-called survival analysis, which was initially mainly applied in medical science. The application of this statistical approach produces average lifetimes of standards, taking into account the expected lifetime of standards which are still valid. This approach is crucial, especially for the analysis of ICT standards, because the number of valid standards relative to historical standards is rather high. Due to the very high relevance of international standards in the ICT sector and the high quality of this subsample, we concentrate the survival analysis especially on the international standards including the standards released by the European standardisation bodies. The results of this analysis provide us with new insights about the expected lifetimes of standards differentiated by technology in the ICT area. The final step of our analysis tries to answer the question which causal factors influence the lifetimes of standards in the ICT sector. We present first insights by applying the so-called Cox regression, which allows us to identify whether some selected characteristics of a standard, like cross references or references to international standards, have a significant impact on its actual or expected lifetime. The approach to assess the importance of a technical document by analysing its references to other documents or being referenced in other documents has a long tradition in evaluating the value of patents by counting and analysing their citations. The paper concludes with a brief summary of the