

## Chapter 4.23

# Factors Influencing the Lifetime of Telecommunication and Information Technology Standards: Results of an Explorative Analysis of the PERINORM Database

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### **ABSTRACT**

*This article presents the results of an explorative study for the lifetimes and survival rates of formal standards in telecommunication and information technology. The analysis reveals that the survival rate depends on the dynamic development of technologies and on country-specific characteristics. In a second step, we tried to identify factors influencing the lifetimes of standards. In general, standards replacing an already existing document have an expected survival time compared to documents without a predecessor. Standards with a successor document have, as anticipated, a shorter expected lifetime. Finally, the increased speed of technological change re-*

*duces the lifetimes of standards. Based on these first insights, we derive the following recommendations. First, standardisation bodies should adapt their standard maintenance according to the specific requirements of technologies and the related markets, but should also harmonise their processes at the international level in order to avoid frictions for the development of technologies and markets.*

### **INTRODUCTION**

The dynamic technological changes in information and communication technology (ICT) influence the lifetimes of standards. The need

to change or adjust standards according to new trends in the ICT sector 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.

Despite the high dynamics in ICT and the high relevance of standards for the development of ICT and the related sectors, there is no systematic quantitative analysis which tries to investigate the dynamics of ICT standards and its 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 article presents first explorative results comparing different technologies and countries, 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 Française de Normalisation). 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. We are not able to analyse this kind of interrelationship referring to the database used for this analysis. In contrast to the rather few quantitative studies, we can rely on a long tradition of theoretical analyses done by economists starting the 1980s by the work of Arthur (1989) applied in David's study of the typewriter keyboard standard QWERTY (David, 1985) and Farrell and Saloner's (1985, 1986) game theory approach. Based on network externalities, increasing returns but also information asymmetries these authors mainly explain the lock in effects of standardisation and the missing dynamics. Besides these very 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 article adds an additional methodological dimension to the analysis of the dynamics of standards.

The remainder of the article is structured as follows. First, we analyse the average lifetimes of standards in a quantitative manner, taking into account differences between countries. The country differences are caused by institutional differences in the countries considered, like different time lags regarding the implementation of international and European standards, but also by the heterogeneous quality of the data delivered to the central database. 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 additional

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