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Motives to standardize: Empirical evidence from Germany



Knut Blind^{a,b,c,*}, Axel Mangelsdorf^{a,d}

^a Technische Universität Berlin, Chair of Innovation Economics, Germany

^b Fraunhofer Institute of Open Communications Systems, Germany

^c Rotterdam School of Management, Chair of Standardization, The Netherlands

^d BAM Federal Institute for Materials Research and Testing, Germany

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ABSTRACT

In this paper, we identify the strategic motives of German manufacturing companies in the electrical engineering and machinery industry to be involved in standards development organizations. First, we present the general motives for the formation of strategic alliances and relate them to specific standardization motives. Then, we identify pursuing specific company interests, solving technical problems, knowledge seeking, influencing regulation, and facilitating market access as motives to standardize by means of factor analysis. In a second step, we test hypotheses on the relationship between the importance of strategic motives and firm level variables, e.g. R&D intensity, innovation activities, and firm size. The results reveal that firms in electric engineering and machinery have a particularly strong interest in ensuring industry-friendly design of regulations, which can be achieved by standards. Moreover, the results confirm that small firms also from these two sectors are active in standardization alliances to access knowledge from other involved stakeholders.

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1. Introduction

Firms' involvement in standards setting alliances is attracting increasing attention within industry, among policy makers and researchers (Choi et al., 2011; European Commission, 2008). A firm participating in standards development organizations (SDOs) can increase its competitiveness by actively influencing standards towards its own preferred specializations or by passively gaining knowledge from the standardization process (e.g. Sherif, 2015). Our analysis identifies firms' specific strategic motives related to their involvement in standardization committees and their relation to companies' characteristics.

For policymakers, standards – the results of the standardization process – play an important role in internalizing externalities and achieving international trade liberalization. In the European Union (EU), the introduction of the 'New Approach' to technical harmonization aims to establish a European Single Market by prescribing essential health and safety requirements in harmonized standards. At the global level, international standards gain importance through Agreement on Technical Barriers to Trade of the World Trade Organization (WTO) (Büthe and Mattli, 2011; Mattli, 2001; Sykes, 1999).

Given the fundamental impact of standardization on growth (Blind and Jungmittag, 2008), policymakers in industrialized and newly-industrialized countries recognize the importance of standardization for the competitiveness of their economies. Within the last decade, Canada, China, Germany, Japan, Russia, the UK, and the USA have implemented national standardization strategies (Hemphill, 2009; Limin et al., 2005). However, considering that standards are mainly set by private actors, surprisingly little is known about *firm-specific motives* towards their involvement in standardization. Existing literature on firm strategies in standards setting is limited to firms in industry consortia in the information and telecommunication sector (Chiesa et al., 2002; David and Steinmueller, 1994; DeLacey et al., 2006; Greenstein and Stango, 2007; Grotne, 2008; Ranganathan and Rosenkopf, 2014), on factors influencing standards battles (Shapiro and Varian, 1999), or dominant designs (Suarez, 2004), e.g., in the case of computer workstations (see e.g., Khazam and Mowery, 1994). Examples of a standards battle in SDOs is ODF vs OOXML within ISO (Blind, 2011). However, battles between de facto standards are more common, like VHS vs. Betamax (Cusumano et al., 1992 or Gallagher and Park, 2002), or Sony's Blu-ray vs. Toshiba's HD-DVD in blue laser DVDs (e.g., Gallagher, 2012). Only one recent case study attempts to capture firms' different motives to standardize in formal standards setting (Riillo, 2013). To this end, this paper is a first attempt to derive an empirically-based taxonomy of firms' motives in standardization alliances organized by officially-accredited

* Correspondence to: Technische Universität Berlin, Faculty of Economics and Management, MAR 2-5, Marchstraße 23, D-10587 Berlin, Germany.

E-mail address: Knut.Blind@TU-Berlin.de (K. Blind).

URL: <http://www.inno.tu-berlin.de> (K. Blind).

formal SDOs. We base our contribution on survey data collected among German firms in the electrical engineering and machinery industry that participate in national, regional (European) or international standards setting processes in formal SDOs. In contrast to other manufacturing sectors, like the chemical industry, or services sectors (Wakke et al., 2015), these companies are much more active in formal SDOs (Blind and Mangelsdorf, 2013) and have therefore developed more sophisticated strategies. The focus of our paper is on the formal standardization process as opposed to de facto standardization.

Whereas de facto standards emerge naturally through market processes, formal standards arise out of voluntary open and transparent, consensus based standardization processes of interested parties organized by SDOs. Formal standards therefore have greater legitimacy, especially in Europe, and are often of a higher quality (Belleflamme, 2002; Leiponen, 2008). Consensus-based standards represent coordination within an industrial segment (Rysman and Simcoe, 2008), despite occasional standard was even their occurrences are less likely that in the case in de facto standards (e.g., Gallagher, 2007; Schilling, 2002; Shapiro and Varian, 1999; Shurmer and Swann, 1995; Suarez, 2004). Moreover, formal SDOs in Europe – as opposed to rather informal consortia – are characterized by government recognition. In the EU, formal European and national SDOs are recognized by Directive 98/34/EC. Concurrently, the WTO Agreement on Technical Barriers to trade requires member states to establish ‘enquire points’ for information requests regarding technical regulations, standards, and conformity assessment procedures (WTO, 1995). This means that formal standards become legal requirements when governments mandate the development of technical specifications to standardization alliances organized by formal SDOs (Tassey, 2000).

With the exception of Axelrod et al. (1995) and Riillo (2013), who focus on the role of company size, and Van de Kaa and De Bruijn (2015), who identify the incentives for consensus building, companies’ strategic motives to participate in standardization have yet not been comprehensively investigated, nor empirically validated. Consequently, the aim of this paper is twofold. First, we seek to derive a parsimonious set of motives for firms to participate in standardization alliances based on the large body of literature on strategic alliances. Second, we conduct a study on the explanatory factors for these motives by focusing on company specific variables including R&D intensity, innovation related activities, and company size.

The remainder of this paper is organized as follows. The second, subsequent section gives an overview of the literature, where we define the basic terms used throughout the paper and link general motives of alliance formation to specific standardization motives. In the same section, we formulate hypotheses about the relationship between companies’ characteristics and standardization motives. In the third section, we provide descriptive statistics of our company sample and show the importance of various standardization motives. Next, we reduce the set of standardization motives with the help of factor analysis in order to derive a typology. The resulting factors are then explained in multivariate ordinary least squares (OLS) models, which help us to reveal the relevance of company specific characteristics for specific motives. In the last section, we show how our research contributes to the literature, summarize our results and derive a set of implications and recommendations for standardization management and policy.

2. Literature overview and hypotheses

In this section, we first define basic terms used in the paper. Then, we give general definitions of strategic alliances and show why standardization committees are a specific type of strategic

alliance. We employ a literature survey where we combine the two streams of literature, i.e., the review the literature on motives to form strategic alliances (the general issue) and link them to standardization motives (the specific issue). The resulting list of motives to participate in standardization alliances is tested in our empirical analysis in the following sections. Finally, we develop some general hypotheses regarding the relationship between company characteristics and the importance of standardization motives in an area missing both a comprehensive theoretical framework and empirical investigations in Section 2.2.

2.1. Strategic alliances and standardization alliances organized by SDOs

2.1.1. Definitions

Strategic alliances are defined as ‘inter-firm collaboration over a given economic space and time for attainment of mutually defined goals’ (Glaister and Buckley, 1996). They can be classified according to geographical (i.e., national versus international) and industry scope (i.e., intra- versus inter-industry) and to functional areas. The functional areas encompass several activities in the economic value chain, i.e. from joint R&D and technology development to manufacturing alliances and marketing (Varadarajan and Cunningham, 1995). The alliance governance literature has identified strategic alliances as opportunities for interfirm knowledge transfer (Kogut, 1988; Hamel, 1991; Doz, 1996). Learning from external sources has become a central factor for business success: successful transformation of information enables firms to exploit external knowledge internally for new product development (Cohen and Levinthal, 1990; Zahra and George, 2002). Successful knowledge acquisition from alliances is positively related to firm performance and innovation (Van Wijk et al., 2008).

The following three characteristics are conditions for inter-firm collaborations to be considered as strategic alliances: (1) the partner firms remain independent after the formation; (2) the partner firms share benefits and control over the performance of assigned tasks; and (3) the partner firms continuously contribute to the mutually-defined strategic areas (Yoshino and Rangone, 1995). Standardization alliances qualify as strategic alliances (Blind and Mangelsdorf, 2013), because they satisfy these three conditions. Based on a consensus decision making process in committees, participating firms share control and benefits of the content of the specifications. Finally, standardization – defined by De Vries et al. (2003) as the development or revision of a standard or a cluster of related standards – involves a continuing contribution by participants, especially in the form of technical expertise.

Although standardization is considered as a form of strategic alliance organized by formal SDOs, they feature specific elements compared to other alliances and industry consortia. First, standardization alliances organized by SDOs are characterized by heterogeneity of participants. Beside firms, consumer organizations and government take sometimes the opportunity to get involved in standardization (De Vries and Slob, 2006). Second, outcomes of standardization alliances – the technical specifications (standards) – have public good characteristics that may lead to free riding behavior and non-participation in standards setting alliances (Cabral and Salant, 2014). However, incentives for participation exist because engagement in standardization can generate private benefits in the form of knowledge spillovers and reduced costs related to the implementation of the produced standards (Blind, 2004). Third, SDOs follow a variety of different rules (Chiao et al., 2007) that influence the degree of openness, the level of consensus and the treatment of intellectual property rights in the standards developed. In general, formal SDOs provide a *neutral* platform – neutral in the sense that the SDOs do not influence the standards setting process itself.

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