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Development and prospects of standardization in the German municipal wastewater sector ☆

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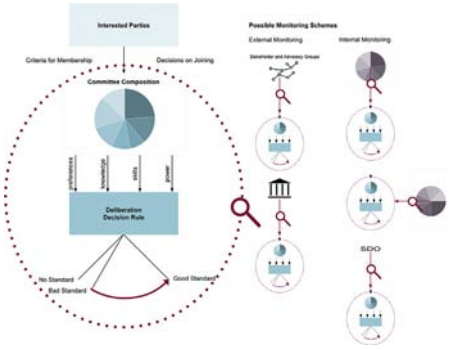
HIGHLIGHTS

- Improvement of rules on standardization in German wastewater sector over time
- Scope for improvement with respect to committee decision-making and committee composition
- Monitoring scheme possible means of enhancement
- Consideration of internal and external organization of monitoring

GRAPHICAL ABSTRACT



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ABSTRACT

Given the significance of wastewater treatment and disposal for society and the economy together with the omnipresence of standards in the sector, we studied the development and prospects of the rules governing standardization in the German municipal wastewater sector. We thereby provide a detailed description of sector-specific committee-based standardization and significantly contribute to the understanding of this complex arena.

We find that the German Association for Water Wastewater and Waste (DWA) has significantly improved its rules on standardization over time by aligning them closer to the generally accepted superordinate standardization principles. However, by focusing on theoretical findings of committee decision-making and committee composition, we argue that there is still scope for improvement with respect to rule reading and rule compliance. We show that the incentives at work in standardization committees are manifold, whereas the representation of the different stakeholder groups needs' remains unbalanced. Due to vested interests and potential strategic behavior of the various agents involved in standardization rule compliance does not necessarily happen naturally. To this end, we claim that the implementation of monitoring mechanisms can be a significant contribution to the institutional design of standardization and briefly discuss the advantages and disadvantages of different schemes. Finally, we show that there is ample need for future research on the optimal design of such a scheme.

Even though the analysis relates specifically to the DWA our claims apply to a wide range of standards development organizations.

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1. Introduction

Technical standards, developed by committees in so called standards development organizations (SDOs), are a necessary means of structure and, hence, are essential to a well-functioning economy, even more so in a world of increasing technological variety and complexity. They are so to say guidelines for compliance with legal norms and administrative provisions or for solving certain technical problems. However, standards are not neutral technical descriptions and instructions, but rather arise as a result of complex negotiation processes (Mai, 2011). Amongst others, incentives, bargaining power, intrinsic motivation, incomplete or asymmetric information as well as personal judgment of the parties concerned, influence standardization processes and, hence, ultimately their outcomes, i.e. the actual standards. This, together with the omnipresence of standards, make a thorough understanding of standardization processes as well as the rules on committee composition in SDOs necessary.

However, to put it in the words of Simcoe (2014), SDOs are

> multifaceted institutions, and there is no standard economic model of how they work (Simcoe, 2014).

To this end, a prerequisite for a better understanding is an insight into different kinds of SDOs, i.e. not only official SDOs as for example the German Institute for Standardization (DIN, *Deutsches Institut für Normung*) or the official European standards body CEN (European Committee for Standardization, *Comité Européen de Normalisation*), but also sector-specific SDOs.

Whereas the main body of sector-specific analyses focuses on the ICT sector, there is still a lack of studies addressing other sectors. Böhm et al. (1998), for example, is the only comprehensive study the authors are aware of on standardization in the (German) wastewater sector. Here, a significant part of technical standards is developed within the German Association for Water, Wastewater and Waste (DWA, *Deutsche Vereinigung für Wasser, Abwasser und Abfall*).

Several features, characteristic to the wastewater sector, make it valuable to conduct a sector-specific analysis. Wastewater disposal and treatment is of major significance to the economy and society. As an important part of the environmental sector it clearly influences economic welfare. At the same time, it has direct influence on individual well-being. The increasing demand for health but also environmental protection measures as well as the growing need for fostering sustainability greatly impact on the wastewater sector and vice versa. Sustainability in a holistic sense may, however, only be facilitated if ecological and social goals are reached cost- and resource-efficiently. Yet, the centralized municipal wastewater sector constitutes a natural monopoly.[1] To this end, there are limited means counteracting the disregard of efficiency considerations in the development of standards. Whereas, market forces counterbalance these effects in competitive sectors, in sectors like wastewater there exists a tendency to overvalue effectiveness, since this improves the reputation of SDOs as well as public utilities and additional costs can be transferred to customers comparably easily (Oelmann, 2005).

Also, with public sanitation being part of the public sector, public procurement and its interrelation with technical standards play a significant role and further increases the relevance of standards in the sector.

In addition, with wastewater utilities being local monopolies together with the legal obligation for connections to the sewage system, particular attention is due to the incentives to innovate in the wastewater sector. Blind et al. (2017) show that standards, as opposed to regulation, negatively impact on innovation in markets with low uncertainty and *vice versa*. In their analysis market uncertainty is related to the perception of the predictability of technological developments in the market together with the possibility to pre-assess the benefits of a product before purchase. In comparison with other sectors, like for example the ICT sector, uncertainty in the wastewater sector with its long-lasting infrastructure, exhibits less uncertainty (even though it has surely increased in recent years — and will continue to increase — due to, e.g., digitalization or the necessity of the industry to adapt to the consequences of the climate change).

The aim of this paper is to contribute to a better understanding of the working of sector-specific committee-based standardization by providing a description of standardization in the DWA as well as an analysis of the development and prospects of the rules governing the standardization process. We highlight the complexity of the standardization process and the significant influence of the design and conduct of the standardization process on the resulting standards. Finally, we argue that, no matter how sophisticated the rules on standardization may be, improvements with respect to rule reading and rule compliance can still be made and deduce that this does not happen naturally, such that a monitoring scheme appears to be a natural prerequisite. In line with the adopted research approach the remainder of this paper is structured as follows.

Firstly, we conducted a detailed literature review (Section 2). Thereby, we define the relevant classes of standards and standardization for the problem at hand and briefly discuss the legal framework in which German sector-specific standards development organizations as the DWA operate. In a next step, we identify and discuss possible areas of improvement concerning standardization which may be approached — at least to some extent — by SDOs themselves through intra-organizational rules and guidelines.

Secondly, we carried out an in-depth analysis of the development of the rules governing standards development in the DWA (Section 3). We introduce the organization DWA and describe the rules and guidelines governing DWA standardization as well as their development and prospects. In a next step, we discuss DWA standardization in the light of the findings of Section 2.

Finally, Section 4 concludes.

2. Related literature

2.1. Standardization research

Various aspects of standards and standardization have been addressed in the literature. In fact, the strand of economic literature on standardization in general[2] began to evolve, apart from a few early exceptions, in the mid-1980s. In particular, the author teams Katz and Shapiro (1985, 1986), Farrell and Saloner (1985, 1986) but also David (1985) motivated the development. Swann (2000) subdivides the literature into eight areas. The early literature focuses mainly on (1) the classification of standards and (2) their development in market-based processes. Work on (3) standardization in SDOs and (4) the comparison of the two approaches was intensified in the late 1990s. Likewise, (5) standard diffusion and the effects of standards on (6) the macro-economy, (7) companies, and (8) consumers was not the field of attention of the early studies. Recently, the number of studies addressing more than one of these areas at the same time seem to be on the rise. Blind and Gauch (2009), for example, in their study on standardization in nanotechnology, develop a new classification scheme linking functional categories to stages in the innovation process (1&7). Wiegmann et al. (2017),

[1] A market is said to be a natural monopoly if meeting demand is more costly in the case of multiple firms than in the case of a single firm.

[2] For a comprehensive literature review, see, e.g., Swann (2000) together with Swann (2010).