

Navigating Soundscape Standardization: Understanding Barriers to the ISO 12913 Implementation

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ABSTRACT

This paper explores challenges and opportunities surrounding the implementation of the ISO 12913 series on soundscape, established by the International Organization for Standardization (ISO) to standardize definitions, frameworks, and methodologies for soundscape research. The study identifies barriers to engagement with the ISO 12913, at both organizational and operational levels. Through semi-structured interviews with National Standards Bodies (NSBs) representatives and focus group discussions with soundscape experts, the paper unveils barriers such as a lack of national interest, resource constraints, and insufficient awareness and literacy about soundscape theory. This study offers an opportunity to the broader field of environmental standards, giving practical insights for overcoming barriers and promoting the (further) adoption of ISO 12913 for healthier acoustic environments.

1. INTRODUCTION

The benefits of implementing standards in organizations are widely recognized to provide a level of rigor and specification in the operation of businesses, guiding the manufacture, quality assessment and communication of products and services [1]. The International Organization for Standardization (ISO), as a network consisting of National Standards Bodies (NSBs) produce standards for common and repeated use. Although ISO standards are voluntary, a considerable implementation of ISO documents is witnessed in industry and public sectors as benchmarks for best practice [2]. However, limited research is normally conducted to examine the success and implementation process of “new” ISO standards, and what barriers there may be in this process, at national level. Over the past few decades,

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research into the concept of “soundscape” has spread across many scientific areas such as sustainability studies, urban planning, architecture, etc. This has gone beyond the initial inquiries in the area of acoustic ecology, to understand the human and sound relationships in the built environment, looking at ways to preserve culturally valuable soundscapes and create positive soundscapes for restoration purposes [3–5].

Aiming to establish standardized methods for data collection, analysis, and interpretation, the ISO launched in 2008 the Working Group 54, within the ISO Technical Committee 43, Sub-Committee 1 *Noise* (ISO/TC 43/SC 1/WG 54), with the task of developing the ISO 12913 series on Soundscape. This standardization proves particularly valuable for urban planning, architecture, and environmental management, fostering the creation of healthier, more pleasant, and sustainable acoustic environments [6]. The ISO 12913 series, consisting of several parts, aims to foster a broad international consensus on the definition of “soundscape,” laying the groundwork for interdisciplinary communication and professional collaboration. Part 1 [7] of the series, alongside the Technical Specifications of Part 2 [8], provides a definition of soundscape and an elementary framework, offering methods to explore and measure both physical, psychological, and psychoacoustic parameters. Part 3 [9] was subsequently published, as Technical Specifications, in response to the data collected via the methods outlined in Part 2. Currently, Working Group 54 is actively developing Part 4, which will introduce methods for designing, managing, and implementing soundscape interventions [10]. Since the publication of Part 1 in 2014, the ISO 12913 series has significantly influenced soundscape research, particularly in the realm of the built environment [11–13]. The impact of the soundscape approach now extends beyond academia, influencing environmental policy documents such as the Noise and Soundscape Action Plan 2023–2028 in Wales (UK), and related regulatory frameworks [14,15]. Furthermore, assessment methods outlined in ISO/TS 12913-2:2018 are increasingly adopted by soundscape researchers and practitioners [16]. However, such implementations remain predominantly localized to some countries, raising questions regarding the barriers to broader engagement with ISO 12913 development guidelines among diverse stakeholders, including National Standards Bodies (NSBs) in the first place, in different regions of the World. This study aimed to address these gaps by carrying out one-to-one interviews with representative from ISO National Standards Bodies (NSBs), as well as a focus group with stakeholders from industry and other sectors [17].

2. MEMBERSHIP OF ISO/TC 43/SC 1/WG 54

Based on reports from Working Group 54 “Perceptual assessment of soundscape quality” spanning from 2008 to 2022, it was possible to map out the allocation of experts from national standards bodies to identify countries that weren’t actively participating in the development of the ISO 12913 series [17]. This was done to ensure a balanced representation of participants for the subsequent focus group with experts and the one-to-one interviews with National Standards Bodies (NSBs), with both active and non-active engagements. Figure 1 illustrates that certain NSBs consistently appointed experts over the years (such as the USA, UK, Japan, Germany), while others showed intermittent involvement (like Italy, Sweden, New Zealand), and some NSBs have recently increased their engagement with the development of the ISO 12913 series by appointing new national experts to the Working Group 54 (for instance, Spain, China, Turkey).

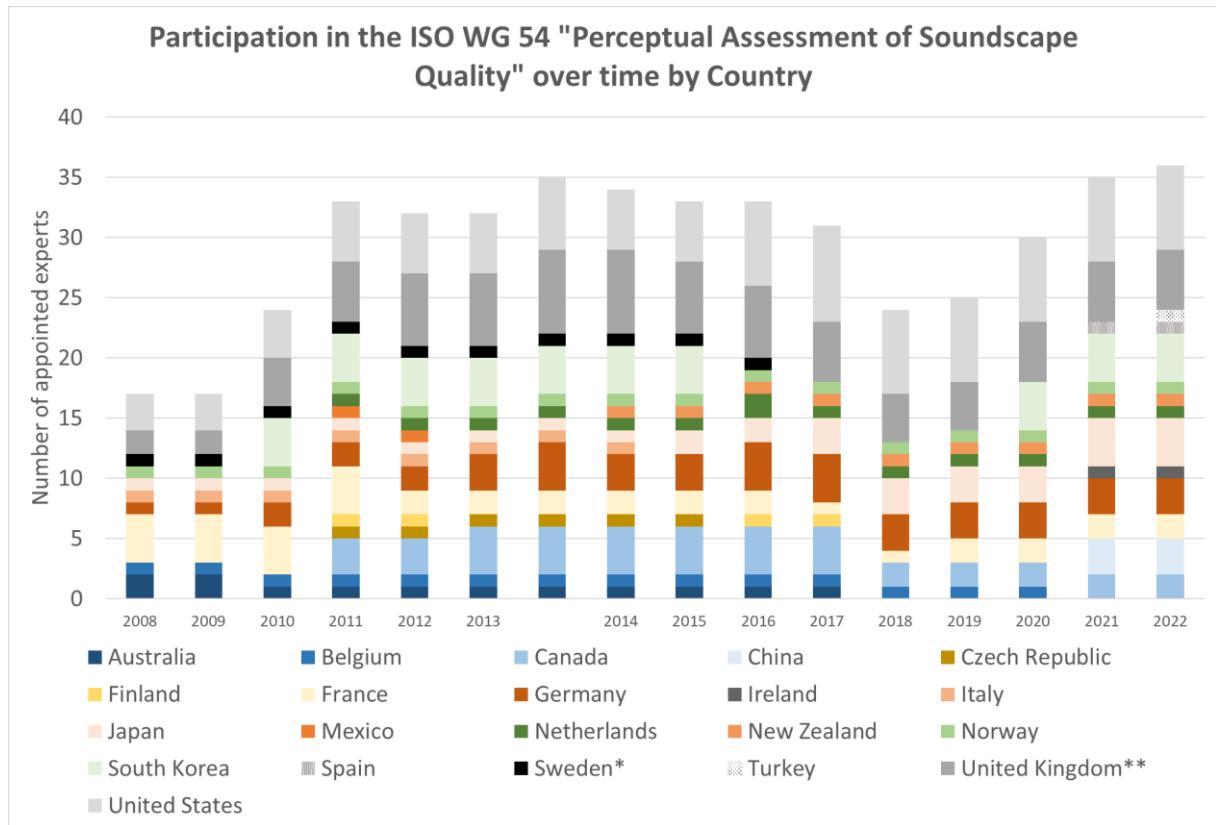


Figure 1: The number of experts appointed by different National Standards Bodies (NBS) to participate in the ISO Working Group 54 between 2008 and 2022, stratified by countries (image sourced from [17]).

3. METHODOLOGY

A two-stage data collection was planned for this study, with one-to-one interviews with representatives from NSBs (based on different levels of engagement with ISO 12913 series development as per Section 2), and a focus group session with different stakeholders in soundscape research and practice, from industry, academia, and non-governmental organizations [17]. The study was approved through the Research Ethics Committee at Faculty of Art, Design and Media, Birmingham City University, UK (approval no. 10619). All participants received a participant information sheet and provided informed consent in accordance with the Declaration of Helsinki.

3.1. Interviews with NSBs representatives

An invitation email was sent to all publicly available contact points of the ISO Members National Standards Bodies (N = 127), retrieved from the ISO website, soliciting interviews with representatives or experts in the field from their respective organizations. A total of 14 responses were received. Ultimately, 12 representatives from NSBs across 9 countries participated in the interviews. The interviews were conducted online via Microsoft Teams between May and June 2022. The questions posed addressed the social context of standards development and implementation across countries, covering topics such as the process of appointing experts to join ISO working groups, awareness of, interest in, and involvement with the ISO 12913 Soundscape series development, and barriers to implementing the ISO 12913 Soundscape series at the policy level, as reported in Table 1.

Table 1: Outline and Questions for the semi-structured interviews with representatives or National Standards Bodies (NSBs) [(sourced from .[17])].

Initial steps	Prompts for discussion
<ul style="list-style-type: none"> • Thanking for participation; confirming participant information sheet has been read and consent provided. • Confirming OK to video-record and data will only be used for transcription and note taking. • Explain who we are and why we are doing this: "We are a group of researchers currently involved in the development of the ISO 12913..." 	<ul style="list-style-type: none"> • Could you please confirm your name and affiliation and what is your role and/or involvement with your national standardization body? • How does the appointment of experts to ISO working groups work for your organization? Are there any limitations? • In general, how does your organization decide if/when to participate in a specific technical committee and working group? • Are you familiar with the ISO 12193 series on soundscape perception? Have you ever come across it in the context of your role at your organization? • From what we can see from ISO data, your organization hasn't engaged too much or at all in the WG54: why do you think this is the case? What are the barriers? • In your opinion, what could encourage your organization in the future to engage with ISO12913 and WG54?)

3.2. Focus group with stakeholders

Through purposive sampling, experts in the field were contacted via the authors' professional network to arrange the focus group. Invitations were extended to 23 soundscape experts and stakeholders who had either published extensively in the field, or actively contributed to the development of the ISO 12913 series, spanning 15 countries. Twelve of these experts accepted the invitation, with nine ultimately participating in a focus group discussion conducted online via Microsoft Teams in June 2022. The remaining three experts, unable to attend the scheduled session, were interviewed separately on alternative dates. The focus group discussion was structured into two stages, commencing with a brief introduction outlining the study's background and objectives, followed by sequential exploration of three key questions: 1) What are the barriers that prevent people from engaging with the development process of ISO 12913 soundscape series? 2) How can we respond to remove these barriers? 3) How can the ISO 12913 be used more innovatively to make wider impacts?

4. RESULTS AND DISCUSSION

The interviews and the focus group sessions were videorecorded, and their verbatim transcripts were further processed for thematic analysis by the authors. The thematic analysis conducted on the transcripts involved several key methodological approaches to ensure a comprehensive understanding of the discourse. Firstly, a systematic reading of the

transcripts was performed by the authors to familiarize themselves with the content and identify recurring themes. Next, segments of the transcript were analyzed based on their content, focusing on explicit statements regarding challenges, solutions, and perspectives on soundscape standardization and implementation. Throughout the analysis, attention was paid to the context and nuances of participants' statements to ensure a nuanced interpretation of the discussion. Finally, the themes were synthesized into a coherent narrative.

4.1. Outcomes from the interviews with NSBs representatives

The interviews conducted with representatives from various National Standards Bodies provided valuable insights into the processes, challenges, and perspectives regarding engagement with the ISO 12913 series development. Across different countries, a common theme emerged regarding the mechanisms for appointing representatives to engage with ISO working groups. While some countries have formal processes in place, such as proposing representatives to the ISO or relying on recommendations from national committees, others lack clear procedures, resulting in *ad hoc* selection methods.

Several other challenges hinder effective engagement with ISO 12913 development. These include limited awareness and understanding of specific standards, resource constraints, language barriers, and time zone differences. Additionally, there is a disparity in the level of interest and expertise among national stakeholders, with certain technical areas getting more attention than others. Notably, the concept of soundscape is relatively novel in some countries, leading to a lack of expertise and awareness, which impedes meaningful participation in relevant ISO working groups.

Despite these challenges, there is a consensus among interviewees regarding the importance of promoting awareness, building capacity, and fostering collaboration to enhance engagement with ISO standards. Suggestions included organizing workshops, providing training, translating standards into local languages, and facilitating networking opportunities to bridge the gap between national stakeholders and international standardization efforts. Furthermore, there was a call for increased support for developing countries to facilitate their participation in ISO activities and ensure their voices are heard in the standardization process. Overall, addressing these challenges and implementing proactive measures can facilitate greater involvement and contribute to the development of robust international standards that reflect diverse perspectives and expertise.

4.2. Outcomes from the focus group with stakeholders

The analysis of the focus group transcript revealed a comprehensive discussion on the challenges and potential solutions regarding the standardization and implementation of the soundscape approach. Participants expressed concerns about the opaque process in for experts appointments to working groups in some countries, where the absence of a dedicated acoustics committee complicates approval. Resistance within the community arises due to resource allocation concerns, emphasizing the need to demonstrate the value generation potential of soundscape-related standards.

Regulatory bodies' reliance on traditional metrics like decibel levels poses challenges in convincing them to adopt new standards. The conversation underscored the importance of quantifying the value of positive soundscapes and noise reduction in social, economic, and environmental terms. Participants advocated for holistic cost models to showcase the benefits of soundscapes alongside traditional noise metrics, drawing parallels with successful economic analyses driving policy changes at local levels.

Interdisciplinary collaboration emerged also as a recurring theme, with participants recognizing the need to integrate soundscapes frameworks with other disciplines such as health, urban development, and experiential design. They proposed involving other disciplines in developing and applying soundscapes standards to address multi-dimensional

challenges. Additionally, they emphasized the importance of evidence-based approaches and efficient knowledge exchange platforms to track progress and address knowledge gaps.

Overall, the discussion stressed the complex challenges surrounding the soundscape approach standardization and implementation. However, it also highlighted the potential for interdisciplinary collaboration and evidence-based approaches to lead to progress in the field.

5. CONCLUSIONS

The findings from this work highlight significant barriers holding back the engagement with ISO12913 standards on soundscape among NSBs. These include:

- Limited awareness about Working Group 54 and the concept of soundscape.
- Insufficient national interest in urban noise or acoustic environmental qualities.
- Constraints on public resources, hindering participation in the development process.

Furthermore, experts identified key obstacles via the focus group session to broadening participation and impact:

- Scarce practical examples of applied soundscape research.
- Hierarchical structures within the policy-making process.
- Diverse interpretations of the soundscape concept across disciplines.
- Challenges in the timely translation of standards.

This project facilitated dialogues with national standards bodies, offering valuable insights into their organizational processes. Notably, such engagement efforts have resulted in five additional members being appointed as national experts in their respective countries by their NSB to the Working Group 54 for ISO 12913 standard development on soundscape—specifically in China, Spain, Portugal, Ireland and Türkiye. Their appointments stand as tangible evidence of this project's impact beyond academic circles. Moreover, this project underscores the urgent need to establish an international network comprising soundscape researchers, practitioners, and policymakers. Such a network is essential for addressing the barriers hindering engagement with the ISO 12913 soundscape series effectively.

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