Analysis of Standardization Activities for City Resilience From Research Projects:
A Literature Review

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ABSTRACT

Building resilience in cities requires, among other things, translating relevant research findings into practice at the city level. In this regard, standardization is an effective means of supporting the dissemination of research findings on particularly complex topics such as city resilience. To evaluate the scientific landscape on standardization activities for city resilience from research projects, a literature review was carried out using the Web of Science database. Only 6 of the 22 articles identified actually relate to city resilience and standardization, and a further 23 articles were found on so-called Workshop Agreements to provide evidence of the use of standardization activities in research projects in general. They were mainly published in the last five years and dealt little with standardization. The results confirm the lack of relevant scientific publications, and therefore, research should focus on standardization activities in research projects in general and on city resilience in particular.

KEYWORDS

CEN, City Resilience, ISO, Research Project, Resilient Cities, Smart Cities, Standard, Standardization, Urban Resilience, Workshop Agreement, WoS

INTRODUCTION

The importance of standards and standardization for the various phases of the innovation process was already described several years ago (e.g. Blind, 2013). Other literature focuses mostly on the economic benefits of standardization (e.g. Blind et al., 2011) or the general relationship to innovation in various domains (e.g. Blind et al., 2016). Within research projects, however, the topics of standards and standardization play no or only a very minor role. This has changed significantly in recent years.

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In this context, Sanjuán et al. (2011) already pointed out more than 10 years ago how important it is to consider standardization during all phases of a research project. Almost simultaneously, research projects began to systematically use existing standards to review the state of the art in their field of research and to conduct standardization activities to transfer their project results into new standards (e.g. iNTeg-Risk, 2021). This was triggered by new European Commission regulations promoting standardization as a tool to support the dissemination and exploitation of research projects (e.g. European Commission, 2018). Nevertheless, most researchers are still not aware of the benefits of standards and standardization for their projects. Bringing together relevant stakeholders on a particular research topic is one of the main benefits that standardization offers, especially for complex topics (e.g. Lindner et al., 2021a). For example, city resilience is such a broad topic that it requires the involvement of a wide range of stakeholders to achieve.

The topic of city resilience was already introduced several years ago. However, it has come into the spotlight more than ever due to the recent floods in Europe, which caused the highest number of deaths from a natural hazard in Germany in almost 60 years (Fekete & Sandholz, 2021), and due to the still ongoing COVID-19 pandemic (e.g. McCartney et al., 2021). However, existing approaches supporting resilience, such as the "Sendai Framework for Disaster Risk Reduction 2015-2030" (UNDRR, 2015), or various resilience-enhancing tools derived from research projects (e.g. SMR, 2021), have been available for years but have not had a significant impact on countries and cities to apply them to prepare for such crisis situations. For example, Fekete and Sandholz (2021) have already analyzed the gaps and challenges of the recent flood in Western Germany by sorting them according to the four different priority areas of the Sendai Framework. The difficulty of managing the large number of volunteers was one of the identified challenges during and after the flood. However, this aspect has already been addressed since 2017 in an international standard, the ISO 22319 on 'Security and resilience - Community resilience - Guidelines for planning the involvement of spontaneous volunteers' (ISO, 2021).

In addition, research projects on city resilience have involved cities to varying degrees in the development and implementation of resilience-enhancing tools. These and related research usually have the difficulty of effectively engaging cities, as they are often unable to participate in joint resilience-enhancing projects due to the usual workload of cities. However, because the involvement of relevant stakeholders is critical to the success of a project, funding authorities such as the European Commission require the integration of end-users, such as city representatives, in the development of tools in research projects over several years (European Commission, 2015). This led, for example, to increased participation of cities in resilience-related projects. Furthermore, some projects used standardization to also verify project results with additional project external cities and further stakeholders. As a result of one of these projects, the CEN Workshop Agreement (CWA) series CWA 17300 on 'City Resilience Development' has been available since 2018 to support cities in their activities to become more resilient (CEN, 2021). Although there are some standards related to city resilience, they seem to be poorly known by cities. Nevertheless, relevant standardization committees have included resilience in their work programs to meet the demand of cities and communities for guidance to support their resilience building efforts. Further research activities to support the transformation of cities to become more resilient, as planned by the European Commission under Horizon Europe (European Commission, 2021a), can build the basis for new standardization activities and thus help to fill relevant research gaps (Zuccaro et al., 2020).

Figure 1 summarizes the three above identified gaps for city resilience.

As mentioned above, the literature landscape focuses mostly on the relationship of standards and standardization to innovation; literature assessing the relationship to research and research projects is lacking. But this type of research is necessary to analyze the possibilities of standardization for research projects and to provide researchers with more detailed information about standardization approaches for research projects. To address this problem and gain more knowledge about how the integration of standards and standardization is addressed in research projects, for example on city resilience, a systemic literature review is required. Therefore, this research explores the question of what literature exists that relates to the integration of standardization activities in research projects in

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