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Integrated Impact Assessment of Living Labs

Conceptual Framework, Approach and Methods applied in the LANTERN project

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Abstract

Switzerland aims for net-zero greenhouse gas emissions by 2050. Against this background, the LANTERN project uses urban Living Labs to co-design, test, validate, and scale up a portfolio of interventions that can contribute to a more user-empowered, decarbonized, resource efficient and sufficient energy consumption in Switzerland. An important component of this project is the development, test, and application of an integrated impact assessment.

However, an important limitation of the Living Labs approach that has been identified in the literature is that it has failed so far to convincingly demonstrate its impact.

To contribute to the discussion about how to overcome this gap, we are currently developing a conceptual framework with support of our project's different work packages and Living Labs using a co-design approach.

This Research-In-Progress paper will present the current state of the ongoing work related to the integrated impact assessment in the LANTERN project, thus providing the opportunity to receive feedback on our work in progress and to discuss our experience on the topic of impact evaluation of Living Labs with the other conference participants.

Key words

Living Labs, Energy, Integrated impact assessment, Conceptual framework, Methods, Socio-technical systems

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Introduction

In Switzerland, the Federal Council decided in 2019 to aim for net-zero greenhouse gas emissions by 2050 (Federal Council, 2019). To achieve this goal, technical and regulatory solutions but also the behaviour, social norms, acceptance and changing values of the various actors play a key role.

The LANTERN project uses Urban Living Labs to co-design, test, validate, and scale-up a portfolio of interventions that can contribute to a more user-empowered, decarbonized, resource efficient and sufficient energy consumption in Switzerland. It conducts research and development at the interface between markets, technology, policies, and society and assesses the relevance of socio-technical aspects towards sustainable ways of living and working whilst improving the quality of life. The 8-year project has an overall budget of CHF 33m and consists of a broad consortium

including at its initial stage five Urban Living Labs, five cities and other public sector institutions, seven public research institutions, forty-one companies and cooperation partners, and four associations. It reflects the diversity of the Swiss ecosystem and covers three linguistic regions with several of the country's main urban areas represented.

LANTERN and its Living Labs allow us to co-design, test and validate corresponding new services, programs and policies at different scales (e.g., in homes, institutions, districts, or city level) and therefore to develop and test pathways to achieve the objectives of national energy strategy and the climate plans. The country-wide potential will be established through the development of a strategy for scale-up. Furthermore, an explicitly designed evaluation framework aims at supporting the working plan of the Living Labs (van Geenhuizen, 2018).

Hence, an important component of the project is the development, test, and application of an integrated impact assessment. The assessment focuses on the impacts of the created service, programs and policies on different dimensions such as technology, economy, and society, and integrates these dimensions them while considering interactions and dynamics between the three dimensions.

Research gaps and objective

Research has shown that the impact assessment of Living Labs is challenging and needs to be further improved. First, there is not yet an evaluation method or framework that is generally accepted and used (Bouwma et al., 2022) and it is unclear how Living Labs can be operationalised and how their outcomes can be measured (Mbatha & Musango, 2022; Paskaleva & Cooper, 2021). Second, limited attention has been paid on how evaluation methods can contribute to future Living Lab performance (Vervoort et al., 2022) and how interventions through Living Labs contribute to sustainability transitions (von Wirth, Fuenfschilling, Frantzeskaki, & Coenen, 2019). Third, the assessment of Living Labs has mostly been done using qualitative and descriptive case studies. Quantitative methods and comparative studies are often missing (Schuurman, De Marez, & Ballon, 2015). And last, transitions inherently affect multiple domains but developing tools and methods that capture change across different domains is difficult both conceptually and practically (Williams & Robinson, 2020).

To address these gaps, we are currently developing a conceptual framework using a co-design approach involving our project's different work packages, its researchers from different disciplines, and Living Labs with its practitioners. We develop and discuss specific "Theories of Change" (ToC) of the projects different work packages and Living Labs. This allows us to consider the different contexts, objectives, approaches and needs and hence, to design a conceptual framework that allows integrating all key aspects in a holistic and specific way at the same time. Hereby, the assessment approach will consider the level of participant involvement and empowerment, time-series analysis, and long-term viability of the Living Labs (Bronson, Devkota, & Nguyen, 2021).

Method and Results

This Research-In-Progress paper will present the current state of the ongoing work related to the integrated impact assessment in the LANTERN project. First, we will outline the planned activities and expected impacts of the project. Second, we will present the challenges and opportunities for an integrated impact assessment, which we have identified based on a literature review and the ongoing project experience. Third, we will present the conceptual framework of the integrated impact assessment, which focuses on various dimensions such as technology, economy, and society, and integrates them by considering interactions and dynamics between them. Fourth, we demonstrate the operationalization of the conceptual framework and its applicability by using a set of selected indicators. Lastly, we present the planned data collection procedure.

The originality of the approach lies in a cascading approach by which the Living Labs (as permanent entities, including some certified by ENoLL, Vervoort et al. 2022) are considered at a project level and at the interventions in real life settings. Instead of having one goal and with all pillars of activities being directed to it, we assume that the activities of the interventions will be connected in a way to be discovered through the co-design and to several outcomes, some of which some will be expected, and some others will be unexpected.

Based on the information presented in our Research-In-Progress paper, we would like to use the opportunity to receive feedback on our work in progress and to discuss our experience on the topic of impact evaluation of Living Labs with the other conference participants.

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