Framing improvements of public innovation in a living lab context

Processual learning, restrained space and democratic engagement

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ABSTRACT

Public innovation has received increasing attention in recent years. Experiments with new governance structures, such as New Public Management and New Public Governance, have challenged the traditional top-down, internally driven forms of innovation in the public sector and have entailed a search for new forms of open, collaborative and interactive innovation, implying a reframing of public innovation activities. However, introducing these new frames of innovation causes uncertainties in the public sector, necessitating better understanding of how public innovation can be changed to address societal needs. This paper uses materials from case studies of 21 public living labs across Europe to analyse the lessons that can be learned from public sector participation in living labs in terms of their contribution to reframing public innovation. The "frame" construct is used to analyse and provide an understanding of how participation in living labs helps public actors to reframe innovation and address public and societal needs. Three living lab framings for changing public innovation are identified (processual learning, restrained space and democratic engagement), and the degree of intensity of these framings with respect to involving stakeholders and addressing societal challenges is discussed. The paper contributes to knowledge of public sector innovation by extending previous accounts of how public innovation can be improved.

1. Introduction

In recent years, research has highlighted the role of innovation in public service development (Desmarchelier et al., 2019; Osborne and Brown, 2011; Torfing, 2019). Meeting societal challenges and addressing citizens' needs and expectations for high-quality and cost-effective services entails innovation (Fuglsang and Rønning, 2014; Torfing, 2019). Furthermore, the traditional top-down, internally driven approaches to public development and innovation have been challenged. New ideas of governance have been adopted, such as New Public Management (NPM) and New Public Governance (NPG), or networked governance (Hartley, 2005; Osborne, 2006; Stoker, 2006). Concepts such as open, interactive and networked innovation, co-creation, and collaboration have attracted increasing attention (Hartley, 2005; Hartley et al., 2013; Torfing, 2019; Voorberg et al., 2015). However, research has also emphasized various uncertainties about these approaches. For example, the public sector is risk-averse and may be unwilling to share failures or to invite other actors in (Osborne et al., 2020; Brown and Osborne, 2013). Interaction and collaboration can cause conflicts of interest or over-alignment amongst actors, which prevents action or critical thinking and is not conducive to innovation (Wegrich, 2019).

The current situation therefore calls for better understanding of how public service innovation is being reframed. This paper focuses on experimentations with living lab approaches to public innovation (Gascó, 2017) within real public problem–contexts. The research question is: How do these living labs, as a current phenomenon, contribute to framing public innovation? Living labs emphasize innovation by engaging user and stakeholder perspectives in developing public services (Gascó, 2017; Schuurman and Tõnurist, 2017; McGann et al., 2018). They seek to combine practical, professional and scientific knowledge in experimental problem-solving activities (Følstad, 2008). Living labs have further been designed to experiment with democratized and participative processes of innovation (Björgvinsson et al., 2012). Thus, they take a radically different approach to innovation than the top-down approaches associated with traditional public administration (TPA) and NPM, adhering instead to a networked approach (Hansen and Fuglsang, 2020). Living labs can further be seen as niche activities and as not mainstream in the public sector (Tõnurist et al., 2017; Nesti, 2017;

Ruijer and Meijer, 2020). As such, they may have more autonomy to experiment with, create and enhance innovation processes, potentially becoming more inclusive, experimental and being guided by social objectives, paralleling a transformative change approach to innovation policy more generally (Schot and Steinmueller, 2018).

The construct of framing is used to analyse how these actors engage in reframing public innovation. Frames are dynamically created yet historically persistent "guided doings" (Goffman, 1974; Cornelissen and Werner, 2014). They create foundations for policy action, connecting interpretations of past, present and future, and they evolve over time in response to circumstances (Schot and Steinmueller, 2018). Investigating how niches of living labs within real public problem–contexts imply varied framings of innovation may help to determine how public innovation is realistically being reframed in order to better address societal challenges.

We investigated 21 living labs across Europe. This paper's main finding is that at least three living lab framings of public innovation can be identified: processual learning (stressing internal learning effects for public managers and employees), restrained space (pushing for a lab-like environment that engages multiple stakeholders in networked interactions) and democratic engagement where innovation is controlled by social actors. We further discuss how these framings introduce different types of innovation—incremental-adaptive, systemic and proactive conceptual innovations—to public managers. Each of these frames also entails struggles of empowerment and confronts resistance to the living lab reframing approach. The paper thus extends previous accounts of how public innovation can be enhanced and reframed.

The paper is structured as follows. Section two presents the theoretical framework and reasons for analysing the living lab framing of public innovation. Section three then explains the study's methodology. Findings from the 21 case studies are presented in Section four, which also describes the three identified framings of public innovation. Section five discusses the results, Section six considers the limitations of this study and the implications for future research, and Section seven presents the conclusions.

2. Theoretical framework

The paper's theoretical framework combines public innovation theory with framing and living lab theory. These perspectives will be explained below.

2.1. Public innovation

There appears to be agreement in the literature (Arundel et al., 2019; Torfing, 2019; OECD, 2018) that innovation consists of at least two activities: (1) creating something new, and (2) implementing this new element in practice (Fuglsang, 2010). It follows that the newness must achieve impact and have replicable elements in order to be counted as innovations (Hartley, 2006; Torfing, 2019). Research shows that public managers understand innovation differently than do business managers. This causes problems for exploring and measuring innovation activities across sectors (Arundel et al., 2019). Public managers typically emphasize transformative change and "doing something better". As such, they take a normative approach to innovation. Further, they face difficulties in capturing the implementation part, since innovations are often implemented over long periods of time (Arundel et al., 2019). However, a fine-grained understanding of both incremental and radical forms of innovation is arguably needed in order to take account of the many facets of creating and supporting innovations (Arundel et al., 2019; Bloch and Bugge, 2013). Whether innovations are truly radical and transformative depends on whether and how society adopts them.

A related problem for research is that the literature has identified several types of public innovation that slightly differ from definitions applied to businesses. Windrum (2008) identified six types of innovation in public services: service, service delivery, administrative and organizational, conceptual, policy and systemic innovations. Of these, conceptual innovations (new world views, such as NPM) and policy innovations (new behaviors and intentions of public actors) appear to be particularly important for public innovation and particularly relevant to public managers (Arundel et al., 2019). Other types of public innovation mentioned in the literature include governance innovation (such as new forms of citizen engagement in innovation), and rhetorical innovation (new language and concepts in a service domain) (Hartley, 2005). Another related issue is the nexus of governance and innovation. Hartley (2005) argued that public innovation processes take shape according to three governance frameworks: (1) TPA, leading to large-scale innovation, implemented top-down; (2) NPM, leading to innovation as changes in organizational form and service innovation based on a market logic (competition, privatization); and (3) networked governance, with innovation happening at all levels through networking. The systemic character of public innovation as taking place across many actors, sectors and localities has further been stressed in research (Bloch and Bugge, 2013). Thus, overall, a framework of public innovation must capture combinations of incremental, systemic and conceptual innovation, recognizing that innovation can be transformative to varying degrees, and that normative frames matter for public employees and managers.

2.2. Framing innovation

Framing theory provides an approach to the interpretation of historical and institutionalized arrangements of innovation (cf. Hjelmar, 2021). It emphasizes how meaning-making is guided through cognitive and discursive frames. Frames provide schemas of interpretation, background understandings and guided doings (Goffman, 1974), such that people pay attention to certain problems and perform certain aspects of reality, ignoring other aspects and problems. Although such frames are continuously adjusted, they are also "regimes" —that is, relatively persistent over time and providing stability of meaning.

Cornelissen and Werner (2014) argued that framing can be dynamic. Dynamic framing is the ongoing construction of meaning through discursive activities in interaction with existing frames, for example, framing and reframing what it means to say that public innovation is efficient or effective. Engaging in problem-framing activities can challenge existing frames, mobilize actors and guide doings across multiple actors. Framing theory has been applied by some authors to describe innovations in terms of social groups' conscious framings and reframings of social practices to spur changes in persistent regime-structures (Geels and Verhees, 2011; Geels, 2014). It assumes that by providing new, strong interpretations of emerging practices, supporters of a frame can challenge other frames, make claims about institutional reform and request institutional changes. Frames can also be thought of as tacit problem frames beyond the articulation capability of single actors (Siltaloppi, 2015), for example, when actors implicitly direct attention toward taken-for-granted perceptions of efficiency in an organization.

Some authors within the field of socio-technical transition theory have posited that path-breaking framing activities emanate from societal niches (Geels, 2014; Martin, 2016; Ruijer and Meijer, 2020). A niche is defined as a protective space in which actors are shielded from pressures and conflicts and from which they can more effectively empower positive expectations about the future and claims for institutional reform: reframe the past, criticize existing frames and emphasize future options for innovation (Smith and Raven, 2012). Changes in societal structures arise from interplay between such niche-framing activities and exogenous changes to institutional structures in response to societal challenges (Geels, 2014). Fig. 1, inspired by Geels (2004), provides a heuristic model that describes living labs as niche activities amongst other activities in the public context pushing for governance and practice changes. The term "post-NPM" is used in Fig. 1 instead of NPG to indicate the undecided character and fragmentation of government experiments with governance structures. This creates openings for niches
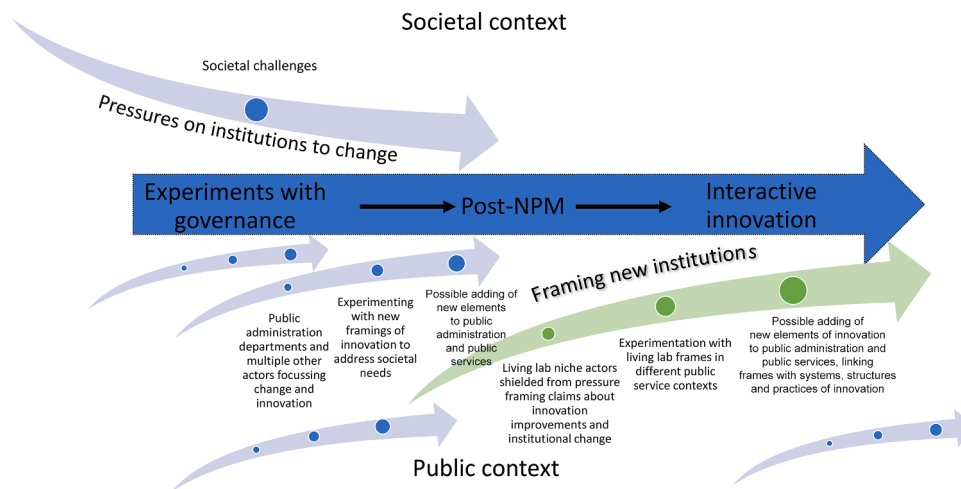
Fig. 1. Theorized model of institutional changes emanating from living lab niches (adapted from Geels, 2004).

such as living labs to contribute to the framing of public innovation. The model differs from Geels (2004) in one important respect: Public sector changes are seen as processes of adding heterogeneous elements to the public sector rather than necessarily crystalized into consistent regimes structures due to the undecided and complex character of the public sector dealing with problems from multiple angles.

Research using the conceptualization of niches has paid attention to whether and how niches achieve success in terms of building the niche and enabling significant changes (Schot and Geels, 2008). Niches that are likely to undergo development are usually broad and include multiple kinds of stakeholders and voices to facilitate second-order learning and changing the mindsets (Schot and Geels, 2008). However, case studies have indicated that niches are often organized in an overly contained and protected way, thereby disabling second-order learning and wider changes. Schot and Geels (2008) further argued for a multi-level approach to analysing successful niche building. Their research suggested that the journey from experiment to regime shift entails linking up with wider shared agendas and socio-technical landscape changes.

Based on these discussions, it is proposed that niche actors engaged in public innovation need to be engaged in broader agendas of public value creation (as opposed to market value). Public administration research has highlighted the role of public value for public services (O'Flynn, 2021; Hartley et al., 2017; Alford and O'Flynn, 2009). Public value is, however, difficult to define and measure since it concerns both the processes and outcomes of public activities including, for example, societal trust. Thus, public value is seen as dynamic and contested by multiple actors. In an approach developed by Benington (2011), public value concerns ongoing deliberations that seek to understand "what … the public most value" and "what adds value to the public sphere" (p. 31). It directs attention to actors involved in constructing and arguing for public value (Hartley et al., 2017). As such, public value is a "contested democratic practice"; what counts as public value is never settled in a stable way and actors can be in tensions (Hartley et al., 2017, p. 652). Following this, niche actors would be faced with wider questions and discussions of public value, and with what adds value to the public sphere. Living labs relate to this understanding of public value by framing an approach to engaging actors in dialogue about public value creation. As such, framing public value approaches directs first- and second-order learning and enables actors to confront resistance.

Interconnected research streams on social movements (Snow and Benford, 1988), transition theory (Geels, 2014) and institutional entrepreneurship theory (Battilana et al., 2009) have suggested decomposing the construct of the frame into three constitutive sub-frames to better analyse and explain how niche actors mobilize actors around a frame.

These are: (1) a problem (diagnostic) frame, (2) a solution (prognostic) frame and (3) and reasons-to-engage (motivational) frame (Snow and Benford, 1988). Some authors (Martin, 2016; Geels, 2014; Smith and Raven, 2012) have added that diagnostic, prognostic and motivational framings must translate into "empowering" actors (offering support and guidance), and confronting resistance towards niche activities. In the case of living labs, niche actors must confront the resistance of the public servants. Thus, the framing activity entails struggles of empowering and confronting resistance towards the niche. Based on these core ideas, it is suggested that such empowerment struggles revolve around contesting "publicness" and "public value": In order to contribute to niche development, confront resistance and empower actors, living lab actors need to articulate and argue how they are engaged with publicness of innovation and public value creation (Hansen and Fuglsang, 2020).

As further detailed in the method and finding sections (Sections 3 and 4), the paper identified three living lab framings: (1) Processual learning, which emphasizes internal learning effects in the public sector; (2) restrained space, which stresses pushing for a more lab-like environment with collaboration across multiple stakeholders on specific innovations; and (3) democratic engagement, which emphasizes the contribution of social actors to public innovation. The frames can be distinguished by the intensity of stakeholder involvement, —that is, whether stakeholders are more passive (frame 1), more collaborative (frame 2) or innovation is being controlled by external actors (frame 3), and whether the frame stresses internal learning effects (frame 1) or wider systemic innovations (frame 2 and 3). In the analysis, we use the above sub-frames to more deductively summarize the niche dynamics implied by the framings. Hence, the paper is about public and private actors aiming to convince public actors that to collaborate more (frame 3 and 2) or less (frame 1) intensively with stakeholders can improve public service processes, and moreover to show them how this can be operationalised.

2.3. Living labs

Living labs have been described as real-life platforms for collaborative innovation (Gascó, 2017; Dekker et al., 2020; Hansen and Fuglsang, 2020; Følstad, 2008; Schuurman and Tõnurist, 2017). They emphasize how users and stakeholders can be engaged in collaborative innovation activities. Living labs are in various ways depicted as collaborative frameworks for innovation: as structures for open innovation (Gascó, 2017); as frameworks for co-production with citizens (Nesti, 2017); as a methodology for public administration research on co-creating innovation (Dekker et al., 2020); as niches for experimentation with collaborative innovation (Ruijer and Meijer, 2020); as a way of putting together external stakeholders in public decision-making processes of solving social problems (Criado et al., 2021); and as tools for public value

co-creation (Hansen and Fuglsang, 2020). While the related constructs of innovation and policy labs rely mostly on professional teams, using design tools for ideating solutions at the front end within a community setting (McGann et al., 2018, 2019; Olejniczak et al., 2020), living labs pay more attention to the real-life context of experimentation and implementation (Schuurman and Tõnurist, 2017). However, this distinction is not absolute. There is no single generally accepted definition of public sector living labs. Gascó (2017), in a summary of research on living labs, defined them as "intermediaries of public open innovation" and "settings or environments for open innovation, which offer a collaborative platform for research, development, and experimentation in real-life contexts, based on specific methodologies and tools, and implemented through specific innovation projects and community-building activities" (Gascó, 2017, p. 91). The literature has concluded, amongst other matters, that some labs tend to focus the discovery stage (McGann et al., 2019); that there is a lack of clarity regarding how effective they are in feeding solutions into policy-making; and regarding how sustainable and durable they are (Olejniczak et al., 2020); that scaling up solutions from the niche requires extra resources and work through macro changes (Ruijer and Meijer, 2020); and that the experimental setting of living labs requires integration of development and outcome-orientated types of evaluation (Dekker et al., 2021). One strength of the living lab construct, which is also a weakness, is that it is an elusive and complex concept (Engeström et al., 2006); the living lab actors need to navigate a paradox of living labs as a playful environment in which they "make-the-world-together" and the need for conceptual clarity to develop the approach. As such, the construct fascinates and attracts many supporters, but it is difficult to develop it systematically as a specific methodology. In addition, little research has explored how actors of living labs reframe public innovation as such (however see Hansen and Fuglsang, 2020; Ruijer and Meijer, 2020; Criado et al., 2021).

Numerous experiments with living lab activities have been conducted across Europe. The living lab construct started to gain attention in 2006 due to European Union policy and funding. It focused initially on ICT policies (Ballon and Schuurman, 2015; Dutilleul et al., 2010) but subsequently extended to public service innovation. The formation of the European Network of Living Labs, which brings living lab actors together, makes it possible to speak of a global niche—that is, a niche supported by a network of actors (Smith and Raven, 2012).

3. Method

As Table 1 shows, 21 living labs from nine European countries were selected to study common themes using a cross-case analysis approach (Stake, 2006). The cases were chosen to provide as much variety as possible while focusing on a single unit of analysis (i.e., the living lab construct in the context of public innovation). Cases were selected to ensure that the following were represented in the sample: (1) large-scale public services and small-batch services; (2) cases organized by public, civic and private agencies; (3) formalized, less formalized and unformalized initiatives; and (4) cases targeting short-term and long-term challenges. The research strategy was to synthesize findings across cases by identifying common elements or frames. During the analysis, it became clear that there was more at stake across cases, and it is this synthesis that is presented via the three framings. Therefore, although there were 21 case studies, there are not 21 framings. Yet, it is clear that the emphasis on each of these framings varies within each case due to contextual factors. The purpose of the sample was thus to allow theorizing (Langley, 1999) on the logics behind the phenomenon (i.e., the living lab framings of public innovation). Data synthesis was an iterative, abductive, back-and-forth process between a theoretical understanding of framing strategies and the cases. This method is relevant when cases are complex and many dynamic and multi-directional causal feedback loops exist (Langley, 1999; Sørensen et al., 2013). While the general frames were inductively derived from the cross-case analysis, we

Table 1
Overview of cases.

Case	Country	Sector/ ownership	Public service/ temporal aspect	Acronym
IDES Living lab	Spain	NGO	Mental health care/ here-and-now	**ILL-E**
Guadalinfo	Spain	Public	Public broadband/long-term	**GD-E**
Library Living Lab	Spain	Partnership model: academia & municipality	Digitalization/ long-term	**LLL-E**
Living Lab of the Ministry of Economy and Finance	Italy	Public - central level	Digitalization/ here-and-now	**LME-I**
The Rome Heritage Lab	Italy	Public	Cultural heritage/long-term	**RHL-I**
PWC Experience Centre	Italy	Private	Citizen welfare/ here-and-now	**EC-I**
Torino City Lab	Italy	Public - regional/state level	Citizen welfare/ here-and-now	**TCL-I**
GovLab Austria	Austria	Public – federal level	Public administration/ long-term	**GL-A**
GovLab Arnsberg	Germany	Public – regional/state level	Public administration/ long-term	**GLA-G**
Verschwörhaus Ulm	Germany	Public – local government level	Digitalization/ here-and-now	**VU-G**
Wallonia e-Health Living Lab	Belgium	Public – relying partly on EU funding	Digitalization/ long-term	**WLL-B**
INSP	Denmark	NGO	Citizen welfare/ long-term	**I-DK**
Public Intelligence	Denmark	Private	Health care/ long-term	**PI-DK**
Aalborg Municipality	Denmark	Public - local government level	Elderly care/ here-and-now	**AM-DK**
StimuLab	Norway	Public	Citizen welfare/ here-and-now	**SL-N**
Norwegian Labour and Welfare administration	Norway	Public	Public administration/ long-term	**NLW-N**
L.I.V.E.	France	Public	Public administration/ long-term	**LIV-F**
SIILAB	France	Public	Digitalization/ here-and-now	**SII-F**
Autonom'Lab	France	Public	Elderly and disabled care/ here-and-now	**AU-F**
Erasme	France	Public	Digitalization/ long-term	**ERA-F**
Kraków Living Lab	Poland	PPP	Citizen welfare/ here-and-now	**KLL-P**

use the insights about empowerment struggles (Section 2.2.) more deductively as second order categories to summarize and discuss the case findings.

The data were collected by seven national researcher teams. Data collection followed common case guidelines for conducting interviews, observations and document analysis. After each national team had made its own initial selection of cases, the selections were reviewed by all teams to ensure a range of cases according to the case-selection criteria. Next, each team conducted interviews (group and/or individual) with and field observations of living lab managers, as well as policy-makers or top management involved in strategic framing (Table 2). In some cases,

Table 2
Data material.

Case	Interviews	Observations
IDES Living Lab	1 group interview with managers	One-day field study
Guadalinfo	1 group interview with managers and chat/brief exchange of views with front-end employees	One-day field study
Library Living Lab	1 in-depth interview with manager	One-day field study
Living lab of the Ministry of Economy and Finance	1 in-depth interview with public senior manager 1 in-depth interview with stakeholders	Field visit interviewing Observation
The Rome Heritage Lab	1 in-depth interviews with public manager	Field visit interviewing
PWC Experience Centre	1 interview with senior manager 1 interview with senior manager 1 interview with stakeholder	Field visit interviewing Observation
Torino City Lab	Semi-structured interviews with senior managers, policy makers and front-line staff (11 in total)	Online workshop Field visit
GovLab Austria	3 in-depth interviews with senior managers 1 in-depth interview with external user	None
GovLab Arnsberg	3 in-depth interviews with senior managers 7 in-depth interviews with board members	None
Verschwörhaus Ulm	4 in-depth interviews with public managers 4 in-depth interviews with volunteers	None
Wallonia e-Health Living Lab	1 in-depth interview with the director 2 in-depth interviews with managers of the CETIC research centre 2 in-depth interviews with managers in the Walloon Region administration 1 in-depth interview with a project leader of a project supported by the WeLL 1 in-depth interview with a key stakeholder from a business creation and development consultancy	Field visit
INSP	2 in-depth interviews with senior managers 3 in-depth interviews with employees 1 in-depth interview with external collaborator	Four days of participant observation
Public Intelligence	3 in-depth interviews with managers 1 in-depth interview with strategic partner	Field visit
Aalborg Municipality	3 in-depth interviews with public managers 2 in-depth interviews with external collaborators	Field visit
StimuLab	3 in-depth interviews with public managers 2 in-depth interviews with policy makers	Field visit and observation
Norwegian Labour and Welfare administration	2 in-depth interviews with top-level strategic manager at directorate level 3 in-depth interviews with managers/designers 1 in-depth interview with	None

Table 2 (*continued*)

Case	Interviews	Observations
	local manager 4 interviews with frontline employees in a local NAV office	
L.I.V.E.	4 in-depth interviews with public managers 3 in-depth interviews with external collaborators	Observations of 3 workshops
Autonom'Lab	1 in-depth interview with director/public manager 5 in-depth interviews with employees 1 in-depth interview with the former director manager	1 observation of a workshop with stakeholders
Erasme	2 in-depth interviews with public managers	None
SIILAB	3 in-depth interviews with public managers 1 in-depth interview with external collaborators 5 interviews with employees (student internship, civic service) during a workshop	2 observations (1 workshop with stakeholders, 1 standup with young employees)
Kraków Living Lab	4 in-depth interviews with policy makers 5 in-depth interviews with person responsible for initiatives	Field visit

front-line personnel and external collaborators/users were also interviewed—where these actors were judged critical for the framings of lab activities—to obtain information on the living lab in context. The interviews were recorded, fully or partly transcribed, and managed by each researcher team. The interviews and observations focused on several topics: the approach taken; the barriers and drivers of living labs; the value created by living labs; the role and motivation of employees and managers; the perceived role of public service users, citizens and communities; the role of the physical environment in creating value; how impact is measured; and the perceived role of the living lab in changing public sector services. The focus was on the internal workings of the living labs, since we wanted to capture the views and experiences of the niche actors promoting them. Each team also conducted document analysis to better grasp the approach taken. This analysis covered several topics, including the key terms applied, the definition of living labs, the understanding of co-creation, the main actors involved, and perceptions of objectives and success factors. Other techniques were also used, such as web search and photographing locations.

To conduct a cross-case analysis (Stake, 2006; Yin, 2014), the data were handled as follows. First, each research team reviewed and analysed the collected data according to the common case guidelines. Second, case reports were written for each case study based on recorded and fully or partly transcribed interviews, observations and documents. Third, the case reports were confirmed by the case organizations, which served to validate the data. Fourth, a synthesis report was written by the authors, which was validated by all the researcher teams and reviewed in depth by members of two teams. The report analysed the 21 cases by synthesizing findings from the case reports and providing an initial coding of the cross-case findings in terms of the three frames of living labs.

Fifth, research data from the case reports were revisited and uploaded to NVivo to search for framing themes. The initial coding was based on the synthesis report and included the three frames, but was iteratively elaborated in terms of diagnostics, prognostics, motivations, empowerment and resistance using NVivo. The three frames were further developed in an abductive process to ensure a general analysis across cases, grounded in the empirical material. The three frames were identified and nuanced during the analysis, and thus represent overarching

composite themes from the 21 case reports of the seven researcher teams and the synthesis report of the authors.

The following section will analyse in more detail the three identified frames for changing innovation practices. Rather than presenting unique data from each case, we explore the overarching strategic framings derived from the analysis. Framings are summarized in terms of the second order categories (empowerment struggles). In the discussion, we summarize and distinguish these framings in terms of the intensity with which they involve stakeholders in addressing societal needs and the different innovation types they introduce to public managers.

4. Frames of public innovation change

This section analyses the three frames for changing innovation practices. It explores the living labs from the point of view of the practitioners to capture the views and experiences of the niche actors promoting the living lab frames. The analysis below synthesizes perspectives across the 21 living labs through the three framings.

4.1. Frame 1: processual learning

First, living labs are framed as sites for processual learning integrated with everyday work. By participating in living lab activities, public employees can acquire skills that are not learned in traditional training programs. These include the skills needed to carry out innovation projects with many stakeholders in order to address public challenges, and several of the cases offer training environments for employees to learn such skills. For instance, GovLab Austria (GL-A) "offers a training program where they offer workshops for administrators to learn about project management and innovation approaches. This is important because it enables public servants to acquire skills they do not learn through their traditional administrative training" (GL-A, Extract from Case Report, hereafter referred to as ECR). Other cases, such as Public Intelligence in Denmark (PI-DK), rely on a strict innovation methodology that participants must learn or adhere to. One learning ambition for public employees is that they acquire the ability to absorb knowledge within an open ecosystem of many actors and apply it to improving administrative routines. Examples are Torino City Lab (TCL-I) and SII-LAB in France (SII-F), where the added value lies in revisiting the internal processes carried out by the administration, seeking to learn from an ecosystem encompassing external actors. In the case of the Italian Living Lab of the Ministry of Economy and Finance (LME-I), value is described as stemming from cross-interactions and knowledge exchange across agencies and other stakeholders, thereby improving internal administrative processes.

Second, and related to the above, living labs are envisioned as changing not only the skills but also the mindset of employees, making them more open to the opinions of citizens and other stakeholders. In this way, the living lab creates a new setting for the public sector in which open innovation is the core activity. Innovation should become "the default setting, [with] administrators that are open to new issues, [and] agency heads who manage administration by clear targets and do not micro-manage processes, [and] who accept change and transformation" (Head of GL-A). Employees and managers should become part of a learning culture, such that the living lab becomes a lifelong learning experience. For instance:

Wallonia e-Health Living Lab (WLL-B) … encourages the learning, openness and exchange of knowledge. This is true for the users but also for the managers of WLL-B itself, who constantly learn from their projects, as well as for the managers in the administration and in the CETIC [Centre d'Excellence en Technologies de l'Information et de la Communication], who wanted to pilot living labs to better understand these structures. Living labs are subjects of lifelong learning experiences. (WLL-B, ECR)

Furthermore, in the case of GoveLab Arnsberg (GLA-G), public servants are described as empowered to use varied innovation methods; the emphasis of living lab projects and workshops is on teaching public servants how to use these methods and on enabling them to use innovative thinking in their own agencies. This is achieved, for example, by supporting department heads in developing their own innovation projects. SII-F's mission is to disseminate amongst regional public servants a set of innovation methods elaborated by the Inter-ministerial Directorate for Public Transformation in Paris to improve internal administrative processes. There is, in some cases, such as StimuLab from Norway (SL-N) a stated need to introduce a new culture: "This has been a project about reputation, a project about effectiveness, and a project for building a culture, which has had a positive influence in large parts of the organization" (SL-N, project document).

Third, living labs should allow people to move outside their professional comfort zone and appreciate interaction with people other than those they usually encounter. Living lab activities inform a different transdisciplinary setting where people with different backgrounds, skills and types of knowledge can meet:

One aspect, I argue, is that we need new partnerships, we need to get out of our silos, we need to get out of our comfort zone, we need to get out of our present structures, because, of course, in our projects we tend, if we need new partners, to collaborate with the ones we are used to. but like this, we are not creating innovations. we mostly pick people who have the same opinion, who are dependant on us, and therefore do what they always do. (Head of GL-A)

Fourth, public sector organizations are seen to be characterized by barriers and resistance to open innovation. Public managers and employees are reluctant to participate in open innovation activities that they see as "useless," and public employees are also generally more risk-averse:

The first dimension is that some public servants are reluctant to participate in GovLabs projects or do not allow their staff to participate, because they perceive GovLabs work as useless. The second dimension is broader, as it affects the implementation of GovLabs projects. For example, administration attracts staff that are more risk-averse than in other organizations and they are reluctant to implement new processes. (GLA-G, ECR)

Open innovation represents a practice which appears radically different from and riskier than TPA, where there is little appreciation of risk and learning from failures:

We analyse [the concerns] pretty well [and ask ourselves], "Is [the law] as strict as the employees claim?" Because they have trained themselves … to avoid mistakes, they interpret some [laws] worse than they actually are. And you have to ask three or four times, "Is it really like that?" Then you find opportunities to [implement your ideas]. (Head of GLA-G).

Generally, public administration is seen as attracting staff who are more cautious than staff in other organizations, and who are reluctant to implement new processes, as further illustrated by the GL-G case:

The mindset of "We have always done it like that, and it works out, so why should we change it?" is therefore predominant. (GL-G, ECR)

This reflects an organizational culture that is risk-averse. Administrators tend to resist new ideas and to protect the environment they are used to. Mistakes are not seen as possibilities to learn but as failure with bad consequences for the persons responsible. (GL-G, ECR)

Employees are framed as resistant to change and protective of their professional identity:

So there is no one … that necessarily desires the new. So we are used to working with resistance … This narrative is often found in the municipalities because there are some care employees who … want to help the citizens, and if we then go in and do things differently, then their roles will also be re-defined. And then they feel sorry for the citizens. So that is actually often a challenge. (PI-DK, CEO)

Innovation is connected with failure, and learning from failures is difficult. However, becoming able to cope with failure is framed as a value added to the public sphere as stated in the case of Norwegian Labour and Welfare Administration (NLW-N):

You have to be able to make a "pivot" and just turn around. There has to be acceptance for that—if the user insights tell you that you are making the wrong thing … the prototype is wrong … then we need space in the organization to say … this is not a waste because we have learned this was the wrong thing. (NLW-N, project leader)

Finally, the above quotes indicate appreciation across the cases that the public value of living labs lies in their ability to address common themes and derive internal learning from this. Living labs are supposed to create an atmosphere of partnership and dialogue on an equal footing. This is neatly expressed in the WLL-B case:

The most important [feature] is that a real dialogue occurs, thanks to methodologies between the players from the private, public, and academic sectors on the one hand and the users on the other hand. … The added value of a living lab, in terms of regional development, lies in its structure as a platform that allows dialogue between these various poles. They facilitate these encounters and collaborative work on a common theme. (WLL-B, manager)

We can summarize frame 1 in terms of a public value empowerment struggle:

- Problem frame: There is a need to improve the skills and the mindset of public employees to become more open toward and learn from other stakeholders and to appreciate risk and failure.
- Solution frame: Create living lab niches to enable employees to develop a more outward-looking approach and learn from others in an open ecosystem approach.
- Motivation frame: Creating a more responsive approach to innovation internally in the public sector.
- Empowerment: Empower the niche to provide employees with innovation tools and a learning culture.
- Resistance: The niche-frame confronts resistance and opens up professional identity and comfort zones by adding new perspectives from users and stakeholders.
- Public value: Empower the niche to the extent that it challenges what public value is through internal learning processes and dialogue around common themes.

4.2. Frame 2: restrained space

Living labs are also framed as restrained spaces or structures for innovation to better address systemic aspects of innovation and counteract complexity and inertia within public sector. The word lab denotes a controlled place slightly removed from everyday work where new types of collaboration and innovation can emerge. For example, StimuLab in Norway "focuses on creating benefits, but is also encouraging open research in an unsafe terrain to get space for innovation" (SL-N, manager).

The restrained space is characterized differently in the various cases, along a continuum from lab-like space to real-life physical, local place. A manager of Aalborg Municipality living lab (AM-DK) describes the living lab as a method—rather than a place—that allows the public sector to bring in external agencies:

Living lab is not a locality, it is not a specific place, it is not a laboratory—it is a way of doing things, it is a method. And as a methodological approach, you can attain a certain form of width and depth because you get a larger degree of flexibility to bring in many different project partners. (AM-DK, manager)

However, AM-DK is centred in a municipality, and it seeks to transform the municipality into an open space for dealing with systemic aspects of innovation. A CEO in another Danish case describes living labs as a philosophy that requires time and a distinct way of thinking: "So it's a motor, it's a philosophy, it's a way of thinking. And that's why it takes a lot of time" (PI-DK, CEO). In this case, the living lab creates an intermediary space amongst healthcare stakeholders that helps them to collaboratively address a perceived need to transform healthcare in the direction of citizens taking better care of their own health.

Some of the living labs struggle with the metaphor of the lab, which can evoke the image of a scientifically controlled area rather than the intended living space where interdependent actors collaborate on innovation activities. In some labs, the notion of space is entirely denounced to emphasize that initiatives are spread across, and thus accessible to, the community:

There are living labs in the health sector which have dedicated spaces with testing apartments, etc. It is not amongst our objectives to get this type of infrastructure. For us, the place doesn't have much impact. But availability seems important to me. We want to dematerialize our activity to the maximum to be able to work on various sites. (WLL-B, manager)

In such cases, then, living labs are a distinct service for the local community. This could also be expressed as a separate space within the community as in the case of the IDEES living lab in Spain (ILL-E) working with mental healthcare: "The ILL-E living lab is related to networks involving many agents, and, as such, it can be seen as a space embedded in network structures" (ILL-E, ECR). Similarly, PI-DK stresses the distributed character of the space: "For me it is not only one living lab, it is a series of test sites that together represent test environments. And then it is a methodology, otherwise it doesn't work" (PI-DK, CEO).

However, living labs also take more concrete meanings as actual places where people can meet and develop new structures and practices. LME-I has special physical rooms designed for brainstorming and prototyping, representing a special kind of dynamic space:

LME-I has two physical rooms located at the MEF DSII [Ministry of Economy and Finance, Directorate for Information Systems and Innovation] headquarters in Piazza Dalmazia, Rome…The space is designed to have different types of rooms for different uses, such as large and small meeting rooms, brainstorming areas, and prototype/testing rooms. (LME-I, ECR)

This case is evidently characterized by the belief that designing a special place for innovation can enhance creativity and participation.

For some living labs, physical place also has a symbolic value for demonstrating political influence. In the case of L.I.V.E. in France (LIV-F), having a unique place serves as a totem or symbol of the political will to endorse living lab activities, and as a tool to convince potential (private) investors: "According to some project managers, not to have a unique place as a totem or a symbol of the political will could be a barrier to promoting the living lab and also to convincing potential (private) investors" (LIV-F, ECR).

In Verschwörhaus Ulm (VU-G) is described as a physical place, offered by the municipal administration, where people meet informally to discuss ideas and work together to work on digitalization. This physical space is described as a "condition for co-creation and innovation, as it is an environment for different people to come together, develop new ideas and test them right away" (VU-G, ECR). In the case of Erasme in France (ERA-F), space is also about claiming community places that already have a strong symbolic meaning, such as a church

used to temporarily accommodate a living lab on digitalization. Here, there has been a move "from a place in the countryside … to a metropolitan place" (ERA-F, ECR). The living lab space/place carries another symbolic meaning as a "third" place (between home and work) or as a "safe" space (for experimentation with innovation):

> The future perspective of ERA-F could be the third stage of its evolution. ERA-F could become the "third place" of innovation and co-design of the Lyon Metropole … to make digital a lever of urban transformation and allow Lyon to be amongst the largest smart cities in Europe. (ERA-F, ECR)

The Metropole living lab is envisioned as a space to enable digital transformations, thus overcoming some of the complexity and inertia of public service development and enable wider systemic innovations in the area.

Some cases describe a need for space that is close to government, because of frequent interaction with policy-makers. "Every agency and every ministry carries out its own life and has a specific function to fulfil. They have a certain view of the world and that means that there should be some form of coordination and communication" (GL-A, advisory board member).

Finally, this emerging space is also fragile and confronts resistance. In many cases, such as GLA-G and GL-A, the living labs appear highly dependant on particular public leaders. Furthermore, the living lab space seems full of uncertainties that policy-makers may not like. As one CEO states:

> We have created a project with some private people. "When does it end?" – "Never"; "What is the cost of it?" – "We don't know"; "What do we get out of it?" – "Nobody knows." Good luck with that … What we have to prove to X Municipality is that the external financing sources are large. (PI-DK, CEO)

Thus, there is pressure on living lab actors to demonstrate proof of concept and explain how they add value to the public sphere. All 21 cases are characterized by acute difficulties in stating the outcomes of living lab activities, since they have not developed clear evaluation methods for measuring the value of the living lab. Evaluation instead concerns what the living lab has the potential to contribute, and this is negotiated in dialogue with policy-makers.

We summarize frame 2 in terms of a public value empowerment struggle:

- Problem frame: The public sector is complex, characterized by inertia, and lacks a structure for involving external stakeholders directly in innovation processes.
- Solution frame: Create living lab niche spaces to enable collaborative innovation.
- Motivation frame: Involving stakeholders directly in innovation to address systemic aspects of innovation and public and societal needs.
- Empowerment: Empower the niche to enable stakeholders to contribute to public innovation.
- Resistance: The niche-frame confronts resistance and uncertainty through coordination and communication across stakeholders and policy-makers.
- Public value: Empower the niche to the extent that living labs bring in project partners to debate, contest and demonstrate what adds value to the public sphere.

4.3. Frame 3: democratic engagement

Some livings labs are further framed as environments of democracy. In some cases, citizens are described as directly involved in co-innovation activities. This frame relies on earlier frames of participatory democracy (i.e., those popular during the 1960s) that are focused on increasing citizens' participation in collective decision-making and

on strengthening their role in the community. Potential downsides include participants being biased by their particular interests, and conflicts emerging between them that could block decisions (Sørensen and Torfing, 2019). However, living labs may be a way to enhance early-stage democratic participation across a community by prototyping ideas for innovation thus making them more accessible and visible to citizens and more impactful.

The 21 cases were coded by the research teams with regard to whether and in what sense they were described as spaces for citizens' democratic engagement (Table 3). Ten of the living labs entailed ideas of representative or consultative democracy, five were mostly framed as embodying participatory democracy, one combined both of the aforementioned categories, and five did not feature direct involvement of users/citizens in innovation (instead emphasizing public administration roles). The three categories are explained below.

4.3.1. Representative or consultative democracy

Although the living labs seek in various ways to include user perspectives on innovation, innovation decisions are seldom delegated from political leaders and managers to users and citizens. It is often the role of policy-makers, managers, designers and researchers to make decisions. For example, in the case of Aalborg Municipality (AM-DK):

> the way citizens are engaged in the living lab initiatives of the municipal unit is mainly based on ideas of representative democracy. The citizens are recruited as individuals representing a specific group of citizens, namely elderly, and since the focus is on individual needs, the elderly are not partaking in a wider discussion of what a good elderly life is or how society can be organized in the future to meet collective challenges. (AM-DK, ECR)

In the case of PI-DK, the "living lab can be used to facilitate a process assembling different voices around a common cause within a public space," but "democratic engagement and empowerment of citizens … is a side effect of the project" (PI-DK, ECR). Similarly, in Autonom'Lab in France (focusing on the elderly) (AU-F) the political leaders and other decision-makers "become the main stakeholders to convince to create new policies with the living lab" (AU-F, ECR). In the case of ERA-F, "co-creation with users is a way to engage inhabitants in the improvement of their own life and culture, and also to participate in the multi-stakeholder governance of the city" (ERA-F, ECR).

4.3.2. Participatory democracy

In some of the cases, more influence is given to (or taken by) citizen groups, which indicates a more direct form of democracy. In these cases, living labs are places where people can meet, inspire one another and develop new solutions that may eventually be adopted by the public sector. Citizens are described as innovators:

> Therefore, the role of volunteers during the co-creation process is very important as they are the idea generators and implementers of projects. The role of public servants working in the Verschwörhaus is to support the co-creation process by providing materials and other resources and providing feedback on the ideas generated by the volunteers. (VU-G, ECR)

Verschwörhaus is a particular place (a house) to which citizens are

Table 3
Distribution of cases according to democracy approach.

Deliberative/ direct/ agnostic democracy	Representative/consultative democracy	No direct involvement of citizens/users, instead focusing public administration.
I-DK, LLL-E, VU-G, WLL-B, LIV-F, RHL-I	AM-DK, PI-DK, ILL-E, GD-E, GLA-G, SL-N, NLW-N, LIV-F, ERA-F, AU-F, TCL-I	GL-A, SII-F, KLL-P, LME-I, EC-I

invited to experiment and build digital innovations for the public sector. Similarly, in Library Living Lab of Spain (LLL-E), the living lab's value lies in democratizing access to knowledge and innovation:

> As for the public value created, the main value created by the L3 [Library Living Lab], according to Dr. X is in "democratizing access to Library Living Lab knowledge and innovation," and all actions and initiatives undertaken in this space are built upon this statement. (LLL-E, ECR)

INSP! in Denmark (I-DK) also provides a place (house) where citizens can meet spontaneously and potentially develop ideas in areas such as employment or loneliness, thus providing a forum for debating innovations that might generate public value. As such, I-DK is also intended to provide an inclusive place for democratic engagement. I-DK is described as an informal place for:

> …discussing and discovering new ways of organizing future society. Hence, INSP can be seen as enabling participatory democracy, that is, giving citizens equal opportunities to engage in democratic debate. (I-DK, ECR)

> So what defines INSP [I-DK] is that we create spaces but we don't create content. That is, we make room for action, room for being, room for people to discover what they want to do, and for them to do it. (I-DK, manager)

However, there are clearly also democratic problems related to these places, as their users are not representative of the population: "This last information shows that the workshops' participants are far from being a democratic representation of the 'citizens,' despite the websites and social networks created to publicize the project" (LIV-F, ECR). As such, innovation developed by these users may be biased by their interests and immediate needs.

4.3.3. No direct involvement of citizens

Some cases describe living lab activities as a move toward democratizing work in public administration. For example, in GovLab Austria (GL-A), "The [board] has the task of giving feedback to GL-A and consulting on decisions GL-A makes, and the main way this happens is through open discussions. This way of working is perceived as free of hierarchies and democratic" (GLA-A, ECR). Kraków Living Lab (KLL-P) is:

> …taking place in a country where administration is traditionally seen as "intimidating" and not necessarily collaborative, [so] the work of the living lab contributes to the evolution of the Polish administration … Because it becomes less bureaucratic, closer to the citizens and their direct concerns, one can say that it contributes to fostering democracy. (KLL-P, ECR)

In summary, living labs are described as tools of innovation that potentially enable democratization, since they involve citizens in (sometimes radical) prototyping and conceptualizing new ideas for public innovation. Whether these proactive-conceptual innovations are adopted by the public sector appears to hinge on policy-makers' capacity and willingness to recognize, legitimize and make use of new ideas and innovations that emerge from citizens.

We summarize frame 3 in terms of a public value empowerment struggle:

- Problem frame: Citizens and communities have legitimate ideas for innovations that are not sufficiently considered.
- Solution frame: Create living lab niches that enable citizens and communities to develop social innovations that can be adopted by the public sector.
- Motivation frame: Creating more effective solutions with a commitment to democratic values and justice.

- Empowerment: Empower the niche to enable citizens to develop social innovations.
- Resistance: The niche frame confronts resistance through contesting democratic biases, injustice and conflicts that block decision-making.
- Public value: Empower the niche to the extent that it uses representative and participatory democracy approaches to enable debate with social actors about solutions that could add value to the public sphere.

5. Discussion

This paper advances understanding of how living labs can help public sector actors to reframe public innovation and improve public actors' ability to address public and societal challenges. Living labs are conceptualized as niches that address the need for reframing public innovation in terms of three frames (summarized in Table 4): (1) processual learning, (2) restrained space and (3) democratic engagement. The first frame suggests that participation in living labs can help employees and managers to engage in responsive first- and second-order learning through listening more to users and stakeholders. The second frame suggests that participation in living labs can help the public sector to better address societal needs by involving multiple stakeholders directly in innovation processes. Finally, the third frame suggests that participation in living labs can help public actors to picture public innovation by using citizens or social actors to articulate needs and develop or anticipate new services.

The three frames, rather than being anchored in different historical periods that follow one after the other, are all part of a post-NPM approach to governance and innovation. It is suggested that they are best distinguished by the degree of intensity with which they suggest involving external stakeholders in public innovation. In the processual learning approach, users and stakeholders are most passive (i.e., they are just listened to, learned from). In the restrained space approach, stakeholders are supposed to create innovations and pay attention to systemic aspects of innovation more actively and collaboratively. In the citizen-driven approach, innovation transpires within a social context and is controlled by social actors. The case studies also revealed the need to confront resistance. Frame 1 confronts resistance from public servants by justifying the need to open up professional identity and comfort zones and adding new perspectives from users and stakeholders; frame 2 confronts resistance and uncertainty via demonstrating how coordination and collaboration across a wider set of stakeholders and policy-makers can take place; and in frame 3 resistance towards citizens engagement in innovation is confronted through attempting to counteract biases, injustice and conflicts that emerge from giving more control to social actors.

The building and maintenance of the niche may be explained in terms of the living labs' engagement in widened processes and agendas of public value creation. Public actors have normative concerns for innovation and want to "do something better" and living labs relate to public value by framing an approach to engaging actors in public value creation. Frame 1 does this by facilitating internal learning and dialogue on common themes and listening to users. Public sector actors are here framed as the main actors of public value creation. Frame 2 engages more actors into the innovation process through more intense collaboration with them, thereby pushing them to challenge and demonstrate what public value is. Frame 3 invites social actors to suggests elements that could add value to the public sphere and uses representative and participatory democratic approaches to contest and select citizen-led solutions. Social actors are here casted as the main actors of public value creation.

It is suggested that each framing implies a specific type of innovation, which we term incremental-adaptive, systemic and proactive-conceptual, respectively (Table 5 and Fig. 2).

Thus, processual learning (frame 1) would mostly be about

Table 4
Three frames describing empowerment struggles of living lab niche actors.

	Processual learning (low intensity of stakeholder involvement)	Restrained space (medium intensity of stakeholder involvement)	Democratic engagement (high intensity of stakeholder involvement)
Problem frame	There is a need to improve the skills and the mindset of public employees to become more open toward and learn from other stakeholders and to appreciate risk and failure.	The public sector is complex, characterized by inertia, and lacks a structure for involving external stakeholders directly in innovation processes.	Citizens and communities have legitimate ideas for innovations that are not sufficiently considered.
Solution frame	Create living lab niches to enable employees to develop a more outward-looking approach and learn from others in an open ecosystem approach.	Create living lab niche spaces to enable collaborative innovation.	Create living lab niches enabling citizens and communities to develop social innovations that can be adopted by the public sector.
Motivation frame	Creating a more responsive approach to innovation internally in the public sector.	Involving stakeholders directly in innovation to address systemic aspects of innovation and public and societal needs.	Creating more effective solutions with a commitment to democratic values and justice.
Empowerment	Empower the niche to provide employees with innovation tools and a learning culture.	Empower the niche to make stakeholders contribute to public innovation.	Empower the niche to enable citizens to develop social innovations.
Resistance	The niche-frame confronts resistance and open up professional identity and comfort zones through adding new perspectives from users and stakeholders.	The niche-frame confronts resistance and uncertainty through coordination and communication across stakeholders and policymakers.	The niche-frame confronts resistance through contesting biases, injustice and conflicts that block decision-making.
Public value	Empower the niche to the extent that it challenges what public value is through internal learning processes and dialogue around common themes Public sector actors are the main actors of public value creation	Empower the niche to the extent that living labs bring in project partners to debate, contest and demonstrate what adds value to the public sphere. Multiple actors participate in public value creation.	Empower the niche to the extent that it uses representative and participatory democracy approaches to enable debate with social actors about solutions that could add value to the public sphere Social actors are the main actors of public value creation.
Type of innovation	Incremental-adaptive innovation	Systemic innovation	Pro-active-conceptual innovations

incremental and adaptive innovation that is tightly integrated into everyday work. In this framing, the main concern lies in improving the innovation process and creating a learning culture through increased interactions with stakeholders. The impact of living lab activities on public sector innovation is stated as 'awareness raising' and 'change of mindset'–at the level of expectations and visions. While this can be described as second-order learning, the adoption of a changed mindset through first- and second-order learning is also framed as an outcome in itself which is decoupled from actual systemic innovations. It is this learning that is included in the processual learning frame. We take this to be an example of incremental and adaptive innovation. It is an incremental step towards listening more to users. However, we recognize that, implemented across the public sector, it might add up to more systemic changes.

In the case of the restrained space (frame 2), innovation tends to be framed as separated from everyday work activities through a more distinct lab-like environment that engages a broader set of stakeholders in more intense collaboration to address public and societal challenges. The innovation activity targets systemic aspects of innovation and involves stakeholders in collaborative actions to "make the world together". Danish Public Intelligence is an example of a living lab that uses a systemic approach involving multiple actors in order to radically transform healthcare services toward a more patient-orientated approach. However, the restrained space may also be used for less radical forms of innovation that are expansive rather than transformative in nature, as when Aalborg municipality involves stakeholders in widening services for elderly people by setting up projects with relevant private stakeholders that provide new welfare technologies.

In the case of democratized innovation (frame 3), the innovation process is framed as carried out by social actors in a social space. For example, INSP is a social space, organized by a municipality, in which social actors gather and ideate new innovations. They implement the innovations directly in own practice, thus transforming their own life conditions. However, from the point of view of public managers and employees, these changes, which appear radical and effective to the involved social actors, have the character of proactive-conceptual innovation or radical prototyping, since the social innovations are not immediately realized within the public sector. Instead, they contest, inspire or put pressure on the public sector to change. This shows that social actors such as communities or social entrepreneurs can contribute to the public sphere by creating ideas and innovations that may eventually be adopted by the public sector. Like frame 1, frame 3 concerns second-order learning through a space in which real dialogue between actors occurs. In frame 1, the learning is framed as internal learning that is contained within the public sector, as described above. In frame 3, social actors specifically act in a more empowered way: Learning is more community orientated.

The three types of innovation are illustrated in Fig. 2, which comprises axes on (1) public innovation (being integrated into everyday work or being separated from it); and (2) initiators of the public innovation (internal public sector actors or other actors). Fig. 2 nuances Schot and Geels' (2008) point that an overly contained or protected niche often entails incrementalistic and limited outcomes, whereas a more open, networked and interactive approach, with inputs from many actors and perspectives, can lead to more global innovations. Thus, "integrated with work" implies that the living lab activities are framed as being contained within local pockets of activities in the public sector by stressing the local learning effects for public managers and employees. "Separated from work", on the other hand, means that the living lab is framed as a structure in its own right where actors explore how they can "make the world together" at a more global problem level. "Internally in the public sector" indicates that the living lab is seen as mainly driven by a narrow set of public actors, whereas "innovation in a societal context" means that the living lab is meant to be driven together with a broader set of societal actors, including regime actors and social actors. Thus, the two dimensions in Fig. 2 elaborate the local-global and

Table 5
Innovation types implied by the living lab framings.

|	Processual learning	Restrained space	Democratization
Relation of innovation to work	Inovation as integrated with work	Innovation as separated from work in a restrained space	Innovation as social activity beyond the public sector
Type of innovation process	Incremental, adaptive innovation	Systemic expansive or transformative innovation	Pro-active, conceptualinnovation
Changing the service	Improving the service	Improving and widening or transforming the service	Radically prototyping new services
Actor-to-actor	Stressing local learning effects for public employees and managers from listening to users on common themes	Stressing "making the world togeteher" through a broader set of actors, including niche actors and regime actors	Stresssing new types of innovations emerging from social actors and potentially adopted by public sector
Learning focus	First- and second-order, internal in public sector	Second-order, collaborative	Second-order, community orientated
Problem area	Mainly local	Global	Local-global
Degree of intensity of stakeholder involvement	Low	Medium	High
Overcoming complexity of public sector	Overcoming complexity and inertia through mutual adjustments and adaptations of practices	Overcoming complexity and inertia through creating an experimental space for innovation	Overcoming complexity and inertia through social innovation by social actors and entrepreneurs
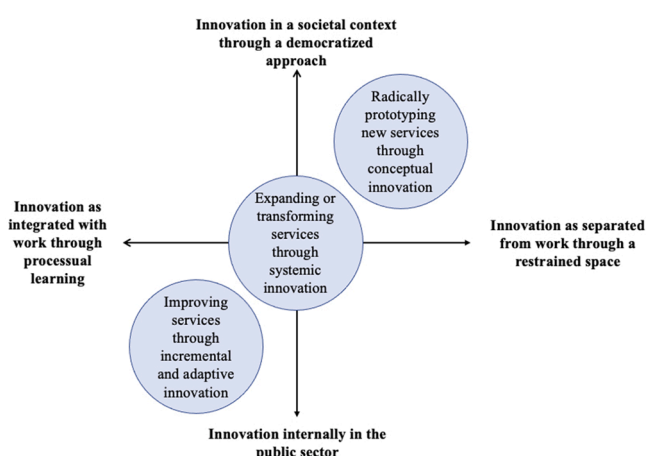
Fig. 2. Types of innovation implicated by the living lab framings.

narrow-broad continua implied by Schot and Geels (2008) specifying how various degrees of intensity of stakeholder involvement can lead to different types of innovation. It thus extends Schot and Geels' (2008) approach by specifying innovation types and by conceptualizing changes of public sector as more heterogeneous and hybrid processes (compared to regime changes and multi-level perspectives) – since the public sector must deal with complex problems from multiple angles stemming from different actors and regimes.

The living labs' framings of public innovation can be analysed as niche activities, as illustrated in Fig. 1. As such, they compete with other activities in public sector departments with a focus on change and innovations. Three recursive stages of the niche framing are suggested in this heuristic model (Fig. 1) through which the three described framings are potentially developed. In the first stage, living lab actors make claims about how public innovation can be improved by setting up living lab activities. In the second stage—in which the framing that were studied in this paper happens—the living lab experiments are carried out, entailing specific incremental, systemic or proactive-conceptual innovations. These may or may not be adopted by the relevant public agencies; working with systemic and transformative innovations appears most challenging for public actors, while adopting incremental-adaptive and proactive conceptual innovation activities is less challenging. In the third stage, the innovation framings themselves may be adopted, linking frames with support structures and routines of innovation. A new learning culture may result, as in the case of Norwegian Labour and Welfare Administration. A lab-based systemic approach to

innovation may be institutionalized by creating more permanent lab structures, as with the Danish Mindlab (2002–2018) or in Aalborg Municipality. Further, greater receptivity to ideas from social actors can be developed by supporting citizen-driven lab-like structures and routines outside the public sector, such as INSP.

6. Conclusion, limitations and future research

In conclusion, living labs can be understood as niche activities through which public and private actors aim to convince public actors about new interactive approaches of public sector innovation to improve public service processes, and to demonstrate how this can be done. The niche building was shown to involve three frames: processual learning, restrained space and democratic engagement. Adding these frames to public sector innovation further hinges upon the engagement with wider agendas of public value creation. In the context of this paper, we acknowledge that multiple niche actors "add new elements to public sector", hence we see public sector changes as more heterogenous, undecided and hybrid compared to the referred regime approach of Schot and Geels (2008).

The 21 case studies were explored from the point of view of the participants: the niche actors framing living labs in the context of public innovation. This has given us unique insight into the real workings of living labs in an organizational context. Two limitations of this approach should be mentioned, both of which open up avenues for further research. First, the case study approach did not enable us to investigate the precise outcomes of specific living lab framings in terms, for example, of generating internal efficiency or external effectiveness. Further, we did not explore which of the three framings is most effective with respect to addressing societal needs. Hence, a greater focus on outcomes is critical for future research.

Second, as this study focused on the internal framings of the living labs, it did not directly explore their external effectiveness from a user perspective. Since user involvement is crucial for many of the living labs, it is important for future research to explore in more detail across cases how users are involved, at what stage, with what outcomes and how user involvement can be evaluated. That said, the active role of the single user does not appear to be a key aspect of the living labs. The key aspect is rather their ability to challenge the complexity and inertia of public innovation.

CRediT authorship contribution statement

Lars Fuglsang: Writing – original draft, Writing – review & editing, Visualization, Conceptualization, Methodology, Investigation. **Anne Vorre Hansen:** Writing – review & editing, Methodology, Investigation.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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