

Co-creation in urban living labs: A multilevel network perspective on labor market innovation.

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Introduction

This paper analyzes co-creation in urban living labs through a multilevel network perspective on system innovation. We draw on the case *House of Skills*, a large, multistakeholder living lab aimed at developing a 'skills-based' approach toward labor market innovation of the Amsterdam Metropolitan Region. Our analysis helps understand stakeholder dynamics toward system innovation, drawing on an innovative living lab example and taking into consideration the multilayered structures that the collaboration comprises. Our conceptual framework provides an important theoretical contribution to innovation studies and offers a practical repertoire that can help practitioners improve co-creation of shared value in living labs, toward orchestrating flexible structures that strengthen the impact of their initiatives.

Context and background

In 2014 the Amsterdam-based *Center of Expertise Urban Governance and Social Innovation*¹ initiated the first of many area-based living labs, supported by the district municipality and in line with the municipal democratization agenda (Amsterdam Municipality, 2019). Since then, the Center has co-created almost 30 living labs varying in size, subject and scale, and comprising of an area-based innovation approach to local challenges such as unemployment, poverty or social health (Majoor et al., 2017). A key function of the living labs is to understand the core of such problems and to devise a useful and sustainable practical repertoire, by developing a flexible collaboration structure aimed at co-creation orchestration among local entrepreneurs, NGOs and citizens, municipal stakeholders and knowledge institutes.

Living lab *House of Skills* brings together more than seventy stakeholders from the business community, trade organisations, employee and employer organisations, knowledge institutes, education and regional administrators. Under the *House of Skills* umbrella, these stakeholders collaborate toward labor market innovation of the Amsterdam Metropolitan Region, subsequently fanning out toward the rest of the Netherlands. More specifically, the *House of Skills* innovation comprises of a 'skills-based orientation' to the labor market, whereby people's broadly defined *skills* rather than (only) their formal certification enables them to find employment, strengthen their intersectoral mobility, and therefore sustain their employability (House of Skills, 2019). Initial funding derives from European, municipal and regional subsidies, and is aimed at developing a sustainable business model and structure for the innovation.

House of Skills is a particularly interesting example of co-creation through living labs because it comprises a *system innovation* that calls for a *multilevel* collaboration structure. In the next section we introduce these core concepts. Next, we illustrate how *House of Skills* orchestrates system innovation in practice while maintaining the flexibility to act quickly in a crisis situation, such as the 2020 corona pandemic. Subsequently, we apply a network perspective as a useful way to analyze how innovation through living labs occurs.

¹ Previously known as research group *Urban Governance*

Multilevel co-creation toward system innovation: the Dutch labor market

We understand co-creation (Puerari et al., 2018) as a joint development activity that includes stakeholders in their innovation processes and that leads to shared value creation across a value chain. Innovation processes can take place at different levels, for instance as product innovation or an industry innovation. However, it can also occur at system level, which we define as system innovation: a cohesive set of experiments by a multistakeholder network, aimed at contributing to a process of sustainable structural change in dominant structures, relations and practices, while interacting with the system (Beers et al., 2016). Clearly, system innovation is extremely complex in that it comprises co-creation between multiple stakeholders acrosses different structures, whereby a substantial change is envisaged. To this end, Geels and colleagues (2002; Geels & Schot 2007) developed a multilevel framework as a means to understand how change at local policy level is connected to innovation at a practical service level, as well as their embedding in broader societal structures.

Geels and Schot (2007) perceive system innovation as an outcome that occurs when developments at multiple levels align. These levels are conceptualized as sociotechnical *regime*, *landscape*, and *niche* innovations. Sociotechnical *regimes* accommodate the broader community of social groups and their alignment of activities that blind professionals to developments outside their focus regulations, standards and routines. The sociotechnical *landscape* forms an exogenous environment that a system innovation seeks to influence but which nonetheless lies beyond direct control (macro-economics, deep cultural patterns, macro-political developments). *Niches* form the 'incubation rooms' at the micro-level where radical novelties emerge, carried and developed by small networks of dedicated actors. Indeed, the breakthrough of niche innovations in mainstream markets can be considered a competition with an existing regime.

To illustrate this process, we draw on *House of Skills*, based in the Amsterdam Metropolitan Region, as an example of an urban living lab aimed at system innovation through co-creation. *House of Skills* seeks to respond to a major labor market challenge, comprising on the one hand a large body of unemployed citizens, and on the other hand a large number of jobs that are difficult to fill. An important impediment to resolving this challenge is the mismatch between the employable population, the jobs available, and a narrow focus on certification among employers rather than skills and competencies (House of Skills, 2019).

Interpreted from the abovementioned multilevel framework, the *sociotechnical regime* (public services) maintains a focus on unemployment, sectoral over-organization, within-sector funding for adult education, and formal certification requirements. Adequate possibilities are lacking for the acknowledgment and development of people's broader – non-certified – skills (e.g. organizational skills, coaching skills, people skills, etc.), which can nonetheless be of great use in their employability and intersectoral mobility. The *sociotechnical landscape* of the Dutch labor market comprises a number of vast societal challenges, such as sustainable growth, ageing population, and urbanization, which apply additional pressure to the labor market. In such a context, innovative practices or *niche*-innovations can build up internal momentum through learning processes, price/performance improvements and support from powerful groups. In this manner, niche innovations can apply pressure on the landscape level and create windows of opportunity to break through regimes.

It is this process that *House of Skills* aims to develop, representing a system innovation of the labor market, toward a *skills-based* approach.

Co-creation through *House of Skills*

House of Skills is a long-term, multistakeholder collaboration aimed at system innovation of the Amsterdam metropolitan labor market, toward a skills orientation (House of Skills, 2019). *House of Skills* seeks a stronger focus on lifelong learning as a structural alternative for a market orientation on formal

certification as a condition for employment mobility. This living lab is illustrative for a multilevel approach to co-creation as it brings together the business community, public institutions, trade organisations, employee and employer organisations, knowledge institutes, education and regional administrators, collaborating toward system innovation. Indeed, this collaboration structure makes it possible to co-create solutions to the labor market challenges summarized above.

As such, *House of Skills* is an example of a living lab that seeks to alter regimes through co-creation of *niche*-innovations. The multilevel framework presented above is useful as an analytical model to understand where change is required, but does not provide a practical repertoire to identify *where* structural impediments occur, and how these can be uplifted. To this end, we add a network perspective to the multilevel framework.

A multilevel, network perspective on co-creation in living lab

Social network analysis examines network structures that arise from social relations, which enable or constrain interactions or the flow of resources (Borgatti et al., 2009). A network perspective examines the interconnected relationships between actors (persons) that provide opportunities for and constraints on behavior (Kilduff & Brass, 2010). The applicability of a network perspective on system innovation in the context presented above is that it can help illustrate the structural embedding of a niche, i.e., which stakeholders strive to co-create a niche, how they are embedded in a landscape, and which enablers or inhibitors they are likely to encounter within the regime. Critical to applying a network perspective is clear delineation of the structural relation one is analyzing, whether this is a collaboration network, a knowledge sharing network, an influence network, or otherwise. Indeed, zooming in on specific structural relations within a living lab can reveal whether the network includes the appropriate actors to co-create a '*niche*-innovation', and ultimately contribute to regime change.

In what follows, we illustrate this process by showing how *House of Skills* developed niche innovations as a means to orchestrate regime change, through a flexible and dynamic co-creation network.

Case example: Innovation deals House of Skills

Niche-innovations can build up internal momentum through learning processes, price/performance improvements, and support from powerful groups, through a process of co-creation. Within *House of Skills*, this process involves experimenting, co-designing, testing, assessing, modeling, implementing and distributing service innovation in the labor market.

Initially, *House of Skills* had a fairly centralized operational structure, with a small program team tasked with realizing strategic partnerships with stakeholders that could help realize the intended regime change of a skills-based labor market. Figure 1a below is a (partial) representation of the initial influence network². The need for regime change was widely recognized, but concrete implementation was challenging and – occurring on a one-on-one negotiation basis – very intensive for the program's management and for the stakeholders themselves.

House of Skills program management therefore decided to take a more concerted approach, extending the co-creation network through 'innovation deals' with new strategic partners and concretizing the steps toward innovation. Innovation deals are based on specific sector-based or organisational challenges (for instance, developing a skills-based human resources program for a sector organisation in the aviation industry; other examples included below). Innovation deals are mainly funded and implemented by the partners of the innovation deals, supported by the expertise

² A selection of representative stakeholders is included as an illustration. The complete network can be provided upon request.

and instruments that *House of Skills* offers. Deals are realized through tailor-made arrangements, drawing on the *House of Skills* portfolio. That is, the small *House of Skills* project team works with a broad network of organisations providing services and developing products, to co-create skills-based labor market innovations for each of the partners involved. A specialized team within *House of Skills* keeps overview of the progress and helps to ensure the innovation deals together contribute to the further portfolio development. In this manner, 60 innovation deals with 100 organisations were developed³, aimed at innovative product development, practical experiments and new financial arrangements.

First, an example of innovative product development is the skills-based data platform *MyHouseofSkills* and a new skills taxonomy. The platform allows people interested in labor mobility to develop a tailor-made profile combining their certification and skills and helps them find jobs that match this profile into a *Skills Passport*; conversely, the platform helps employers 'translate' their jobs on offer into a skills orientation and improve the matching process (Post, 2019). This process is supported by a new skills taxonomy, a 'thesaurus' that enables digital-enabled skills-oriented matching. In collaboration with Aviation Community Schiphol, a pilot comprising 100 employees from 5 different companies helped cargo and passenger handlers at Schiphol Airport develop *Skills Passports* as a means to orient themselves on their careers and possible alternatives, when technology advances or physical constraints risk making them redundant.

Second, *practical experiments* were set up to challenge existing routines. An example is the successful care and technology side-intake pilot. *House of Skills* developed a strategic arrangement in collaboration with the professional pharmaceutical association and pharmacies, attracting job seekers into an accelerated side-intake for pharmacy assistant. Following this success, a regional education institute developed a tailor-made training program for the pharmacy assistants to gain their formal certification. The pilot is now a nationwide program. Similarly, with employment agency Manpower and Schiphol Airport, *House of Skills* developed a program aimed at people interested in a logistical profession, which so far has yielded almost 60 successful matches. In support of such pilots a physical 'fitting room' has been setup for intake, screening and matching, with e-learning enabling candidates to learn more quickly and when it suits them.

Third, *House of Skills* is involved in the negotiation of new intersectoral arrangements for lifelong learning. An example of this is *House of Skills'* joint initiative with the Amsterdam Metropolitan Region bureau to develop a Human Capital Agenda for the Climate dossier. A 'map' of the region was drawn up in spring 2019, including all existing initiatives in this area, which revealed a patchwork of initiatives that were not or hardly interconnected. Discussions on the joint development of this dossier are ongoing, for instance guiding a recent stakeholder meeting with an international industrial organization in the region that is facing major reorganization, including education, industry and government representatives.

Such efforts represent important efforts toward developing a more concerted approach toward farreaching societal questions related to labor market mobility, while at the same time representing a flexible structure that enables quick co-creation when the situation calls for this. For example, the global corona pandemic of March 2020 called for concerted efforts to draw skilled professionals into the vital health industry and to help with 'upskilling' of healthcare professionals to where these were most needed. At the same time, many other sectors were forced to lay off workers (for instance the

³ Examples include intake pathways for pharmacist's assistants, electrical engineers, healthcare professions, logistical professionals; development of skills-based trajectories in shortage professions; deployment of the 'Skills Passport' at Schiphol Airport and at Higher Education Institutes; the "Fitting room", a digital matching tool; and practical research into a powerful learning environment and learning culture. For more, see <https://www.houseofskillsregioamsterdam.nl/about-house-of-skills/>

hospitality, travel and advertising industries), independent professionals saw their assignments dwindle, and employment agencies faced a large influx of skilled workers applying for social benefits. In response, the *House of Skills* network – through the already in-place innovation deals, and the ensuing appeal – was able to orchestrate strategic arrangements from within its network and based on its extant portfolio, in an effort to contribute to labor market mobility and matching of jobs and professionals in a vital crisis situation.

These illustrations show how *House of Skills* developed a flexible co-creation network aimed at creating pressure at the landscape level and windows of opportunity to break through regimes. An illustration of the influence structure underlying this initial network of innovation deal partners is depicted in figure 1b below, comprising a representation of actors co-creating across different organizations (see footnote 2).

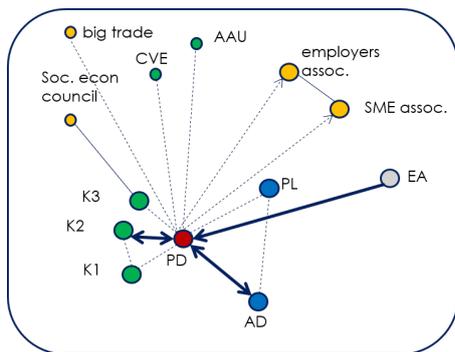


Fig. 1a: initial influence network

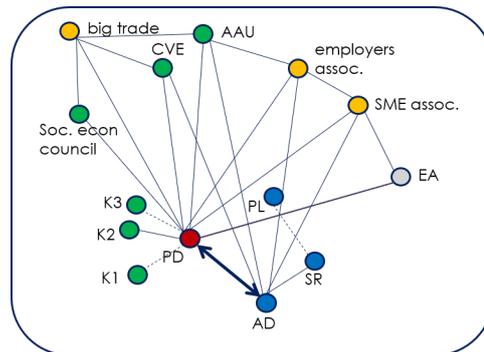


Fig. 1b: influence network after innovation deals

Legend:	
AAU	Association of Applied Science Universities
CVE	Council of Vocational Education
K1,2,3	Knowledge institutes
PD	Program Director
AD	Adjunct director
PL	Project leader
SR	Senior researcher
EA	Employment agency

Analysis

Figure 1 visualizes the structural differences between the influence network prior to (1a) and after (1b) the introduction of innovation deals. Figure 1a shows a low density network⁴ comprising mostly weak ties, whereby the Program Director and Adjunct Director played a highly centralized role, encountering significant pressure from a small number of key stakeholders. This helps understand why the living lab initially struggled in its efforts to initiate system innovation. Namely, getting stakeholders on board depended on labor-intensive, individual efforts; this did not create the necessary momentum to generate niche innovation and apply pressure on the established labor market landscape. Figure 1b visualizes the network structure after the introduction of innovation deals. Analysis of the network helps understand why this intervention proved a window of opportunity to realize the necessary breakthrough. Namely, as stakeholders committed to deals, a snowball effect ensued among others; second, together the stakeholders developed a dense network, forming a powerful group of niche innovators and creating the landscape to break through the labor market regime.

The innovation deals thus represented a co-creation process within the *House of Skills* stakeholder network, allowing a major step forward in this living lab's efforts to orchestrate system innovation of the Amsterdam metropolitan labor market.

Discussion and conclusion

In this paper, we applied a multilevel network perspective on *House of Skills*, a living lab aimed at orchestration of system innovation within the Amsterdam metropolitan labor market. The multilevel

⁴ Density represents the degree of interconnectedness between actors in a social network, i.e. how many possible connections are realized. Networks are representations of cognitive social structures, or a cognitive perception and representation of social relations (Brands, 2013; Krackhardt 1987).

perspective provides a useful framework for conceptualizing the innovation process, but does not provide the means to empirically analyze the collaboration structure. To this end, we introduced a network perspective as a means to reveal structural patterns in multistakeholder networks and thus identify impediments or opportunities for realizing niche innovation. We applied the multilevel network perspective to a living lab that initially struggled to establish system innovation, but through the introduction of *innovation deals* created an enabling, flexible influence structure. This strategic move helped substantiate the co-creation process between the *House of Skills* stakeholders, allowing a major step forward in this living lab's efforts to realize a niche for system innovation of the Dutch labor market. Moreover, the structure enabled rapid co-creation orchestration from within its network in a major crisis situation, aimed at the formation of a strategic structure for upskilling and matching in the vital care industry in face of the 2020 corona pandemic.

Our study has important theoretical implications. We advance innovation studies through the introduction of the network perspective to complement the conceptual model developed by Geels and Schot (2007). That is, we explain how a network perspective on system innovation is a useful, fine-grained means to analyze system innovation at multiple levels. We also contribute to practice by providing a practical repertoire for better understanding and thereby improving co-creation processes in living labs. Indeed, applying our multilevel network perspective can help practitioners and scholars pinpoint the structural barriers to system innovation and can subsequently help identify which social relations offer a fruitful ground for overcoming these barriers, ultimately leading to important breakthroughs in regimes.

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