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**Co-creating and Orchestrating
Multistakeholder Innovation**

1. Co-creation in Urban Living Labs: A Multi-level Network Perspective on Labour Market Innovation

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INTRODUCTION

This paper analyses co-creation in urban living labs through a multi-level network perspective on system innovation. We draw on the case House of Skills, a large, multi-stakeholder living lab aimed at developing a 'skills-based' approach towards labour market innovation within the Amsterdam Metropolitan Region. Our analysis helps understand stakeholder dynamics towards system innovation, drawing on an innovative living lab example and taking into consideration the multi-layered structures that comprise the collaboration. 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, towards 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 living labs, supported by the district municipality and in line with the municipal democratisation agenda (Amsterdam Municipality, 2019). Since then, the Center has co-created almost 30 living labs, varying in size, subject and scale and comprising an area-based innovation approach to local challenges such as unemployment, poverty and 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, sustainable and practical repertoire. This is done by developing a flexible collaboration structure aimed at co-creation orchestration among local entrepreneurs, NGOs, citizens, municipal stakeholders and knowledge institutions.

¹ Previously known as the research group *Urban Management*.

Living lab *House of Skills* brings together more than seventy stakeholders from the business community, trade organisations, employee and employer organisations, knowledge institutions, education and regional administrators. Under the *House of Skills* umbrella, these stakeholders collaborate with the aim of labour market innovation within the Amsterdam Metropolitan Region and subsequently fanning out towards the rest of the Netherlands. More specifically, the *House of Skills* innovation comprises a 'skills-based orientation' towards the labour market, whereby people's broadly defined *skills*, rather than (only) their formal certifications, enable them to find employment and strengthen their intersectoral mobility, towards sustaining 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 relevant example of co-creation through living labs because it comprises a system innovation that calls for a multi-level collaboration structure. In the next section, we introduce these core concepts. We illustrate how *House of Skills* orchestrates system innovation in practice while maintaining the flexibility to act quickly during a crisis, namely the 2020 corona pandemic. Subsequently, we apply a network perspective as a useful way to analyse how innovation through living labs occurs.

MULTI-LEVEL CO-CREATION TOWARDS SYSTEM INNOVATION: THE DUTCH LABOUR MARKET

We understand co-creation as a joint development activity that includes stakeholders in its innovation processes and that leads to shared value creation across a value chain (Puerari et al., 2018). Innovation processes can take place at different levels, for instance product innovation or an industry innovation. However, it can also occur at the system level, which we define as system innovation: a cohesive set of experiments by a multi-stakeholder 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 across different structures, whereby a substantial change is envisaged. To this end, Geels and colleagues (2002; Geels & Schot 2007) developed a multi-level framework as a means to understand how change at the 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 conceptualised 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 and are developed by small networks of dedicated actors. Indeed, the breakthrough of niche innovations in mainstream markets can be considered 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 labour 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. A key 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 above-mentioned multi-level framework, the *sociotechnical regime* (public services) maintains a focus on unemployment, sectoral over-organisation, 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., organisational 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 labour market comprises a number of vast societal challenges, such as sustainable growth, an ageing population and urbanisation, which apply additional pressure to the labour market. In such a context, innovative practises 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 labour market towards a skills-based approach.

CO-CREATION THROUGH HOUSE OF SKILLS

House of Skills is a long-term, multi-stakeholder collaboration aimed at system innovation within the Amsterdam metropolitan labour market towards 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 multi-level approach to co-creation, as it brings together the business community, public institutions, trade organisations, employee and employer organisations, knowledge and education institutions, and regional administrators, all collaborating towards system innovation. Indeed, this collaboration structure makes it possible to co-create solutions for the labour market challenges summarised 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 multi-level framework presented above is useful as an analytical model for understanding where change is required but does not provide a practical repertoire to identify *where* structural impediments occur and how these can be overcome. To this end, we add a network perspective to the multi-level framework.

A MULTI-LEVEL, NETWORK PERSPECTIVE ON CO-CREATION IN THE 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 behaviour (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 analysing, 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 FOR 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, modelling, implementing and distributing service innovation throughout the labour market.

Initially, *House of Skills* had a fairly centralised operational structure, with a small programme team tasked with the negotiation of strategic partnerships with stakeholders who could help realise the intended regime change of a skills-based labour market. Figure 1a page 15 is a (partial) representation of the initial influence network.² The need for regime change was widely recognised, but concrete implementation was challenging and – occurring on a one-on-one negotiation basis – very intensive for the programme’s management and for the stakeholders themselves.

The *House of Skills* programme management therefore decided to take a more concerted approach, extending the co-creation network through ‘innovation deals’ with new strategic partners and concretising the steps towards innovation. Innovation deals are based on specific sector-based or organisational challenges (for instance, developing a skills-based human resources programme 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 and supported by the expertise and instruments that *House of Skills* offers. Deals are realised 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 labour market innovations for each of the partners involved. A specialised team within *House of Skills* monitors progress and helps to ensure that the innovation deals contribute to the further development of the product portfolio. In this manner, 60 innovation deals with 100 organisations were developed,³ 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 labour mobility to develop a tailor-made profile combining their certification and skills in a *Skills Passport* and then helps them find jobs that match this profile; conversely, the platform helps employers ‘translate’ their jobs on offer into a skills orientation and thus 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 programme comprising 100 employees from 5 different companies helped cargo and passenger handlers at Schiphol Airport develop *Skills Passports* as a means to orient themselves within 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 a professional pharmaceutical association and pharmacies, attracting job seekers into an accelerated side-intake for the position of pharmacy assistant. Following this success, a regional education institute developed a

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

³ Examples include intake pathways for pharmacist assistants, electrical engineers, healthcare professions and 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/>

tailor-made training programme for pharmacy assistants to gain formal certification. The pilot programme is now being conducted nationwide. Similarly, with employment agency Manpower and Schiphol Airport, *House of Skills* developed a programme aimed at people interested in a logistical profession, which so far has yielded almost 60 successful matches. In support of such pilot programmes, 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 were hardly interconnected. The joint development of this agenda is ongoing, for instance recently guiding discussions between an industrial multinational corporation that is facing major regional reorganisation and its representatives from within education, industry and government sectors.

Such efforts represent important efforts in developing a more concerted approach towards far-reaching societal questions related to labour market mobility while at the same time representing a flexible structure that enables quick co-creation when the situation calls for it. For example, the global corona pandemic hit the Netherlands in March 2020 and 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 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 labour 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 page 15, comprising a representation of actors co-creating across different organisations (see footnote 2).

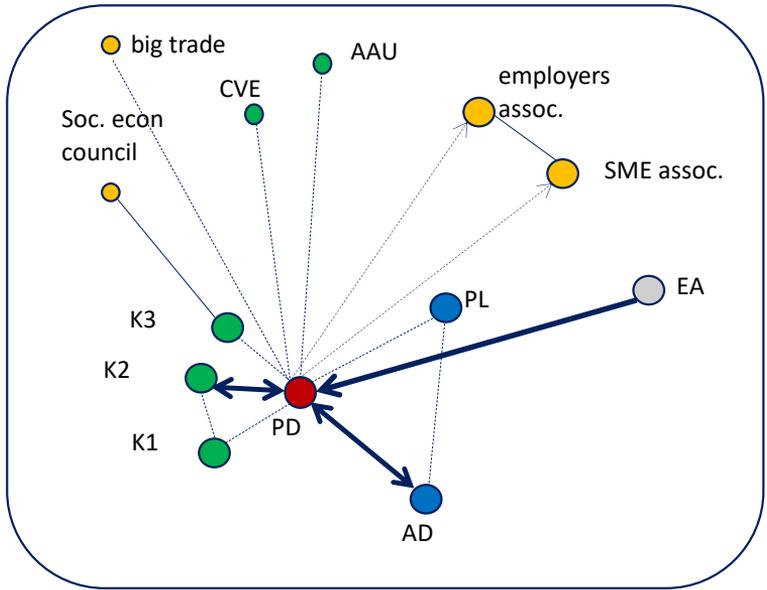


Figure 1a. Initial influence network.

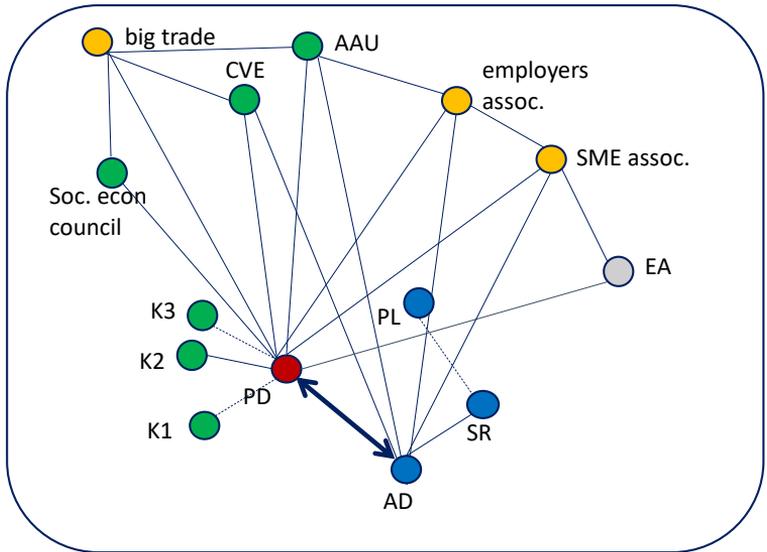


Figure 1b. Influence network after innovation deals.

- Legend:
- AAU Association of Applied Science Universities
 - CVE Council of Vocational Education
 - K_{1,2,3} Knowledge institutes
 - PD Programme Director
 - AD Adjunct director
 - PL Project leader
 - SR Senior researcher
 - EA Employment agency

ANALYSIS

Figure 1 depicts 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 Programme Director and Adjunct Director played a highly centralised 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 labour-intensive, individual efforts; this did not create the necessary momentum to generate niche innovation and apply pressure on the established labour market landscape. Figure 1b depicts the network structure after the introduction of innovation deals. Analysis of the network helps understand why this intervention proved a window of opportunity to achieve the necessary breakthrough. Namely, as stakeholders committed to deals, a snowball effect ensued among others; second, working together the stakeholders developed a dense network, forming a powerful group of niche innovators and creating the landscape to break through the labour 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 in the Amsterdam metropolitan labour market.

DISCUSSION AND CONCLUSION

In this paper, we applied a multi-level network perspective on *House of Skills*, a living lab aimed at orchestration of system innovation within the Amsterdam metropolitan labour market. The multi-level perspective provides a useful framework for conceptualising the innovation process but does not provide the means to empirically analyse the collaboration structure. To this end, we introduced a network perspective as a means to reveal structural patterns in multi-stakeholder networks and thus identify impediments or opportunities for realising niche innovation. We applied a multi-level 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 realise a niche for system innovation within the Dutch labour 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 for analysing system innovation at multiple levels. We also contribute to practise by providing a practical repertoire for better understanding and thereby improving co-creation processes in living labs. Indeed, applying our multi-level network perspective can help practitioners and scholars pinpoint the structural barriers to system innovation and can subsequently help identify which social relations offer fruitful grounds for overcoming these barriers, ultimately leading to important breakthroughs in regimes.

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

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Keywords:

- System innovation
- Social networks
- Co-creation
- Skills-based labor market
- Living labs

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