Matschoss, Kaisa Johanna

2018-12-02


http://hdl.handle.net/10138/258653
https://doi.org/10.1080/09537325.2018.1473853

Downloaded from Helda, University of Helsinki institutional repository.
This is an electronic reprint of the original article.
This reprint may differ from the original in pagination and typographic detail.
Please cite the original version.
Innovation intermediary challenging the energy incumbent: enactment of local socio-technical transition pathways by destabilisation of regime rules

Kaisa Matschoss & Eva Heiskanen

To cite this article: Kaisa Matschoss & Eva Heiskanen (2018) Innovation intermediary challenging the energy incumbent: enactment of local socio-technical transition pathways by destabilisation of regime rules, Technology Analysis & Strategic Management, 30:12, 1455-1469, DOI: 10.1080/09537325.2018.1473853

To link to this article: https://doi.org/10.1080/09537325.2018.1473853

© 2018 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group

Published online: 26 Jun 2018.

Submit your article to this journal

Article views: 151

View Crossmark data
Innovation intermediary challenging the energy incumbent: enactment of local socio-technical transition pathways by destabilisation of regime rules

Kaisa Matschoss a,b and Eva Heiskanen a

a Consumer Society Research Centre, University of Helsinki, Helsinki, Finland; b Helsinki Institute of Sustainability Science, University of Helsinki, Helsinki, Finland

ABSTRACT

The energy sector needs to transform towards sustainability. The multi-level perspective on sociotechnical transitions is embracing an enactment perspective, which focuses on the agency of various actors in shifting transitions pathways but has yet to study local urban experiments from such an enactment perspective. Our empirical research examines an innovation intermediary’s work in destabilising the regime rules in relation to the local energy incumbent company in Helsinki, Finland. Our paper seeks answers to the questions: How does the collaboration of the intermediary and the local energy company unfold? What are the impacts of the intermediary work on the local energy company in terms of enactment of transition pathways and what are the mechanisms causing the impact? Our research shows that the intermediary contributes to the transition by disturbing existing rules, structures, practices and networks by convening innovation champions from different constituencies, renegotiating regime rules and disrupting existing R&D alliances.

ARTICLE HISTORY

Received 6 February 2018
Accepted 27 April 2018

KEYWORDS

Innovation intermediary; energy incumbent; urban experiment; enactment of transition pathways

1. Introduction

Climate change and increasing environmental problems challenge current societies to take a leap towards sustainability. In particular, the need to decarbonise the energy sector requires a major sustainability transition (Bosman et al. 2014). The multilevel perspective (MLP) on sociotechnical change suggests that transitions occur if the current regime (rules, actors and infrastructure) is destabilised by simultaneous pressures from the landscape level (exogenous factors such as change in international agreements, environmental problems) and by radical innovations incubated in protected niches (e.g. Geels 2002, 2005, 2011; Schot and Geels 2008). However, the existing socio-technical regime is institutionally, organisationally, economically and culturally entrenched (Geels 2005) and radically new technologies face barriers in breaking through, because regulations, infrastructure, markets, user practices and maintenance networks are aligned to the existing technology; in stable situations (such as the capital intensive energy sector), innovation is mainly incremental and ‘down the design hierarchy’ (Geels 2002, 1272). Regime actors are, for example, incumbent organisations that have an interest in keeping the regime as stable as possible in order to benefit from their secure position.
The popularity of the MLP perspective has been followed by debate on whether it is sufficiently sensitive to agency and scale (Hodson and Marvin 2009; Raven et al. 2016; Rocholl and Bolton 2016; Collins, Boyd, and Curzon 2017; Svensson and Nikoleris 2018) – for example, the agency of incumbent actors (Hess 2014) and the diverse interests involved in local energy systems change (Collins, Boyd, and Curzon 2017). In response, Geels et al. (2016) developed an approach to study the enactment of transition pathways (see Geels and Schot 2007). This perspective investigates transition pathways as sequences of events consisting of particular mechanisms and entailing moves and counter-moves by actors, some of which might shift the transition from one pathway to another. Geels et al. (2016) argue that this framework can be used at various degrees of granularity. However, most of the research building on this perspective has focused on the national and global levels (Geels et al. 2016; Kern and Rogge 2016) and there is still a dearth of research linking this framework to the most granular level of local projects, which offers the best insight on agency in action (Collins, Boyd, and Curzon 2017) and connects to a vibrant literature on agency in urban sustainability transitions (Hodson and Marvin 2009; Bulkeley and Castán Broto 2013; Rocholl and Bolton 2016) as well as to the emerging literature on the geography of transitions and the role of spatial proximity in transitions (e.g. Coenen, Benneworth, and Truffer 2012; Hansen and Coenen 2015).

Enactment requires agents: individuals, organisations and sector bodies (Avelino and Wittmayer 2016). Wittmayer et al. (2017) argue that transitions entail fundamental changes in the roles of actors and in their relations with each other. Recent research has highlighted the role of various kinds of intermediaries in supporting, stimulating and perhaps even forcing transition pathways (Kivimaa 2014; Kivimaa et al. 2017). Intermediaries can be dedicated organisations, but also individuals within or outside existing organisations who act as innovation champions (Klerkx and Aarts 2013), boundary spanners (Hargreaves et al. 2013; Smink et al. 2015), middle actors (Parag and Janda 2014), embedders of solutions into institutional contexts, or transformers of institutional contexts (de Haan and Rotmans 2018). Intermediaries, thus, do not only play a role in the protection of niches, they might also play an important part in the destabilisation of the current regime (Kivimaa 2014). However, there is limited empirical analysis of the concrete moves that intermediaries might make to destabilise regime rules on a local level.

Our empirical and explorative research examines the mechanism entailed in intermediation that serves to destabilise the regime rules in a local context of a smart city district in the Finnish capital, Helsinki. This local smart energy living lab site was chosen because it serves as a national flagship of radical, open innovation and enables a view on the local enactment of transition. This site can be seen as an extreme case of best practice from a country that strives for a sustainability transition with a focus on social and political engagement and a government supporting ‘an experimental culture’ (Government Programme 2015).

We investigate the mechanisms through which the intermediary interacts with incumbents and niche actors to challenge existing regime rules with following questions: (1) How does the collaboration of the intermediary and the local energy company unfold? As sub-questions we ask (2) How do the intermediary activities impact the local energy company in terms of transition pathways? and (3) What are the mechanisms causing the impact?

By studying the mechanisms through which an intermediary organisation enacts a local transition pathway together with other stakeholders (including the local energy incumbent), we address important gaps in research on sociotechnical transitions. We investigate the enactment of transition pathways on a local level, taking into account the (intentional and unintentional) agency of individuals; moreover, we do so in everyday and commonplace contexts that are not directed toward a particular vision of sustainability transition (Collins, Boyd, and Curzon 2017). We examine the role of intermediaries in not only facilitating and supporting actors, but also destabilising existing regime rules, and identify mechanisms of local destabilisation: the convening of innovation champions from different constituencies, the negotiation of exemptions to regime rules, and the disruption of existing innovation alliances and consortia.
In the following, we present the theoretical perspectives on the enactment of sociotechnical transition pathways framing our analysis of a local sustainability transition and describe our local case study of ‘Smart Kalasatama’ in Helsinki. We introduce how the intermediary organisation enacts local transition pathways and impacts the local energy incumbent company, and discuss our contribution to the enactment of transition pathways and the specific ways in which innovation intermediaries can disrupt existing regime rules. Finally, we conclude and suggest future research needs.

2. Conceptual framework

We draw on the framework presented by Geels et al. (2016) for analysing the enactment of sociotechnical transitions. This perspective investigates transition pathways as a sequence of events consisting of four successive mechanisms (1) structural conditioning of actors by existing rules and institutions, (2) social interaction among actors (e.g. learning, sense-making, collaboration, conflict and actors’ responses to each other’s moves), (3) structural elaboration (i.e. reproduction of rules and institutions or efforts to modify them), and (4) acceptance and retention of rule changes. Geels et al. (2016) argue that this framework can be used at various degrees of granularity – from aggregate alignments of trajectories, event-chains in the development of trajectories, or the interaction of actors in local projects. This framework aims to go beyond established dichotomies (such as new entrants versus incumbents) (Geels and Schot 2007) and to pay attention to ongoing struggles between actors over institutions and technology deployment (see Figure 1).

The structural conditioning of actors by existing rules and institutions is particularly deep-seated in the energy sector (Verbong and Geels 2010). Barriers to a transition in the energy sector include established social networks, skills, belief systems and the market power of incumbents, but foremost high sunk investments in the electricity network infrastructure (e.g. power plants, cables, transformer stations, metres) – all creating path dependencies. While radical innovations emerging in niches are

![Figure 1. Analytical framework of the study (based on e.g. Geels et al. 2016).](image-url)
usually considered the forces to overthrow the existing regime, this is, however, less likely in systems with large infrastructures, high sunk investments and entry barriers (Verbong and Geels 2007). Geels (2011) notes that large incumbent firms could accelerate the breakthrough of sustainable innovation if they supported the innovations with their complementary assets and resources, but are not likely initial leaders of sustainability transitions. Indeed, there is a growing body of research on how incumbent firms ‘tame’ or subvert transitions (Pel 2016; Spåth, Rohracher, and von Radecki 2016). Change is often occasioned by new entrants in the market, who destabilise the regime (Bosman et al. 2014). Intermediaries — including hybrid actors who are part of the regime but engage with niche innovations (Elzen, van Mierlo, and Leeuwis 2012) — are in the position to reinforce this process by mediating between new entrants introducing radical novelties, and incumbents with resources, credibility and existing customer bases.

Social interaction among actors can be supported by intermediaries offering a domain for innovation (Kemp, Schot, and Hoogma 1998). Howells (2006) defines intermediaries as agents or brokers between two or more stakeholders. Winch and Courtney (2007, 751) have defined a more specialised kind of an innovation intermediary, namely an innovation broker, which they define as a party enabling other organisations to innovate (see also Klerkx and Leeuwis 2009). Intermediaries enable better learning from local projects in the form of knowledge circulation (Geels and Deuten 2006; Hargreaves et al. 2013) and help to transform ideas into solutions (Howells 2006) as they are often also spatially closer to new niche actors enabling a more frequent communication (Coenen, Bennneworth, and Truffer 2012; Hansen and Coenen 2015). This is particularly relevant vis-à-vis incumbent firms, which may defend themselves against new technologies by improving existing technology, thus delaying the diffusion of new technologies and the overall transition (Geels 2005; Spåth, Rohracher, and von Radecki 2016).

Structural elaboration entails the renegotiation of regime rules. This is easier to do at first in temporary protected niches of urban experimentation, such as urban living labs, where the usual regime rules can be provisionally suspended. Both living labs and niches provide joint learning processes involving producers and users (Howells 2006; Weber and Rohracher 2012) but also enabling the formalisation of informal collaborations between actors that might not have come together otherwise (Winch and Courtne 2007). However, experimentation is not only about learning from trial and error, but instead it can serve to contest control and authority (Bulkeley and Castán Broto 2013) — i.e. allow for a renegotiation of visions and institutional logics (Klerkx and Leeuwis 2009; Kivimaa 2014; Smink et al. 2015; Hermans, Roep, and Klerkx 2016). Intermediaries, depending on their mandate, funding and location, can in this context act as a linkage between the niche and regime level (Elzen, van Mierlo, and Leeuwis 2012).

Acceptance and retention of rule changes pertains to the stabilisation of new rules created as the result of experimentation and the moves and counter-moves of challengers, incumbents and intermediaries in the transition process. However, following Geels et al. (2016), we can recognise several different ‘depths’ of regime rule changes. Substitution could lead to a complete disruption of regime rules or to ‘layering’, where individual innovations are adopted without significant institutional change. In a transformation pathway, incumbents might add new competences within existing regimes, or reorient themselves through technical diversification or full reorientation through changing beliefs and mission. A reconfiguration pathway can involve new alliances between incumbents and new entrants, which might first entail incumbents incorporating innovating technologies in a modular fashion, but later lead to struggles over the direction of institutional change. Finally, de-align ment and re-alignment is a pathway that acknowledges that transitions are likely to be non-linear; two steps forward may be followed by one step back, or steps in a different direction (Geels et al. 2016).

3. Case study context, method and data

Our empirical examination of the enactment of local transition pathways is in the context of a newly built smart city district in the Finnish capital city, Helsinki. This living lab site experimenting with
different smart energy solutions pilots radical, open innovations in a real-life context and can represent a good practice case. The incumbent energy company under scrutiny, Helen Ltd., formerly Helsinki Energia, is one of Finland’s largest energy companies and an integral part of the city infrastructure. It is fully owned by the city of Helsinki, and operates in electricity production, sales and distribution, as well as district heat and cooling production, sales and distribution.

Helen, along with the city of Helsinki, has committed to making its energy production carbon neutral by 2050, which is difficult since most of its production is fossil fuel based. The company has launched several R&D projects that aim toward the integration of renewable, intermittent energy sources. Many of these efforts are focused in the Kalasatama area, which borders on the site of the company’s production plant. From Helen’s perspective, Smart Kalasatama is seen as a smart grid pilot, which is expected to pave the way for the future energy system.

From 2013, the project focusing on the development of the Smart Kalasatama district has been managed by an innovation organisation completely owned by the city of Helsinki, Forum Virium Helsinki (FVH), which is the focal innovation intermediary in our case. The core business of FVH is in the development of services based on digitalisation jointly with businesses, the city of Helsinki and other public actors. The purpose of the company is to act as an innovation intermediary mediating and supporting the creation of better, digitalised services and new business as well as opening connections to the international markets. FVH has characteristics of an innovation broker, in that it enables other organisations to innovate (e.g. Klerkx and Leeuwis 2009). Nevertheless, as it does engage in the creation and implementation of innovations and piloting, it cannot be seen as an innovation broker only.

Our empirical data collection builds on a case study research design (Flyvbjerg 2006). This study presents a case where several innovations are piloted in a spatially bounded area in an ambitious experiment involving multiple forms of interaction between the intermediary and incumbent. Our case is thus especially well-suited for the identification of internal interdependencies (Seawright and Gerring 2008) made possible by a case study research design.

We draw on several data sources: as background and orientation, we have drawn on accounts of previous efforts at Helen to create disruptive business models (Apajalahti, Lovio, and Heiskanen 2015; Apajalahti, Temmes, and Lempäälä 2018). We have conducted small-scale participant observation with Helen and FVH in 2014 by collaborating in a project proposal centreing on Smart Kalasatama, which in the end was not funded owing to difficulties in assembling a consortium of diverse companies in the project. Further participant observation has taken place in events organised in the Kalasatama area in 2016–2017, such as the ‘Innovators Club’ organised twice a year by the intermediary FVH, in which Helen also participates regularly, as well as other residents’ events.

Finally, we have conducted a series of 23 semi-structured interviews in autumn 2015 and spring 2016 that were recorded and transcribed and later coded and analysed. The aim of the interviews was to create knowledge and understanding of the different perspectives and perceptions on the role of the innovation intermediary in the development of Kalasatama. We have interviewed representatives of Helen, the intermediary FVH and city officials in the roles of experiment organisers, local politicians and officials, as well as residents, funding bodies and potential aggregators of lessons. These have been complemented with document analysis (Smart Kalasatama website, City of Helsinki documents).

The aim of the data collection has served two primary purposes:

1. To describe the case, that is, to discover the details (Flyvbjerg 2006) of what is happening in the Smart Kalasatama project from several perspectives (Helen, FVH, funding bodies, city officials, residents), i.e. what kinds of changes to existing regime practice are being piloted and introduced.

2. To make a close, interpretive analysis of how Helen and FVH and key city officials have experienced the development of their mutual relations during the Smart Kalasatama
project, the purpose and work of the intermediary in the project, as well as the direct or indirect impacts of the intermediary’s activities in terms of changing existing practices of the regime incumbents.

In this latter task, we have drawn on a close analysis of, particularly, the interviews with FVH, Helen and city officials (8 interviews in total). Drawing on Watts (2014), we have attempted to make close ‘first-person’ and ‘third-person’ analyses of the respondents’ accounts and interpretations of the development of their relations in the work of creating Smart Kalasatama. Through this, we investigate how enactment of a transition pathway is accomplished in the local context of an initial structural conditioning, through social interaction and structural elaboration, as well as how the actors involved see the possibilities for retention of rule changes (see Geels et al. 2016).

4. Findings

4.1. Structural conditioning of actors by existing rules and institutions: an established energy system responding to external challenges

In our empirical case study, Helen and the city of Helsinki represent the regime incumbents (although the latter is not on the focus of the study). The city has benefited immensely from the reliable provision of electricity and district heat, which has historically led to improved air quality and high standards of living in the city. Helen has also been a prime example of the benefits of centralised energy production; its combined heat and power production (CHP) has gained several environmental awards and has been economically competitive (Apajalahti, Lovio, and Heiskanen 2015). At the same time, the company’s reliance on fossil fuels has been a source of political debate for decades and created a struggle for the company to find new sources of profitable business.

In order to meet its commitments to carbon neutrality by 2050, Helen has launched several R&D projects for the integration of distributed, intermittent energy sources: among others, building solar power plants, constructing a large battery-based electricity storage unit, introducing district cooling, and demonstrating a home electricity monitoring and control system, as well as increasing bioenergy-based district heat production. (See Appendix Table 1 for a timeline of major events and activities in the living lab site.) In addition, it experiments with solutions for energy efficiency and reducing peak power demand. Many of these efforts are focused in the Kalasatama area. From Helen’s perspective, Smart Kalasatama was initially represented as a test site for piloting smart grid solutions, which will pave the way for the future energy system but retain a central role for the energy incumbent.

Many of these innovative solutions require a new relationship to customers (Apajalahti, Temmes, and Lempialä 2018), which is one of the things that the Smart Kalasatama urban living lab is expected to develop. In Helsinki, as elsewhere, customers have until now had a passive role in the centralised energy system, whereas visions of a smart grid envisage consumers as having an active role in producing electricity and managing their energy consumption according to the availability of distributed, intermittent energy sources (Verbong, Beemsterboer, and Sengers 2013).

The project in the Kalasatama area started as a collaboration of four large established companies (ABB, Helsinki Energy, Nokia Siemens Network and Mitox) in 2010 (see also Heiskanen et al. 2018). In order to support this collaboration, the city council of Helsinki set energy-related requirements on the infrastructure built in the Kalasatama area: e.g. land was to be allocated only to developers that install ‘smart’ electricity monitoring and control systems in the residential buildings. Enabled by these requirements, Helen has piloted a new service in two of the first residential buildings completed in Kalasatama. This smart energy management system is a proprietary wired, built-in network based on the KNX data protocol that allows residents to monitor and control their appliances using several interfaces, including their mobile phones. In this sense, it represents an
incremental change, which allows the incumbent to maintain control over energy data and management solutions, while opening up for ‘smarter’ management of e.g. intermittent power production. The city planning itself, though visibly eager to facilitate innovation, in many ways represents an extension of existing planning procedures that are cumbersome and slow to respond to new technologies.

4.2. Social interaction among actors: bringing together innovation champions

When FVH was placed in charge of the Smart Kalasatama development, its task was to develop Smart Kalasatama into an urban living lab, which serves as a development and test platform for innovative services. This task is performed in collaboration with a wide range of businesses, city departments, residents and organisations. In order to engage new and innovative ideas and combinations of actors, FVH has initiated two main concepts: an Innovators’ Club and a Programme for Agile Piloting. The Innovators’ Club is a regular forum for large and small companies involved in developing the area, as well as city officials, researchers, residents and resident organisations. The goal of the Innovators’ Club is to stimulate innovation by mediating new collaborations and projects through networking and sharing ideas among startups, established companies and researchers. The objective of the Programme for Agile Piloting is to accelerate new concepts into service innovations and new business through small-scale and rapid experimentation by startups.1

The pilots have focused on smart mobility, reducing waste and co-creating local services, and increasingly, on ‘climate positive experiments’: smart city parking and electric car charging, resident-generated solar power, urban green solutions and the carbon footprint of households (Smart Kalasatama 2018).

Based on the interviews and through participant observation, we found a close cooperation between Helen and FVH. Helen has been active in the Innovators’ Club and it is also a member of the board that selects the pilots to be initiated in the Programme for the Agile Piloting. Helen and FVH collaborate in several R&D funding proposals and projects, which aim to develop resident co-operation and lead user innovation in Kalasatama. The incumbent supports the work of FVH, and FVH as an intermediary organisation can offer the energy company new opportunities for networking with actors that they are not likely to meet through their established collaboration channels.

Through these new forms of social interaction, FVH has shaken up the established R&D practices of Helen, which has previously collaborated in consortia of large companies and along clearly defined development lines. Now, Helen is challenged to work with startups and citizen groups active in the area, with different directions and modes of innovation. In this context, the energy incumbent feels that the business actors should be left to take care of themselves, and instead FVH should concentrate on bringing the opinions of residents to the city authorities, which in turn could then create the conditions for businesses to develop new services. Helen representatives felt that such a more indirect approach would leave space for more organic business alliances than explicit efforts to network companies, as illustrated in the following quote:

It would make sense to not start with technical specs and requirements, but by asking the residents how they want it to be … and this social reality should then seep in somehow into the development of city-level regulation … How could the knowledge that their [FVH’s] job is to collect be brought into the planning machinery in the service of democracy? (Helen representative)

None of the interviewed actors mentioned any overt conflicts between the intermediary and the local energy incumbent company. This is not surprising as the organisations are both owned by the city of Helsinki. The lack of overt conflict implies that the challenge posed by the intermediary is not obvious or dramatic. This could also relate to the companies having such strong interdependencies that conflicts of interests are faded out due to the mutually beneficial collaboration (as in the case of multi-level games, see Stewart and Hyysalo 2008).
4.3. Structural elaboration: changing unspoken rules of the market

FVH has worked hard to disembed the notion of the smart grid from proprietary and wired systems that keep the development in the hands of large companies. Indeed, the city of Helsinki has mandated FVH to create novel digital services, and therefore FVH has had a great interest in supporting the development of energy monitoring and control software that has wide applicability, both in terms of locations and applications and further use in new products. Most concretely, from FVH’s perspective, the smart energy management systems developed in Kalasatama should be cost-effectively applicable in other parts of the city, also in older buildings. This has been one of the issues where FVH has worked to disrupt existing structures, in particular, by trying to find solutions and build consortia that go beyond the existing reliance on wired systems and include startup companies developing the use of wireless signals (IoT systems) to monitor and control individual devices, as exemplified by the following quote:

After all, we are creating solutions that are at the frontier of current development – and then when the ecosystem that would take care of the data [secure storage and sharing of electricity usage data] is missing, then that is a barrier, the fact that the ecosystem is missing. (FVH representative)

From the incumbent’s perspective, the intermediary’s attempts to create new business ecosystems to support innovation might conflict with existing business alliances that established companies have. While FVH tries to create new business ecosystems by bringing together companies that have not previously collaborated, short-term and incidental encounters might not, from Helen’s perspective, create the conditions for durable business alliances:

It is a difficult role … trying to at the same time to give companies the autonomy, since they know best, and the freedom to select their business partners and the kind of support they need … but also acknowledging that the companies have the responsibility … they [companies] can’t just [come to a workshop and] disregard, or leave at their office desk, their [strategic] intentions and the way in which they want to enter this market. (Helen representative)

Our interpretation of these and other similar statements is that FVH is inadvertently disrupting the balance of competing firms in the area, because it is unaware of, or disregards, the unpronounced rules of the market in which the companies have so far competed with each other (and which the city, with its original planning regulations, has previously endorsed). Since new alliances are forged ‘from the outside’, the concern was voiced that market players might not take as much responsibility for the collaboration as they would if they were to take the initiative themselves. Through the activities of the intermediary, the incumbent finds itself in constellations where the rules applied are not clear and the trust between actors needs to be built. This creates the opportunity of unexpected new collaborations, but also the risk of lacking accountability if collaborations do not work out as expected (see Matschoss and Heiskanen 2017). This also relates to the particular position of regime incumbents as having responsibilities (e.g. for data security and security of electricity supply), due to the particular role of energy as a necessity and a public good.

We identified three mechanisms through which the intermediary FVH worked to structurally elaborate regime rules: (1) the convening of innovation champions from different constituencies, (2) the negotiation of exemptions to regime rules, and (3) the disruption of existing innovation alliances and consortia. First, FVH convenes innovation champions from several organisations and creates an amenable environment for them (see Fichter 2009; Klerkx and Aarts 2013) by actively bringing together different actors and organising networking events between companies working in the area and residents.

In particular, FVH aims at the creation of new innovations, their dissemination as well as the creation of economic value, new value chains and new learning. These objectives resonate with the roles of intermediary organisations discussed in the literature (e.g. Geels and Deuten 2006, 266–268): the aggregation of knowledge, the creation of an institutional infrastructure and framing and coordinating local activities. This is done in the local living lab sites where small firms, user-innovators and users...
come together for experimentation. Especially in Kalasatama, the local innovation intermediary has offered a stage for energy related experiments by offering infrastructure and possible customers to new firms entering the market with new and diverse solutions.

Second, the context of innovation creates the need and opportunity for negotiating (temporary) exemptions to regime rules, enabled by the spatially bounded area. The joint experimentation regularly runs into conflict with old structures that make piloting and testing of new innovations as well as their diffusion extremely slow. Thus, the realisation of any small new idea takes time, and there the intermediary organisation sees as its concrete task to try to speed up the removal of barriers that are created by old structures, such as working to remove an outdated norm or ‘releasing a stuck IPR’ from the administration of an organisation:

> We aim to change the operating procedures of the city, we are the city’s change agent… whatever we do in Kalasatama, then there is always at least one department, which we need to negotiate with and that has to react to it … so we spend time negotiating whether we can put up a display screen at a metro station. (FVH representative)

In fact, FVH’s success stories in innovation often relate to surmounting a barrier created by old structures. In this context, the pilots and testing of new ideas are an effective way of showing lock-ins and revealing places where things could be done differently in public organisations with the help of digitalisation.

Finally, as shown above, FVH has impacted the energy incumbent by supporting the entrance on new SMEs into the market and enabling new combinations of collaboration in new service provision in the local area. Some of these efforts have been purposeful, others more accidental side effects of attempting to create novelty and generate new projects in the area, which are an important source of income for the intermediary. Through the networking of new stakeholders, the intermediary loosens the actor network that keeps the so far very stable regime fixed and ensures that new solutions remain marginal, that is, in niches.

**4.4. Acceptance and retention of new rules: ensuring the diffusion of innovation and expanding network**

FVH creates an amenable environment by giving innovation in Kalasatama a lot of visibility. With high-profile examples and inspiring rhetoric, FVH generates a reality that does not exist yet but is enacted in new pilots, i.e. the intermediary shapes a responsive context for going beyond existing practice and engaging stakeholders in developing novel solutions.

> They [FVH] bring the idea of a smart city district into reality with their [inspiring] rhetoric about the area. (Helen representative)

The fact that new companies enter the market and new constellations of co-operating companies offer new services to the residents in the area intensifies the pressures on the incumbents to renew their business and operating models. The overall energy market transition forces the evolution of business towards more service-orientation, although some of the interviewed actors had strong doubts whether the incumbent and conservative energy businesses are capable of transforming into service providers.

In fact, there were views stating that the investments into truly changing the way business is done in energy companies are much too small to actually contribute to a change of business culture. The intermediary was seen as a catalyst enabling the market entrance of real service providers that will replace the old actors and radically transform the structure of the energy market. In the most radical view of the future energy market, the current energy companies are just energy producers with no customer interface and completely new service companies will offer novel services to customers, as one of the interviewed city representatives suggested (see also Geels et al. 2016). Table 1 lists the main findings of this study in terms of local enactment of sociotechnical transition in Kalasatama.
5. Discussion

The structured enactment perspective on sociotechnical transitions has not hitherto been applied to the local level, although local projects as such have been the place of many transition studies. Enactment has been studied in national politics, especially in bipartisan political structures where enactment is shown in dramatic shifts between policies (Geels et al. 2016), though recent research has threaded together different strands on local, national and global levels (Kern and Rogge 2016).

However, a focus on the local level enables us to zoom in on the tactical moves that players can make to promote energy transitions (Hodson and Marvin 2009; Collins, Boyd, and Curzon 2017), and in particular, the opportunities that local innovation intermediaries have to make small disruptive moves vis-à-vis, yet within, the regime.

From the multi-level perspective (MLP), the regime is held stable by interlinked actors and rules that maintain the current regime; these linkages are the glue that supports the regime, which makes it difficult for radical innovations to break out of the niches (Schot and Geels 2008). In addition, according to MLP, the regime will not change in one disruptive event but gradually when several innovations start emerging and one innovation that manages to leave the niche may lead to another, occasioning different kinds of transition pathways. In our case study, it seems that the entry of an innovation intermediary has shifted the local transition from a substitution pathway (where some new technologies are incorporated into the regime) onto a reconfiguration pathway, where new alliances are created between incumbents and new entrants (Geels and Schot 2007; Geels et al. 2016). This has been made possible and enforced by the spatial proximity of actors in the local area, enabling frequent interaction (e.g. Coenen, Raven, and Verbong 2010).

Table 1. Main findings of the case study in Kalasatama.

<table>
<thead>
<tr>
<th>Mechanisms of enactment (Geels et al. 2016)</th>
<th>Local enactment of sociotechnical transition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural conditioning of actors by existing rules and institutions</td>
<td>City benefits from reliable energy provision</td>
</tr>
<tr>
<td></td>
<td>Economic benefits from CHP to the incumbent</td>
</tr>
<tr>
<td></td>
<td>The established regime is about ingrained practices, competences and customer relations and established business alliances</td>
</tr>
<tr>
<td></td>
<td>Commitment of the city to become carbon neutral challenges the incumbent to find new profitable business =&gt; incumbent launches R&amp;D projects to find new business and maintain own position in the market and in the spatial area</td>
</tr>
<tr>
<td></td>
<td>New land allocation rules support new, but possibly incremental solutions</td>
</tr>
<tr>
<td>Social interaction among actors</td>
<td>New urban living lab site created through the funding of Smart Kalasatama project, management given to the intermediary</td>
</tr>
<tr>
<td></td>
<td>Intermediary brings together niche innovators and new ideas e.g. through regular Programme for Agile Piloting</td>
</tr>
<tr>
<td></td>
<td>New constellations of co-operating companies through Innovators’ Club</td>
</tr>
<tr>
<td></td>
<td>Co-operation with residents, lead users and small firms active in the spatially bounded area</td>
</tr>
<tr>
<td></td>
<td>Shaking up the established partnerships of the incumbent by forcing new constellations of co-operation</td>
</tr>
<tr>
<td>Structural elaboration</td>
<td>Convening of innovators from various constituencies</td>
</tr>
<tr>
<td></td>
<td>Disruption of existing innovation alliances and consortia</td>
</tr>
<tr>
<td></td>
<td>Intermediary activities change unspoken rules of the market</td>
</tr>
<tr>
<td></td>
<td>Offering a stage for aggregation of knowledge, creation of institutional infrastructure, framing and coordinating local activities</td>
</tr>
<tr>
<td>Acceptance and retention of new rules</td>
<td>Enhanced visibility for innovation activities through visits from other urban experimental sites</td>
</tr>
<tr>
<td></td>
<td>Intermediary as a catalyst for market entrants that will profoundly transform the structure of the energy market</td>
</tr>
<tr>
<td></td>
<td>Intermediary attempts to have an impact beyond the Kalasatama area and spread good practices and innovations within the city</td>
</tr>
<tr>
<td></td>
<td>Creation of new business ecosystems to support innovation by forging new and long-term alliances by the intermediary</td>
</tr>
<tr>
<td></td>
<td>Incumbent faces a risk through lacking accountability of novel partnerships in case collaboration fails</td>
</tr>
</tbody>
</table>
The role of intermediaries in the MLP literature is usually seen as aggregator of niches (Geels and Deuten 2006). However, our case study shows that innovation intermediaries with an explicit mandate to create new dynamisms and novel possibilities within a system (cf. Smits and Kuhlmann 2004; Howells 2006) can do important work in disrupting the regime by mediating between the niche and regime actors (Elzen, van Mierlo, and Leeuwis 2012) in a geographically bounded space (e.g. Hansen and Coenen 2015). While incumbents tend to defend the existing regime (Geels 2011) our case study in Kalasatama shows that the incumbent energy company is attempting to keep up with the change by cooperating with the intermediary in a way that satisfies both organisations, which implies that the incumbent has turned to strategic reorientation (see Bosman et al. 2014). In Kalasatama, the current regime is not replaced with a new regime, but it itself reforms and adopts new rules, technologies and actors that form the new regime in the local area, potentially influencing the whole capital area and later the energy market.

Changes in the roles and relations between actors have been highlighted as an important but neglected aspect of transitions (Wittmayer et al. 2017). Our empirical case highlights how intermediaries can bring about such changes in roles. Local experimentation was found to be a way to bring together innovation champions from incumbent companies, startups and civil society, thus enabling changes in their cognitive frames and assumptions. Furthermore, the experimentation has occasioned the need and the opportunity to renegotiate regime rules, in which task the intermediary has played an important role. Finally, it has served to disrupt existing actor coalitions and create new ones. From an enactment perspective, the pressure formed by the forging of new partnerships may loosen up the linkages within the regime, allowing space for disruptive innovation to escape the niche into the mainstream (Geels et al. 2016). Our findings show how these partnerships disturb the existing rules of the market and challenge the incumbent company, thus unintentionally disrupting existing R&D alliances (e.g. Klerkx and Leeuwis 2009) and shifting the direction of technological innovation.

According to Geels (2011), niches usually emerge outside, rather than within, regimes. We suggest that in the case of government or city owned intermediaries a protected niche for experimentation and the pressure on the regime may indeed emerge within the regime. As our findings show, the regime actors have also been involved in Kalasatama, which has enabled an institutional embedding of the experiment. The geographically bounded space offers a site for experimentation that offers scope for ambition but limits the possible failure of experimentation to one site only. This spatially bounded experimental site does not pose a great challenge to the incumbent regime as a whole, but instead offers a place of renewal where successful lessons learned can be picked up and brought into the incumbent regime.

Our study has certain limitations. We have analysed an individual case, which in itself is not generalisable: there might be different forms of transition enactment in other local sustainability initiatives. Our case study, however, serves as a first effort to identify mechanisms of destabilisation that local innovation intermediaries can employ.

6. Conclusions

Our empirical research has examined the mechanisms through which an intermediary organisation participates in enacting an energy transition by destabilising the regime represented by the local energy incumbent company and the established city governance structures. We have done so in the context of the smart city district of Kalasatama in Helsinki, Finland, a national pilot project in renewable energy and smart grid technology providing the infrastructure needed to bring experimentation to a larger scale. Through this research, we highlight the everyday and ongoing work of enactment of energy transitions on the local level.

Our research confirms the previous suggestions in the literature (Kivimaa 2014) that the intermediaries can contribute to the transitions through disturbing existing structures, practices and behaviours from two levels: niche creation and regime destabilisation. The previous literature has not
emphasised the role of networking between niches and regimes in the destabilisation of the existing regimes. Our research identified three mechanisms for how this can occur: (1) the convening of innovation champions from different constituencies, (2) the negotiation of exemptions to regime rules, and (3) the disruption of existing innovation alliances and consortia. Further research on the interaction of the regime and niche actors and the networks that new experimental sites make possible could bring more knowledge on the enactment of energy related sustainability transition. The study of energy experiments and the actor constellations in a broader view of several experiments could complement the findings of this explorative study.

Our research provides an empirical illustration of the problems in the analytical separation between niche and regime actors in the MLP literature (Svensson and Nikoleris 2018). In our case study, the city of Helsinki hosts both niche and regime actors, and the change process in Smart Kala-satama involves both practices that are linked to the regime (the conventional role of energy companies, conventional practices of city planning) and novel niche-like elements that have been added to the equation to bring about radical change. Moreover, within the organisations involved (Helen, city administration), different units and individual people can represent different aspects of the regime. Hence, further research is also called for that integrates analyses of organisational change into the MLP approach.

Note

1. More information about the Programme of Agile Piloting and the piloted services can be found at https://fiksukalasatama.fi/en/agile-piloting/.

Acknowledgements

The research has received funding from Academy of Finland for TRIPOD [GA 288402] and the Academy of Finland’s Strategic Research Council for SET [GA 293405].

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

The research has received funding from Academy of Finland for TRIPOD [grant number 288402] and the Academy of Finland’s Strategic Research Council for SET [grant number 293405].

Notes on contributors

Kaisa Matschoss PhD, senior university researcher at the University of Helsinki. Research interests: energy and environmental issues, sustainable consumption, smart energy transition, the role of intermediary organisations in energy transition and public and stakeholder engagement in sustainability.

Eva Heiskanen Professor of Sustainable Consumption at the Consumer Society Research Centre, University of Helsinki, Finland. 2008–2010 coordinator of the FP7 project CHANGING BEHAVIOUR. Currently, leading sub-projects in two major Finnish national projects related to sustainable energy transitions and the role of users, local experimentation and the development of competences in the energy transition.

ORCID

Kaisa Matschoss http://orcid.org/0000-0002-4045-6729
References


### Table 1. Timeline of major events and activities in Kalasatama.

<table>
<thead>
<tr>
<th>Year</th>
<th>Innovation intermediary ‘Forum Virium Helsinki’</th>
<th>Incumbent company ‘Helen’</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>Start of the project of the smart grid business consortium</td>
<td>Helen’s ‘towards carbon neutrality by 2050’ development strategy, City of Helsinki sets energy related requirements for the construction in the area</td>
</tr>
<tr>
<td>2012</td>
<td>New City Council approves Helen’s development programme towards carbon neutrality, Helen starts to burn wood pellets in addition to coal at Hanasaari power plant located next to Kalasatama (also in Salmisaari, another location in Helsinki)</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>Smart Kalasatama -project begins as part of the Smart city – programme of Tekes (the Finnish Funding Agency for Innovation) (funding 2013–2014), FVH takes the lead of the project’s management</td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>FVH initiates experimentation and pilot projects in the living lab</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>Funding for the period of 2015–2017 is granted from the 6Aika-strategy, FVH initiates the Innovators’ Club including Helen as a member</td>
<td>City Council decision to close down Hanasaari B and shift partially to a separate heat production and decentralised energy system, Helen constructs the Suviitahti solar power plant attached to Kalasatama area and starts experimenting with its smart home service ‘Hima’ in two apartment buildings</td>
</tr>
<tr>
<td>2016</td>
<td>FVH initiates a Programme for Agile Piloting, (e.g. Toop, Foller against food waste, Smart waste basket, Button Neighbour, Fitnesspals, Auntie), the Innovators’ Club adjourns 4 times a year, Flex spaces are piloted</td>
<td>Helen builds Nordic’s largest grid-connected electricity storage (1,2 MW), Kivikko solar power plant founded (located in another part of the city), Helen’s energy storage (Europe’s largest battery) is taken in use</td>
</tr>
<tr>
<td>2017</td>
<td>Programme for Agile Piloting continues (e.g. Green House Effect, Smart minigrid, Rentapark, Solar energy for residents, Homecoal), the Innovators’ Club continues with focus on novel urban services enabled by IoT, a Flex spaces -pilot continues and expands with new funding</td>
<td></td>
</tr>
<tr>
<td>2033</td>
<td>The construction in the Kalasatama district is completed: last buildings are finalised in Verkkosaari</td>
<td></td>
</tr>
</tbody>
</table>