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'Doing' system innovations from within the heart of the regime

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ABSTRACT

Urban experiments are no longer exclusively undertaken by alternative networks, dominated by new actors and alliances and located at the fringes of the current system. A second generation of initiatives is emerging, which Is characterized by a leading role for local governments, together with other established players. For experimentation at the fringes of the regime the challenge is to maximally benefit from niche protection while seizing opportunities to influence regime dynamics. Second generation experiments face a different challenge: to benefit from the proximity to the regime while maintaining a protective space for developing 'deviant' solutions. I will draw on insights on reflexive governance to develop a framework for understanding this challenge and strategies to meet it. I will use an ongoing project on achieving synergy between energy, water and data infrastructures in Amsterdam as an empirical referent to clarify and sharpen the argument. The framework includes propositions on strategies for this newly emerging types of initiatives, focusing on the processes through which they do or do not work. They may be tested and further developed through case studies. Such work may also contribute to meta-theoretical issue of the relations between institutional, discursive and material factors in driving change.

1. Introduction

Increasingly, global climate change and resource problems are no longer primarily a source of protest and action amongst social movements and engaged individuals. Transnational business-NGO partnerships and increased discomfort regarding the potential political-economic and international security ramifications of natural resources scarcities have created to a broadly shared aspiration for sustainable development. In addition, the Paris Treaty as well as already discernible effects of climate change, like increasing floods and damage to buildings and harvests through extreme weather, are leading to increasingly ambitious and comprehensive governmental policies for climate change mitigation and adaptation. Hence, experiments with fundamentally different practices are no longer exclusively undertaken by alternative networks, dominated by new actors and alliances and located at the fringes of the current system. Rather, we increasingly witness established actors, seeking to fundamentally transform their regular practices, located close to the heart of the incumbent system.

In cities, for instance, a first generation of local government initiatives (often in the wake of UN Agenda 21) remained small compared to a later, considerably stronger wave of initiatives by (alliances of) actors from civil society, market, and knowledge infrastructure, often (at some stage) supported by local governments. The ambitions of such 'urban experimentation' include to explore and develop novel urban practices and infrastructures, promoting local circular economies, energy neutrality and climate change resilience; and to explore novel modes of local governance to accommodate such practices. (Bulkeley & Castán Broto, 2013; Bulkeley et al., 2014; Raven et al., 2019) In general the idea of propagators of such initiatives, often part of recently emerged

social movements like the Transition Towns movement in countries like the UK and Belgium, the *Energiedörfer* in Germany or the global City Makers Movement, is to scale up these practices and their governance modes, transforming their city.

More recently, however, reflecting both increasing aspirations in society as a whole, and novel national policies on climate change mitigation and adaptation, a second generation of initiatives is emerging, characterized by a leading role for local governments. Together with other established players, such as housing corporations, local business associations, utility companies and infrastructure managers, local governments are now exploring and pursuing projects with similarly ambitious objectives as earlier ones, emerging from society and the market. Often, they deliberately decide to try and work and collaborate in fundamentally different ways around specific sites, e.g. realizing a new, or transforming an existing, dwelling area.

Understanding the challenges facing this new generation of urban initiatives, and developing strategies to deal with them, requires different conceptualizations. To understand the first generation, transition theory took a particular logic as point of departure, well-rooted in evolutionary economics and sociology, science and technology studies (STS), and social theory (Rip et al., 1998) and grounded in historiography and historical case studies (Schot, 1998). This logic follows from the basic theorem of transition studies: the definitions of societal problems, the practices that tend to be used to deal with them, and societal structures themselves *co-evolve* with each other – i.e. the evolution of each over time co-shapes the evolution of the other two. (Grin et al., 2010, p. 3 ff) Over time, this mutual shaping is likely to result in a coherent system of problem definitions, practices and structures, dubbed the regime. As an important corollary, if problem definitions that fundamentally deviate from earlier ones become dominant, practices may be needed to deal with them that so fundamentally differ from regime practices, that they are not well served by incumbent structures. Power embodied in structure may generate inertia and resilience (Bos & Grin, 2008; Geels, 2014; Grin, 2003; Meadowcroft, 2009; Roep et al., 2003; Smith, 2007), and yield less fertile ground to these projects and their supporters than to resistance (Avelino, 2009; Grin, 2012; Geels, 2014; Hoffman & Loeber, 2016). Thus, innovative practices are difficult to establish, may easily fall back into normality, or may eventually be terminated. Hence, as a second corollary, to deal with such fundamentally new problems, we need not just a single innovative practice, but also multiple novel practices and a matching structural context: a novel regime. Such innovations we call system innovations. In more dynamical terms: system innovations involve a re-orientation of the co-evolution of problems, practices and structures. (Grin, 2006)

Taking these two corollaries together, the central challenge of realizing system innovations for the first generation of experiments was understood as: develop these novel practices, pre-empting all too adverse influences from the incumbent regime while simultaneously structurally transforming that regime. In transition studies, the solution proposed was to initially nurture fundamentally new socio-technical practices ('niche experiments') in socio-technical niches, typically located at the fringes of the regime and involving a high share of 'alternative' players. There they could develop and mature outside the direct sphere of influence of the incumbent regime (Rip et al., 1998; Schot, 1998). Through 'strategic niche management,' (SNM; Hoogma, 2000; Kemp et al., 1998), several niche experiments would eventually develop into mature socio-technical practices, and help establish a supportive structural context – a 'niche-regime' (De Haan & Rotmans, 2011).

In the next section, I will argue that the second generation of urban experiments, by their nature, faces a different challenge, and broadly outline an associate, different approach (Proposition 1.1). I will subsequently (Section 3) elaborate that into a framework for understanding, guiding and monitoring second generation urban experimentation. It consists of propositions, to be further tested, derived by theoretically informed reflection on an actual programme working close to the heart of the regime. In the concluding section, I will explore key issues for future research, and argue that such research may contribute to the meta-theoretical quest for a more dialectic understanding of change and stability (Marsh, 2010), drawing on and pushing further both neo-institutionalism (Lowndes & Roberts, 2015) and constructivism (Parsons, 2010), while bringing in material structure.

2. Conceiving and meeting the different challenges of first and second generation urban experiments

The central challenge to generation 1 experimentation was noted already long ago, as a comment on earlier versions of strategic niche management, which focussed on understanding internal niche processes, especially learning between niche actors, the shaping of expectations and network formation. These critics (e.g. Berkhout et al., 2004) referred to key findings in the very research that inspired SNM: historical case studies of transitions, mapped – with evolutionary theory as a canvas – in terms of the so-called Multi-Level Perspective (MLP; Berkhout et al., 2004; Rip et al., 1998). This work had portrayed transitions as a change in the regime, resulting from constructive interference between dynamics at three levels: socio-technical niche experiments; instabilities and deliberate, self-induced smaller changes in the regime; and pressure from exogenous developments (the 'landscape'). Thus, these critics pointed out, strategic niche management should much more actively incorporate the notion that niche experiments alone cannot induce a transition – it is necessary to link them dynamically to external forces and ongoing changes in the regime. Recognizing the point, historical studies (e.g. Geels, 2005) and evolutionary theory were used to develop a typology of pathways, describing different ways in which multi-level dynamics may unfold (Schot & Geels, 2010). Drawing on such insights, SNM studies shifted towards understanding the interaction between internal and external dynamics of niches.

Of course, this shift in emphasis notwithstanding, the protective function of niches remained important. As offering protection to experiments within the niche and connecting them to external dynamics obviously do not necessarily imply the same demands, this gives rise to a series of dilemmas for practice (Scheme 1) as Schot and Geels (2010, pp. 80–92) point out in their review of SNM research.

For urban experimentation undertaken at the fringes of the regime, developing novel practices of living, working, transportation and so on, the challenge will be to maximally benefit from niche protection while seizing opportunities to influence, from the niche, regime dynamics. This will shape how these dilemmas are seen and acted upon. There will be more inclination to stick to one vision than to iterate between different elaborations (dilemma #1) and more to promoting variety rather than to accumulate experiences (#2). The network

1.	Expectations, visions	Be flexible, engage in iterative visioning exercises; adjust visions to circumstances and take advantage of windows of opportunity	vs.	Be persistent, stick to the vision, persist when the going gets tough
2.	Learning	Create variety to facilitate broad learning	vs.	Too much variety dilutes precious resources and prevents accumulation & tends to create uncertainty & may delay choices / commitments (by consumers, policy makers)
3.	Learning	Upscaling through bricolage strategy and stepwise learning. Disadvantages: a) slow; b) incremental steps	vs.	Upscaling through breakthrough strategy and big leaps to achieve success rapidly. Disadvantages: a) danger of failure, b) mis-alignment with selection environment
4.	Network	Work with incumbent actors, who have many resources, compet4enmce and 'mass'. Try to change their agenda, visions.	vs.	For radical innovations, it is better to work with outsiders, who think 'out of the box' and have new ideas. Incumbents have too many vested interests and will try to hinder or encapsulate radical innovations
5.	Protection	Protection is necessary to enable nurturing of niche innovations	vs.	Do not protect too long and too much. This might lead to limited exposure to selection processes (and the danger of creating white elephants).
6.	Niche-regime interaction	Wait for cracks in the regime, and then vigorously stimulate niche innovations. Until such windows of opportunity arise, niches should be nurtured to facilitate stabilization.	vs.	Use niche experiences to influence perceptions of regime actors and actively create cracks in the regime

Scheme 1. Dilemma's for strategic niche management, rooted in the tension between promoting reflexivity and adapting the incumbent world. Source: Schot and Geels (2010, p. 90).

will tend to have a critical mass of radical innovators rather than being dominated by incumbents (#4); protection will focus on serving niche innovation (#5); and niche players do well to carefully wait for moments of regime opening up for real change, rather than undertake to too quick attempts and be eaten by it (#6). Indeed, the literature focusing on evaluating such initiatives (e.g. Bulkeley et al., 2014; Raven et al., 2019; Sengers et al., 2018) tends to define success in terms of acting according to these preferred choices – basically seeking to understand how novelties conceived in a niche, may benefit from external dynamics to scale up in time and space.

It is not difficult to see that the more recently emerging second generation of initiatives, undertaken by established actors, from within the heart of the regime, will see these dilemma's from a different angle: how to benefit from the proximity to the regime (e.g. because of associate access to resources, competence and 'mass,' #4; and opportunities to influence perceptions of regime actors and actively create cracks in the regime, #6) while maintaining a protective space where 'deviant' solutions can be developed? To be sure, at the core of this project will be actors who are strongly motivated to go for deep change. Yet, not only need these to enroll other, less committed, actors. Importantly, even these committed actors themselves, through professional training and prolonged practice, will more often than not have been influenced by incumbent institutions' 'logics of appropriateness' (March & Olsen, 1984) and the logics inscribed in incumbent infrastructures (cp. Akrich, 1992). Dominant discourses, acquired through training, may thus have been further internalized in professionals' overarching theories and appreciative systems (Schön, 1983) and in how they understand and position themselves in relation to their tasks and relevant colleagues in other organziations. Therefore, these professionals need more than a protective niche, shielding them from their structural context: they need support in actively re-thinking the structurally embedded logics that normally govern their practices.

2.1. Reflexive governance

Precisely here, another strand of literature from transition studies appears useful: reflexive governance (Feindt & Weiland, 2018; Grin, 2003, 2006, 2010; Voß et al., 2006). This notion is rooted in a central idea from Beck's (1997, 2006) modernization theory: ecological and many other problems are understood as the side effects of first modernity, when what we called the co-evolution of problem definitions, practices and structures was oriented towards the modern faith that organizing society to give way to scientific and technological advance would yield social and economic progress. When it appeared that this produced more than mere progress, these side-effects were politicized, yielding pressure towards a second modernity, oriented towards ensuring welfare while pre-empting or mitigating side-effects.

Against this background, reflexive governance refers to governance oriented towards 'second order reflexivity,' i.e. the capacity to 'reflect on and confront not only the self-induced problems of modernity, but also the approaches, structures and systems that reproduce them' (Voß & Kemp, 2006, p. 6). This requires attention to the 'politics of networks and network management.' (McNutt & Rayner, 2018) A systematic way to understand how this all hangs together has been synthesized from literature by Hoppe (2011), who conceives of practices of problem structuring (=problem setting, problem solving and their iteration – in short: designing) as embedded in networks and discourses. These institutional and discursive contexts are normally reproduced in day-to-day problem structuring, because the way in which problems are structured affects who is involved in their governance ('participation'), which on its turn shapes 'powering' and 'puzzling' and thus eventually institutional and discursive context, respectively – reproducing earlier problem solving.[1]

In first generation urban experimentation, at the fringes of the regime, to deal with the dilemmas of Scheme 1, reflexive re-orientation of problem structuring is done in 'niche' practices, where the influence of incumbent structural context is less pervasive. First, participation is different, following rules of thumb like 'always have at least 30% non-conformists involved' (Rotmans & Loorbach, 2010). Second, niches reduce the influence of incumbent discursive, institutional and material contexts is. Over time, the combination of shifts in problem structuring and changes in participation will, through associate powering and puzzling, yield a different institutional and structural context which may evolve into a new (or transformed) regime.

For experiments undertaken in the heart of the regime and by established actors, a different strategy is needed. It must facilitate incumbent actors in working reflexively, and proximity to regime structures is not only a risk, but also an opportunity. Together, these two things require re-orienting relevant problem structuring practices through introducing a (i) suitable method and (ii) novel substantive orientation, while (iii) adapting their structural context. The loops of causation depicted by Hoppe then offer opportunities to consolidate these changes through promoting mutual reinforcement between adapted practices of problem structuring and adapted structural context.

Proposition 1.1: *For defining, undertaking and monitoring transitions in the heart of the regime, by established actors, it is crucial to promote reflexivity in problem structuring through*

(a) *shaping problem structuring, directly through (i) proper method and (ii) substantive orientation of these practices, and indirectly through (iii) their adapting structural context;*
(b) *promoting mutually reinforcing feedback amongst these elements as well as between them and problem structuring processes.*

In the remainder of this article, I will further develop this approach, formulated above as guiding Proposition 1.1, into a set of additional, more detailed propositions. In line with the programmatic aim of this special issue, these propositions may provide some guidance to future practices for transition processes in such contexts, while future research may draw on such practices to test, correct, develop and complement these propositions.

3. Towards an analytical framework

To elaborate Proposition 1.1 above into a framework for understanding how to promote reflexivity from within the heart of the regime, I will consecutively discuss the just identified three aspects of intervention in problem structuring (i.e. design) practices: intervening in (i) the method and (ii) substantive orientation of these practices, and (iii) their structural context. Before that, I will introduce the concurrent case that will be an empirical referent to clarify and sharpen the argument.

3.1. A concurrent case as an empirical referent: the Koppelkansenproject

The case involves a project in which I am involved, and that, at the time of writing, was underway for about 1,5 year. I will discuss the conditions and activities realized and planned in this project to adstruct the ideas (based on the above notions from transition theory) which underlie these provisions, and phrase them as propositions that may guide further research, including an evaluation of this particular projects as it will progress. It is thus not a full-fledged, ex-post case study of a project and its outcomes, but an illustration, serving a theoretical exploration. My main sources are documents from the project,[2] my own observations during meetings, and my own contributions to the project as specified below.

This *Koppelkansenprogramme* in Amsterdam intends to explore strategies to meet objectives in terms of the energy and resources transition, climate resilience and the digital transition through achieving synergy between solutions to these challenges ('koppelkansen' = linking opportunities; from now on 'KK'). To find and explore options for achieving such synergy, the municipality and two main (privatized) utility companies, Liander (the energy grid manager) and Waternet (water supply, sanitation and waste water treatment) are co-operating in three different pilot projects and an overarching programme for cross-learning. This basic idea of seeking synergy had been proposed as a way to meet the variety of sustainability and digital challenges at acceptable costs or citizens by two directors of Liander and Waternet, in a panel during an inter-municipal symposium. It was swiftly taken by some future oriented, innovative and experienced co-workers of their organizations as well as the municipality.[3] Soon, it was discussed, and then integrated, in the so-called Knowledge-Action Centre Water where practitioners from Waternet and other organizations had started transdisciplinary collaboration with experts from water institute KWR, universities and other knowledge institutes.

Through a scholarly colleague from my university, involved in the centre, I was enrolled into *Begleit-forschung* around the KK programme. Together with a junior researcher and assisted by student work, we seek to support both the design and operation of pilots and the cross-learning between them. These tasks are fulfilled by way of interaction with the practitioners involved, simultaneously monitoring, supporting and guiding them *and* benefitting from their knowledge, experiences and competences. More specifically, our intended contributions are[4]

   i to help professionals in the project, through individual advice and masterclasses, to adopt methods and attain competences, in 'doing' transition work;

  ii to act as 'reflective participants,' helping the project's core team[5] to strategically monitor the proceedings of the project i.e. to identify and analyze opportunities and barriers and translate that into action;

 iii to feed back the results of (ii), such as the understanding of a barrier as an expression of incumbent structure, into (i).

 iv to support learning within and between the pilot projects.

3.2. Intervening in practice through method

The first type of intervention to make problem structuring reflexively scrutinize, rather than just reproduce, incumbent structures concerns method. The idea is to turn routine 'thinking-in-action' (Schön, 1983) that constitute practices, by into 'consciousness, reflection and discourse' (Wilk, 2009, p. 149), 'a conscious reconsidering and revising of what is 'self-evident,' of what is wise and just to do under the circumstances that warrant action' (Loeber & Vermeulen, 2016, p. 32) as a basis for finding different problem definitions and associate solution strategies. In the KK programme we took as a starting point a design method to do precisely that, proposed in earlier work with Sierk Spoelstra, Bram Bos and others (Bos & Grin, 2008; Grin, 2003; Grin et al., 2004), and subsequently developed further for and through real-life innovation projects in a variety of sectors.

This RIO[6]-method comprises three main clusters of design activity, distinguished in the method, but to be iteratively connected in practice: actor and system analysis; system re-design; and realization of the innovation (Koerkamp et al., 2008; Bos et al., 2009). All three activities are shaped to promote reflexivity. Actor and system analysis focuses not on actors' requirements or interests (often reflecting existing solutions as much as actors' needs), but on the underlying needs, enabling a much wider search space for finding problems and solutions that make sense to the variety of actors involved, enabling 'congruent' (Grin & Van de Graaf, 1996), innovative action. Building upon a method for sustainable technology development (Weaver et al., 2000), it also includes collectively constructing visions that offer a different 'horizon of expectations' (Grin, 2003), helping actors to construct and appreciate strategies differently. The second cluster comprises the (re-)design of a system, with innovative ways of linking needs, functions, and specific socio-technical solutions to realize these functions (inspired by a classical engineers' design method – Van Den Kroonenberg & Siers, 1999) – including the type of synergetic solutions sought in the KK programme. Finally, RIO's third cluster of activities involves iterative rounds of work to actually realize the design. Barriers anticipated or encountered are analyzed in terms of how they reflect the incumbent system (Bos & Grin, 2008; Grin, 2003; Schuitmaker-Warnaar, 2012), leading to an agenda for systemic adaptations which the project will need to address or have addressed to facilitate or even enable novel practices.

Earlier application of the RIO method in the Dutch livestock sector (Bos, 2008; Bos & Grin, 2012; Koerkamp et al., 2008) had made clear that it could indeed promote reflexivity amongst both key innovators and stakeholders who were much less committed; and a project in the Port of Amsterdam had brought positive experience with achieving the same closer to the heart of the regime (Lissandrello & Grin, 2011). The above is summarized in Proposition 3.1:

Proposition 3.1: *A methodology may shape problem structuring so as to yield reflexivity for defining, undertaking and monitoring transition experiments if, and only if:*

- *the methodology offers systematic guidance for reflexivity*
- *the methodology is tailor made to context and, and, explicitly and reflexively relates to theoretical/methodical knowledge and competences, as well as incumbent professional values and identities of those who are to employ it.*

This Proposition underlies the design of the KK programme. The RIO approach had been adopted and internalized by members of the transdisciplinary core team from the project definition stage (February – October 2018) onwards and influenced the way in which the team monitored events. Through individual advice, coaching during work sessions and a masterclass,[7] those working on the first pilot to take off were and are being stimulated to adopt this thinking. Over the first year, this triggered further methodical innovation. With us emphasizing throughout that RIO should be implemented in a tailor-made way, a creative senior designer had started to work on articulating, with her team, how in the most interesting instances of achieving reflexivity, the design process had worked. Thus RIO principles were integrated into a novel method for urban planning, using wordings and visuals that planners could relate to and felt inspired by.[8] Through producing the book, Fall 2019, the team further developed and internalized the method. It radiated enthusiasm about their attained 'capacity to act otherwise' (as Giddens famously defines agency) viz-a-viz colleagues – their enthusiasm originated from the feeling that the method brought fascinating new designs within reach of all.[9] Thus I forward a third Proposition:

Proposition 3.2: *A proper methodology as specified in Prop 2) may*

a *empower its users and their organizations to 'act otherwise,' and thus*
b *yield (mutual reinforcement between) (i) a contribution to a transition, (ii) increased support for 'acting otherwise,' and (iii) further methodical changes as well as and changes in professional values, identities, knowledge and competences ('second order learning').*

More substantively, the gradual internalization of RIO led not only to different designs for subsoil[10] and further methodical elaboration, but also inspired the commissioning of a report which, as we will now see, yielded sharper substantive orientation by analyzing the barriers encountered (RIO cluster 3).

3.3. Intervening in practice through a different substantive orientation

As argued in section 2, next to method also a substantive re-orientation (a really different problem definition and emerging novel discourse elements) may shape the evolution of practices and their institutional and material contexts. Hajer (2006) has called the former mechanism the 'discourse institutionalization,' and argues that this mechanism helps a novel discourse get dominant. I am adding here what we may call a 'discourse materialization,' which may have a similar effect. Both mechanisms, and the reverse causation mechanisms, may reinforce themselves and each other, contributing to consolidation of the re-orientation of practice through re-orienting overall co-evolution.

During the conception of the KK programme, some thirteen basic principles ('red threads') had been distilled by a Waternet co-worker (with earlier experiences in transitions) from preliminary discussions on some potential bits and pieces of solution and their conditions.[11] They articulated the then understanding of the re-orientation needed. Some provided direction to novel practices, stipulating the ambition to deal with major challenges through finding synergy between water, energy, waste etc. in an area-oriented way, using overlap between functions and rhythms of replacement and maintenance of infrastructure as a key point of departure (Scheme 2, #1, 2, 4, 6, 8). Others provided orientation for institutional change to realize physical and financial linkages: through proper governance and organization connections, a clear commissioning- and decision structure and joint financing to minimize costs for citizens (# 3, 9, 13). A final set concerned re-arranging material assets and infrastructures: consider the various flows and stocks, infrastructures and associated social practices as an integrated system, and create more flexibility, and order in subsoil infrastructure (#7, 10, 11).

1.	deal with major challenges through finding synergy
2.	consider broad set of fields: water, waste, energy, data etc
3.	achieve governance and organizational connections to enable physical linkages
4.	develop a joint perspective
5.	organization & governance scaled to fit the infrastructural assets
6.	identify and elaborate linkage opportunities from an area-oriented perspective
7.	determine design choices on basis of overlap between functions and rhythms of replacement and maintenance
8.	determine design choices on basis of overlap between functions and rhythms of replacement and maintenance of infrastructure
9.	combine forces financially to minimize costs for citizens
10.	create more order in subsoil infrastructure
11.	design for flexibility in infrastructures
12.	use co-creation to break through organizational boundaries
13.	ensure a clear commissioning- and decision structure across organizations

Scheme 2. The 'red threads' identified early in the project. Source: Presentation by Rob Ververs (Waternet), KK programme meeting, Amsterdam, 12 February 2018.

These ideas were clearly reflected in the formal design of the programme,[12] produced on invitation of and to be endorsed by seven directors one each om the two utility companies, five from different department of the municipality. The KK programme's problem definition was stated in this document as the need to find 'smart, integral solutions based on efficient utilization of subsoil space, leading to more flexibility above ground and associate increased collaboration and novel governance arrangements;' and it was decided to structure the project as based on three cases in three mutually different areas, so as to emphasize and enable an area-oriented approach.

The preceding observations inform Proposition 3.3:

Proposition 3.3: *Novel orientations may emerge from a reflexive consideration of material problems and anticipated, structurally embedded, barriers. That is, they may emerge from and feed the interaction between conditions and changes in the discursive, institutional and material dimensions of incumbent structure.*

Also, in line with the RIO methodology (discussed in previous section), the project would comprise an analysis of anticipated and encountered barriers in terms of the systemic features underlying them, as basis for identifying required institutional and discursive changes. These barriers became clear through several routes: individual coaching, attending pilot team meetings and discussing pilot experiences in the KK programme core team, in which the pilots were represented. Most systematically, however, such barriers were identified in an analysis[13] commissioned to an external consultant with a background in planning and governance, with frequent feedback and advice based on transition studies by ourselves.

Two key lessons we drew from this analysis[14] concerned that, and how, traditional urban planning logic and the incumbent institutional arrangement for collaboration between the Amsterdam municipality and its partner appeared not fruitful for establishing synergy. Some study in the history of urban planning, especially in the city of Amsterdam, revealed how both this logic and the arrangement were part of the institutional, discursive and infrastructural context that had co-evolved with the practices undertaken since around 1900 to deal with the then dominant urban problem: produce urban dwelling areas and homes for improving living conditions, in order to improve public health and alleviate poverty. This had produced, over the following century, a tightly interwoven whole. (Lintsen et al., 2018; Sengers et al., 2018) Precisely that system was now producing the barriers just mentioned. It (i) privileged functional differentiation of utility practices, thus inhibiting attempts to define and realize synergy between functions and the infrastructures serving them. Also, it (ii) followed a deductive approach, starting with designing a dwelling area on basis of hygienistic (like 'air, space and sunlight') and urban planning (like 'garden city' or the New Living') ideas, through translating that into street views to requirements on utility provision. Achieving synergy in the KK project, however, requires inductive thinking, starting from the characteristics of the place.[15]

I then presented and discussed developed these ideas during a masterclass[16] with the core team and the pilot project team. Articulating this logic and its deviation from traditional logics created further development and internalization of a novel substantive orientation. During the masterclass, this made some team members realize that much more attention was needed in the pilot case to a precise problem definition: one that would articulate these things in a way that would provide direction to the pilot, awareness of the difference with traditional urban planning discourse and legitimacy in the eyes of others, including the directors. This actually was largely a restatement of the problem definition already formulated in the programme proposal which had got a bit into oblivion: apparently, a substantive reorientations is not just given once and for all, but needs be internalized through 'living it,' maintained against the inclinations of incumbent institutional and discursive structures to reproduce themselves.

Thus we arrive at Proposition 3.4:

Proposition 3.4:　*Novel orientations may, together with methodical provisions that promote reflexivity, provide direction to design efforts, and through successive design episodes become increasingly well-defined, internalized and resistant against structural reproduction of regime practices.*

This 're-discovered' problem definition shaped further thinking, as expressed in a document[17] specifying design guidelines and extension schemes for cables and pipes in the KK pilot cases, as well as in more general municipal vision documents, required by new legislation (Omgevingswet – Environment and Planning Act) to provide direction to future urban planning. This inspires the next Proposition:

Proposition 3.5:　*Novel orientations may serve to provide guidance to both design practices and to their implementation and facilitation, by attributing meaning to particular design choices, and communicating and legitimating it to relevant third actors.*

3.4. Adapting institutional context for the pilot practices

Previous experiences with the RIO method in other sectors (Bos & Grin, 2012; Lissandrello & Grin, 2011; ter Haar-van Twillert & van den Bosch, 2017, p. 192 ff) had confirmed the reflexive governance notion (Grin, 2006) that a proper linkage between reflexive design processes and actors that may induce regime changes ('dual track governance'), and that this may not only help the process maintain an innovative course, but also induce mutual reinforcement between successive (episodes in) experimental practices and wider change. Therefore, the KK programme proposal contained the provision[18] that there would be direct access to the directors, constituting a 'reflexive arrangement' i.e. a place where reflexive governance would be possible. This highly visible way of monitoring would provide a chance to get authorization for unusual practices. At the start, the core team pointed out that earlier experiences in such arrangements (Bos & Grin, 2008; Hendriks & Grin, 2007) had demonstrated that even such governance could be easily derailed: 'normal' institutional rules may easily enter the reflexive arrangements, especially through (i) actors less submerged in the above substantive and methodical guidance or (ii) anticipation of the plan's implementation in a real life structural context. Therefore, it was also agreed that the project team would communicate with the directors not just on achievements, but also on barriers rooted in that real life context, and measures to overcome them. Thus responding to situational 'backtalk' (Schön, 1983) this rudimentary reflexive arrangement could evolve from an arrangement to nurture and authorize unusual practices, into one that helped transform the wider institutional context, which would then further promote novel practices. Through this self-reinforcing loop, over time, the arrangement and its transforming wider context could then increasingly provide guidance towards the required reflexivity (Proposition 3.6).

Proposition 3.6:　*Creating an institutional context that yields reflexive practices access to an authoritative forum to discuss structurally embedded barriers is a quintessential initial step, which may trigger a self-reinforcing process of institutional innovation, further promoting reflexivity.*

First experiences suggest what can and cannot be thus achieved. When the report on barriers[19] showed that the existing 'coordination system'[20] between the municipality and the utilities was still shaped by the functional differentiation between these organizations that had co-evolved with the earlier problem definition of urban planning, it was decided to bring this to the attention of the directors and propose to adapt the system (from mere alignment of others to the plan of one partner to collaboratively working to achieve synergy; and allowing a longer

time horizon). Other barriers identified in the report, with similar effects but rooted in national legislation (e.g. the Telecom and Electricity Bills, and regulations from the National Authority Consumers and Markets) rather than in local regulation, were also brought to the directors, but could obviously not be addressed as directly but had to wait for an opportunity to change national policies. This leads us to our final Proposition.

Proposition 3.7: *Creating a context as discussed in Proposition 7 is necessary and in principle sufficient for achieving internal institutional adaptations, but insufficient for achieving such changes in external institutional provisions. In realizing the latter, established successes of pilots may contribute legitimacy.*

4. Concluding discussion

In this article, I have proposed a framework as guidance for practices of, and research into, the now rapidly spreading transition experiments undertaken by established actors, in the heart of the regime. Its propositions on successful strategies focus on the processes through which they work, or do not work. They may be tested and further developed through applying them, and analyzing experiences with them through a 'thick' account of processes as well as comparative (across sectors and socio-political contexts) analysis.

Interestingly, the framework and its illustration in the KK programme case show how changes in the different (institutional, discursive and material) dimensions of structure may produce and reinforce each other, leading to more comprehensive and consolidated change – and how difficult this is to achieve without proper measures and solid, authoritative support. The proposed future research may thus contribute to more insight into a much more general and fundamental issue: the meta-theoretical quest for a more dialectic understanding of change and stability (Marsh, 2010).

Last but not least, such work could contribute to a major puzzle in literature: 'what drives what?' Marsh seems to ultimately privilege the material in amore classical social science sense. Materiality as artefacts and infrastructures are given most explanatory credits by Science & Technology Studies, especially actor-network theory, scholars. Many constructivists stipulate the central role of discursive change. And, unsurprisingly, much of neo-institutionalism emphasizes institutional change as causal factor.

Yet, interestingly, it seems that things are moving toward a more interesting picture, synthesizing these different pictures. Lowndes and Roberts (2015), show in detail that recent developments in institutionalist literature, beyond neo-institutionalism, are promising better understanding of *institutional* change. Key is the recognition that practices are overdetermined by the variety of institutions and discourse in their context, as shaped by earlier co-evolution between practices, narratives and institutions. Precisely that overderminacy raises possibilities for reflexive agency: agents in these practices may selectively draw on rules and discourses so as to adapt their practices, transforming rather than reproducing rules and discourses. Such agency is further promoted as practices are located in interstitial spaces. Parsons (2010) provides a similar, more or less mirror-image account of *discursive* changes, referring to a plurality of discursive constructs (narratives, discourses) on which actors may, or may not draw in ideation within their practices. Like institutions, these constructs too have historically co evolved. While neither author discusses, in addition to the discursive and institutional dimension also the third, material dimension, it is easy to draw on STS to provide a similar account from that perspective (see e.g. Castán Broto, 2016; Switzer et al., 2013).

Testing the proposed framework could contribute to more understanding of these issues by explicitly investigating how relations are being achieved, maintained and transformed between practices and discursive, material and institutional structures: a relational perspective, as argued for by Smith (2007) and done, for instance, by Hoffman and Loeber (2016). Work by e.g. Swilling et al. (2016) and Castán Broto (2016) exemplifies how this may done in a historicist manner, needed to longitudinally analyze the interaction between these practices, their structural embedding and their politics.

Notes

1. Hoppe does not discuss the material dimension, but we know from Science and Technology Studies that it affects practices (cf especially actor network theory from Latour, Callon and others), and that objects and infrastructures on their turn are

shaped by participation (the social construction of technology, by authors like Pinch and Bijker). In transition literature, this has e.g. become clear from Swilling et al. (2016) and Castán Broto (2016).

2. Most observations used have been recorded in reports on meetings and blogs. These reports and blogs as well as other documents (in Dutch) are public, and many can be obtained from the project's website (https://www.kennisactiewater.nl/co-creatie-trajecten/koppelkansen/); others may be obtained on request, through the author. As my objective here is not to provide evidence for an argument, but to present a set of propositions, I will only occasionally refer to these sources.

3. Verslag van de eerste twee co-creatie bijeenkomsten 'Koppelkansen Water en Energie', 28 november en 7 december 2017, Amsterdam.

4. Co-creatietraject Koppelkansen. Document for the Directors, October 24, 2018; and https://www.kennisactiewater.nl/nieuws/koppelkansen-gaat-van-start-nu-echt/.

5. Comprising co-workers of the three organizations plus the scholars. The team leads the programme on a day-to-day basis.

6. Dutch acronym for Reflexive Interactive Design.

7. https://www.kennisactiewater.nl/bijeenkomsten/systeeminnovatie-hoe-doe-je-dat-eigenlijk-een-verslag-van-de-eerste-masterclass-reflexief-interactief-ontwerpen/.

8. Joyce van den Berg et al. *Werkboek/Studie Amstel-Stad. Integrale ontwerpmethode openbare ruimte*. Engineering Bureau Municipality of Amsterdam, 2020.

9. Conversation with Joyce van den Berg and observation during a team meeting on January 21, 2020.

10. https://www.kennisactiewater.nl/nieuws/ingewikkelde-problemen-en-integrale-oplossingen-voor-infrastructurele-planvorming-in-amstelstad/; https://www.kennisactiewater.nl/rapporten/de-druk-op-de-amsterdamse-ondergrond-neem-toe-hoe-kan-het-anders/.

11. Presentation by Rob Ververs (Waternet), KK project meeting, Amsterdam, February 12, 2018.

12. See *Co-creatietraject Koppelkansen*. Document for the Directors, October 24, 2018.

13. Sten Camps, *Verkenning governance Koppelkansen Amstelstad. Rapportage.* Gemeente Amsterdam, 24 december 2019.

14. A third key lesson., drawn already while drafting the programme, was that better understanding business propositions for multiple value creation would crucially help. This made us, successfully, apply for a project on that issue for a grant from the National Science Foundation. This is yet to start, however, and will not be further discussed here.

15. In addition to these 'internal' barriers, there were also 'external' barriers, e.g. in the form of legislation on the various infrastructures, which also tended to reproduce functional differentiation.

16. Masterclass Reflexive Design, University of Amsterdam. September 2, 2019. Cf https://www.kennisactiewater.nl/bijeenkomsten/systeeminnovatie-hoe-doe-je-dat-eigenlijk-een-verslag-van-de-eerste-masterclass-reflexief-interactief-ontwerpen/.

17. Eric van den Beuken. *Flap Uitlegschema*. Kernteam KK programme, December, 2019.

18. *Co-creatietraject Koppelkansen*. Document for the Directors, October 24, 2018.

19. Sten Camps, *Verkenning governance Koppelkansen Amstelstad. Rapportage.* Gemeente Amsterdam, 24 december 2019.

20. The so-called *coördinatiestelsel*, including regular meetings and the formal WIOR (*Verordening Werken in de openbare ruimte*) regulation stipulating how the partners are to interact.

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Disclosure statement

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