Evolving geographies of innovation: Existing paradigms, critiques and possible alternatives

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Abstract

Theory development on the geographies of innovation has been very successful in incorporating the changing patterns of knowledge dynamics due to globalization, lifting the gaze beyond processes of localized learning and increasingly acknowledging the multilevel, multiscalar governance of innovation. Arguably less attention has been directed to the changing qualities and impacts of innovation as a result of globalization, notably in view of social polarization and climate change. The aim of the article is to provide suggestions for how research on the geography of innovation can be improved by engaging with a more capacious understanding of innovation and territorial development. The authors explore how socio-ecological innovation can be introduced in contemporary discussions and practices of place-based smart specialization policy. They conclude by suggesting that future research should address and interrogate (1) the rise of the foundational economy as an expression of

place-based innovation, which entails new forms of co-governance, and (2) the challenge of experimentalism in the public sector, a sector that looms large in lagging regions and the places that were deemed not to matter until they took their revenge on the mainstream political system.

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Introduction

Innovation has become a global buzzword. It is something that many decision-makers in public and private sectors aspire to as they are seen as a key determinant of growth, both at the micro-level of individual firms and at the macro-level of nations, regions and cities (Shearmur 2012). However, a more recent shift in policy rationale for innovation can be observed. Increasingly, the importance of innovation for wider societal goals beyond economic growth, jobs and competitiveness is being debated.

Schot & Steinmueller (2018) have recently suggested three historical framings of innovation policy: innovation policies 1.0–3.0 Innovation policy 1.0 – wherein innovation policy is part and parcel of science and technology policy – has been primarily directed towards research and development (R&D) based innovation, drawing on a linear model of innovation that privileges the technological discovery process. It emphasizes as a rationale for policy the advancement and commercialization of scientific and technological knowledge. Innovation policy 2.0, which is underpinned by the systems of innovation approach and geared to objectives of economic competitiveness, growth and job creation, acknowledges a broader knowledge base for innovation, supports commercial use of a wider variety of knowledge and seeks to strengthen the link between discovery and application of knowledge. In Schot & Steinmueller's account, the most recent phase, innovation policy 3.0, involves the explicit mobilization of science, technology and innovation for meeting societal needs and addressing the United Nation's Sustainable Development Goals (Schot & Steinmueller 2018). It addresses the issues of sustainable and inclusive societies at a more fundamental level than previous framings or their associated ideologies and practices.

While the debate on whether innovation policy 3.0 is more than 'old wine in new bottles' is currently raging (Fagerberg 2018), little attention has been paid to the spatial and scalar differences and varieties of this latest incarnation of innovation policy. At the same

time, it is fair to conclude that the widespread attention to innovation in policy circles has been tightly wedded to research on the geography of innovation, debunking one-size-fits-all models and suggesting instead a place-based approach (Tödtling & Trippl 2005; Barca et al. 2012). A geography, as Asheim & Gertler (2005) assert, that is deeply uneven: innovative activity is not uniformly or randomly distributed across the globe but tends to be spatially concentrated. Since the early 1990s, research on the geography of innovation has shed light on the question of how nations, cities and regions can generate the internal conditions and dynamics necessary for innovation. At the same time, the idea that cities, regions and spatial proximity are essential for innovation has been evolving under the weight of novel theorizing and empirical evidence (Morgan 2004; Boschma 2005; Shearmur 2012).

Theorizing innovation geographies has been very successful in incorporating the changing patterns of knowledge dynamics, due to globalization lifting the gaze beyond processes of localized learning and increasingly acknowledging the multilevel, multiscalar governance of innovation (Binz & Truffer 2017). However, in doing so, research has been predominantly concerned with rates and quantities of innovation (Sjøtun & Njøs 2019; Uyarra et al. 2019). Arguably less attention has been directed to the changing qualities and impacts of innovation as a result of globalization, notably in view of social polarization and climate change. The aim of this article is to provide suggestions for how research on the geography of innovation can be improved by engaging with a more capacious understanding of innovation and territorial development. Through a critical commentary and discussion of existing and emerging literature, we explore how socio-ecological innovation can be introduced into contemporary discussions and practices of place-based smart specialization policy.

Evolution of regional innovation systems (RIS)

While the discourse on innovation may seem ubiquitous, patterns of innovation remain concentrated in certain sites and places, often emblemized by the epicentre of technological revolution in Silicon Valley (Saxenian 1996; Miao et al. 2015; Pfotenhauer & Jasanoff 2017). It has become a truism that agglomeration and spatial proximity are critical for innovation even though it is equally accepted that these relationships are not universally positive but more nuanced and multilayered than often assumed (Morgan 2004; Boschma 2005). The significance of agglomeration and proximity are now commonly accepted in the literature on the geography of innovation dating back to the work of Alfred Marshall in the early 1920s on the agglomeration advantages of industrial districts (Asheim 1996), which was rediscovered by the Italian theorists of the 'Third Italy' (Bianchi 1998), rebranded by the work of Michael Porter (Porter 2000) on clusters, and translated into strategies of place-making for the creative class by Richard Florida (Florida 2005). Spatial environments needed to come up with new products and services, and new ways to organize production and distribution of goods and services are typically characterized by dense knowledge pools, extensive networks and linkages, and supportive institutional environments for risk-taking and entrepreneurship (Asheim & Gertler, 2005).

Although a plethora of concepts describe and explain the uneven geography of innovation (Moulaert & Sekia 2003), the regional innovation system (RIS) approach can be seen as a synthesis of decades of research on the topic (Cooke et al. 1997; Doloreux 2002; Asheim & Coenen 2005; Isaksen et al. 2018; Asheim et al. 2019). At the heart of the approach, innovation is conceptualized as a relational, social and networked process between key actors – firms, their supply chains, governments, and universities – wherein institutions are guiding their behaviour. In its capacity as an ordering framework, RIS helps to describe and map the place-based structures that condition innovation in a certain region and to identify the presence of proximity advantages in a region.

In the early 2000s, the original RIS perspective was criticized for being too bounded in its conception of space (Bunnell & Coe 2001; Bathelt et al. 2004). Under the influence of processes of globalization, it became increasingly myopic and parochial in its delineation of the analytical scope to consider only assets, resources and processes of localized learning and innovation. In response, regional innovation system analysis became increasingly attuned to the influence of non-local network linkages and the role of extra-regional institutions (Cooke 2005; Moodysson et al. 2008; Martin & Moodysson 2013).

An important merit of the RIS approach has been its fierce critique of 'one-size-fits-all' models (Todtling & Trippl 2005; Coenen et al. 2017). Instead, it offers a framework that captures the contextual, place-based nature of innovation processes, often taking shape through various typologies (Cooke 2005; Asheim et al. 2015). It is probably for this merit that the RIS approach has seen a true proliferation in policy circles as a result of EU's smart specialization strategy (Camagni & Capello 2013; Coenen et al. 2017; Morgan 2017; Uyarra et al. 2017). In this regard, all regional authorities are supposed to have in place regional development strategies that are attuned to the specific conditions for innovation-based development in their respective region in order to qualify for EU cohesion policy funding – the world's biggest and most substantial territorial development policy. Smart specialization is explicitly geared to do away with the more generic, place-blind policy mobility to emulate and transfer best-practice from successful regions such as Silicon Valley, often resulting in the heroic but naive effort to build high-tech cathedrals in the desert (Barca et al. 2012). In arriving at place-sensitive smart specialization strategies, the RIS perspective has proven an indispensable tool for analysing the specific conditions for innovation in a region and designing place-sensitive strategies.

The evolution of the RIS approach illustrates how well-adapted and responsive theorizing the geography of innovation has been to the changing patterns of knowledge flows

as a result of globalization. This is not to deny that there are no more disputes and controversies in the geography of innovation. As showcased by the recently published handbook on the geographies of innovation, edited by Richard Shearmur, Christophe Carrincazeaux and David Doloreux (Shearmur et al. 2016), various areas of dispute keep the field far away from turning into unified, homogenous body of knowledge but one that highlight its pluralism and heterogeneity. The handbook identifies six areas of debate:

1. What is the most suitable focus of study or unit of analysis for research on innovation geographies? Is it a spatial unit such as a region or cluster or is it the innovative agent, most often the firm?
2. Why study innovation geographies? Is it to be informed about and inform individual agents locational strategies for innovation, as increasingly practised by economic geographers working in business schools or is it to be informed about and inform innovation-based local and regional development?
3. What kind of innovation should be studied? Is it new-to-the-world innovation that is often highly visible and impactful or is it small-scale incremental innovation that determines firm adaptation and survival?
4. Can theorizing 'successful' innovative regions be generalized to non-successful regions?
5. Should we primarily focus on the creation of innovation or on the diffusion of innovation? What does this tell us about the relationship between value creation and value capture from innovation?
6. To what extent are our theories on the geographies of innovation biased by their spatial and temporal context? Is there a bias towards the Global North? Why are we

primarily concerned with innovation in the centres but at the expense of innovation in the peripheries?

While addressing these questions would undoubtedly produce highly insightful and resourceful findings on the geography of innovation that would be of interest far beyond the disciplinary realms of geographers and the academic concerns of researchers alone, a fundamental question that is left unconsidered is 'Why innovation?' The contributions edited by Shearmur et al. (2016) rather exclusively engage with the hegemonic economistic rationale for innovation that it generates growth and jobs, and is crucial for competitiveness. Despite notable exceptions, the volume as a whole largely shies away from reflecting on and scrutinizing the question of for what, or rather for whom, is innovation good?

Taking the handbook edited by Shearmur et al. (2016) as representative of the wider geography of innovation literature, we argue that the body of literature has been limited by a preoccupation with the *conditions* for innovation, and skewed towards a particular *kind* of innovation, namely market-based, technology-driven innovation. This bias invites for some reflection on how this partial engagement may have coloured our understanding of the geography of innovation. Moreover, broadening our understanding of what innovation is and why it matters opens up our perspective on where innovation happens and why there rather than elsewhere?

Questioning the purpose of innovation

Despite its increased knowledge and learning intensity, our innovation-fuelled economies are facing some intractable problems. The key challenge that comes to mind to many, given recent extreme weather events, is that of global warming and climate change. Nothwithstanding increased attention paid to greening the economy and the widespread

investment in clean technologies and eco-innovation, we are still on a crash course towards destructive levels of temperature increase (Rockström et al. 2016). Another problematic development is one that is often referred to as runaway technological development (Karlsson 2007), which is illustrated bythe notion of smart cities and its Promethean promises to make our cities more sustainable, resilient and liveable. The idea to increase the use of sensors and big data to improve our urban systems of provision is facing increasing opposition by urban dwellers. Instead of viewing smart urban technology as a means to improving urban life, fear over loss of privacy and the risks of a surveillance society have become increasingly prevalent (Hollands 2008; Kitchin 2014). It seems that also in other domains, such as the increased automation and 'roboticization' of health-care services, driverless vehicles and artificial intelligence, smart technologies increasingly run the risk of turning the term 'innovative' into a misnomer (Karvonen et al. 2019). Common to the aforementioned examples is that what is coined and branded as 'innovative' may be perceived by some as turning innovation into solutions looking for a problem, rather than the other way around.[1]

In broad lines, three sub-bodies of literature can be identified within innovation studies that have responded to these fears and critiques of innovation: (1) a turn towards responsible research and innovation; (2), a turn towards mission-oriented innovation policy; and (3) a more capacious understanding of innovation.

Responsible research and innovation

Responsible research and innovation (RRI) is in part a policy concept and in part a theoretical construct with a clear lineage back to the tradition of technology assessment that had its heydays in the 1980s and 1990s (Schot & Rip 1997). RRI seeks to give greater control over the direction of research, technology development and innovation to a broader group of stakeholders, most notably the public. Following the definition of RRI suggested by von

Schomberg (2012, 54), as ‘a transparent, interactive process by which societal actors and innovators become mutually responsive to each other with a view to the (ethical) acceptability, sustainability and societal desirability of the innovation process and its marketable products’, it is not just an approach that advocates greater democratic control over the desirability and outcome of innovation, but does so by directly intervening in the innovation process. Stilgoe et al. (2013) have further suggested four criteria that are supposed to engender responsible research innovation and research:

1. Anticipation to prompt researchers and innovators to ask ‘What if?’ questions
2. Reflexivity to hold a mirror up to one’s own activities, commitments and assumptions in the innovation process
3. Inclusion of ‘new voices’ beyond the usual suspects in the innovation process, notably to include members of the wider public
4. Responsiveness to changes in the shape and direction of innovation process that affect stakeholders and public value as well as responsiveness to changing circumstances.

While there is little to comment on the ethical and normative soundness of the four criteria, we argue that the trope of responsible research and innovation remains limited in two ways. First, it primarily targets the design and framing of research and innovation processes and programmes but overlooks its implementation. It remains surprisingly silent about the capabilities and institutions needed to make it happen. Second, it (i.e. trope of responsible research and innovation) tends to ‘black box’ those who are supposed to constitute the wider public and the new voices. Despite its thoughtful guidelines, RRI remains a blanket approach, akin to a one-size-fits-all framework that is in need of grounding its global procedures to local circumstances.

The mission-oriented approach to innovation policy

The mission-oriented approach to research and innovation policy has been prominently advocated by Mariana Mazzucato (2018a; 2018b). The main contribution of the approach is its ambition to bring innovation back on track as a means to an end rather than an end in its own right. Instead of assuming that all innovation is desirable – as often seen in the systems of innovation approach – the mission-oriented approach seeks to attract greater explicit attention to the directionality of the problem-solving process implied in innovation by stating ex ante the problems that require to be solved by innovators. As such, the mission-oriented approach relates innovation funding directly to the grand societal challenges such as climate change, ageing societies, the refugee crisis, and food poverty. In doing so, it recognizes the value of innovation beyond a strictly economic value. However, in its implementation, the mission-oriented approach remains heavily predicated on the notion of the entrepreneurial state (Mazzucato 2015), as it assumes a benevolent, well-endowed government in terms of resources and capabilities to orchestrate and coordinate collective action. This may be a heroic assumption when acknowledging differences and diversity in government capacity across countries and regions.

Both RRI and the mission-oriented approach to innovation policy call for greater attention to directionality in innovation processes and are more explicitly attuned to the *purpose* of innovation. However, they are insensitive to geographical context. We would argue that instead a more capacious conceptualization of innovation would be better suited, not only with a view to the desirability of innovation but also with regard to appreciating the spatial sensitivities of innovation.

A more capacious notion of innovation

New narratives of innovation are emerging that do not depend on the conventional machinery of economic growth machines and many of these narratives can be classified as socio-ecological models of innovation (Healy & Morgan 2012; Truffer & Coenen 2012; Marques et al. 2018; Todtling & Trippl 2018). Although the RIS3 guide to smart specialization (Foray et al. 2012) is largely predicated on a conventional science and technology (S&T) model of innovation, a careful reading of the guide reveals a somewhat schizophrenic attitude because it contains not one but two models of innovation. Apart from the explicit S&T model, which encompasses both STI (science, technology and innovation) and DUI (doing, using and interacting) modes of innovation (Jensen et al. 2007) and innovation originating from differentiated knowledge bases (Asheim et al. 2017), another model of innovation can be discerned in the RIS3 guide (Foray et al. 2012) – one that can be called the 'socio-ecological model'. This implicit model deserves to be given more prominence because its ends are very different to the explicit model in the sense that they are not the instrumentally significant ends of economic competitiveness, but rather the intrinsically significant ends of human needs and ecological integrity. As stated in the guide,

> In the Open Innovation era, where social innovation and ecological innovation entail behavioural change at the individual and societal levels if the challenges of health, poverty and climate change are to be addressed, the regional governance system should be opened to new stakeholder groups coming from the civil society that can foster a culture of constructive challenge to the regional status quo. (Foray et al. 2012, 37)

The RIS3 Guide further states that 'social innovation is important for regional development' because, as well as creating new business opportunities, it can 'provide new perspectives to citizens, and help the modernisation of the public sector' (Foray et al. 2012, 112). Forey et al. state, that in the socio-ecological model,

> [the] public sector is central in the delivery of many services of social and economic value. In this regard, it has a pivotal role in answering ... today's major societal challenges such as demographic ageing, increased demand for healthcare services, risk of poverty and social exclusion, the need for better and more transparent governance, and a more sustainable resource management. (Foray et al. 2012, 113)

Particularly the social innovation literature, pioneered by Moulaert and colleagues, among others, has explicitly pitched social innovation in contrast to technological innovation, rather than seeing it as a continuum (Moulaert et al. 2013). We argue that this dichotomy 'throws the baby out with the bath water' and grossly understates the enabling potential of technology and the knowledge intensity of such 'other' forms of innovation, such as grass-roots innovation (Seyfang & Smith 2007) which is exemplified by community energy initiatives, sharing economy schemes, and recycling workshops, as well as social innovations such as affordable housing initiatives, time banks and community currencies.

Still, there are various differentials between conventional innovation and more capacious, socio-ecological understandings of innovation (Weber & Rohracher 2012; Coenen et al. 2017; 2018; Schot & Steinmueller 2018; Diercks et al. 2019; Grillitsch et al. 2019). First, socio-ecological models draw attention to other innovating agents (not just actors), including the firm but also beyond it. Second, they emphasize that the purpose of innovation is not limited to achieving competitive advantage in the market-place but view the rationale for innovation explicitly in response to social needs and often informed by ideological norms and values. Third, socio-ecological models understand the process of innovation to move beyond the exploration and exploitation of knowledge but explicitly recognize innovation as an act of deliberative, collective problem-solving. Moreover, they acknowledge the experimental nature of innovation, understood as a deeply uncertain, open-ended process of

trial-and-error, also referred to as bricolage. Fourth, while the socio-ecological models acknowledge that innovation involves interactive learning, the relationships between actors are less transactional but explicitly transformational. Particularly social innovation actively promotes inclusive relationships among individuals. Fifth, whereas orthodox innovation tends to treat institutions as largely facilitative and/or constraining but in doing so treating institutions as largely static and inert, more capacious conceptualizations of innovation draw attention to institutional entrepreneurship operating in tandem with technological change and, very importantly, are mindful of the politics, conflicts and contestations implied in innovation. Especially the latter is a notorious blind spot in many traditional studies of innovation. Lastly, it is still a challenge to identify the policy implications and policy instruments to stimulate 'alternative' forms of innovation that stand in contrast to the proven policy prescriptions of fixing market and/or system failure in orthodox innovation.

Given the significance and importance of policy relevance for innovation studies in general and research on the geography of innovation more specifically, as well as the paradoxical critique that policymaking processes and governance of innovation have remained somewhat 'black boxed' in innovation studies (Flanagan & Uyarra 2016), it is worthwhile to expand further on the last aspect. We therefore continue this article with an exploration of how socio-ecological innovation could be introduced into contemporary discussions and practices of place-based smart specialization policy. In the next section we explore two important aspects of such governance by examining (1) the rise of the foundational economy as an expression of place-based social innovation, which entails new forms of co-governance, and (2) the challenge of experimentalism in the public sector, a sector that looms large in lagging regions and the places that were deemed by conventional wisdom not to matter until they took their revenge on the mainstream political system (Rodríguez-Pose 2018).

The foundational economy as a place-based social innovation

Social innovations are social in both their ends and their means; in other words, 'they are innovations that are both good for society and enhance society's capacity to act' (Foray et al. 2012, 112). One of the most progressive models of social innovation today is the foundational economy model, which carries enormous implications for a place-based approach to innovation, development and territorial politics (Bentham et al. 2013; Fairbrother 2017). In contrast to conventional models of innovation, which are primarily focused on the fashionable high-technology sectors of the knowledge economy, the foundational economy model focuses on the unfashionable mundane sectors that are designed to keep us 'safe, sound and civilized', such as health, education, dignified care for the elderly, social housing, agrifood, and energy (Marques et al. 2018).

The foundational economy includes goods and services, which are the social and material infrastructure of civilized life because they provide the daily essentials for all households. These include material services via pipes and cables, networks and branches that distribute water, electricity, gas, telecommunications, banking services and food, and the providential services of primary and secondary education, health and care for children and adults, and income maintenance (Engelen et al. 2017). Foundational goods and services are purchased from household incomes or provided free at point of use from tax revenues. The state is often a direct provider or as funder, with public limited companies and outsourcing conglomerates increasingly delivering foundational services. The requirement for local distribution makes foundational activity immobile and much is protected from global competition by the regulatory requirements for infrastructure investment, planning permission or government contracts (Barbera et al. 2018). Foundational thinking rests on two key ideas,

which break with established ways of thinking and challenge taken-for-granted assumptions about economy, society and politics:

1. the well-being of citizens depends less on individual consumption and more on their social consumption of essential goods and services – from water and retail banking to schools and care homes. Individual consumption depends on market income, while foundational consumption depends on social infrastructure and delivery systems of networks and branches which are neither created nor renewed automatically, even as incomes increase;
2. the distinctive, primary role of public policy should therefore be to secure the supply of basic services for all citizens, not just a quantum of economic growth and jobs. If the aim is citizen well-being and flourishing, then politics at national and sub-national levels needs to be refocused on foundational consumption and securing universal minimum access and quality. When government is unresponsive, the impetus for change will have to come from engaging citizens locally and regionally in actions which have the virtue that they break with the top down politics of "vote for us and we will do this for you" (Foundational Economy Collective 2018).

From a geographical standpoint, one of the most radical implications of the foundational economy perspective is that it inverts and disrupts conventional thinking about place-based development. Much of the latter thinking, especially with respect to lagging regions under neoliberal modes of governance, revolves around the attraction of inward investment to boost the local economy and this entails locational tournaments as cities and regions seek to outbid each other in a subsidy-fuelled race to the bottom (Pike et al. 2007). In spatial terms, this race

to the bottom amounts to a zero-sum game because success for one region spells failure for all the other regions that were vying for the mobile investment.

In sharp contrast to the zero-sum game, the foundational economy constitutes a positive-sum game because all cities and regions have a significant stock of employment in the mainstream foundational sectors, since they tend to be distributed by population rather than by wealth. Employment in the foundational economy tends to be as much as 30–40% or more of total employment, especially in lagging regions, and therefore it plays an intrinsically significant role in meeting human needs (Foundational Economy Collective 2018). In other words, the foundational economy approach is analogous to the status of public goods, which are deemed non-rivalrous because the fact that region 'A' has them does not mean that region 'B' has been denied them. Promoting the growth of the foundational economy breaks with the conventions of locational tournaments and zero-sum games and reduces the scope for territorial competition between cities, regions and countries.

Although the foundational economy seemingly could be juxtaposed with the technology generating sectors of the knowledge economy, we argue that – similar to the notion of low-tech (Hansen & Winther 2011) – all foundational sectors are extensive technology using and knowledge-intensive sectors, and therefore the foundational economy perspective should not be dismissed as being inherently Luddite or antithetical to technology per se. In employment terms, one of the main tasks facing the foundational economy is to upgrade the terms and conditions of work, especially in sectors such as care for the elderly, which are high in social value but low in economic reward, and this can only be done through social innovation at the societal level by national governments and civil societies agreeing to view and value such work in more rewarding ways, given its significance to human well-being (Bentham et al. 2013.

Nonetheless, there is still considerable ambiguity with regard to the role of innovation in a foundational economy. Further empirical and theoretical research is needed to address a range of fundamental questions that so far have not been addressed in the emerging literature on the foundational economy. Despite differences in normative underpinnings, the RIS framework could be potentially instructive in framing the following questions and allowing for place-based and spatially comparative studies: Who are the innovating agents in the foundational economy? What characterizes the networks and institutions that enable and constrain innovation in the foundational economy? How is innovation in the foundational economy different from innovation as we know it in the knowledge economy? How do regional characteristics condition the possibilities for advancing principles of the foundational economy? In the next section, we present a discussion in which we teasing out some of the governance aspects of the foundational economy.

For all its advantages, the foundational economy perspective is politically challenging on three counts: (1) it is constrained by the fact that treasuries are averse to raising tax income to provide revenue support for public services such as education, health and social care; (2) it presupposes that governments are prepared to engage in radical re-regulation to raise the social 'ask' of the private firms and public agencies that deliver foundational services; and (3) it is predicated on the concept of active citizenship inasmuch as citizens are deemed to be willing and able to become co-producers of the essential services that they collectively consume (Morgan 2018).

The challenge of experimentalism in the public sector

One of the great paradoxes of the 'age of austerity' is that many governments are promoting mission-driven innovation at the same time as many of them are shrinking the state, an ideological quest that runs counter to the fact that the state looms large in many of the societal

sectors facing challenges (e.g. energy, food, transport, and public health) and in which such missions feature most prominently (Mazzucato 2018a). Even so, the rapid growth of public sector innovation (PSI) labs is one of the most tangible signs that governments at all levels of the multilevel polity are seriously trying to grapple with the challenges of novelty and transformation. The UK innovation foundation Nesta is one of the most prominent pioneers of public labs as a means of addressing societal challenges through evidence-based local experiments (Morgan 2018). Geoff Mulgan, its chief executive, has documented the growth of the lab movement and argues that such labs need to be both insiders and outsiders at the same time, which means they face the classic 'radical's dilemma': 'If they stand too much inside the system ... they risk losing their radical edge; if they stand too far outside they risk having little impact' (Mulgan 2014, 2). It follows that the most crucial skill they need to learn is how to navigate the inherently unstable role of being both insiders and outsiders; campaigners and deliverers; visionaries and pragmatists'. Although there is no concise definition of a PSI lab, Mulgan suggests that it might include 'experimentation in a safe space at one remove from everyday reality, with the goal of generating useful ideas that address social needs and demonstrating their effectiveness' (Mulgan 2014, 2).

Working at 'one remove from everyday reality' might allow PSI labs to introduce innovations at a small scale in, for example, in certain public service niches, but this would still leave as unresolved the larger question as to how the niche-level service innovations would be scaled up in the mainstream public sector, a question that bedevils all transitions from local social innovations to systemic innovation (Geels et al. 2008; Bugge et al. 2017). Although the barriers to scaling up are many and varied, depending among other things on national context, the public sector in most countries is invariably beset by a number of common problems. Three of these common problems merit special attention because they

seem deeply entrenched in the public sector culture of most countries, namely feedback, failure and learning (Morgan 2018).

Feedback, failure and learning in experimentalism

Although the significance of reliable feedback is widely acknowledged, especially in evolutionary theories of change, many people tend to assume that it is readily available. However, the truth of the matter is that feedback is filtered and tempered by a whole series of factors, such as power, status, hierarchy, fear, and ambition (Picciotto, 2015). That 'whistleblower' laws have been introduced in many countries to help public sector workers find their 'voice' clearly speaks volumes for the fact that feedback faces formidable obstacles and on no account should it be assumed to be easily forthcoming.

If feedback is hard to manage, failure is even more difficult to accommodate, especially in the public sector, in which taxpayers' money is at stake (Coenen 2018). Failure in the public sector can spell disaster for managers and their political masters. Advocates of new industrial policy, such as Dani Rodrik, are undoubtedly right to argue that we need to have a higher tolerance of failure because it is part and parcel of experimentation and innovation and therefore the aim should be not to try to outlaw mistakes but to reduce the costs of mistakes by learning from them and by learning to 'fail faster' (Rodrik 2004). To have a more enlightened understanding of failure in the public sector, policy innovators will need to mobilize a wider constituency so as to include such groups as public auditors, legal advisers and of course politicians, the very people that are responsible for fuelling the risk-averse culture that stymies innovation in the public sector.

Last but not least, the public sector will need to allocate more space, time and resources to learning about what works where and why, if policy experimentalism is to have practical traction, because monitoring and evaluation are still seen as low status activities

(Smeds & Acuto 2018). The barriers to organizational learning in the civil service – silo structures, staff turnover, ineffective mechanisms to support the acquisition and dissemination of good practice, and the lack of time devoted to learning – are common to the public sector in many countries and these features are manifestly at odds with the assumptions of smart experimentalism (Morgan 2017).

Place-based experimentalism

One possible way to overcome the deeply entrenched systemic barriers is to insist on a more concerted application of the place-based approach advocated a decade ago by Fabrizio Barca (Barca 2009). The place-based approach, we might recall, is predicated on a number of key propositions, two of which are highly pertinent to the experimentalist perspective. The first is that geographical context really matters, and context is understood in the multidimensional sense to include social, cultural, political, and institutional specificities (Bentley & Pugalis 2014). The second proposition is that also knowledge and power matter in the design and implementation of territorial policies: the role of multilevel governance is critically important in this respect because no single level of government has sufficient knowledge to know what works where and why, hence the need for local knowledge to be elicited from local actors and for extra-local knowledge (and pressure) to be brought to bear if and when local elites are unable or unwilling to tackle the 'persistent underutilization of potential' (Barca 2009, vii).

In the multilevel architecture, as the Barca Report conceives it, the upper levels of government are supposed to set the general goals and the performance standards to establish and enforce the 'rules of the game', while the lower levels have 'the freedom to advance the ends as they see fit' (Barca 2009, 41). The ultimate purpose of exogenous intervention in this scenario is to induce local agents to commit their energy, knowledge and resources to tackling untapped potential in their territory. However, what if they fail to do so by engaging instead in

rent-seeking and gaming the system? According to Barca (2009), the antidote to this risk is to utilize the key principles of democratic experimentalism as developed by Sabel & Zeitlin (2012), namely to make the local decision-making process verifiable, open, experimental, and inclusive. In other words, the following principles should be established:

- a clear identification of objectives and standards, measured by validated indicators, which can be compared with what happens elsewhere and which are open to monitoring and public debate;
- a permanent mobilization of all interested parties, stimulated by exogenous interventions, by the injection of information on actions and results;
- an experimental approach through which collective local actors are given an opportunity to experiment with solutions while exercising mutual monitoring, and alternative measures are tried and compared through a systematic learning process, where the results are used to design new interventions (Barca 2009, 45).

In specifying the above principles of the place-based paradigm, the Barca Report (Barca 2009) acknowledges its debt to the experimentalist governance thinking of Sabel & Zeitlin (2012), which appeals to Barca primarily because it combines bottom-up localism and agent empowerment with the top-down pressure for standards, testing and the dissemination of the results of localized learning beyond the confines of the locality. The fact that this place-based approach has not yet delivered the anticipated dividends reflects the deeply entrenched nature of the above-mentioned public sector barriers. The implication is that we should redouble our efforts to address these barriers through more concerted multilevel action rather than jettison the multiscalar place-based approach.

The foundational economy is one example of a more capacious conception of innovation and its fortunes depend heavily on a combination of social innovation in civil society and smart experimentalism in the public sector, particularly from state sponsorship at all levels of the multilevel polity. Although this vision might seem remote from conventional models of innovation, we would argue that it is already present in smart specialization policy thinking and practice (Foray et al. 2012), in which it appears as part of a socio-ecological model of innovation. We need to distinguish these two models of innovation, the conventional and the capacious, because they carry radically different policy implications. The conventional smart specialization policy repertoire enjoins regional policymakers to particularize their regional economies by differentiating their activities for the sake of competitive advantage. However, the logic of the foundational economy enjoins policymakers to universalize their regional economies for the sake of sustainability and human well-being. Because the foundational economy furnishes the infrastructure of everyday life – the material goods and providential services that are essential to human well-being in every city and region – it signals what people and places have in common and not what casts them as rivals.

Conclusions: implications and rethinking the geography of a broader understanding of innovation

By way of recap, the aim of this article has been to provide suggestions for how research on the geography of innovation can be improved by engaging with a more capacious understanding of innovation and territorial development. In this article we have explored how socio-ecological innovation can be introduced in contemporary discussions and practices of place-based smart specialization policy by suggesting a future research that addresses and interrogates (1) the rise of the foundational economy as an expression of place-based social innovation, which entails new forms of co-governance and (2) the challenge of

experimentalism in the public sector, a sector that looms large in lagging regions and the places that were deemed not to matter until they took their revenge on the mainstream political system.

This brings us to the spatial implications of a more capacious conceptualization of innovation. First, in raising the question of where does innovation happen, it lifts the gaze beyond an identification and mapping of clusters and networks of knowledge-intensive organizations and individuals. In addition to this supply-based focus, it also draws attention to mapping, whereby collective articulations of unmet needs in relation to social and environmental challenges meet innovative, problem-solving capabilities and how these processes of intermediation are organized, governed and funded across space. Second, with regard to the question of how to govern place-based innovation there is a need to transcend the common preoccupation with agglomeration economies in 'the places that matter', to reach a greater appreciation of how spatial context enables and constrains the messy process of experimentation.

As a deliberative mode of governing innovation, experimentation allows for a more direct engagement with the challenge-driven ambitions targeting wicked problems as laid out in contemporary innovation policy thinking. Rather than emphasizing the entrepreneurial discovery process underpinning the identification of strategic avenues for place-based innovation, which runs the risk of becoming captured by rent-seeking interests of incumbent and elites, it suggests that prioritization for development and innovation is based on principles of empowered deliberative democracy. This means focusing on specific, tangible local problems highlighted by the foundational economy, such as drought, ageing societies or economic hardship due to the disappearance of local industries and involvement of 'ordinary people' affected by these problems as well as problem-solvers, and an emphasis on deliberative development of solutions to these problems. Experimentation would the

emphasize selection and investment in innovation opportunity as an outcome of brokering and aligning demand and supply for innovation, rather than an exclusive focus on the supply side of the innovation system. Thus, the incentive for problem-solving and innovation would not be based on entrepreneurial opportunity alone but would also extend towards an articulated demand for 'real' local problems.

Thus, implementation of innovation projects approximates the notion of living labs understood as sites devised to design, test and learn from innovation in real time in order to respond to particular societal, economic and environmental issues. It emphasizes experimentation understood as collective search and exploration processes in which a broad suite of stakeholders such as firms, universities and actors from government and civil society are navigating, negotiating and ideally reducing uncertainty about innovations through real-world experiments, and gaining knowledge and experience along the way in an iterative learning-by-doing and doing-by-learning process.

Finally, experimentation would acknowledge insights from experimentalist governance that argues that experimentation is only meaningful in a multilevel policy architecture, as this allows for monitoring, evaluating and translating lessons learned from local experiments beyond its own local, territorial context. This implies that smart experimentation only makes sense in relation to supra-regional or networked governance structures, as they allow for the 'learnings' from experiments to institutionalize, scale or diffuse, regardless of whether the 'learnings' are derived from successful or failed innovation.

That we are not suggesting is that experimentation should be seen as a governance panacea to the economic, social, political, and environmental challenges surrounding innovation in and across different spatial contexts. There are many unresolved debates and looming questions, particularly with regard to the 'dark sides' of experimentalist governance

in terms of potentially fuelling greater spatial and social inequality, insecurity, and the rise of a precarious economy.

Note

1. Related to this discussion, the traditional geography of innovation literature, until fairly recently and not withstanding an early warning by Lundvall (1996), has been more or less quiet on the uneven distribution of costs and benefits of innovation (e.g. Dahl 2011; Breau et al. 2014; Florida & Mellander 2016).

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