

Systemic eco-innovation for urban sustainable development?

Jonas Bylund, Management Board

After two days of being marinated at the Eco-Innova final conference held in September,¹ I have had a month or so to reflect on its core notion of systemic eco-innovation. More specifically to think about its usability for the JPI Urban Europe. Not that this in any way was a formal task delegated to me. But one key issue at the conference was how to secure the legacy of the programme. Systemic eco-innovation is something the JPI Urban Europe may be very able to support – albeit it is, as usual in innovation and tech-transfer, probably only possible after some reflexive tweaking and modification!

This exercise is particularly pertinent since Max Grünig's thought-provoking blog contribution on our recent *Cities' Workshop*, noting the long-standing character and repeated advance of some challenges:

To me, it is a recurring surprise how key issues seem to present themselves over and over again, no matter what disciplinary or geographic focus the research or intervention takes: How do we engage city authorities? How do we communicate research into policy? How do we involve stakeholders in a meaningful and effective way?²

These issues probably require a different approach than the near-segregation of domains such as academic, policy, and business in the triple helix? But, perhaps more important, we may need to have another go at how we understand innovation, since it is, as we shall see, truly a key element in the recurrent key issues.

How do we understand innovation?

According to Raymond Hegarty,³ innovation is used in many confusing and sometimes counter-productive ways. Often, it seems, simply as a trendy way to say research, development, or invention. Perhaps, and this is my suspicion, many times to simply say

¹ Eco-Innova Final Conference *Boosting Eco-Innovation through Cooperation in Research and Development*, Copenhagen, 17–18 September 2014, <www.eco-innova.eu/final-conference>

² Grünig, 'Horizontal issues in the vertical space' <<http://jpi-urbaneurope.eu/horizontal-issues-in-the-vertical-space/>>

³ Hegarty is Managing Director, International Licensing for Intellectual Ventures, quoted in Hudson (2014)

change. However, many notions used in the nexus between industry, academic research, and policy practice gain usability by not being too strictly and narrowly defined. Some notions are perhaps best kept as ‘porridge words,’ since these types of words make us agile in our practical, everyday thinking.⁴ I’m digressing a bit, but it is important to keep in mind the practicalities of discourse so as not to be constantly blinded by an idealized sun in a similarly idealized cave. These practicalities may also help us avoid *faux ami* – words that look the same in various settings but differ vastly in meaning!

To begin with, we may observe a common difference in the economists’ sense to, say, a general social scientific sense of innovation: that is, between a market and a socio-technical based version of innovation. The market version denotes innovation as when you have an artefact that is stable enough to leave the lab or the workshop or studio – the innovator’s workbench – and is able to survive the transactional movement between a supplier and a ‘demander.’⁵ In other words, this characterizes a linear model of innovation where ‘science invents, industry applies and society conforms.’⁶ Usually, it is a good thing, a positive trait, for firms and commercial organisations to display the capacity to produce marketable artefacts, positive for financial or monetary growth. The unintended consequences are sometimes good and sometimes bad externalities, but the main point is the innovative capacity.

However, this understanding is of course quite narrow if one would like to see the promises of innovation for urban development. Since innovation in the linear version is only possible through a market transaction of objects or products. It is doubtful whether this definition can really cope with other substantial kinds of societal transformations (such as e.g. Linux or Wikipedia) that does not rely on a linear innovation model to produce game-changing or radical innovation. Another example might be the wider ‘break-through’ in the late 1990s of various prefix to capital – such as social, cultural, human, etc. – that changed to some degree, at least in the West, how organisations viewed e.g. human resources or how communities actually hold together. Or, currently, the ways of promoting ‘smart’ ways of organising societal development in the EU. Where is ‘market introduction’ of these innovations required for their efficacy in changing the course of societies? Hence, the socio-technical transformation version, on the other hand, speaks of innovation as any intentionally induced change not limited to and with externalities that reach beyond a market transaction. We are here concerned with a broader sense of diffusion than to ‘end-users’.

These two discourses coexist somewhat uneasily in contemporary European urban development policies and actions. So, maybe a simplified definition, but a useful keep-in-mind working definition that can be used to check the usage in various contexts, is that

⁴ Cf. de Bono (1971)

⁵ See for instance the *Horizon 2020* technology readiness levels (TRLs), which comprise a clear example of the linear way of understanding innovation: since the ‘barometer’ outlines a desired movement from basic research and prototypes in a lab towards a market introduction.

⁶ Felt & Wynne (2007), p. 21

innovation is not merely ‘something new’ but that this new effects some tangible change, whether in a market or anywhere else. It has to do with impact and transformation. Thus it has to do with implementation.

The systemic approach

Differences between the linear and the socio-technical is also discernible in the systemic approach. First of all, what does the ‘systemic’ bit add to innovation? At the Eco-Innova final conference, the distinction between innovation and systemic innovation was characterized by Richard Miller (InnovateUK) along the lines of the following answers to the question ‘what is systemic innovation?’:

- It’s not about complex problems
- It’s very rarely about the technology on its own
- It’s never the right time to change a system

So, somewhat parallel to the linear/socio-technical uses, one difference between ‘mere’ innovation and the systemic approach may be that the former is object-oriented,⁷ whereas systemic innovation is infrastructural in character, where infrastructure is understood as connecting various systems to offer many times tacit support for everyday life.

A simplified characterization of technical innovation systems and systemic innovation can be done through the notions of *niche* and *regime* levels, where systemic innovation is seen to effect ‘fundamental changes in both social dimensions (values, regulation, attitudes etc.) and technical dimensions (infrastructure, technology, tools, production processes etc.) and, most importantly, in the relations between them.’⁸

Systemic innovation thus seems to cover much of what we talk of as ‘integrated’, ‘transdisciplinary’, and ‘solution oriented’, etc. in *urban innovation ecosystems*. Although the comparison and juxtaposition of the two notions is not altogether fair, since the latter is more immature and a placeholder for a perspective to be developed further. The makeshift definition of urban innovation ecosystems is currently that the notion describes the creative capacity of cities to co-create value and make up the level of deployment for research and innovation.⁹ Typical actors that make up the innovative dynamic in an urban innovation ecosystem are *inter alia* urban decision-makers, communities, industry, citizens, researchers, NGOs, entrepreneurs, utilities, and so on, with a stake in e.g. new business cases and financing models, standardisation, scalability and replicability of solutions, an active and user-driven demand side, and so on.

⁷ Object-oriented is in a sense borrowed from ICT, but more generally from object-oriented strands in speculative realism. Let’s note that any system may be seen as an object, and vice-versa, to not spend too much space here on this kind of philosophical dance. For the sake of the main reflection on innovation, an ‘object’ is an entity that is mobile in Euclidean space whereas it is at the same time fully entangled in network space, cf. Bylund (2013). Further reading on the issue, see e.g. Bryant (2011).

⁸ Suurs & Roelofs (2014), p. 2

⁹ See Fireball (2012); Declaration (2009); EIO (2013); Coutard et al. (2014)

Research, policy, and industry experiences show that innovation and implementation depend on active participation from many different kinds of actors – from developers and engineers over civil servants to citizens – in order for the innovations to gain market shares and reach their full effect in efficiency. Thus, urban innovation ecosystems are made up of nearly everything required to make research and innovation work in settings outside the research and innovation workshops or laboratories in a stricter sense.

Furthermore, urban innovation ecosystems are at once a resource and a first instance to describe the urban setting from a research and innovation perspective. The notion is developed to help outline how urban living labs may be most useful. It was picked up from the literature with the intention to develop a boundary object (or quasi-object) that is able to traverse more relational waters in the urban research archipelago.¹⁰ That is, in contrast to e.g. social innovation, which is still probably too easy for certain kinds of research and policy actors to dismiss as ‘on the social side of things’. Urban innovation ecosystems’ interface, on the other hand, can cope with ‘hardcore technical implementation’ and ‘business’ as well as ‘cultural politics’ and ‘gender issues’.

So, shall we play?

Now, I’m not an expert. I’m just a project manager with some dilettantish curiosity in innovation. But it seems that systemic eco-innovation would not, in itself, be much of an innovation if I was able to just pick it up and *without further ado* make it work in our context. If this was possible, then we would only have a neologism for something we were already doing anyway. Since this may be the case, I have here the opportunity and privilege to underline one contrast in line with the discussion above to illustrate the friction and attunement required to make it work.¹¹

The contrast lies in the sense of sociotechnical. Because technical innovation systems and systemic innovation seems to harbour a desire to provide the whole picture. By this it seems that systemic eco-innovation is still looking for optimal timing, i.e. to identify the right time to change a system. A time that, at least according to practitioners (above represented by InnovateUK’s Miller), will never occur. Hence, the lacunae in urban innovation ecosystems on this usually strategic issue thus reflects how it seems more appropriate to have theory and action tailor-made and makeshift to the challenge at hand in a pragmatic fashion and problem-solving oriented approach.¹²

Thus, the notion of urban innovation ecosystems is closer to the *innovation platforms* used in practice (e.g. by InnovateUK, Swedish Vinnova, and Finnish Tekes), where the intention is to foster a creative dynamic between technology push and pull, exploitation and exploration of new technologies and artefacts; or, in other words, to set up a resilient sys-

¹⁰ Star & Griesemer (1989); Serres (1980)

¹¹ Cf. Akrich (1992); de Laet & Mol (2000)

¹² Cf. Akrich, Callon, & Latour (2002)

tem to balance growth and renewal.¹³ Urban innovation ecosystems are thus better described by complexity and network dynamics rather than linear systems in causal chains (even if two-dimensionally depicted as contextual clouds and swarms), since innovation in practice rarely develops like a conveyor belt in a Ford factory.¹⁴

So, do we still see a co-creative eldorado beyond the horizon with systemic eco-innovation given these contrasts? Well, yes. Particularly since the three recurrent questions all relate to societal change in one way or the other – i.e. with sociotechnical innovation! Since city authorities are probably not only interested in new markets for technical artefacts but rather in how we put various kinds of improvements and new ideas to use, both as business and as public service as well as from an infrastructural point of view. The academic research working in relative seclusion may produce powerful evidence and other artefacts, but knowledge practices are probably easier to communicate and implement if the ‘receiving context’ or ‘users’ are active in the activities to develop knowledges in the first place – as urban innovation ecosystems.

References

- Akrich, M. (1992). The De-Description of Technical Objects. In W. E. Bijker & J. Law (Eds.), *Shaping Technology/Building Society: Studies in Sociotechnical Change* (pp. 205-224). Cambridge Mass., London: The MIT Press.
- Akrich, M., Callon, M., & Latour, B. (2002). The Key to Success in Innovation Part I: The Art of Interestement. *International Journal of Innovation Management*, 6(2), 187-206.
- Arvidsson, N., & Mannervik, U. (2009). The innovation platform: Enabling balance between growth and renewal. *Vinnova Report VR 2009:25*.
- Bryant, L. R. (2011). The ontic principle: Outline of an object-oriented ontology. In L. Bryant, N. Srnicek, & G. Harman (Eds.), *The speculative turn: Continental materialism and realism* (pp. 261-278). Melbourne: re:press.
- Bylund, J. (2013). Plassein: on the mobility and fluid politics of urban qualities in planning practice. *Planning Theory*, 12(3), 244-266.
- Coutard, O., Finnveden, G., Kabisch, S., Kitchin, R., Matos, R., Nijkamp, P., . . . Robinson, D. (2014). *Urban megatrends: Towards a European research agenda. A report by the Scientific Advisory Board of the JPI Urban Europe*.
- de Bono, E. (1971). *Practical Thinking: 4 Ways To Be Right; 5 Ways To Be Wrong; 5 Ways To Understand*. Harmondsworth, New York, Ringwood, Ontario, Auckland: Penguin Books.
- de Laet, M., & Mol, A. (2000). The Zimbabwe Bush Pump: Mechanics of a Fluid Technology. *Social Studies of Science*, 30(2), 225-263.

¹³ Arvidsson & Mannervik (2009)

¹⁴ Cf. Suurs & Roelofs (2014); Felt & Wynne (2007)

- EIO. (2013). Europe in transition: Paving the way to a green economy through eco-innovation. Eco-Innovation Observatory Annual Report.
- Felt, U., & Wynne, B. (2007). Taking European knowledge society seriously. Luxembourg: Office for Official Publications of the European Communities.
- Fireball. (2012). Smart cities as innovation ecosystems sustained by the future internet. Fireball White Paper.
- Hudson, R. L. (2014). Bad news for research and innovation? In The new European Commission: Bad news for research and innovation? An analysis of the Juncker Commission (pp. 3-5). Brussels: Science Business. Retrieved from www.science-business.net
- Declaration, L. (2009). The Lund Declaration: Europe must focus on the grand challenges of our time. The Lund Declaration: Europe must focus on the grand challenges of our time.
- Serres, M. (1980). *Le passage du Nord-Ouest*, Hermes V. Paris: Les Éditions de Minuit.
- Star, L. S., & Griesemer, J. R. (1989). Institutional Ecology, "Translations" and Boundary Objects: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology, 1907–39. *Social Studies of Science*, 19(3), 387-420.
- Suurs, R., & Roelofs, E. (2014). Systemic innovation: Concepts and tools for strengthening national and European eco-policies. TNO Report 2014 R10903.