TOWARDS AN ASSESSMENT METHODOLOGY FOR SMART SPECIALISATION STRATEGIES: SPATIAL ECOSYSTEM FOR INNOVATORS' HOTSPOTS

C. Trillo

School of the Built Environment, University of Salford, Salford, M5 4WT, UK

Email: c.trillo2@salford.ac.uk

Abstract: The place- based development, as advocated by the European Commission through the Smart Specialisation Strategy (S3), is more than just an economic development strategy since its benefits allow for the achievement of more sustainable local economies. This paper presents an intermediate step in the achievement of the goals of an EU H2020 granted project, namely MAPS led, which stems from the assumption that spatially-led strategies can better meet the intentions of a place-based approach. After having developed a method to visualize socio-economic data at a level of granularity consistent with a place-based approach, the project is now entering its second fundamental stage which is about developing a novel assessment method to approach Smart Specialisations. This is undertaken by incorporating social innovation and civic engagement in the process of policy making and implementation. In detail, the paper focuses on the spatial factors and related triggers, which allow a full exploitation of the S3 in order to design a framework for a comprehensive assessment of the S3 potential. In so doing, it draws from case studies in the US to corroborate findings and conclusions with a robust empirical dataset.

Keywords: MAPS-LED, Place-Based And Sustainable Development, Smart Specialisation Strategies

1. INNOVATION – DRIVEN LOCAL DEVELOPMENT

Whilst a widespread interest in innovation-driven economic development is emerging (Madelin, 2016), yet still current assessment approaches and related methods/instruments/ tools show deficiencies in catching up with the dynamic nature of innovation. Furthermore, the persistent dichotomy between quantitative versus qualitative approaches hinders the capability to capture the holistic and complex nature of social capital-embedded phenomena. Although it is possible to narrow down at the urban level regional datasets relating to cluster analysis as in the traditional cluster analysis approach (Porter, 1990; www.clustermapping.us), an exclusively quantitative based approach is still not suitable to detect emerging clusters, due to their dynamic nature. These limitations challenge the adoption of traditional methods of assessment whilst tackling the evaluation of the so-called Smart Specialisation Strategies (S3) endorsed by the European Commission and based on the concepts of entrepreneurial discovery and risk taking (Foray, 2015; McCann & Ortega-Argilés, 2015). This paper draws on, and puts forward, a EU H2020 granted project, namely MAPS led, which stems from the assumption that spatially-led strategies can better meet the intentions of a place-based approach. After having developed a method to visualize socio-economic data at a level of granularity consistent with a place-based approach, the project is now entering in its second fundamental stage which is about developing a novel assessment method to approach Smart Specialisations. This is undertaken by incorporating social innovation and civic engagement in the process of policy making and implementation and by operationalising them in the form of assessment grid. In detail, the paper focuses on the governance mechanisms which allow a full exploitation of the S3 in order to design a framework for a comprehensive assessment of the S3 potential. In so doing, it draws on case studies in the US and in Europe. In detail, preliminary studies, aimed

at exploring the issue further, were conducted by interviewing selected key-stakeholders on issues and opportunities for the S3 implementation in the Manchester, UK, area. They showed that: (1) in the Manchester area, the S3 strategy was possibly underestimating the potential of some emerging clusters, such as the digital technology applied to the media, with the huge potential of supporting local development; (2) where innovation was happening, the alignment between innovation-driven economic development and social innovation was not deliberately regulated; (3) the stakeholders' engagement process in determining what S3 should be pursued could have benefitted from a higher clarity in the organisation and implementation of the process; (4) the S3 rationale was deeply interconnected with the devolution agenda (i.e., the formation of the Northern Power House political alliance and the constitution of the Greater Manchester Authority as an elected body). This preliminary investigation was conducted with the aim of achieving a better understanding of the gaps to be filled in the European context. Although the S3 official documents seemed to depict a clear and univocal approach to the S3, in reality a shared approach on the concrete application of S3 was far from being fully developed in all its aspects. In particular, room for discussion existed on the role played by innovation in supporting (or not) equitable development, paving the way to broadening the research questions with regard to the connection between innovation-driven versus *social* innovation-driven local economic development. The Habitat III Agenda has better clarified the nexus between the economic and social agendas, particularly within cities. The Sustainable Development Goals, as defined in the Quito UN Summit, can be considered key drivers in framing the concept of "sustainable innovation", reflecting the main aim that socially-driven innovation should pursue (http://www.un.org/sustainabledevelopment/sustainable-development-goals/).

The way towards the assessment of how far innovation-driven development is also sustainable (hence, incorporates the *social* innovation component) is by using the *space* as the common ground to appraise the alignment of all the factors which make sustainable innovation possible.

This paper seeks to address the following questions: (1) What problems should be addressed by delivering a better assessment methodology for S3 in spatial terms? (2) What are the possible spatial enablers of place-based and locally-embedded development? A novel assessment methodology will be suggested, seeking to address the following issues: (1) How to select indicators for assessing the potential of S3, consistent with the S3 rationale (granularity, timely availability, place-based)? (2) How to create the *spatial ecosystem* supportive of an efficient S3 implementation? (3) What best practice of "spatial enablers" holding a transferability potential can be identified, by drawing on evidence from empirical research conducted in the Boston area?

It is anticipated that this paper will conclude that: (1) The set of indicators usually adopted to understand, appraise and monitor innovation process are not fully consistent with the S3 rationale. The paper will suggest a strategy to address this gap, namely: (2) The spatial factors that made innovation possible in the Boston area that have been identified through a survey and a set of interviews. The paper suggests a list of the most important *innovation- supportive spatial factors* to be prioritized by innovation focused policies, both public and private; (3) Innovation is particularly boosted in specific dense places (*hotspots*) which act as enablers of innovative mechanisms suitable to be spread around and be interconnected with the innovation ecosystem locally and internationally. The paper suggests how such an "innovation supportive" ecosystem should be spatially organised and what different types of spatial enablers can be activated in a target area; (4) Innovation is spurred by *triggers* or *activators* which can be individuals (*champions*), organisations, task forces, thus starting the process.

2. TOWARDS A NOVEL METHODOLOGY FOR ASSESSING EMERGING INNOVATION: MAPPING SOCIAL INNOVATION

A constructivist approach has been considered the most appropriate to investigate the research problem. A case study strategy has been adopted in order to achieve an in-depth understanding of innovation-driven economic development in the selected area with the aim of developing transferable instruments and recommendations. The case study production and analysis was conducted in the Boston area over a 12 months' period through a mix of quantitative and qualitative methods applied to a selection of sub-case studies (the innovation *hotspots*, as explained in more detail later). The sub-case studies were initially selected through desk analysis and interviews with key experts from the Boston area; then the initial selection was refined following the first round of interviews. The selection of the sub-cases started in March 2016 through a set of interviews aimed at narrowing the focus on the investigation and understanding the most appropriate areas to target. The desk analysis included academic papers and technical reports on innovation districts, planning documents and reports on innovation districts in the Boston area and a general planning framework for the Boston area. The desk analysis was complemented through participation in conferences and public discussions on Boston metropolitan area urban and economic issues. After one year, the findings incorporated in this report were discussed with experts on public policies and economic development based in the Boston area in order to better focus on the possible gaps still existing in the suggested approach. The feedback received led to the following improvements: (1) the assessment methodology was re-cast within the developmental evaluation conceptual framework for public policies, and (2) notwithstanding the scope of the methodology is to bridge the gap between micro and macroscale, it was clarified that it is essential to focus on a given scale; also there is a necessity to understand the most appropriate stakeholders to be involved in the delivery of the policies.

The hotspots have been studied by conceptualising the urban environment following the rationale of *urban patterns as cognitive infrastructure* (Trillo, 2016), hence, by rejecting a boundary-led criterion and by focusing on "hotspots" of innovative development. Key-hotspots have been identified: The Cambridge Innovation Center (CIC) in Kendall Square, Cambridge; The Boston Innovation Center and the Boston Impact Hub in Milk St, downtown Boston; The District Hall in the Seaport District; The Roxbury Innovation Center (RIC) in the Roxbury area, Dudley Square; The Boston Masschallenge in the Seaport District; The PULSE in the Longwood area; The GreentownLab in Sommerville, and the Venture Café. In some cases the hotspots allowed for the identifying of emerging clusters (Kendall: BioFarma, Longwood: E-Health; Roxbury: low-tech); in some cases, they were related to specific regeneration spatial strategies (District Hall: Seaport District regeneration; Roxbury Innovation Center: Dudley Square regeneration).

The two main research tools used to investigate the 8 hotspots were: Questionnaires – to provide insights on case studies from a mainly quantitative perspective; Interviews - to provide in-depth and personalised insights on case studies from a mainly qualitative perspective. The questionnaire aimed at investigating: (1) What are the spatial factors that make the area surrounding the hotspot attractive for the companies? (2) What are the major impacts that the hotspot produces on the surrounding area? (3) What are the spatial linkages of the hotspots in terms of housing, transport and services? The questionnaire was tested by administering it with a start-up based in the Cambridge Innovation Center. Through the testing it emerged that some generic terms (i.e. "amenity") could have misled the interviewees, thus, it was decided to specify, for each location, the site-specific factors which could be related to a certain category.

For example, instead of asking interviewees to rate the importance of landscape amenities in the Kendall Square area or in the Seaport District, the questions were formulated to provide a rating on the importance of, respectively, the Charles River and the sea view. This led to creating as many questionnaires as the hotspots that were selected.

The questionnaires were delivered through a Survey Monkey tool by the MAPS LED team members. Initially, a paper version of the questionnaire was prepared. When the questionnaire was tested, it emerged that the best way to deliver it across the targeted people (i.e., innovators reluctant to use traditional tools and thus more likely to fill in a web based questionnaire) was a Survey Monkey tool. Hence, the 8 questionnaires were each associated to a web link. Although the delivery of the survey was web-based, personal interaction with each company was essential in ensuring the response rate necessary to get a significant snapshot of the interviewee opinions. In 4 cases (CIC, Boston Innovation Hub and Boston Innovation Center, RIC and District Hall) this was achieved by attending several social events and/or working in the different hotspots (6 sessions at the Venture Café Thursdays at CIC, 2 sessions at the Roxbury Night Café, 1 social event at the Innovation Hub Boston; 4 working days spent at the District Hall), approaching individually each company/ individual working in each of the places and explaining the reasons for the survey. In some few cases, the questionnaire was filled in jointly. In the majority of the cases, people approached during social events or while working preferred to defer the survey. This reduced the response rate but allowed compliance with the ethical principle of fully voluntary participation in the survey and, most importantly, it meant that the researchers were not considered to be intrusive by the management of the different places, thus allowing a more extensive delivery of the survey.

For each of the hotspots the survey was enhanced by a qualitative data collection based on semi-structured interviews with key-informants for each of the selected hotspots. All the hotspots were investigated by talking to at least 2 different people in different roles in the organisation. All the semi-structured interviews were preceded by preliminary interviews aimed at correctly framing the case. Extensive qualitative fieldwork complemented the data gathering based on a visual survey of the hotspots and surrounding areas and on direct observation of the behaviour of the users of the innovation hotspots. This was conducted by spending several hours observing the hotspots over a 10 months' period (June 2016 - March 2017) at different times of the day and of the year (3 rounds of observation: June 2016, August 2016, March 2017), taking pictures and talking to the people working in the hotspots.
The investigation of the 8 main hotspots was complemented with a direct study of 12 further places whose importance had emerged through the interviews in the first round. These cases were investigated by administering semi-structured interviews with key informants and by direct observation (no survey were administered). The list of the 12 further places were: Fairmount Innovation Hub, Dorchester; Mass Innovation Labs, Kendall Square; Smarter in the City, Roxbury; JPNDA Brewery, Jamaica Plain; Commonwealth Kitchen, 196 Quincy Street; WeWork South Station, Boston; WorkBar Leather District, Boston; Intrepid Labs, Cambridge MA; Trumotion, Boston; Breather, Downtown Boston; Idea, Northeastern Innovation Hub, Boston; Artisans' Asylum, Somerville. Hence, a total of 20 places provided the main body of empirical evidence for the findings used in the construction of the grid of assessment. Overall, 40+ informal interviews have been administered with experts and key informants, delivered between April and June 2016 in order to narrow the focus in the data gathering process; in addition to 40+ semi structured formal interviews with experts from different stakeholders' groups (public, private, NGOs), and 100+ questionnaires were received.

All the empirical evidence was used in order to produce a novel assessment methodology suitable in supporting the detection of early stage innovation areas and to appraise their potential in terms of innovation. Traditional assessment methods are seriously challenged when applied to dynamic and highly interconnected systems such as an innovation ecosystem. While innovation is a static concept, innovators do move, do concentrate and do network, creating multiple spatial patterns of innovation which reflect the flows of innovation across different areas. For this reason, the spatial pattern of innovation has been re-conceptualized as a network of spatial hotspots connected by flows of knowledge, rather than as identifiable areas. However, innovation still happens within a given space which is related to the geographical area in which the main stakeholders in charge of making innovation happen, operate. Furthermore, it is the geographical area that allows for the identifying of decision makers in charge of operating in each space (governance); thus, while the space of innovators should be conceptualised as a dotted network for the purpose of the data collection, the space of the decision makers still rests upon a traditional definition of institutional boundary. For this reason, the regional scale remains the most appropriate to investigate innovators' spatial dynamics and, therefore, the hotspots were identified within the Boston metropolitan area and not at a local scale. In particular, they were selected within the following three cities: Boston, Cambridge and Somerville.

This evaluation framework is: (1) based on a socio-constructivist approach aimed at drawing insights from the knowledge embedded in the community of innovators, and (2) shaped beyond the administrative/institutional boundaries by selecting urban "hotspots" of innovators and expanding around them multiple boundaries incorporating key infrastructures and services on different scales.

The adoption of traditional assessment methods in innovation areas is challenged by a variety of factors. The boundaries of innovative clusters are blurred and extremely dynamic. Findings from the survey corroborated this perception, by showing the international projection of many of the companies in the hotspots. Rather than creating a list of indicators to be mapped within a given boundary, the suggested methodology is based on the idea of "detecting" an innovative hotspot and, from there, mapping around the significant elements creating the sustainable innovation ecosystem for the (early stage) innovative hotspot to grow. The rationale for assessing whether and how far the ecosystem around a given hotspot is supportive of an innovation-driven economic development, will be to appraise the alignment of all factors by visualizing, at the appropriate scale, the key factors supporting the growth of that hotspot; hence, the spatial configuration of innovators and hotspots remains crucial.

The key spatial indicator for mapping social innovation is the number of spaces where innovation happens within a defined building because of the presence of either an incubator or an accelerator (regardless of whether public or private), allowing a critical mass of start-ups to grow. Where these spaces are significantly present, the following dynamic is activated: (1) they act as an anchor for bigger companies in search of talents and or new ideas; (2) they are mutually supportive and reinforcing; (3) they attract venture capitalists further boosting the economic growth.

Patents are still a key indicator for innovation but they are not suitable to detect people-driven innovation at an early stage, rather to confirm that successful innovation-driven growth is happening. It is, therefore, suggested that S3 should be activated where the local entrepreneurial social capital shows a high potential of growth and that the presence of a variety of innovators' hotspots can be the way of assessing it.

The theoretical assumptions behind this model are: (1) Smart Specialisation rests on an organic conceptual paradigm, according to which innovation happens when the overall "ecosystem" is innovation-supportive; (2) Smart Specialisation must encompass the concept of social innovation as a major driver for an equitable growth and development; (3) Smart Specialisations should be spatially identifiable at an appropriate level of granularity, and (4) Smart Specialisations build on the concept of cross-fertilization across different sectors rather than on an individual sector.

The first three concepts lead to framing the ideal setting for Smart Specialisation within a sustainable urban environment and, in fact, some significant areas of overlapping can be identified between the S3 and the Sustainable Development Goals launched last year by the UN. The first and fourth concepts recall the idea of mixed use development which is still a basic pillar of sustainable urban development. It is, hereby, theorized that Smart Specialisation, intended as embedded development strategies, require as fertilizer innovative ecosystems which in spatial terms coincide with, but are not fully accomplished by, the prerequisite of sustainable urban regeneration as redefined by the UN through the Sustainable Development Goals.

The following diagram shows how to conceptualise both the assessment rationale for sustainable innovation driven S3, which should be embedded in S3, and the assessment rationale for addressing the prioritisation of public and private policies aimed at achieving socially-driven innovation.
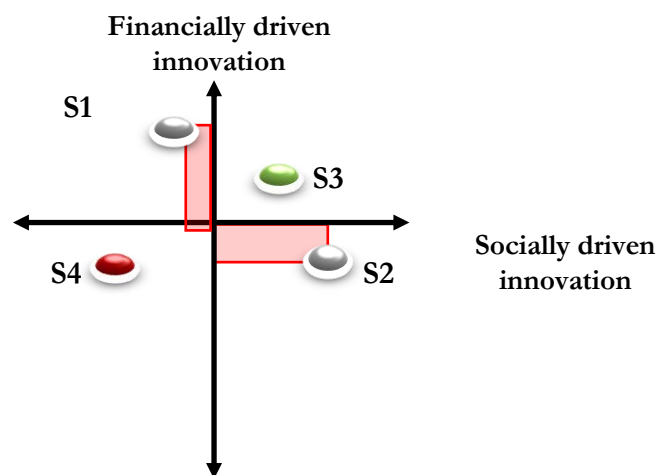
Figure 1: Rationale for the assessment grid of S3

In Figure 1, S3 are located in the top-right quadrant, meaning that they are both sustainable financially and socially. S1 are successful strategies based on non-necessary socially-driven innovation, for example, based on an externally sourced highly skilled workforce working for external companies bringing financial surplus to a certain area, but undermining the social structure and displacing rather than building on the local social capital. S2 are successful strategies based on exclusively socially driven innovation, not capable of sustaining themselves financially in the long term; they are in constant need of being subsidized and are, therefore, fragile and not reliable in times of financial crisis. A further component could be added to the conceptual diagram which is the time, since strategies can significantly change throughout their lifetime, but reasons of clarity this aspect will not be considered.

The methodology hereby suggests applying a framework allowing an understanding of to which quadrant a given strategy belongs and what tools/ instruments can be adopted in order to move towards the top-right quadrant.

3. CONCLUSIONS: WHAT SPATIAL FACTORS TO ASSESS AND HOW?

The previous section showed how the metropolitan area of Boston was investigated by focusing on specific innovation "hotspots" within the region while considering the scale of broad issues which emerged from the answers of the respondents (typically, local/regional/international), i.e., approaching the innovation "hotspots" as dots in a multi-scalar network embedding local-international linkages, both physical and non-physical. By looking at the performance of those networks from the social innovation perspective, evidence from Boston led to the formulation of the following:

(1) The scale of social innovation: social innovation is activated by networking at multiple scales. The networking works both horizontally and vertically, creating local-local and local-international linkages that activate the circulation of knowledge and generate spillovers far beyond the border of the Boston metropolitan area. In particular, such spillovers promote equity by binding lagging behind either neighbourhoods in the same city or even cities outside the Boston metropolitan area, thus allowing a consistent level of highly specialised expertise across a variety of different social contexts. A good example of this is the Venture Café' network, linking together two Innovation Centers in competitive neighbourhood (the Cambridge and the Downtown Boston ones) with an Innovation Center triggering the economic revitalisation of a formerly deprived and blighted area (the Roxbury one). It also networks with other US cities (e.g. St. Louis) and even European cities (Rotterdam). However, evidence of a correlation between this mechanism and the parallel process of regenerating the area is still far from being proved.

(2) The location of the innovators: social innovators are spread across different categories of stakeholders. Sophisticated governance allows for a blended public private approach, encompassing civic organisations, second tier NGOs, collaborating through structured frameworks thus allowing space for risk taking even in those sectors which are usually risk-adverse. A good example of this is represented by UrbanMechanics, a task force operating in close conjunction with the City of Boston Mayor allowing for experimentation and the testing of initiatives with the aim of upscaling only those that demonstrate that they can be successful.

(3) The spatial ecosystem for innovation hotspots: innovation hotspots work better in walkable environments and in socially and physically dense neighbourhoods. Physical and spatial planning in all the places investigated supported the densification of the area, by increasing the public transport and encouraging mixed-use. Evidence has shown that these kinds of urban ecosystems tend to be more attractive for innovators. This happens because social innovators are usually environmentally conscious and tend to prefer more sustainable urban patterns but also because social innovators tend to prefer socially interesting environments, hence, dense and high-quality urban settings.

Drawing from the findings above, table 1 shows the assessment grid of factors.

Table 1: Assessment grid for innovation – driven development

SPATIAL FACTOR	TRIGGER	SPATIAL TOOL	ECOSYSTEM
Dense and walkable urban environment	Public local authorities	Mixed use Public transit	Proactive local public authorities
Spatially identifiable hotspots	Private companies HE institutions Public local, regional and national authorities	Incubators Accelerators (both public and private)	Anchor companies Anchor institutions Champion(s)
Local2local and local2global networks	Private companies HE institutions Public local, regional and national authorities	Spatial proximity of the local2local networks	Local and global incubators Local and global accelerators
Spatially identifiable civic innovation centres and socially driven incubators	Public local authorities NGOs	Regeneration initiatives Civic centres Social incubators	Active local authorities Active communities
Spatially identifiable anchor HE institutions	HE institutions	HE anchors HE accelerators and incubators	Starts-ups generated by the HE institutions

The grid can be both used to assess the state of the ecosystem of a given region, understanding whether it can be considered mature enough to support a S3 environment, and for filling gaps which can be identified by appraising the presence of all the given factors in an area. It should be observed that, in all the cases, the whole ecosystem worked with the physical presence of all the elements in place, in other words, physical proximity remains the precondition for an ecosystem to work and no factor can be replaced by externally sourced assets.

Possibilities for further research include expanding on the land value and cluster dynamics' nexus. It has been clarified how the current cluster analysis does not reflect the dynamic nature of the clusters, thus failing in detecting emerging areas for innovative clusters. However, the dynamic nature of cluster development is directly related to the value of land (and rents). Further studies could investigate the correlation between changes in the clusters' patterns and property market dynamics.

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