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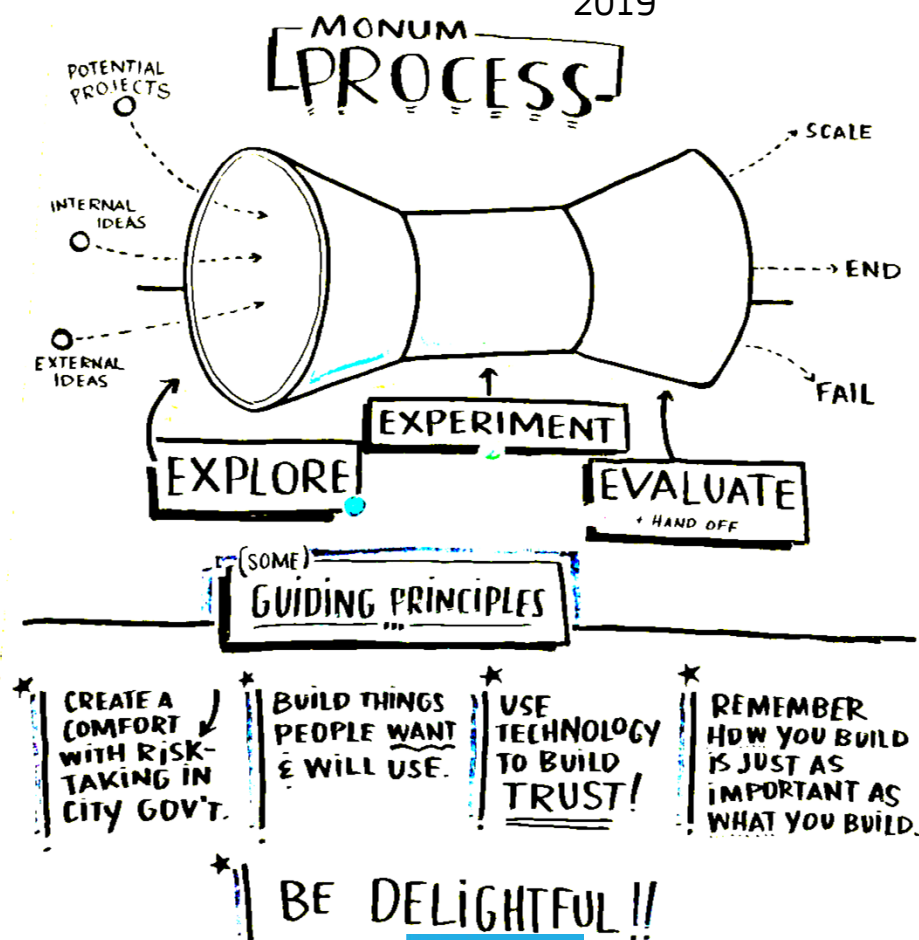
## JRC TECHNICAL REPORTS

# Place-Based Innovation Ecosystems

*Boston-Cambridge  
Innovation Districts (USA)*

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## Foreword

This research publication is part of a series on *Place-based Innovation Ecosystems* that was born in 2017 from a fruitful collaboration between the Committee of the Regions (CoR) and the Joint Research Centre of the European Commission (JRC) on promoting the importance of evidence-based policy development for regional and urban policy makers.

In December 2016 a delegation from the Joint Research Centre of the European Commission (DG JRC) participated in a research workshop organized as part of the knowledge-sharing activities of the Horizon 2020 Research Project MAPS-LED (Multidisciplinary Approach to Plan Smart Specialisation Strategies for Local Economic Development), held at Sapienza University in Rome. This project, commenced in 2015 and ended in March 2019, involved four institutions in Europe (Mediterranea University of Reggio Calabria in the role of Lead Partner, Sapienza University of Rome, Italy, University of Salford, Manchester, UK and Aalto University, Helsinki, Finland) partnering with 2 USA institutions (Northeastern University in Boston and San Diego State University).

The workshop offered the opportunity for an in-depth discussion of one of the two case studies of this research, i.e. the Boston metropolitan area, where the MAPS-LED team was developing extensive fieldwork on multiple local case studies thanks to a large team (circa 60 people) of early stage and experienced researchers based at the USA partner institution Northeastern University.

It was immediately clear how the rationale behind the MAPS-LED project, i.e. approaching the Smart Specialisation Strategies (S3) from the USA perspective and comparing across different approaches, had led to finding some relevant insights, thus holding the potential to inform European policy making on local economic development and urban regeneration. Further discussion occurred in the subsequent research workshops in September 2017 in Salford and in May 2018 in Reggio Calabria and constituted the basis for this joint effort between the JRC and the MAPS-LED team, capitalizing from the Horizon 2020 project.

The present report feeds into the research line launched by the JRC in 2017 on the topic *Place-based Innovation Ecosystems*.

The Editor and Authors

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This report has been developed thanks to the field work made possible within the research project MAPS-LED (Multidisciplinary Approach to Plan Smart Specialization Strategies for Local Economic Development) granted by the European Commission through the Horizon 2020 RISE programme, project number: 645651. The authors thank the project partners in the project, in particular the Department of Economics at the Northeastern University of Boston and all the interviewed experts who generously provided the suggestions and comments that were essential in developing the conceptual framework and empirical evidence. Discussing the research questions with Berry Bluestone at the Dukakis Center, and with Bruce Katz and his team at the Brookings Institute of Washington D.C., was essential in building the conceptual framework of this report which combines the new economic growth theoretical approach with the idea of innovation districts. It would be impossible to mention all the colleagues and experts who provided us with data and valuable insights, making themselves available to discuss, explore and check data often more than once. To mention some: Barry Bluestone, Catherine Tumber, Laurie Dopkins and Tim Love (Northeastern University); Christian Ketels, Erez Yoeli, Diane Davis (University of Harvard); Erin Baumgarten, Fabio Duarte, Rex Britter (MIT, Senseable Cities Lab); Nico Calavita (San Diego State University); Farooq Iram (Cambridge City Hall); Bruce Katz, Jason Hachadorian and Scott Andes (Brookings Institute); Katharine Lusk (Boston University); Richard McGuinness and Chris Bush (Boston Redevelopment Authority); Nigel Jacobs and Stephen Walker (Urban Mechanics); Sara Mruz, Naomi Berlin and Ben Shaw (Cambridge Innovation Center); Geoff Mamlet (Impact Hub Boston); Becky Donner and Sarah Desimas (District Hall); Roman Kern and Lindsay Simeone (Masschallenge); Nina Kandilian (PULSE Masschallenge); Alexandra Brown (Roxbury Innovation Center); Bethann S. Steiner, Cem Oruc, Sanjay Gokhale (MassTech); Jennifer Conway (MIT Investment Management Company); Brontë McGarrah (Greentown Lab); Hans Ludi (Mass Innovation Labs); Donalyn Stephenson (Fairmount Innovation Hub); Richard Thal (JPCDC); Gilas Rosenzweig (Smarter in the City). Without their generous insights, valuable suggestions and comments, this report would not have been possible.

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Note: parts of this report draw on previous documents representing a piece of research carried out by the authors within the MAPS-LED project.

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## **Abstract**

This report focuses on the case study of the Boston area and identifies the key success factors in the Boston regional innovation ecosystem. It discusses how the macro-innovation eco-ecosystem is composed by a variety of interconnected micro-innovation ecosystems, mutually reinforcing each other and making the entire “territorial” system successful. The spatial configuration of these micro-innovation ecosystems at the urban scale has been specifically investigated, thus leading the authors to theorize that the Innovation District may act as an enabler for place-based innovation.

Evidence from the Boston case study shows that there is not a single magic recipe for the successful implementation of place-based and social innovation-driven strategies. On the contrary, the variety of place-grounded combinations of micro and macro initiatives, embedded in the social and spatial fine grain of places and encompassing a diversity of actors, can create the conditions that enable places to thrive and local economic activities to grow in a sustainable way.

# 1 INTRODUCTION

The present case study feeds into the research line launched by the JRC in 2017 on the topic of *Place-based Innovation Ecosystems* aimed at studying the functioning of territorial innovation ecosystems and the role of individual key players to orchestrate quadruple helix (i.e. Government, University, Enterprise and Society) stakeholders' collaboration in order to understand their specific contribution to the Entrepreneurial Discovery Process. The latter requires strong multi-stakeholders' engagement as a pre-condition for the successful implementation of a regional operational programme and, especially, of regional smart specialisation strategies (RIS3). In particular, this study builds on and moves forward the related JRC publication series by expanding the knowledge on international case studies which is useful to draw insights and steer the Smart Specialisation Strategy (S3) implementation in the EU member states. The focus of this report is on the rationale for the *spatial* configuration of those places where place-based innovation occurs.

This report aims to inspire European policy makers willing to support local economic strategies which are: delivering goals in line with the Habitat III Sustainable Development Goals; rooted in the concept of embedded innovation (i.e. collaborative forms of innovation underpinning the wider socio-environmental context); aimed at leveraging the potential of urban hubs as enablers of a network of innovation hotspots; gauging innovation throughout all the strands of economic and social capital. This goal is achieved by suggesting an intertwined set of spatial, political and economic strategies to be orchestrated at both the regional and the local scale and to be implemented at the neighbourhood scale, through the right combination of embedded strategic spatial tools delivered by a variety of actors.

## **Quick guide**

The study starts by identifying a conceptual framework that can inform the assessment of the case study according to general criteria, allowing the operationalisation of the principle of social innovation within the policy field of urban strategies and local economics. The study continues by developing the following steps: a presentation of some innovative actors operating in the Boston-Cambridge innovation ecosystem; a synthesis of three sub-case studies representing different significant interpretations of the 'Innovation District' phenomenon; a discussion of the main factors enabling social innovation in the innovation ecosystem, and a critical analysis of those factors within the USA context, by highlighting regulatory and political constraints undermining their applicability to the European context and coming up with a set of possible recommendations holding the potential to feed into the current implementation of Smart Specialisations and into the post-2020 urban development and local economic development policies.

The target area of this study is part of one of the most innovative areas in the world, the Boston metropolitan region. This case study allows for the identification of the key success factors in the Boston regional innovation ecosystem by focusing on different types of innovation hotspots active in the area, operating on different spatial and economic scales. This case targets a variety of different innovation hotspots across the wider metropolitan area, including the cities of Boston and Cambridge. However, for this report, only three sub-cases have been selected, having the potential to play the role of *models* for 'Innovation Districts': two in Boston (Seaport in South Boston and Dudley Square within the Roxbury neighbourhood) and the third - Kendall Square - located in the city of Cambridge. This report discusses how the macro-innovation eco-ecosystem is composed by a variety of interconnected micro-innovation eco-systems, mutually reinforcing each other and making the whole "territorial" system successful. The spatial configuration of these micro-innovation ecosystems on the urban scale has been specifically investigated, thus leading to theorizing that the Innovation District may act as enabler for place-based innovation, contributing by its specific *spatial* configuration to enable the location of a particular type of *innovators* who are mainly responsible for triggering sustainable urban regeneration dynamics. The evaluative framework used for assessing the overall performance of the innovation districts has been derived

from the Habitat III Sustainable Development Goals, with the concept of inclusive growth to be incorporated as an imperative within the rationale of the policy, without disregarding economic priorities.

Evidence from the Boston case study shows that there is not a single magic recipe for the successful implementation of place-based and social innovation-driven strategies. On the contrary, a variety of place-grounded combinations of micro and macro initiatives, embedded in the social and spatial fine grain of places and encompassing a diversity of actors, can create the conditions enabling places to thrive and local economic activities to grow in a sustainable way.

### ***Main findings***

One of the successes of the Boston-Cambridge innovation ecosystem lies in the effective interconnection and intertwining of the four main anchor HE institutions, i.e. Harvard, MIT, Northeastern University and Boston University. The crucial role of such world-leading academic systems as an activator of cutting-edge local innovation is out of the discussion of this report and the limitations as to the generalizability of such an example to other contexts is also very clear to the authors. However, it is worth noting that this report does not focus exclusively on the factors which made the Boston-Cambridge innovation ecosystem successful, an assumption which would undermine any attempt of transferability to other contexts, rather it will highlight some distinctive factors in that ecosystem which could work at different scales and in various contexts.

Firstly, from a *spatially-driven* perspective, the Boston-Cambridge innovation ecosystem rests on a robust urban fabric, supporting a thriving and vibrant urban community of innovators. This peculiarity differs from other types of innovation spatial ecosystems, such as Silicon Valley which is characterized by a sprawled urban fabric lacking a proper network of public spaces and which is spatially divisive.

Secondly, the Boston-Cambridge innovation ecosystem is a multi-actor and multi-scale networked ecosystem, enabling effective knowledge-exchange across different subjects and scales. Some key intermediate subjects, enabling interaction across the actors of the quadruple helix model, implement models that support the circulation of knowledge dynamically on different scales (neighbourhood, city, state, global). This peculiarity also differs from some other types of innovation hotspots which are less suitable at producing spillovers on a local scale due to a lack of proper supportive local governance.

Thirdly, entrepreneurial discovery is embraced additionally by public subjects (who are traditionally risk-averse) thus activating civic engagement and grassroots' collaboration at all levels of the local governance of innovation. This factor innovates and contradicts the idea that some typical dynamic qualities are a prerogative of the private sector only.

These three aspects could be considered as evidence of good practice, suitable for informing public and private innovation policies in Europe. They are suitable to be transferred to different contexts, both in terms of geographical and economic scale.

### ***Key conclusions***

The key success factors for the development of the Boston innovation ecosystem can be generalised as follows:

- 1) The quadruple helix model (i.e. Government, University, Enterprise and Society) is properly embedded in the physical structure of the two cities (Boston and Cambridge), in which anchor Higher Education (HE) institutions continuously nurture the Entrepreneurial Environment (e.g. Innovation Centres both feeding and applying spillovers from HE; small start-ups and international corporations mutually reinforcing and interacting within the urban fabric);



2) An entrepreneurial approach emerging from the local governments, eliciting risk taking and bottom-up civic participation in tackling key issues in the city (e.g. the unique experiment of 'Urban Mechanics' in the city of Boston);

3) A fully operational networking structure of some intermediary actors supporting entrepreneurial collaboration, cross-fertilization and co-creation, who collaborate on multiple-scales thus enabling positive spillovers from the stronger to the weaker contexts (e.g. the Venture Café network enabling international cooperation and cross-collaboration);

4) Local authorities aware of the socio-economic value of the built environment as an enabler of cognitive networks (by releasing masterplans allowing mixed use and emphasizing the value of public pedestrian-oriented spaces);

5) The availability of civic-led spaces enabling grassroots' collaboration and cooperation (e.g.: the 'District Hall' in Boston Seaport, enabling both local economics and social value initiatives).

In conclusion, the US experience offers valuable insights that could potentially feed into the post 2020 policy design for entrepreneurial discovery and place-based local development in the Smart Specialisation Strategy (S3) context. A direct connection between urban and local economic development policies, achieved through actions targeted at pilot urban areas, will be the driver of embedded and innovative strategies leveraging local assets.

## 2 CONCEPTUAL FRAMEWORK

This report stems from a trans-disciplinary approach merging economic, social and spatial planning concepts to theorize the role of innovation urban districts as socio-economic physical infrastructures for embedded innovation. This approach derives from the nature of the Horizon 2020 project from which this report draws, as MAPS-LED was conceived from the outset as an opportunity for exploring the *spatial* configuration of locally-grounded economic initiatives, by combining different disciplinary fields, i.e. economics, spatial planning and social science.

Combining principles drawn from the New Economic Growth Theory (Romer 1994) and from the socio-constructivist approach to economic growth (Gravenotter 1985) with the New Geography of Innovation emerging from the networked nature of Innovation Districts (Katz & Wagner 2014), this report explores the spatial configuration of innovation districts, where knowledge-based growth is occurring, with the aim of unveiling replicable spatial patterns and transferable portfolios of public policies. These latter hold the potential to be used by European policy makers to steer the implementation of S3.

Whilst a wide body of literature (Katz & Bradley 2013, Katz & Wagner 2014, Swinton 2017) suggests that cities should naturally be considered ideal natural clusters, supporting cross-fertilization and innovation thanks to the physical setting they provide for the construction of a collective knowledge, yet a considerable distance persists between regional policies and urban development strategies. This report suggests that urban policies and economic development policies should be addressed with an integrated approach to mutually reinforce each other.

Moreover, whilst innovation is normally considered a positive trigger of local economic development and is usually associated with an increase in competitiveness, a growing body of literature suggests that innovation is non-neutral (Florida 2017a, Florida 2017b, Berkes & Gaetani 2015, Berkes & Gaetani 2018, Walker 2018). This report suggests that inclusive growth goals (including civic engagement, social equity and inclusion) should be taken into consideration to ensure equitable innovation-driven local development.

This report draws from the MAPS-LED robust dataset and related outcomes to discuss a novel approach to innovation-driven local economic strategies by testing them against the Sustainable Urban Development rationale. In so doing, it aims at offering valuable insights to European policy and decision makers at all levels, including the local level, useful for steering the ongoing implementation of Specialisation Strategies.

The theoretical assumptions behind the MAPS-LED approach are (EC 2011, EC 2013, Barca et al. 2012, McCann & Ortega-Argilés 2015, Foray 2015):

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 equitable growth and development;
3. Smart Specialisations should be spatially identifiable at an appropriate level of granularity;
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 S3 within a sustainable urban environment and to assuming the Sustainable Development Goals’ framework launched by the UN in 2015 as mainstream for re-casting the S3 targets. The first and fourth concepts suggest that mixed-use and socially mixed urban physical settings are the most supportive for implementing Smart Specialisations, recalling the principles advocated by Sustainable Development Goal 11, Sustainable cities and communities. Smart Specialisations, intended as embedded development strategies, require, as fertilizer, innovative ecosystems that in spatial terms coincide with, but are

not fully accomplished by, the prerequisite of sustainable cities and communities as defined by the United Nations. Hence, cities should be considered not only as an economic agglomeration accelerating growth (as in the Schumpeter and Marshall traditional approach), but also as a *cognitive infrastructure* enabling a knowledge economy (Trillo 2016). A widespread body of literature suggests that innovation is non-neutral, and that economic segregation is a direct effect of the concentration of knowledge-based industries (Florida 2017a, Florida 2017b, Berkes & Gaetani 2015, Berkes & Gaetani 2018). The dramatic scenario described in the recent “Pictures of a Gone City” (Walker, 2018) uncovers with a rich dataset the “Dark Side of Prosperity in the San Francisco Bay Area”. The unintended negative consequences of a neutral approach to the knowledge economy are mercilessly unveiled, thus demolishing the myth of innovation ‘*sic et simpliciter*’; likewise blind faith in progress has been dismantled by 20<sup>th</sup> century human made disasters. However, tackling social inequalities through social services, healthcare, education, affordable housing, appropriately arranged through spatial planning strategies, is still considered a *remedial* action reflecting a sort of *philanthropic* attitude rather than a real and proper economic strategy for generating more economic success, perpetuating the outdated dichotomy between neo-liberalism and socialism. Instead, a genuinely place-based approach should allow for the maximizing of the contribution of all regional *and* local assets, as well as for the contribution (and the benefit) of all the societal assets. This is only apparently in contrast with a regionally focused perspective of development policies: rather than it being an issue of scale of the policies, it is more a matter of how the networked system of actors enables the implementation of regionally sound policies at a fine grain, allowing spillovers and cross-fertilization among stakeholders.

The conceptual assumption behind this report is that S3 are *regional by design* but *local by nature*; as such, to ensure they achieve their goals successfully, it is necessary to understand the fine grain - the scale of the *district*, the physical articulation of the neighbourhoods within the city - that will translate the overall strategy into actual interventions. For this reason, the urban scale, and even further, the urban district, have been considered as being most effective in shedding light on the magic recipe which allows places to be successful in a S3-led rationale. The major lessons from the observation of ‘S3 alike phenomena’ in the US context have been derived from the concept of a new geography of innovation and metropolitan revolution (Katz & Wagner 2014), based on the recent trend of seeing “a rising number of innovative firms and talented workers ... choosing to congregate and co-locate in compact, amenity-rich enclaves in the cores of central cities.” This report does not seek to suggest that innovation districts located in the core of central cities are the only spatial pattern capable of enabling innovation-driven strategies but it argues that their spatial configuration allows enabling strategies capable of supporting place-based and embedded local development, thus holding the potential to combine social innovation and a competitive entrepreneurial environment (Bevilacqua et al. 2018a, Bevilacqua et al. 2018b, Bevilacqua et al. 2018c, Monardo 2019, Monardo & Trillo 2016, Trillo 2017, Trillo 2018).

The implications of a knowledge-led economy on the formation of wealth have been widely explored in the so-called New Growth Theory, whose central notion is that new knowledge or technology produce increasing returns and do not diminish with use as with other traditional economic inputs. The New Growth Theory intersects the concept of Innovation Districts by demonstrating that, whilst in traditional sectors big anchor companies attract small ancillary companies which depend on the former, in an innovation-driven economic system the link between big anchor companies and small dynamic companies works in two directions in that a big anchor institution attracts small ancillary companies, and small innovative start-ups make the ecosystem attractive for big companies. This is because the cycle of innovation requires a very long pay-off time and even big companies are reluctant to invest in such a scenario. Instead, they prefer acquiring new knowledge and innovation by being located where *innovators* are. Using a metaphor from nature, life sciences and other highly innovative sectors “want to feed in the waters where the minnows are swimming” (Bluestone & Clayton-Matthews 2013:8), i.e. the role of big firms is about *consuming* rather than *producing* innovation. This theoretical shift is revolutionary in terms of a rationale informing industrial public policies. Whilst big firms do not need public support to thrive, small firms do. “Thus, programs that combine incentives for innovation along with resources to

augment human capital should, according to this theory, fuel rapid economic growth more than anything else socially can do to promote prosperity” (Bluestone & Clayton-Matthews 2013:22), i.e. prioritizing investments on *innovators* rather than investments on *innovation*. Here again, the nexus is with urban policies. *Where* are those *innovators* located and what role do they play in the production of innovation?

Trusheim et al. (2010) suggested a framework for analysing prototypical American Biotechnology Clusters, which allows for relating the success of such clusters with the presence of critical factors. This framework is articulated in three stages through which innovation happens: basic research, translation, and commercialisation. According to this framework, talents (both creators and craftspeople) play different essential roles in all three stages of the innovation process. The nexus between talents and urban environments has been widely explored in the seminal book by Florida (2002) and allows for recognizing the pivotal role played by urban environments in the production of embedded innovation, which is the main conceptual driver of this report.

However, after celebrating the creative class (Florida 2002) enthusiastically and linking its blossoming to the renewed importance of city centres, Richard Florida himself admitted that a further nexus exists, between innovation and inequality (Florida 2017a, Florida 2017b). The second conceptual pillar of this report is that spatial planning and urban policies are essential to re-channel the negative spillovers of innovation within the tracks of inclusive growth, and in generating social innovation as well as productive innovation (Morrison & Bevilacqua 2018).

The MAPS-LED project allowed the building of a robust empirical dataset gathered through a three-year research conducted in Boston by a team of over 60 researchers. Findings from the Boston case study shed light on possible success factors replicable outside the originating contexts and on enabling embedded economic development. Purposely selected districts were targeted and investigated by mapping innovators rather than investigating innovation, i.e. identifying hotspots for innovation located in the Place (the *where*), the innovators (People) involved (the *who*) and the ways of interaction in the Place (the *how*) (Figure 1).

**Figure 1.** The three Ps for understanding the success of innovation districts.



Source: Authors’ elaboration based on MAPS-LED findings

Typically, conventional innovation is mapped by identifying the location of the firms which have obtained a patent. However, embedded innovation often happens “below the radar”, sometimes in the form of an ephemeral discussion between innovators. The data gathering methodology reflects the rationale that innovators, not innovation, contain the information regarding the embedded innovation process production. Hence, to identify the critical factors for a successful innovation district and assess these factors’ level of readiness, it is essential to map where innovators interact and produce innovation. Innovation hotspots, such as accelerators, incubators and civic engagement spaces, allow for the detecting of the presence of a critical mass of innovators and to locate its space, thus allowing the construction of an assessment framework which includes dense and walkable urban environments, spatially identifiable hotspots, incubators, accelerators, anchor companies and Higher Education institutions, civic innovation centres and socially driven incubators. Flows and interconnections among innovators have been largely investigated by social scientists by

approaching this topic from a networking theory perspective, which is not the methodology applied in this report. The space in which innovators produce and use innovation in a virtuous circle, through the cross-fertilization of ideas and knowledge exchange, does have an impact as to whether there are greater or lesser opportunities in terms of achieving interconnected goals (as in the framework introduced by the United Nations with the Sustainable Development Goals, i.e. the United Nations international agenda adopted in 2015 to achieve a sustainable future for all (UN 2015)). It is clearly stated that, to be successful, the entire agenda needs to be delivered as a whole, as the different aspects ensuring a sustainable future (equitable development, health environment, etc.) are mutually intertwined and interdependent. The lack of connection between economic process and physical setting prevents managing the interconnections across different spatial scales, actors and factors thus influencing sustainability. Instead, a focus on the spatial fabric of the innovation district allows for the appreciation of the intertwined matters deriving from the innovation-led local development, thus shedding light on positive and negative impacts. The physical setting in which the innovators' ecosystem operates is an enabler of embedded innovation because the proximity of innovators, generated by the spatial pattern supporting embedded innovation, fosters cross-fertilization and knowledge exchange across all the different societal actors. Following the new growth theory, the traditional hierarchical assumption (that led in the past to the creation of innovation poles by subsidizing the relocation of big companies (small companies will follow)) has been conceptually rebalanced by a more integrated vision, whereby different scales are equally important. It has been also recognized that innovation happens when a variety of factors are well aligned (the economic model is well known from the Porter (2000) cluster theory), including demand, government and good governance.

A community of innovators enabling a Sustainable Development Goals-oriented innovators' ecosystem encompasses all the different groups constituting the ecosystem itself. The boundary between production and the use of innovation must be blurred to achieve innovation that stems from the collaboration across actors, including local authorities, HE institutions, private companies, start-ups, citizens and communities. As anticipated, this process happens in specific places which are, in this report, the innovation districts (Monardo & Trillo 2016). Henceforth, the case studies will be developed both by discussing the role played by the actors in the innovation ecosystem and by discussing the spatial infrastructure enabling the process.

### 3 TERRITORIAL CONTEXT

The Greater Boston area is currently one of the most innovative locations in the US local development landscape, thanks to its high agglomeration of educational institutions and industries. The entire urban region, which is recording the highest rate of growth anywhere in the US, is increasingly able to attract the interest of major investors. Over the last thirty years in the cities of Boston and Cambridge, public and private investments have been developed to boost sectors such as education, financial services, life sciences, and the high-tech industries, which today represent the main clusters within the entire urban region.

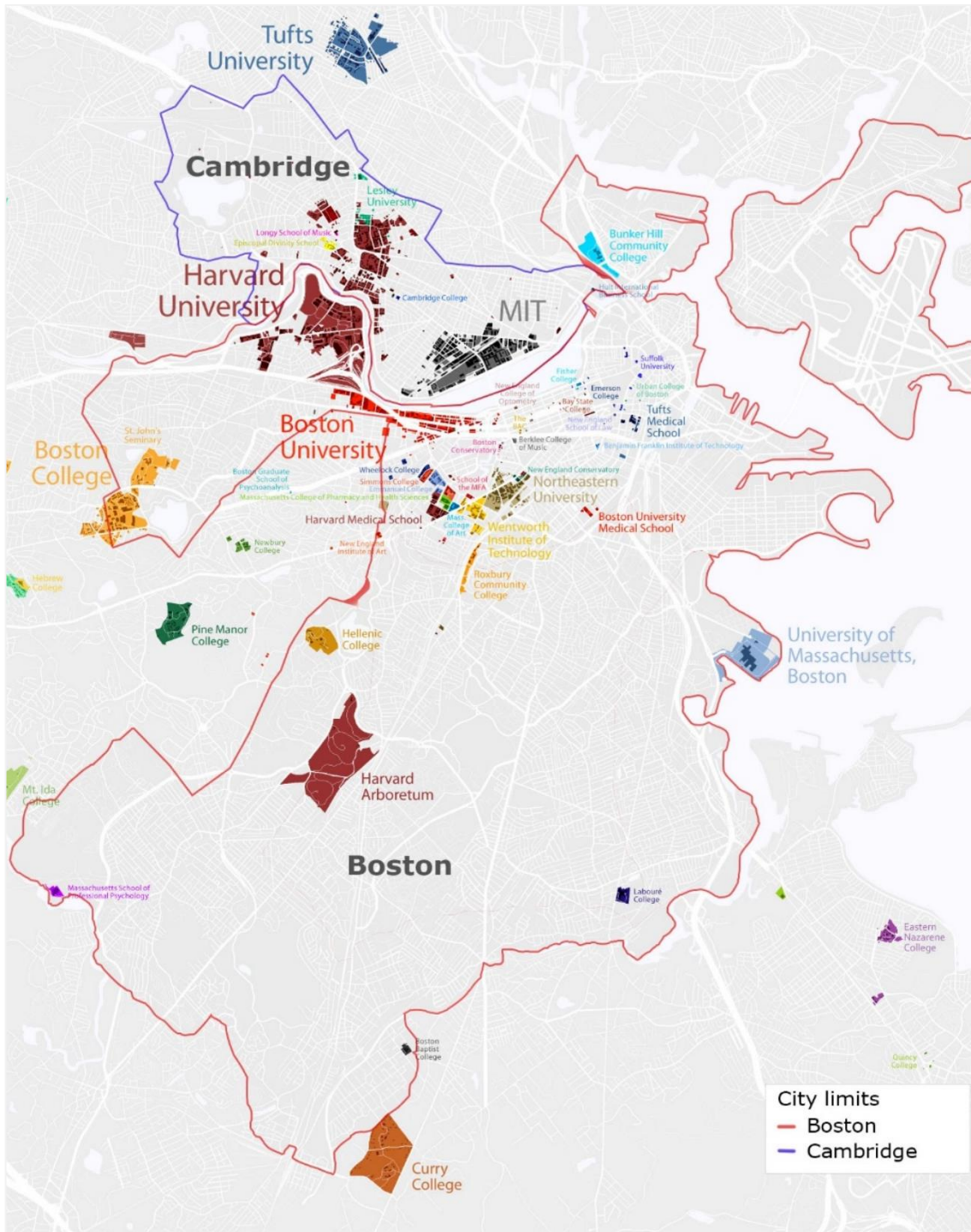
Greater Boston is a huge metropolitan area that includes the counties of Suffolk and Middlesex. The municipalities of Boston and Cambridge are located within it. The Greater Boston area is the foremost location in the U.S. for fostering entrepreneurial growth and innovation (US Chamber of Commerce Foundation 2016). This ranking is based on how well the top 25 US metropolitan areas “attract talent, increase investments, develop specializations, create density, connect the community and build a culture of innovation” (US Chamber of Commerce Foundation 2016, p. 12). Even though the San Francisco Bay Area dominates most index categories, “its lack of a collaborative community and a declining quality of life for wide swaths of its citizens vaulted Boston to the top spot”. Boston ranked second to the Bay Area “on most traditional metrics of start-up activity, but local entrepreneurs indicate stronger connections with universities, institutions and citizens” (U.S. Chamber of Commerce Foundation 2016, p. 8).

The cities of Boston and Cambridge host a large concentration of Higher Education institutions’ start-ups, tech industries and research centres which make them the ideal innovation urban ecosystem attracting high-skilled creative workers, innovators and investors. Moreover, the local government contribute to the growth of the innovation ecosystem by providing services, funding and resources for businesses and entrepreneurs (e.g. the Cambridge Entrepreneurship Assistance Program, the Cambridge Small Business Enhancement Program), implementing planning initiatives (e.g. Boston Innovation District), and creating new spaces for the local innovation community (e.g. District Hall, Roxbury Innovation Center).

These factors contribute to the capability of Boston and Cambridge to set up what we can call a ‘Smart Strategy’ promoting innovation and economic development (Monardo 2018).

Figure 2 depicts the location of the major Higher Education institutions and colleges located in Boston and Cambridge, showing their close interconnection with the urban fabric.

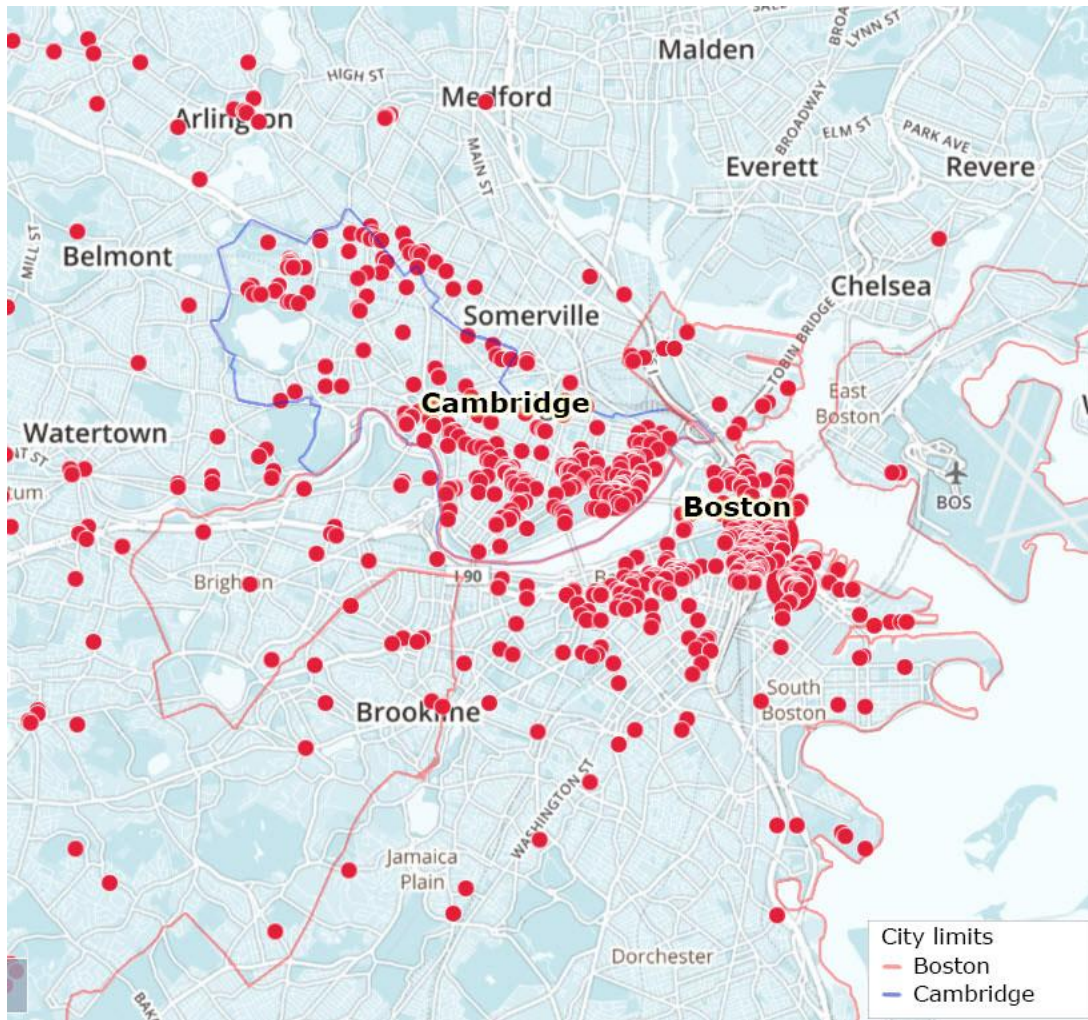
**Figure 2:** Main Higher Education institutions and colleges in Cambridge and Boston



Source: MAPS-LED 2016 based on [www.radicalcartography.net](http://www.radicalcartography.net)

The number of innovation spaces has boomed in Boston and Cambridge over the last few decades (Neely 2018). The start-up and innovation ecosystem is built on a ‘pillar of interaction and collaboration’ and one of the “ways that Boston’s techies manage to stay so connected is through the recent spurt of co-working. Tunnel vision happens to the most creative among us, but when you’re rubbing elbows with other entrepreneurial minds and diverse thinkers day in and out, new perspectives and solutions are easy to come by” (Zimmermann 2015, p. 2).

**Figure 3:** Start-ups in Boston and Cambridge



Source: MAPS-LED 2016, based on: TECHSCENE@Boston, 2014



## 4 ACTORS OF THE INNOVATION ECOSYSTEM

This section presents three key-players in the Boston-Cambridge innovation ecosystem which have emerged as pioneering place-based developments. This section is not an exhaustive discussion of the different players operating in the case study; some of these hold such specific features (such as MIT) that have an impact on their role as a potential model. The key-players illustrated below hold the potential to be replicated and, in fact, two of them are expanding internationally. The first key-player is a public agency created by the local government in support of civic engagement and an entrepreneurial approach to local governance. The second and third key-players are privately-driven innovative hotspots which both contribute to making their respective areas of location vibrant and thriving. These key-players are built up by the mutual support of big firms and ground-based start-ups.

### 4.1 Urban Mechanics

The Mayor’s Office of New Urban Mechanics (MONUM) was created in 2010 as one of the initiatives of the Mayor Thomas Menino and serves as the City’s R&D Lab. Currently, it continues its original mission under the leadership of Mayor Walsh; this includes a variety of issues such as civic engagement, racial equity, city infrastructure, and education. Examples of the areas of interest include housing, transport, public spaces, cultural and social resiliency. The peculiarity of MONUM is that, although it is a public office operating in conjunction with the Mayor, it shows the common traits of a typical entrepreneurial actor. Furthermore, MONUM builds partnerships across the quadruple helix. As MONUM experts have pointed out (April 2017), everything is done in partnership with start-ups and universities with the underpinning idea of equating innovation with social goals.

**Figure 4.** MONUM Office hosts an average of 12 innovators working in close proximity to the Mayor’s office



Source: Authors’ photo

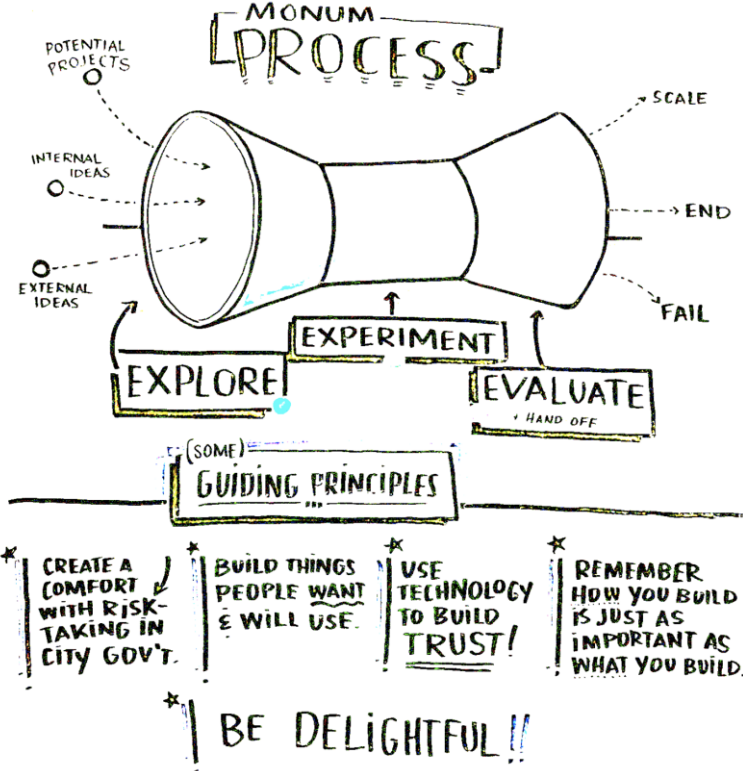
Experimentation and risk taking are two major features of MONUM. It is allowed to take risks that traditional City Departments do not usually take, by developing low-cost, small prototypes that are piloted to test their potential to be scaled up. Examples include: developing a tool to promote savings for college and a career, launching a smartphone app competition that encouraged safer driving by nudging drivers towards better driving habits, offering affordable housing to graduate

students while helping older adults stay in their homes by pairing them as roommates. Failures are considered as learning opportunities and are shared across the larger community of public decision makers; successful experiments can be implemented by the traditional departments and scaled up to the city scale. Beside testing innovative ideas, MONUM also plays the role of a “front door” for start-ups, universities and residents willing to collaborate with the City. The MONUM process encompasses three phases: exploration of internal and external ideas and projects, experimentation through small pilots, and evaluation of the outcomes to assess whether the project is worth being scaled up (Figure 5).

The Urban Mechanics’ start was motivated by the willingness of Thomas Menino to have a governance system that allowed taking advantage of innovation for the community and enabled civic engagement. The Urban Mechanic philosophy is people-centred. One example of successful project is represented by Citizens Connect where people take pictures of what needs to be fixed and send it to the Public Works Department to get them fixed. MONUM developed an app and delivered it to the people; once this happened the Department of Public Works realised it was an extremely powerful tool and took responsibility for it, though it would not have been in the position to take the lead on the prototype.

Urban Mechanics is quite a unique experiment and its success is witnessed by the growing interest it is gaining across other cities worldwide. Currently there are mentorship initiatives to develop similar offices.

**Figure 5.** Spurring on innovation in local government



Source: New Urban Mechanics, City of Boston

**4.2 Masschallenge**

Masschallenge is an industry-agnostic (i.e. no industrial sector is prioritised over others) non-profit accelerator created in 2010 with the intent to support producing entrepreneurs. It is based in the

Seaport Innovation District and hosted in a former large-scale industrial building. Part of the building was given for free to Masschallenge thanks to the support of the City who negotiated with the developer. The advantage of this for the developer has been that the presence of Masschallenge in the building allowed for a doubling its real estate value since it also secured the relocation of big companies such as Autodesk.

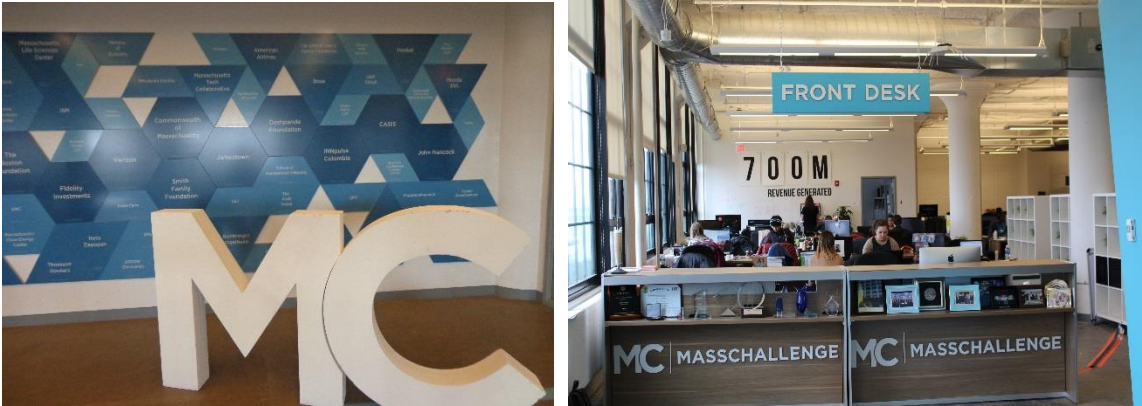
**Figure 6.** Masschallenge, location and international network



Source: MAPS-LED 2016

Because of its role in anchoring the relocation of relevant companies, Masschallenge has significantly contributed to the regeneration of the Seaport District area. It is managed by a public-private partnership financed by three kinds of actors: corporations, foundations and government (these latter two institutions mainly use Masschallenge for renewing built spaces or exploring opportunities).

**Figures 7 - 8.** Masschallenge entrance to the co-working space



Source: Authors' photo

Each year Masschallenge admits hundreds of finalists to its accelerator programmes. The most promising are awarded cash prizes at the end of the programme. It has accelerated over 1,000 start-ups so far. Following the success of the Boston accelerator, Masschallenge has expanded by opening programmes in other countries (Mexico, Israel, Switzerland, UK) through a franchise model (Figure 6). The four key ingredients which make a place suitable to host a Masschallenge are: strong educational institutions, strong governmental support, potential for funding partners such as big

companies or foundations, and the presence of start-ups. Within the Boston ecosystem, Masschallenge networks with other incubators and accelerators, such as Greentown Labs and Pulse. As managers at Masschallenge have pointed out (March 2017), they are extremely collaborative with public key stakeholders who join key meetings. Furthermore, they actively network with other incubators and accelerators, even including in their newsletters other institutions' news and sending to other incubators and accelerators companies that are suitable to be hosted in more specialised environments.

### 4.3 Cambridge Innovation Centre (CIC) and Venture Café

Cambridge Innovation Centre (CIC) and the Venture Café Foundation were both founded by Tim Rowe, the former in 1999 as an incubator, the latter in 2010 as a social experiment. Following an initial flop as an incubator, the CIC was turned into an innovative co-working space. In fact, it is not an incubator nor an accelerator, it is a private entrepreneurial activity based on renting shared and flexible office spaces with an innovative style. It currently hosts over 700 companies across two buildings, located in Kendall Square and in downtown Boston, about 500 of which are start-ups.

In the CIC (based in Kendall Square, Cambridge), flexible and high-quality spaces are offered for a reasonable cost, since prices range from US\$425 to US\$1,500/person/month all included (stocked kitchens, conference rooms, Internet, printing & copying, telephones, high-end furniture, operational & technical support and concierge) (Trillo 2016). However, it is the style of management of the spaces that really makes the difference in conceptual terms. Each floor is equipped with a common kitchen, offering free food that varies on each floor to encourage people to move around the building. Cross-fertilization of innovative ideas is considered the major asset offered to the hosted companies that are mixed across the floors and not clustered by sector. Collaboration complements cross-fertilisation, since companies looking for specialised services might find them within the CIC itself, relying on the assistance of the Relationship Managers whose presence is ensured on all floors. It is the personal knowledge of the Relationship Managers of the individual company that orients the potential advice. The institutionalised role of a facilitator is a concrete example of coupling proximity with the opportunity of experiencing frequent and observable interactions. Informal interviews with local stakeholders have confirmed the extraordinary role played by the CIC in building a favourable physical ecosystem, spurring on innovation and supporting start-ups' creation. Additionally, the CIC have allowed some large companies, such as Google, to temporarily settle down in Kendall Square prior to making the final decision of moving there with the entire headquarters.

Figures 9 -10. Venture Café, Thursday event. Entrance to the Cambridge Innovation Center (CIC)

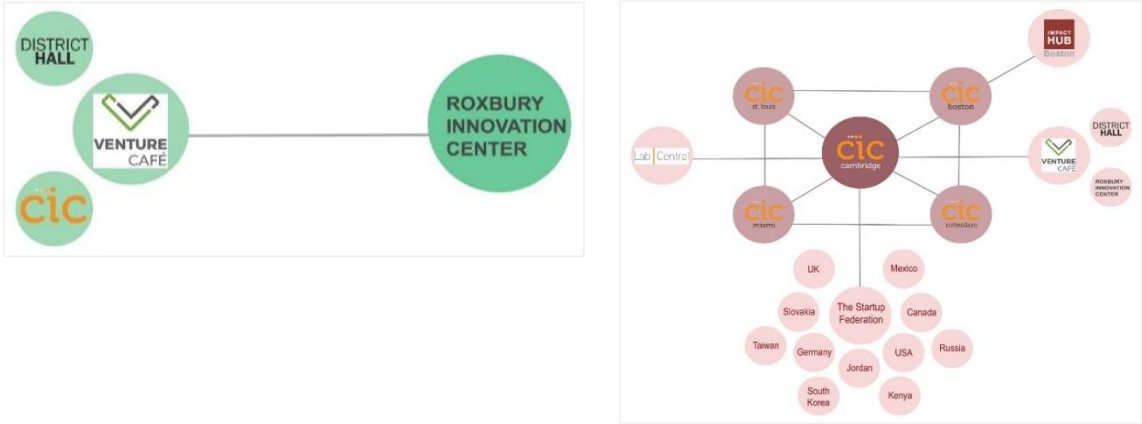


Source: Authors' photo

The Kendall Square building includes the Venture Café, a sister non-profit organisation to CIC, which has the mission of bringing together entrepreneurs, venture capitalists and the greater Boston start-up community. Each Thursday the Venture Café Foundation runs in the CIC an event that gathers together entrepreneurs, investors and advisers, creating a unique opportunity for networking (Figures 9-10).

Both the CIC and the Venture Café operate following a very sophisticated network of connections (Figure 9) enabling collaboration across hubs located in very different social contexts. CIC has recently expanded by opening co-working spaces in Miami and Rotterdam and it also interacts with the St. Louis centre, whose context is very different from Kendall Square. However, because of the community of experts managing the centres internationally, the St. Louis centre can benefit from the same high level of expertise offered to the start-ups located in one of the most innovative hubs in the world. Likewise, at a more local scale, the Venture Café Foundation operates the Roxbury Innovation Center (RIC) which is located in one of the most deprived neighbourhoods of Boston. This space hosts programmes supporting local innovators, entrepreneurs and business founders (RIC Monthly Café Nights, Workshop Series) and it offers rental space (meeting and event space to accommodate 4 to 100 attendees) and a Fab Lab. Bringing positive energy and expertise to a lower-income and minority population is one of the missions for the Venture Café. Additional to the two locations of the CIC (Kendall Square and Downtown Boston) and the Roxbury Innovation Center, a fourth space, the District Hall, is also managed jointly and is part of the Boston network of spaces for innovators aggregated by the Venture Café Foundation. District Hall is in the heart of the Seaport Innovation District and offers rental space (meeting and event space to accommodate 4 to 400 attendees), an open working space and general facilities hosting a Café night every three months.

**Figure 11.** Venture Café & Cambridge Innovation Center (CIC) local and international connections



Source: MAPS-LED 2016

## 5 INNOVATION DISTRICTS IN THE BOSTON AREA: THREE CASE STUDIES

As anticipated in the introduction, this report discusses how place-based innovation is *spatially* located in innovation districts, whose urban fabric is supportive of social interaction and whose economic development is framed within a wider planning strategy that allows relating the economic growth objective with the regeneration of a larger regeneration area.

The city of Boston represents a paradigmatic case of original and compelling integration between innovation policies and city redevelopment, thanks to the on-going implementation of an explicit strategy whose core is the interaction between urban redevelopment initiatives and the potential of innovation-related growing ecosystems. The strategy of spurring on innovation within the city can be interpreted at the economic, real estate level as promoting ‘excellence poles’ (Seaport), at the social level as connecting disadvantaged populations to employment and educational opportunities (Roxbury) or at the knowledge driven level as leveraging on prestigious high education institutions, like the Massachusetts Institute of Technology (Kendall Square).

Furthermore, a new generation of redevelopment projects is changing urban geography all over US and, in the Boston area, urban policy by supporting the placement of innovation hubs within different neighbourhoods. The idea of creating an innovative urban ecosystem is embodied in the ‘Innovation District’ concept: a “geographic area where leading-edge anchor institutions and companies cluster and connect with start-ups, business incubators, and accelerators” (Katz & Wagner 2014). Innovation districts are conceived as dense enclaves that merge the poetic potential of research-oriented anchor institutions and start-ups in well-designed, amenity-rich residential, commercial and inclusive environments. Creation, circulation and the commercialization of new ideas are facilitated within these thriving atmospheres that leverage the intrinsic qualities of the virtuous urban context: physical proximity, relational density, dynamic identity.

### 5.1 Seaport BID<sup>1</sup>

In 2004, the Boston Planning Development Agency (BPDA), then known as the Boston Redevelopment Authority (BRA), launched the ‘LifeTech Boston’ policy initiative which was a significant incubatory step towards the eventual creation of a new redevelopment model, the first Innovation District in Boston. Its original mission was to foster the growth of Boston’s life sciences’ and high-technology sectors by nurturing incumbent companies in the city, and by attracting national and international business. It targeted three different domains: biopharmaceuticals, ICT and medical devices.

The BRA’s strategic goal was to attract new companies that were looking for favourable localizations, by providing city services and identifying financial resources. With regard to this activity a network was created between trade and investment organizations, consulates, the third sector and public agencies. It worked with two stable partners: MassBio, a non-profit organization that represents and provides services and support for the life sciences’ sector, and the Massachusetts Life Science Centre (MLSC), a quasi-public agency tasked with implementing the Massachusetts State Life Sciences Act.

The most significant strand of the original strategy was later identified as being the ‘Boston Innovation District’ (BID), a planning initiative launched in 2010 by the Menino administration and still in progress. The project aims to create a complex neighbourhood able to attract financiers, resources and talent that mimics the success of 22@Barcelona, the most significant trailblazer of all ‘innovation district’ models (Monardo 2019).

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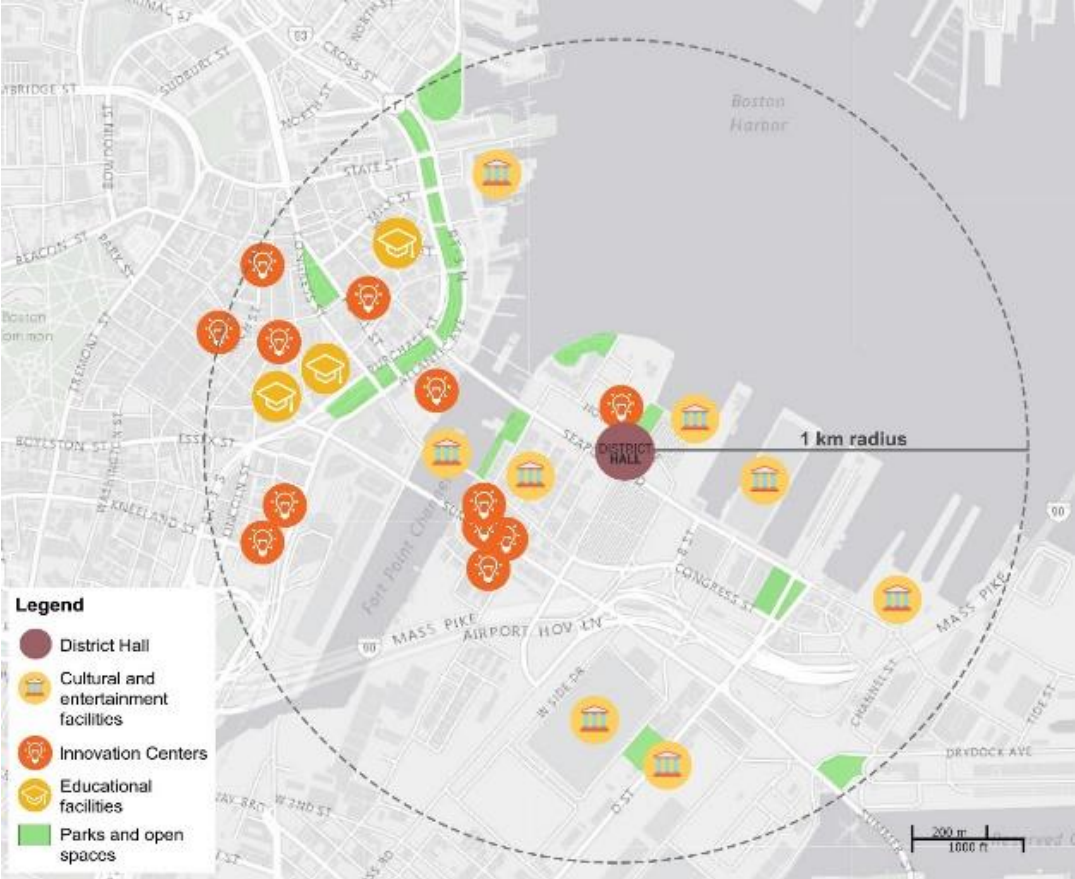
<sup>1</sup> This section elaborates on previous studies developed within the MAPS-LED project (Monardo and Trillo 2016).

The BID project was conceived to redevelop the South Boston Waterfront, an underutilised area of 1,000 acres that previously hosted industrial activities and parking, and to transform it into a thriving hub of innovation and entrepreneurship together with new residential, commercial and retail spaces (about 7.7 million sq. ft.) with a mixed-use configuration.

The BRA managed the project and provided partial funding for constructing new public spaces. They built a network of private companies and used financial and planning tools within a PPP ‘architecture’ in order to both guarantee progressive implementation and to ease the cost burden of the project on the city’s budget.

The public initiative has been actively involved in attracting both start-ups and more established companies such as Vertex Pharmaceutical and, more recently, General Electric, both of which have received significant tax breaks in return for setting up their new headquarters within the BID boundaries. Unique assets are concentrated in the dense redevelopment area such as the world’s largest start-up accelerator – ‘MassChallenge’ – and ‘Factory 63’, a significant experiment in innovative housing, providing private micro-apartments and public areas for working, gathering and organizing events.

**Figure 12.** Seaport District and District Hall locations



Source: MAPS-LED 2016

The BID vision has four main features, thus presenting the general guidelines as to how such developments should be approached:

1) *Industry-Agnostic*: the initiative is open to industries of every kind; this should allow for a broad inclusivity of established companies and small enterprises, providing a framework for community engagement;

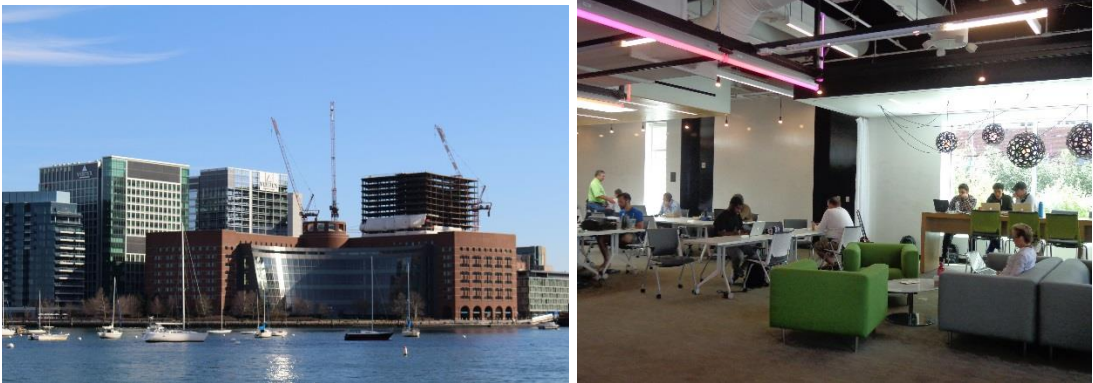
2) *Clusters*: the BID’s motto is “Work, Live, Play” which shows that the municipality hopes to attract amenities that would encourage entrepreneurs to spend more time in the district networking and socializing. This would bring entrepreneurs together into clusters to increase their proximity and density, making it easier for creative people in such a cluster environment to share technologies and knowledge. The city needs to retain talents through a working and living environment favourable to creativity and exchange; the creation of physical spaces that enable entrepreneurs to convene during and after work hours is an imperative for this municipal initiative, leading to the recruitment of accelerators such as MassChallenge, and the development of public meeting spaces such as District Hall;

3) *Experimental*: the public administration is adopting an experimental framework characterized by expedited decision-making and planning flexibility. The city’s choice, reconfirmed by the present administration after Mayor Menino’s original idea, aroused interest among the business community and created momentum for the public sector’s efforts to attract developers, the creative industries, CEOs, entrepreneurs and non-profit organizations, and engage them in building a new community;

4) *The City as Host*: differing from the ‘university as host’ scenario, as seen at MIT in Cambridge (Kendall Square), in the BID the city embodies the role of host institution. The identification of the innovation district as the flagship project in Boston means that the neighbourhood will be free to develop organically and create momentum, and will allow innovation to spread throughout the city and its surroundings.

The centrepiece of the BID is the District Hall, a large public space where innovators can meet, exchange ideas, explore potential synergies, finalize their creativity, and come to concrete agreements (Figure 14). The building, opened in 2013, offers 12,000 square feet of meeting space. It is the result of a Public Private Partnership (PPP) between the BRA and private investors who funded its construction within the development of the Seaport Plan. The city also plans to add 1.2 million square feet to the Massachusetts Convention Centre, a major focal point in the district, with a US\$1bn project to implement the construction of new private housing units. In 2014, District Hall hosted a total of 562 events ranging from hackathons and training sessions to start-up networking meetings and brainstorming sessions. More than 70 percent of District Hall’s space rental value has been donated for community use – a US\$1 million investment in the local start-up community.

**Figures 13-14.** Seaport District and District Hall



Source: Authors’ photos

**5.2 Roxbury ‘NID’<sup>2</sup>**

The ‘Neighbourhood Innovation District’ (NID) is an on-going public strategy launched in 2014 by Boston City Council. The main goal of this initiative is to encourage and spread innovation and technology within low-income neighbourhoods to improve small business growth and local

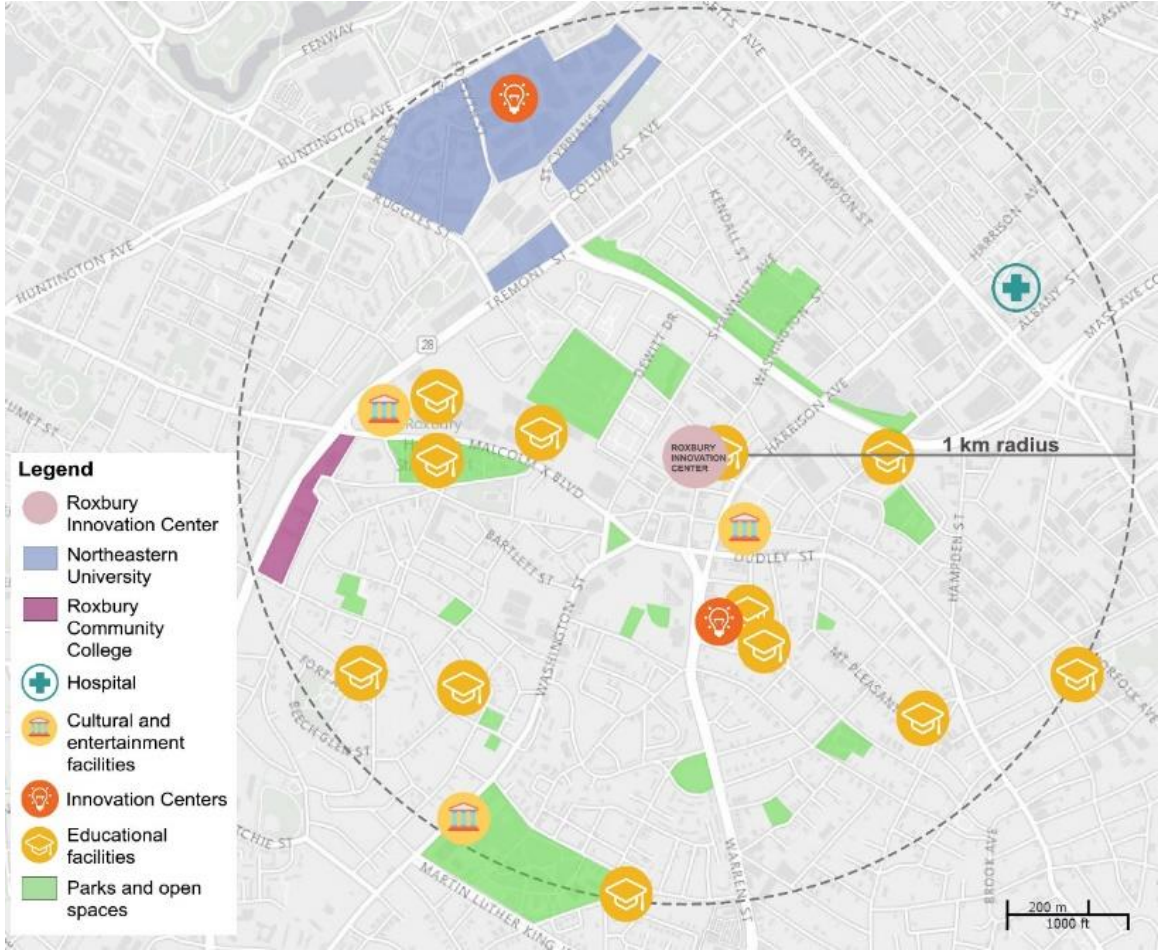
<sup>2</sup> This section elaborates on previous case studies prepared under the MAPS-LED project (Monardo and Trillo 2016).



economic development. However, rather than supporting a specific industrial sector chosen in advance, the NID strategy has adopted a more consistent territory-based approach which is able to empower existing business activities as well as adapting to the physical and geographical requirements of the areas. The initiative’s most innovative aspect has, therefore, been to shift the focus from the mere *idea* of entrepreneurship towards a more inclusive and community-oriented point of view, considering the requirements for an overall economic empowerment of the neighbourhoods.

This represents the first time an explicit innovation policy has sought to prevent the inevitable displacement of the existing community that is generated by the development of innovation districts, the creation of which inevitably leads to ‘gentrification’ in the form of a dramatic rise in real estate values and related exclusory factors for original low-income residents and small businesses. This is the reason why the ‘Neighbourhood Innovation District Committee’ (NIDC) – a body created by the current administration to identify policies, practices and infrastructure improvements to support the development of innovation districts throughout Boston – strongly suggested the use of a district housing plan to ensure a consistent provision of new, affordable housing and business spaces within the neighbourhood (NIDC 2015).

**Figure 15.** Roxbury and the Roxbury Innovation Center (RIC) location



Source: MAPS LED 2016

The NIDC comprises local leaders, business experts, representatives of community-based organizations and city officers, jointly in charge of piloting the process. It encourages a participatory

approach, working with residents and local stakeholders to ensure a shared and affordable vision of economic development in the city. The results achieved by the NIDC were collected in a document that defines the guidelines to implement an innovation district in an existing distressed neighbourhood. Four specific recommendations are highlighted in the document: ensuring adequate entrepreneurial education programmes, promoting a streamlined regulatory framework for new entrepreneurs, providing enough space for both retail activities and new affordable housing and, finally, delivering publicly accessible business spaces and infrastructure that support interaction between private entrepreneurs.

Following specific criteria mentioned in the innovation district literature (transit access, affordable office space, arts and cultural amenities, involvement of non-profit organizations) and considering the particular features of the area (e.g. the presence of higher-education institutions, vacant lots, transportation nodes) the location for the first experiment was chosen to be the 'Dudley Square-Upham's Corner Corridor', a vibrant zone within the Roxbury neighbourhood (Figure 15). The area contains all the physical and structural characteristics necessary to become a successful pilot project, with the ability to spur on local entrepreneurship.

Since the beginning of the initiative, the area has attracted investment from a few local stakeholders, such as the non-profit 'Initiative for a Competitive Inner City' (ICIC) founded by Michael Porter in 1994 which proposes several state and federal research programmes aimed at boosting market opportunities and investment in inner-city areas. After almost four years' activity, however, the Roxbury Innovation Center has mainly been involved in providing vocational training programmes for residents. The local administration, due to a lack of a thriving socio-economic environment, is still struggling to find entrepreneurs ready to invest in the corridor.

**Figures 16-17.** Dudley Square and Roxbury Innovation Center (RIC)



Source: Authors' photos

### 5.3 Kendall Square ID<sup>3</sup>

The history of Kendall Square is intrinsically related to the presence of the Massachusetts Institute of Technology which makes this case study, obviously, almost unique. However, because of this uniqueness, it can well explain how, even in an outstanding context in terms of innovation, spatial factors can still play a significant role and are considered relevant both by public and private actors. Kendall Square is a former brownfield site located in Cambridge (MA), on the opposite side of the Charles River to Boston. It started in 1868 as an industrial district and consolidated this function with the opening of the first underground line nearby. The presence of the Massachusetts Institute of Technology dates to 1916. Following the Second World War, the area entered an era of decline which the Cambridge Redevelopment Authority (CRA), established in 1955, sought to reverse

<sup>3</sup> This section elaborates on previous case studies prepared under the MAPS-LED project (Trillo 2016, Bevilacqua et al. 2018b).

including through the clearance of 29 acres of land for the accommodation of NASA. Because of a change in the federal government strategies, the plan was not implemented, and the vacant land was partly redirected to the Department of Transportation. A shift in the approach to the redevelopment of the area, managed as a detached industrial estate, happened first with the implementation of the East Cambridge Riverfront Plan, then with the 2001 Citywide Rezoning. Walkability, quality of open spaces and mixed-use real estate became the norm in the area. Recent massive capital investments confirm the tendency to invest in the area with high quality interventions. The importance of the urban structure as a catalyst for local development is acknowledged both by public and private stakeholders. As can be seen in the current planning documents, the connection between urban fabric and the attractiveness of the area for private companies is evident: “A dynamic public realm connecting diverse choices for living, working, learning, and playing to inspire continued success of Cambridge’s sustainable, globally-significant innovation community.”

**Figure 18.** Kendall Square and Cambridge Innovation Center (CIC) location



Source: MAPS LED 2016

Furthermore, recent studies on companies’ behaviour in this area proved how the traditional cluster policies (based on subsidizing “anchors” that - once settled down - would attract smaller companies) are now coupled with a bottom-up oriented perspective, in which a significant number of small, dynamic, highly innovative companies create a favourable ecosystem for attracting big companies interested in having interaction with young talent and, possibly, in incorporating smaller (and cheap) companies with a higher potential for growth. Therefore, public policy makers should also support the creation of a cluster of innovative and cutting-edge start-up companies, rather than merely seeking to attract a big one to make them follow. This creates the need for urban environments that are attractive, as Florida suggests, to young talent. How much companies value the competitive advantage of being in this kind of environment is testified by what recently occurred to a leading

pharmaceutical company in the Kendall area. Biotech is one of the historical companies located in Kendall Square. It was founded by a MIT professor, Phillip Sharp, who at the time he launched the company, wanted to work close to his laboratory. Despite its roots in the area, in recent years a controversial decision was made to move the Biotech headquarters to the cheaper suburb of Weston. A few years down the line this decision was questioned and a willingness to return to the area prevailed. The reasons are clear: “Other biotech companies have come to the neighbourhood to take advantage of the healthy infrastructure in Cambridge and its vibrant bioscience community. While there were many individuals and organizations involved, MIT faculty members and administrators indeed played a major role in reviving Kendall Square, because they understood that to build a thriving bioscience program, they would have to build a thriving community of talented people - at MIT and beyond.” (<http://news.mit.edu/2014/how-to-build-a-biotech-renaissance-mit-in-kendall-square>) This view is shared by experts on cluster and industrial policies in Massachusetts, who suggested that what brought Biotech back to the Kendall area was the ‘atmosphere’.

Private companies perceive the economic benefit of being localized in an innovative district and are willing to pay the extra costs associated with a more expensive location in order to get extra benefits in return, including the well-being (and related increase in productivity) of their employees and the opportunity to benefit from a powerful network of informal and multi-disciplinary connections, made possible by the specific features of the urban fabric. In addition to the urban pattern encouraging knowledge and innovation building, Kendall Square also includes key-hotspots for informal decision-making and cross-clustering, such as the CIC (Figure 18).

**Figures 19-20.** Kendall Square



Source: Authors' photos

## 6 TRANSVERSAL CASE ANALYSIS

This section discusses the main factors that enable the innovation districts flourishing in the Boston area. It analyses the American context to identify regulatory and political constraints that may undermine their applicability to the European context and comes up with a set of possible recommendations holding the potential to feed into the current implementation of Smart Specialisations and into post-2020 urban development and local economic development policies.

### 6.1 Contextual enabling factors

As previously mentioned, according to the last report released by the U.S. Chamber of Commerce Foundation and the National Organization 1776<sup>4</sup>, the Boston area for the second year in a row has been ranked the top ‘start-up community’ in the US. The Massachusetts Governor Charlie Baker highlights that the privileged ranking “solidifies Boston and the Commonwealth’s standing as the best place to start and grow an innovative technology-focused business, whether it’s a start-up emerging from one of our top academic institutions, or a major global company looking for next stage growth. This is a testament to the innovation ecosystem that exists here in Massachusetts, bringing together and building on the unique partnership between our universities and tech firms.”

As has already been argued in the previous sections, the recent popularity and powerful development of ‘Innovation Districts’ (IDs) and hub centres stems from their active role in becoming a nexus for technological, economical, institutional, social and spatial innovation in emerging urban ecosystems. Within the contemporary framework of innovation, following some European examples (Barcelona, London, Hamburg), USA IDs are becoming agents for urban regeneration processes that are more likely to address the actual needs and challenges of contemporary complex communities. Innovation places are assuming the identity of hybrid platforms linking internal networks to external players and to the resources of a city (Acuto et al. 2018); the main mission of this ‘changeable geometry’ entity is the production of new value-oriented relationships. Their emerging aim is to develop, try out and test urban solutions, producing changes in diffused and concentrated urban areas by bridging high-tech solutions, economic development and social inclusion within a desirable innovative design-led physical space. It is supposed to be a virtuous collision of regeneration initiatives giving sense to urban policies run by local governments together with privileged and diffused stakeholders.

Flexible forms of partnerships among diverse actor families (public, private, non-profit) allow for the operative pursuance of the specific objectives of different projects. Consequently, within the common context of chasing the place-based innovation ecosystem vision, in the Boston-Cambridge area it is possible to identify at least three enabling factors: the spatial ecosystem for innovation hotspots, the location of innovators, the multi-level nature of innovation.

#### ***The spatial ecosystem for innovation hotspots***

Innovation hotspots work better in walkable environments and in socially and physically dense neighbourhoods. In all the locations that were investigated, physical and spatial planning 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 tend to prefer socially interesting environments, hence, dense and high-quality urban settings.

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<sup>4</sup> ‘Innovation that matters 2017’, available at: <http://www.1776.vc/reports/innovation-that-matters-2017>

### ***The location of innovators***

The presence and diffusion of innovative subjects 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 approach 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.

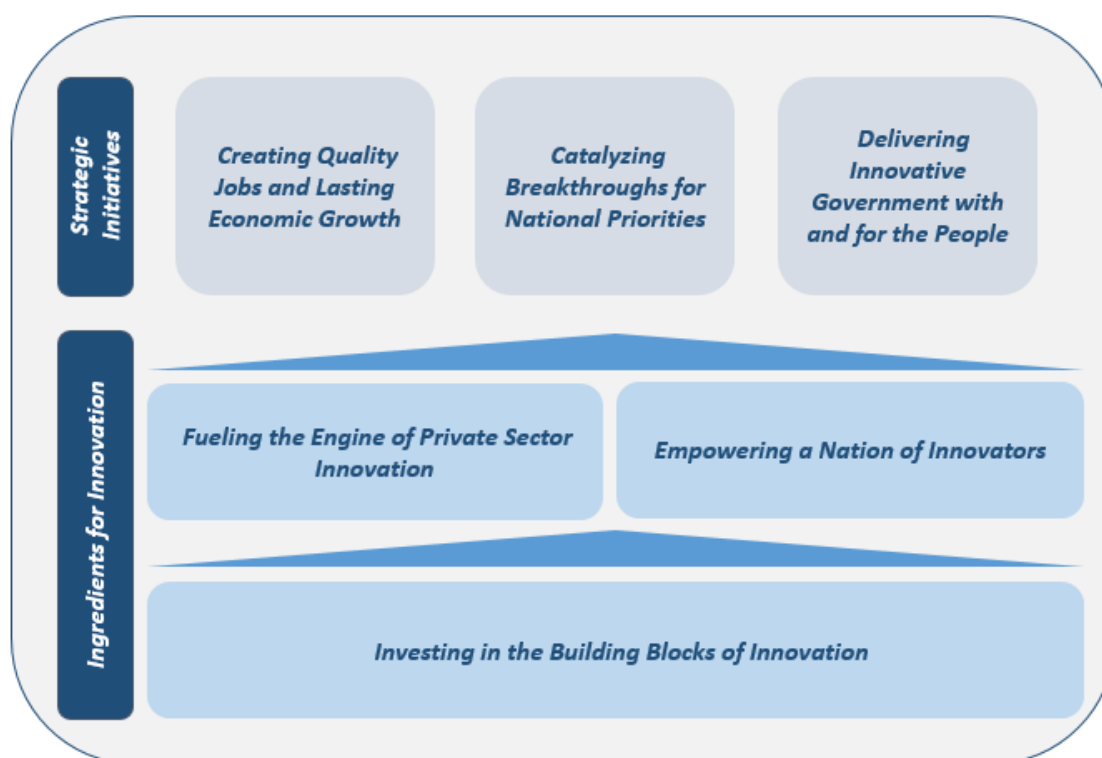
### ***The multi-level nature of innovation***

Economic-financial, technological, social, institutional and even spatial innovation is activated by networking on multiple scales. 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. Such spillovers promote equity by binding in either neighbourhoods in the same city or even cities which are outside the Boston metropolitan area, the State of Massachusetts and the whole country (hence cities worldwide) that are lagging behind thus allowing a consistent level of highly specialised expertise across a variety of different geographic contexts. A significant example is the *Venture Café* network, linking together two Innovation Centres in competitive neighbourhoods (the Cambridge and the Downtown Boston ones) with an Innovation Centre triggering the economic revitalisation of a formerly deprived and blighted area (Roxbury). It also networks with other US cities (e.g. St. Louis) and European cities (Rotterdam). However, evidence of a correlation between this mechanism and the parallel process of local urban regeneration is still far from being proved.

## **6.2 Regulatory and institutional enabling factors**

Significant path changes have been introduced in ongoing public innovation policies through the principles of economics-driven prosperity highlighted and pursued by the Federal government under the Obama administration. In 2009 the White House first issued the '*Strategy for American Innovation*', later updated in 2011 and lastly re-launched in October 2015. In its general framework the idea of innovation is conceived as a powerful tool for addressing the most imperative challenges in the entire nation enabling all Americans to significantly improve their quality of life in terms of health, education, work, opportunities, and a natural and anthropic environment. Through focused funds the Federal authorities started to sustain and stimulate relevant 'critical mass' investments that are enabling the private sector to create the industries and jobs of the future and to ensure that all Americans can benefit from the increasing innovation economy. The *Strategy for American Innovation* has been conceived through six key elements (Figure 21). It is recognised that the important role for the Federal Government is to invest in the 'Building blocks of innovation', to 'fuel the engine of private-sector innovation', and to 'empower a nation of innovators'. The Strategy describes how the White House leverages these important ingredients for innovation through three sets of strategic initiatives that focus on 'creating quality jobs and lasting economic growth', 'catalysing breakthroughs for national priorities', and 'delivering innovative government with and for the people'.

**Figure 21.** The general framework of the ‘Strategy for American Innovation’



Source: The White House 2015

The general horizon generated by the White House innovation strategy is impressive both in content and in the ‘critical mass’ of investments. Looking at the first ingredient, the ‘Building blocks of the American innovation ecosystem’, these are those strategic axes whereby Federal investments can provide the starting boost for the innovation process: world-leading investments in fundamental research, access to high-quality STEM education (Science, Technology, Engineering, Mathematics), and paths for immigrants to help propel the innovation economy, leading to a 21<sup>st</sup> century physical infrastructure and next-generation digital infrastructure.

The White House document is mainly implemented through the programme Regional Innovation Strategies (RIS) a catalytic national grant programme focused on regional capacity-building. The RIS is led by a dedicated office, named the EDA’s (Economic Development Administration’s) Office of Innovation and Entrepreneurship (OIE). EDA “currently awards grants that build regional capacity to translate innovations into jobs (1) through proof-of-concept and commercialization assistance to innovators and entrepreneurs and (2) through operational support for organizations that provide essential early-stage risk capital to innovators and entrepreneurs”<sup>5</sup>. The RIS is operationalized through two tools: (1) the “I6 Grant Program”, aimed at funding and building regional capacity to translate ideas and inventions into products, services, companies and jobs; (2) the “Seed Fund Support Grant Competition”, aimed at funding and increasing availability of, and access to, regional risk capital for early-stage companies. In 2018 the RIS programme allocated US\$ 587 million with federal funds further matched by local funds.

Looking at what policies are in place for supporting scientific research, the USA system is based on two fundamental aspects. The first is supporting mission-oriented research largely to federal labs mostly in sectors like defence and health; the second channel is sustaining basic, curiosity-directed research through university funding. The federal government financed approximately US\$146 billion of R&D activity in 2017. From around 2010 there has been a modest increase in federal

<sup>5</sup> <https://www.eda.gov/oie/ris/>

government support for R&D from around 0.78 percent of GDP to 0.88 percent. However, since then and with the budget sequester, federal support for R&D has fallen over 10 per cent. Fiscal challenges facing the federal government suggest that any increase in the future will be unlikely.

The universities' research domain is supported by several agencies, including DOD (Department of Defence), DOE (Department of Energy), and NIH (National Institute of Health), to help them achieve their mission goals. However, the National Science Foundation (NSF) funds university research largely unrelated to agency mission goals. While the higher education system is based on the conception of the linear model of research (based on the assumption that funds for basic research lead to valuable outcomes), some argue that federal funding for university research should take a more explicit account of the needs of the commercial economy and promote technology transfer. However, in part because of recent federal funding cuts, university R&D levels (relative to GDP) in the United States are losing the top rank positions.

As in the paramount example of the Boston-Cambridge area, the successful concentration of world class research universities and multiple commercialisation, technology transfer mechanisms – supported by the flexible regulatory approach of the public governments – have built a significant model whose features allows the US to remain one of the most innovative R&D knowledge-intensive economies in the world. The models of public government investments are assuming new identities. In the last decades federal innovation policies and programmes have proved to be temporally arrhythmic, inadequate in duration, quantitatively insufficient and absolutely fragmented, and for this reason the promotion of regional innovation is more and more taking place at state and local levels (Wessner 2013). The knowledge-intensive clusters as holistic 'innovation ecosystems' – well represented by the Boston-Cambridge area – have begun to be considered as naturally attracting hubs through public action pursuing technology transfer models and targeting the place-based excellence of local territories. In terms of advanced research-driven production, education synergies and emerging social patterns, hubs like Boston-Cambridge represent authentic 'communities of innovation', enabling virtuous partnerships of knowledge-sharing among great universities, large research-driven firms, great corporations, diffused entrepreneurial start-ups, investors, and venture capitals located in regional and urban areas.

The Massachusetts Institute of Technology, one of the world's premier research institutions, is a crucial focal point in the Boston-Cambridge innovation ecosystem. MIT spent US\$930.7 million on R&D in 2015, more than half of which was provided by the federal government. The lion's share of R&D spending at MIT – 44.7% – is dedicated to the school's engineering and high-tech programme. While twelve research universities outspent MIT in 2015, only the 10 combined campuses of the University of California had more patents than MIT's 278 that year.

### **6.3 Formal governance model**

Cities' transformations and the need to address the rapidly growing urban challenges require more and more collaboration within and between emerging systems, actors and actions. The pro-active role of different actors (BEPA 2010) in promoting local experimental projects, with public-interest purposes, is taking on such dimensions so as to lead to the assumption that their actions are not only oriented towards the resolution of their needs, but are paving the way for a new paradigm shift, the 'geographies of innovation' (Shearmour et al. 2016) enhancing the 'Smart strategies' approach applied not only to the regional but also to the urban scale.

In academic literature this approach is commonly distinguished and interpreted through different and, at the same time, entangled axes. Together with the 'consolidated' dimensions of innovation such as high-tech, economy and finance, the advanced experiences in northern America highlight the emerging role of institutional and social innovation (Caulier-Grice et al. 2010, Moulaert et al. 2013), describing a combination of bottom-linked actions, by which people find answers to pressing needs (Moulaert & Vicari Haddock 2009) that cannot be satisfied without explicit and sophisticated public, private and non-profit partnership models under the place-based approach umbrella.



## **6.4 Quadruple helix**

The interpretation of urban regeneration through the strategy of creating vibrant place-based innovation ecosystems represents an intriguing opportunity for questioning how specific places can play a significant role in spanning multiple sectors and actions. What are the lessons that can be learned by urban planning, how to trigger and enable actions from a variety of actors and what is the role of the quadruple helix stakeholders? Innovation districts and hub centres are intended as interfaces triggering energies, resources, and opportunities emerging from the territory; in other words, powerful tools able to influence and reshape the urban fabric. They are often referred to as open innovation environments (Montanari & Mizzau 2016) interacting through adaptable devices of collaboration among social, economic and institutional actors, becoming long-term influence levers and facilitating the construction of innovative values. The interaction of actors, actions and practices in a complex system is the key for these entities to contribute to developing into local 'urban innovation engines' (Dvir 2003).

In the Boston area, attention to the city transformation's routines, built with a quite explicit participatory approach, presents significant virtuous effects and opportunities together with some unavoidable minuses. The Boston-Cambridge area undoubtedly represents one of the highest peaks in the successful construction of a 'new redevelopment vision' towards an ideal sustainable urban innovation ecosystem. The geometric progression of economic development, real estate values, investor attraction, high-level companies, venture capital and a 'creative class' presence in specific hot spots is emerging as one of the overwhelming dimensions in the regeneration policy of the Boston area. Whether more business-oriented (Seaport) or knowledge-driven (Kendall Square), the ideal conduction of the redevelopment game has been delivered via some privileged actors of the quadruple helix configuration. The direct involvement of great developer groups and global companies (such as Vertex, PwC, General Electrics, Microsoft, Amazon) or prestigious universities (such as MIT, Harvard, Northeastern) has been encouraged, incentivised and accompanied at all public government levels (municipal, state and federal).

### ***Coordination and implementation***

The numerous interpretations of Innovation Districts and hubs are proving to be interesting inspirational models in different cultural contexts, especially because they reintroduce the values of physical contiguity: the direct relationships between different actors allow them to act as playgrounds in which multiple practices, stakeholders and policy-makers can interact in a long-term vision which has the perspective of a structural change.

The Boston area represents an extraordinary example of how the emerging shapes of integrated strategies can blossom towards the creation of mature place-based urban innovation ecosystems in both northern America and European urban regions, as well as in any other favourable cultural condition within contemporary cities. Innovation spaces can provide an answer to the current evolution of the ways of living, working, meeting and enjoying services, by providing a multifunctional physical environment able to connect, support and cross-fertilise previously separated urban elements. Innovation Districts, Urban living labs, innovation centres, or sector-specific community hubs (Calvaresi & Pederiva 2017) certainly present different scales promoting different actors and areas of influence (from large fragments of the urban fabric to complex buildings), but they show common features in the interpretation of innovation as a methodology to trigger complex urban development processes (Ostanel 2017). In Innovation Districts the space is conceived as an enabler of innovation that, starting from the endogenous capital (Camagni & Dotti 2010), gathers and connects external resources, operating at both local and global levels. The common ground where these models can be examined is, firstly, the interpretation of innovation, meant as a co-creative interaction producing additional value in social, economical and institutional domains. Furthermore, a shared feature is the pro-active role of the users interacting in a physical and virtual environment to achieve a mutual outcome.

Coordination and implementation of innovation districts is enabled by complex multilevel governance, including local authorities, (which create favourable conditions through forward-looking and robust spatial planning frameworks) and the state (which not only provides funding and grants, but also contributes to enhancing stakeholders' networking and clustering). Awareness about the importance of cross-collaboration among the different levels emerges from all the stakeholders. Innovation is supported through a variety of instruments but, most importantly, by a consistent rationale, i.e. building on partnerships and collaborations across industry, academia and government. An example of this approach is represented by MassTech, the public agency operating in Massachusetts, which supports the innovation economy by recognising the importance of the overall ecosystem efficiency in support of a healthy local economy, rather than the presence of isolated anchor institutions. As a strategic manager at Masstech Collaborative claimed (April 2016), "The ecosystem as a whole is important, having a university is great, but this is just one part of it." The purpose of Masstech is to create and maintain a responsive environment for the development, growth, attraction and retention of technology-intensive and innovation-driven clusters of organizations. This is achieved by enacting a stakeholder-led process, involving so far over 1,347 organizations, 78 higher education institutions, more than 350 Massachusetts' companies and the participation of over 4,300 institutional, civic and entrepreneurial leaders.<sup>6</sup>

At the local level, all the examples explored in this report stem from a robust and forward-looking local strategy, envisioned by local governments and supported by anchor academic and industrial institutions, enabled by funding streams from both private and public actors, enacted by a variety of academic, private and public actors, and complemented by civic engagement.

The Kendall Square District<sup>7</sup> was kick-started by a public-driven redevelopment plan, enhancing the MIT anchor institution. Today, the entrepreneurial ecosystem has evolved in one of the most competitive networks on the planet, including all scales of companies, from technology and pharmaceutical giants to one-person start-ups. One example of how the local entrepreneurial community has deliberately taken leadership of the vision shaping the Kendall Square future is represented by the creation of the Kendall Square Association (KSA). In 2008 a group of Kendall leaders decided to start an initiative aimed at connecting and exchanging ideas at street level, holding the mission to build partnerships and advocate for public policy issues. With over 180 members, KSA provides a platform for collaboration on projects of common interest. The Learning Communities cover issues such as diversity and inclusion crises, equitable transport, eco-districts, and showing engagement with wider societal issues.

The Seaport District stemmed from a vision of the Boston Mayor and its success was achieved through a combination of public (state and federal) and private (Masschallenge) investments. The relocation of the Babson college into the Financial District, in close proximity to the bridge connecting the downtown with the Seaport area, completed the quadruple-helix model in the area (Baily and Montalbano 2018; Intersector Project 2015). The innovation district was made possible by one of the most important infrastructural projects in the history of US cities, the Big Dig. The elevated Central Artery that was cut of the waterfront from the Boston downtown was channelled into a tunnel, thanks to massive federal funds, thus enabling the connection between Seaport and the Financial District. Further funds invested in the infrastructural transit system allowed for the completion of the Silver Line, the Bus Rapid Transit connecting the Seaport District to the Airport. Supported by these massive public capital investments, the area was then targeted by both public and private initiatives, creating the conditions for attracting business and private investments. The entrepreneurial ecosystem was created thanks to a combination of tax credits (which brought Vertex to the area) and private support (through the biannual call for start-ups issued by the Masschallenge).

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<sup>6</sup> <https://innovation.masstech.org/innovation-institute>

<sup>7</sup> <https://www.kendallsq.org>

The Dudley Square local plan is focused on improving connectivity through the creation of a key-transit station served by the new Bus Rapid Transit line, complemented by the launch of the Roxbury Innovation Centre near to the new transit station (hence, two major public capital investments). The latter has been deliberately built to bring innovation and entrepreneurship to an area traditionally neglected by investments and business and, indeed, it is serving as an anchor for building trust across the entrepreneurial community. A former MIT graduate, Gilad Rosenzweig, founded the start-ups' accelerator 'Smarter in the City' near Dudley Square, which launches 2 cohorts of 5 start-ups per year. The presence of the Roxbury Innovation Center, which is managed by the Venture Café (the same non-profit operation at the Cambridge Innovation Centre in Kendall Square), in combination with the Smarter in the City accelerator, are changing the perception of the area which is now targeted by venture angels and funders. As the Smarter in the City founder stated (April 2017), it is still difficult to say whether the accelerator induced a shift in the pride of the locals, nevertheless, there was an assumption that people from that neighbourhood were unable to have ideas and now this is no longer true.

The three cases show how the coordination of multilevel stakeholders was mainly steered by local authorities (i.e. the City of Boston and the City of Cambridge), but was firmly backed by both federal and state funds and programmes. Local authorities have acted as main orchestrators; nevertheless, state and federal governments have supported their strategic visions with consistent actions. The state of Massachusetts provided support through an agency, Masstech, which was deliberately conceived to enable co-creation rather than to deploy bottom-up strategies or preconceived plans and projects. The multi-agents' arena, including anchors (such as higher education institutions and big companies) and small actors (such as innovators from academia and industry and industrial leaders) collaborated proactively to deploy co-created strategies in the target areas, i.e., the innovation districts.

### ***Consensus and commitment***

The Boston and Cambridge cases represent emerging multifaceted urban models where IDs, as new generation urban redevelopment patterns, are gaining more and more centrality as contact points between government, university, market and citizenship, highlighting the differences of cultural approaches and underpinning the positive externalities to be taken into consideration both by policy-makers and innovation practitioners. Despite the diversities of the various urban conditions (at economic, social, cultural and physical levels), the common output of the Boston-Cambridge area is embedded in the creation and enhancement of a backbone structure in the urban fabric, where new 'place-based hotspots' spur on innovation as a main externality within the regeneration strategies of the city. From an individualistic conception (creative genius), the Boston area is moving towards a vision of collective and widespread innovation in which the presence of real relational and co-innovating districts and hubs becomes crucial in pursuing authentic quality ecosystems within the whole urban and metropolitan context.

The framework represented by "Imagine Boston 2030" is paradigmatic in this sense. This plan is the first comprehensive citywide plan since 1965 and aims at being the framework to preserve and improve Boston. Co-creating and engaging multi-level stakeholders in the planning process has been key. More than 15,000 citizens contributed to the identification of the Boston 2030 goals and generated ideas on how to achieve them. A variety of citizens' engagement tools and instruments have been implemented, including multiple stakeholders (such as industrial partners): open houses (300 participants), visioning kits (330 participants), surveys via text messages (2,400 participants), community workshops (270 participants), online/mobile mapping tool (1,070 comments), surveys via street teams (7,090 participants), the Imagine Boston Forum (500 participants), community workshops (180 participants), "Building Blocks" (1,400 participants), Expanding Opportunity feedback (360 comments), the Imagine Boston Week (340 participants), Boston by the Numbers (70 participants), industry roundtables (105), Franklin Park workshop and draft plan survey (185 participants), Forum on the Future (290 participants). The results from this process allowed for the prioritising of equitable issues in the planning decisions such as: housing affordability, equitable

transit, creation of job opportunities (City of Boston 2019).

Likewise, the planning process in the city of Cambridge has also embraced seriously the challenge of co-creating the future decisions shaping the city. Currently, the city of Cambridge has embarked into a comprehensive citywide planning process prioritising the active engagement of multilevel stakeholders. This has been enabled by the implementation of *Envision Cambridge*, a community-wide process aimed at prioritising urban form and community wellbeing goals through a participatory approach, which has been just finalised in January 2019 (City of Cambridge 2019). As planners in the city of Cambridge have highlighted (interview April 2016), “People who live in Cambridge value diversity”, and this attitude has been undoubtedly endorsed by the planning process.

In the Boston-Cambridge area, the local governments seem extremely sensitive to the ‘institutional innovation’ approach, playing a sophisticated role in tailoring ‘ad hoc’ initiatives, specific tools and adaptive partnerships among anchor institutions, investors, high education subjects, non-profit organizations and local communities. This model represents a ‘virtuous hybridization’ of the wisely mixed dimensions in the planning initiatives: from the overwhelming role of real-estate development to the increasing sensitiveness for local inclusion, from socioeconomic and environmental quality to changeable government/governance profiles. The emerging local public administration pattern related to the redevelopment policies in cities like Boston and Cambridge is proposing an intriguing blending of three main ‘modes of governance’: hierarchy, market and network.

## **6.5 Strategic choices and vision: orchestrating the Boston innovation ecosystem**

Within the heterogeneous forms of public private partnerships, the role and actions of the numerous stakeholders have been managed through a flexible geometry approach. The construction of ‘partnership architectures’ has proved to be not always so easy, revealing some potential risks. In the Boston municipality case, the general aim of keeping together economic boost and social innovation sometimes has been interpreted as the possibility to pursue ‘acceptable forms’ of retraction of the governments in public service delivery (Manzini 2017) delegating to the non-profit dimension the management of supplementary resources and raising controversies in the relationship with the traditional economy sectors.

Boston and Cambridge are addressing these questions with a strong focus on the role of places as interaction nodes that can make the difference in terms of rapidity, skills and opportunity development for micro practices, in both short and long distances’ networks, using contiguity mechanisms fostered by institutional devices. In Boston, the value produced by the IDs is complementary to the traditional economic sectors and the platform they create is strategic both for practitioners and institutions: they could represent R&D units and social cohesion tools for public sector policies and planning devices development. The actions linked to local resources and practices hence are supposed to become anticipatory elements of urban transformations.

The public actor could, therefore, represent at the same time an obstacle, the mediator or the interaction platform driver in the innovation framework. In Boston’s redevelopment policy the pro-active strategy is played with different potentialities. The powerful engaging role of the institution in Roxbury, supported by non-profit subjects, for example, is a steady commitment to the redistribution of the added value to be extended to originally uninvolved actors. Other IDs, however, may produce important results in terms of resources, services, inclusive products and urban transformations, which tend to remain in a smaller impact area if not re-produced by the public.

As many scholars have argued (Crosta 1990, Habraken 2000), urban user-oriented transformations are considered effective when generated as positive externalities of interaction between subjects. If IDs can be deemed as valuable sources of interaction, the open issue is to pave the way towards a

more structured role of these places in bridging innovation from social practices to institutional policies. In the hiatus between State and citizenship these experiences are to be means to shorten the distance: they act as autonomous regenerative systems capable of creating new civic values. The effectiveness of Innovation Districts at urban and territorial scale is related to an institutional innovation vision that fosters the production of open knowledge and provides valid exchange frameworks between different value systems. Within the different roles assumed by the public governments, universities, enterprises, non-profit organizations and other stakeholders, the emerging paradigm seems to be the hybridisation of models and the flexible geometry governance of initiatives with changing roles for actors, alternatively called turbines, drivers, referees or simple players on the urban stage.

## 7 CONCLUSIONS

This report builds on and brings forward the effort attempted by the EC Joint Research Centre with the launch in 2017 of the research line *Place-based Innovation Ecosystem*, focused on *how and where* innovation ecosystems happen and *who* makes them happen. In detail, this report draws from the dataset and research findings gathered through the H2020 MAPS-LED project, aimed at investigating how Smart Specialisations can be reflected in unique spatial patterns, i.e., how the geography of embedded innovation is turned into a physical and spatial entity. In so doing, it fills a persisting gap in the current literature on entrepreneurial ecosystems, which tends to pay little attention to *where* innovation happens and more specifically to *where it happens at the fine grain of the local scale*.

The previous sections discussed the role played by some of the key-innovators (Urban Mechanics, Masschallenge, CIC and Venture Café) operating in the case study arena (the *who*), the way they and other players co-create innovation by operating as an intertwined ecosystem (the *how*) and the urban spaces in which they collaborate (the *where*). Three cases of Innovation Districts (Kendall Square in the city of Cambridge, Seaport District and Roxbury in the city of Boston) were instrumentally selected to show how *innovators* and *innovation hotspots* interact with the urban fabric, demonstrating that *urban innovation districts can be enablers of place-based innovation*.

As such, it is paramount to complement the implementation of Smart Specialisations with consistent urban policies supportive of the construction of spaces for innovators. Also, the urban linkage allows for the tackling of the issue of the inequalities generated by the innovation ecosystem, e.g. by:

- (a) steering the creation of a balanced provision for public spaces, offering opportunity for engaging citizens and leveraging civic values;
- (b) monitoring the pursuance of the Sustainable Development Goals in a consistent manner, made possible by the simultaneous vision offered by the spatial canvas supporting different development strands;
- (c) maximising the interaction between accessibility, equity and competitive advantage, through the correct implementation of transportation plans consistent with the major areas of job opportunities and housing.

A major challenge to effective embedded development is that urban policies and place-based innovation are still poorly interconnected, challenged by a silo-approach plaguing all the scales and by the difficulties in achieving genuine collaboration from all the key-players. However, the alignment between urban policies / spatial planning at the district scale and place-based innovation initiatives is the cornerstone of the success of the case study discussed in this report. Possible examples are:

- the mutual benefit from having the Masschallenge accelerator within the Seaport Innovation District, this latter enabling the relocation of a wide range of small, medium and large companies (e.g., Vertex; PWC, GE) in a concentrated area;
- the positive dynamics created by the District Hall and the Seaport District, the former playing the role of both socially-oriented co-working space and civic centre, the latter in need of a civic hub for maximising the social spillovers of the development of the area;
- the complex role played by the city of Boston, showing an understanding of the importance of spatial planning to support a consistent framework of economic and regeneration initiatives (e.g., the new Plan 'Boston 2030') and civic engagement.

In the quadruple helix model recognizable in the Boston metropolitan area, several international Higher Education institutions create a polycentric spatial structure deeply embedded in different innovation districts of the urban fabric anchoring and leveraging the blossoming of innovative entrepreneurial actors such as the numerous start-ups and innovation centres.

In this clustered system of Higher Education institutions, spatially embedded in the urban districts, start-ups and big companies are equally involved in a sophisticated and intricate frame of public, private, public-private driven initiatives, in some cases creating international spillovers reinforcing the knowledge exchange and the co-creative process. As all those actors and initiatives are intertwined and mutually influencing, it is difficult (if not impossible) to identify one single *orchestrator*.

The presence of influencing Higher Education institutions such as the MIT is undoubtedly a key-driver, however, it is not the orchestrator of the case study innovation ecosystem. Without the public leadership expressed by the Mayor, Thomas Menino, and his trust in the power of urban regeneration as a catalyst for equitable development and his faith in the human capital and the people, it would be difficult to imagine how the Boston situation in the 1990s shifted to the current one, well depicted in the Boston 2030 Vision, including sustainable urban districts and affordable housing as higher priorities.

Likewise, the remarkable efforts of the Cambridge City Council in incorporating a high percentage of affordable housing in the new housing developments show a public commitment to reducing the displacement of locals and to ensuring some social balance in the communities.

Furthermore, it is difficult to imagine how so many start-ups could thrive if the big companies were not supportive of an integrated model, in which the reciprocal value is appreciated and recognized to the point that a key accelerator such as the Masschallenge is mainly subsidized by big companies, willing to increase the entrepreneurial capital of fresh ideas and exploit it, in collaboration with similar hubs and with the local Higher Education Institutions.

Thanks to the canvas represented by the urban fabric, all those dynamics happen in a concentrated place, thus mutually reinforcing. On the other hand, it is the urban and neighbourhood scale which allows the appreciation and steering of the innovation-led local development within the framework of the Sustainable Development Goals, because these latter become explicit at the local scale (rather than at the regional scale).

Drawing from these considerations, some policy recommendations are formulated below.

Firstly, Smart Specialisation Strategies (S3) should encompass spatial interventions of the built environment, thus holding the potential to facilitate the construction of a *physical ecosystem* supportive of innovation. These spaces include shared spaces and private small businesses facilitating interaction, both informal and formal, both specialized and multi-disciplinary; public services and facilities that allow the preservation of uniqueness and inclusiveness. Furthermore, the spatial pattern should be supportive of a walkable environment, offering effective transit and public transport facilities. The economic benefit for the private companies located in such areas is proved by the empirical findings from the case study, although not yet quantified.

Secondly, social innovators should be identified as key-players for testing small scale and pilot actions, locally embedded and grounded within the entrepreneurial ecosystem. As demonstrated by the experimental approach of Urban Mechanics, entrepreneurial discovery and risk taking are not in conflict with reliability in the use of public funds, as long as a reasonable cap in the expenses is established. Moreover, both public and private mediators can manage the creation of entrepreneurial hotspots, as demonstrated by the Masschallenge example. Current European funding schemes tend to prioritise “reliable” beneficiaries, whose reliability is evidenced mainly by financial guarantees. Instead, targeting non-traditional entrepreneurs within the framework of a solid and spatially managed hotspot, would allow for maximising the public benefit of spurring on place-based innovation and achieving local regeneration.

This can be achieved by introducing some major changes in the post-2020 European Commission regulations and instruments, such as:

- Launching dedicated programmes focused on small target areas (e.g. *S-URBAN*: Sustainable innovation urban districts), combining spatial planning and innovation-driven economic

initiatives (and funds) and monitoring them against the targets of the Sustainable Development Goals.

- Introducing flexible rules within concerned funding schemes (for example, in structural and investment funds), prioritising goals over means, and monitoring the performance based on *key performance indicators* (core indicators) focused on the level of achievement of the targets instead of the level of achievement of the means.
- Fostering pilot programmes (including non-conventional beneficiaries and non-traditional eligible costs) by expanding the eligibility criteria, thus allowing below-the-radar and social innovators to grow.



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## **Interviews, meetings and events**

Boston Redevelopment Authority: Richard McGuinness, 11th June 2017; Chris Bush and Richard McGuinness, 15th June 2018.

Boston University and Initiative on Cities: Seminar on Image Boston 2030, 4th April 2017. Speakers: Kathrine Lusk, Director of the Initiative on Cities; Sara Myerson, Director of the Planning Dept. of the Boston Redevelopment Authority; Matthew Littell, responsible for the Image Boston 2030 plan.

Brooking Institute Washington DC: Bruce Katz, with Jason Hachadorian and Scott Andes, 6th April 2016.

Cambridge Innovation Center, Kendall Square: Sara Mruz, 14th April 2016, 9th June 2016, 29th March 2017, 14th June 2018; Kendall Square Association Breakfast, 5th April 2017.

City of Boston, Urban Mechanics: Nigel Jacobs, 30th March 2017; Stephen Walter, 4th April 2017.

City of Cambridge: Iram Farooq, 11th April 2016.

District Hall: Sarah De Simas, 10th June 2016; Becky Dormer, 28th March 2017.

Harvard University: Kristian Ketels, 7th April 2016; Erez Yoeli, 8th April 2016.

Impact Hub Boston: Geoff Mamlet, 28th March 2017.

Massachusetts Institute of Technology, Investment Management Company MITMICO: Jennifer Conway, 14th April 2016.

Massachusetts Institute of Technology, Senseable City Lab: Fabio Duarte, 7th June 2016.

Masschallenge: Lindsay Simeone, 28th March 2017, Roman Kern, 6th April 2017.

MassTech: Cem Oruc and Betham Steiner, 13th April 2016; Bethann S. Steiner and Sanjay Gokhale, 14th June 2017.

Northeastern University, Barry Bluestone, 4th April 2016, 3rd April 2017; Catherine Tumber, 4th April 2016, 8th June 2016, 3rd April 2017; Tim Love, 14th June 2018.

Roxbury Innovation Center: Alexandra Brown, 14th June 2016, 5th April 2017; Alexandra Brown and Kevin Wian, 28th March 2017.

Roxbury Innovation Center: Female Founders Night, 28th March 2018.

Smarter in the City: Gilas Rosenzweig, 6th April 2018.

Venture Cafè: various Thursday Cafè events attended in 2016, 2017 and 2018.

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