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The role of STPs on the development strategies of low density territories the Brigantia EcoPark

PARALLEL 2
Factors of location in city-STP relationships

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The role of Science and Technology infrastructures on the development strategies of low density territories – the case of Brigantia EcoPark

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Executive summary

Brigantia EcoPark is a Science & Technology (S&T) Park located in the city of Bragança, in the Northeast of Portugal (Trás-os-Montes region). Due to its location, Bragança faces the risks and challenges of a low-density territory. In this context, Brigantia EcoPark represents a successful example of a strategic approach towards urban development of low-density territories. It is the result of a long-term process, performed at both local and regional level, which resulted in the development of a quadruple helix innovation ecosystem, embedded in a very consistent conceptual design and in line with the new strategic guidelines for integrated development set out at the European level for the next seven years. The focus of Brigantia EcoPark is also illustrative of the abovementioned alignment and also represents a practical example of how to operate the concept of smart specialization on the ground.

The municipality of Bragança: a territory with low-density trends

The municipality of Bragança is the capital of the homonimous district, located in the North of Portugal, in the so called Trás-os-Montes region. It has a total population of 35,341 inhabitants - 23,099 of which live in its urban area.[1]

As the district capital, Bragança is a relatively attractive urban hub, enjoying the benefits of a certain territorial centrality at the regional level. Bragança presents higher levels than Trás-os-Montes in areas such as education (inhabitants with higher degree - 20,4% against 12,4%) and purchasing power parity (93,75 and 67,43, respectively, in comparison with the national average), among others. It also encompasses 20% of the total number of companies in the region as well as 86% of the total export revenues from Trás-os-Montes.[2]

However, Bragança also faces social and economic challenges which enhance the risk of being labeled as a low density territory. According to Baleiras, low density territories "feature population and economic activity losses which tend to self-feed in a circular and cumulative causation process".[3] This vicious circle mutually impacts on demography and economy: "Low density tends to be associated with few jobs which are not enough to accommodate active population, young individuals tend to out-migrate, the population stock gets older, there is an entrepreneurship scarcity, institutional thickness is thin, private investment lacks, which contributes to few jobs and the circle closes and traps the territory into a relative impoverishing growth path."[4]

[1] Câmara Municipal de Bragança (2013). "Bragança em números." Available at: http://www.cm-braganca.pt/PageGen.aspx?WMCM_PaginaId=11565.
[2] INE (2012). Recenseamento da População e Habitação. Available *online* at www.ine.pt.
[3] Baleiras, R. (2011). "Collective efficiency strategies: a policy instrument for the competitiveness of low-density territories." NIPE Working Paper Series, 04/2011, p.9. Available at http://www3.eeg.uminho.pt/economia/nipe/docs/2011/NIPE_WP_04_2011.pdf.
[4] Baleiras, *id.*, p.10.

Bragança's current population is practically the same as it was at the beginning of the 80's (35.380) and 10% less than it was in the 50's (38.233). Furthermore, according to INE, its population density (30 inhab/km2) is approximately four times lower than the national rate (114 inhab/Km2) and six times lower than the Northern rate (173 inhab/Km2).[5] The senior population (65 years old or more) corresponds to 22% of the entire population of the municipality - higher than the national and regional (North) average, which are of 19% and 17%, respectively.

The municipality of Bragança also faces some of the other most common challenges of low-density territories, such as: Distance from the main political and economic centers (215 km away from Oporto and 491 km away from Lisbon); Limited internal market; Decline of the private sector; Low levels of innovation; Economic activities based on traditional sectors (such as agriculture); and Limitations on providing high-added value goods and services.

Brigantia EcoPark: a long-term process

Being aware of the role that S&T can have in improving such an adverse context, the Municipality of Bragança started a long term process focused on the urban development of the city and its surrounding region, in which the promotion of S&T activities and infrastructures would play a major role.

The initial development of the Brigantia EcoPark was started in a general planning process promoted by the city council in 2009. The resulting "Strategic Plan for the Eco-City of Bragança" was developed by way of a detailed and participatory process that considered the available regional assets and involved most of the regional stakeholders. The strategy, particularly focused on the area of sustainability, was awarded the "Cities of Excellence" prize by the Portuguese publication "Planeamento e Cidades" (Planning and Cities).

Subsequently, the Municipality of Bragança, together with another 5 small-sized cities of Trás-os-Montes (Macedo de Cavaleiros, Miranda do Douro, Mirandela, Chaves and Valpaços) took the initiative of setting up a collaborative network focused on promoting innovation and sustainability in the region. In particular, the Municipality of Bragança led the creation of a Network of Cities for Innovation and Sustainability (Rede ecoCITRAS), which aims to promote the transfer of knowledge and experience in the area of sustainability (mostly agriculture, eco-tourism, eco-construction and renewable energies) and for which the creation of a S&T Park is one of its main drivers.

Following the defined strategic guidelines, identified activities and the mobilization of the regional stakeholders, the creation of the Brigantia EcoPark became a reality. With the support of the local S&T institutions (including Instituto Politécnico de Bragança – IPB, and the Universidade de Trás-os-Montes e Alto Douro – UTAD), the local/regional public authorities, and the regional private sector, a strong will was developed for the implementation of an infrastructure that could promote "triple helix" relationships. Furthermore, the Brigantia EcoPark began to be seen as a key player that could foster stakeholder engagement and the promotion of strategic partnerships in order to drive innovation, economic growth, sustainable development and smart specialization.

The Municipality of Bragança and its partners then further developed the S&T Park strategy. This design process involved a range of international exchange activities, including benchmarking studies on the Parque Tecnológico de Boecillo (Valladolid, Spain), Instituto Tecnológico de Galicia and Parque Tecnológico de Álava (Spain), and on Dyfi EcoPark (Wales). It also involved the interaction (and subsequent association) with the Network of S&T Parks and Incubators of Northern Portugal, called PortusPark, a member of the International Association of Science Parks - IASP. The participation of PortusPark network in the Brigantia EcoPark project provided further expertise for the coordination of the project and allowed the partnership to benefit from the experiences of S&T Parks in the North of Portugal region.

The conceptual basis: a knowledge hotspot within an intelligent and responsible territory

[5] INE (2012). Recenseamento da População e Habitação. Available *online* at www.ine.pt.

This long-term process of an integrated approach of sectorial-focused S&T development encompassed in an urban development strategy is fully aligned with recent European trends in urban planning, innovation-led development strategies and knowledge-based economic growth.

The intention of the Municipality of Bragança with Brigantia EcoPark is to create a "knowledge hotspot" in the region of Trás-os-Montes. A "knowledge hotspot" is defined as a "designated area where the focus lies on knowledge-based economic development."[6] A knowledge hotspot may assume different conceptual designs (science parks, technology parks, creative districts, among others) as well as to be either focused on specific branches or follow a more cross-sectorial approach. In the case of Bragança, the knowledge hotspot was designed to be a S&T Park focused on sustainability issues.

A knowledge hotspot may also help strengthen triple helixes relationships, adding a territorial cross-cutting dimension to the innovation ecosystem: it thus contributes to marketing a certain region as a knowledge-based territory, providing the local knowledge economy with a face and an address.[7]

A knowledge economy situated in Bragança (and, ultimately, in Trás-os-Montes) represents a "soft discontinuity" from the past and its associated current economic patterns and operations. It is not a "new" economy, but rather the original economy with new procedures, a new organizational basis and new management practices.[8] Agricultural and land-based goods may thus remain the economic basis of Bragança and Trás-os-Montes, but increasingly absorb intangible investments in strategic thematic areas, Research & Development (R&D) projects, ICT usage, higher qualified workers and ever increasing sustainable and innovative solutions.[9]

The implementation of this conceptual basis of Brigantia EcoPark is also expected to foster the engagement of civil society into S&T, turning the innovation ecosystem into a quadruple helix. This conceptual basis is also intended to leverage urban development, turning the entire territory of Trás-os-Montes - but particularly that of Bragança and of its urban area - into a "living lab" for experimenting new and innovative territorial and sustainable strategies and projects, that could enhance the quality of life for local citizens, the promotion of entrepreneurship and job creation, helping to support the economic and social development.[10]

As the Brigantia EcoPark is focused on environment-related sectors, Bragança intends to position itself as the leader of a "sustainability hub", based on the areas of energy, environment and Eco-Construction, extending this "territorial trademark" to the Trás-os-Montes regions through the EcoCITRAS network. Ultimately, the implementation of Brigantia EcoPark sets the pace for developing an intelligent and responsible territory in Trás-os-Montes.

An intelligent and responsible territory is defined as "a space-network able to increase its social capital and improve its management and problem solving capacities, through social/organisational learning dynamics and knowledge management processes, aiming to develop lasting competitive advantages to endure (sustainability), generate a positive social impact (social cohesion) and produce sustainable development (territorial social responsibility)".[11]

The alignment with Europe 2020 strategy: sustainable growth and smart specialization

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[6] Van Winden, Willem. (2011). "Creating knowledge hotspots in the city: A handbook - Practical guidelines for developing campuses, science quarters, creative districts and other knowledge hotspots". REDIS - URBACT II project, Amsterdam, p.2.
[7] Van Winden, *id.,* pp.3-4.
[8] Brinkley, Ian (2006). "Defining the Knowledge Economy." Knowledge Economy Programme Report: The Work Foundation, p.13.
[9] Brinkley, *id., ibid.*
[10] Neves, Eurico (2012). "Baseline Study - INNOVA: sustainable business growth based on innovation and knowledge".
[11] López, Javier Farto. (2006). "Intelligent and Responsible Territories." Documenta: Santander. 3a edição. P. 181.

The execution of the conceptual basis in which Brigantia EcoPark is embedded in faces the challenge of a transition context at the European level: 2013 represents the last execution year for the current Multiannual Financial Framework (MFF) of the European Commission (EC). A new EC-MFF is already being designed for the period 2014-2020, but so far only strategic aspects have been defined, and incorporated into the so called Europe 2020 Strategy (EU2020).

Yet, Brigantia EcoPark is fully aligned with the thematic objectives and investment priorities set out in EU2020 and in related documents, enhancing the likelihood of European financing for the activities undertaken in Brigantia EcoPark.

EU2020 is the growth strategy set out for European Union (EU) for the next seven years, based on a threefold priority: smart, sustainable and inclusive growth. Within the sustainability axis, the EU will implement two flagship initiatives (meaning broad range and multi-fund programs) with substantial relevance for Brigantia EcoPark: (i) Resource-efficicent Europe - to boost low-carbon economy projects; (ii) Industrial policy for the globalization era - to foster competitiveness. Ultimately, the goal of both initiatives is to achieve the so called "20/20/20 target": 20% reduction of greenhouse gas emissions by 2020; 20% share of renewable energies in the total consumption rate by 2020; 20% in energy efficiency by 2020.

At a more operational level, the EU2020 strategy has defined thematic objectives and investment priorities for the different funds which constitute the most relevant financial instruments at the European level for the next seven years.[12] In this context, sustainability has been an underlying concept: 3 out of the 11 thematic objectives for the Common Strategic Framework are sustainability-related,[13] as well as several investment priorities within each of the funds - some of which are highly related to the social and economic context of Trás-os-Montes and Bragança.[14]

Due to the mutual implications of sustainability, knowledge economy and territorial development within the development of Brigantia EcoPark, this S&T infra-structure will also contribute to the implementation of the "smart specialization" concept in Bragança and Trás-os-Montes. Smart specialization is a strategic approach to economic development through targeted support to Research and Innovation. Along with the above mentioned thematic objectives and investment priorities, it will be the basis for using European funds for R&D. Smart specialization involves a process of developing a vision, identifying competitive advantage, setting strategic priorities and making use of smart policies to maximise the knowledge-based development potential of any region, strong or weak, high-tech or low-tech.[15] Sustainability thus represents the strategic guideline for promoting R&D and innovation in Brigantia EcoPark, for adding value to the local economy and for creating territorial competitive advantages. In order to more efficiently leverage the smart specialization concept and to optimize the use of featured EU R&D funding schemes, Brigantia EcoPark will take advantage of "Horizon 2020" - the new EU Framework Programme for Research and Innovation.

From the strategy to the project: past, present and future perspectives

Having set the conceptual basis of Brigantia EcoPark, the Municipality of Bragança moved forward with achieving the financial conditions for the materialization of Brigantia EcoPark. In this context, it applied for European Union funds through the Portuguese National Strategic Reference Framework

[12] European Regional Development Fund (ERDF); European Cohesion Fund (ECF); European Social Fund (ESF).
[13] Supporting the shift towards a low carbon economy in all sectors; Promoting climate change adaptation and risk prevention and management; Protecting the environment and promoting resource efficiency.
[14] Such as smart grids, low carbon strategies for urban areas, systems, promotion and development of cultural and natural heritages and urban environment quality within ERDF; and specialized investiments in climate change, investments in the water, green infra-structures and waste sectors within the ECF.
[15] As stated in http://s3platform.jrc.ec.europa.eu.

(NSRF). With the approval of this application in 2011, Brigantia EcoPark has now moved to the implementation stage, and the S&T facilities foreseen for phase 1 are currently being constructed.

The implementation stage is structured into 2 phases. Phase 1 has an intervention area of 33,000 m2 comprising the main building, gardens and parking. Phase 2 provides the infrastructure and nine extra parcels for building companies, all in an area of 66,000 m2 (see figure 1).

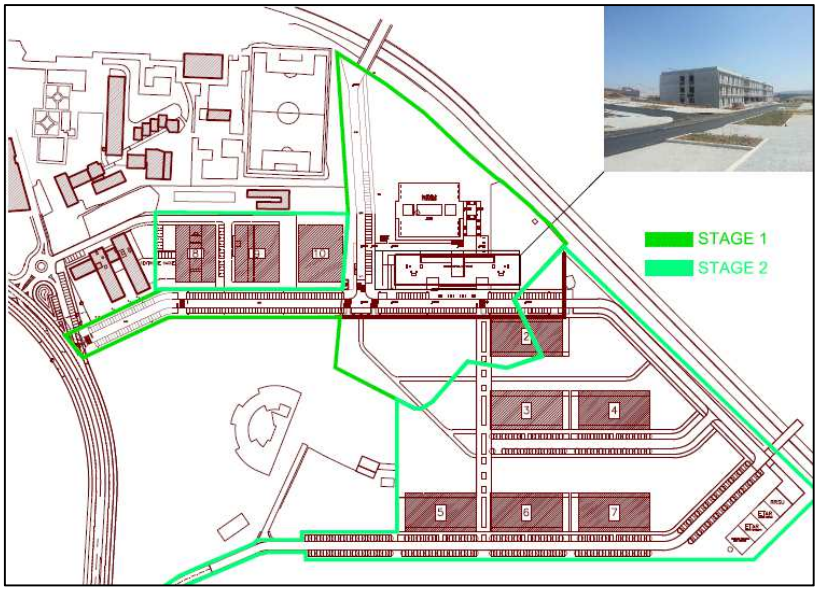

Figure 1 - Developing stages for the S&T park Brigantia EcoPark, Bragança, Portugal.

The main building has a projected area of 3,000 m2. It includes a business incubator comprising 35 modular rooms for incubation with two main typologies (29 rooms with 25 m2 and 6 rooms with 37 m2), distributed over floors 0,1, 2 and located on the east side of the main building. Brigantia EcoPark has designed two incubation programmes, both oriented to technology-based start-ups and spin-offs. One oriented for short periods (pre-incubation) and another intended for medium-term incubation processes.

The main building also comprises 16 modular rooms and spaces for well stabilized companies with two main typologies (4 rooms with 40 m2 and 12 spaces with 55 m2), distributed over floors 1 and 2 and located in the central part of the main building.

In addition, Levels 1 and 2 comprise 23 modular spaces for laboratories with four main typologies (10 spaces with 56 m2, 4 rooms with 40 m2, 8 spaces with 50 m2 and 1 space developed in height with 110 m2). Finally, Level 0 encompasses Brigantia EcoPark's administrative offices, as well as meeting and training spaces and a restaurant and a bar, while Level -1 has warehouse space and vehicle parking. Level - 2 presents one big heat exchanger (earth-air) to cool down the new incoming air in the summer and heat during the winter. This sustainability is complemented with other measures to produce heated water and electricity, using a small number of solar panels and 192 photovoltaic panels. The thermal fluid for HVAC system uses a geothermal station based on 42 holes in the ground, each with 140 m depth (see figure 2).

Figure 2. Project design of Brigantia EcoPark main building.

Source: www.brigantia-ecopark.pt

The operational design of Brigantia EcoPark took into account the recent European trends in terms of promoting the integration of knowledge-based large infra-structures into the urban and landscape design, potentially enhancing the quality of life and the working conditions of the knowledge-based workers as well as fostering interaction and networking among the institutions situated there - such as is the case of the Eindhoven High Tech Campus and of the Magdeburg Science Port.[16] Brigantia EcoPark encompasses a set of common amenities and facilities - such as a restaurant and a coffee shop - as well as a North-South pedestrian axis which will eventually connect the central building with the other infra-structures of the S&T Park ending in the Central Plaza - a place that is structured to host institutional and informal events.

Final key notes: the relevance of specialized technical assistance

Throughout the entire process – since the development of the Strategic Plan for the Eco-City of Bragança until the harmonization of the Brigantia EcoPark strategy with Horizon 2020 priorities – the Municipality of Bragança and the EcoCITRAS partners have been supported by an international consultancy company - Sociedade Portuguesa de Inovação (SPI). Headquartered in the city of Oporto, in Portugal and with offices in countries such as Spain, China and United States, SPI is positioned as a key organization in the provision of knowledge-management services that foster innovation and promote international opportunities along with strategic partnerships.

Gathering an extensive knowledge in the fields of innovation and S&T with a practical experience of territorial development, local economic competitiveness and national and European funding schemes, SPI has revealed itself to be useful partner for the Municipality of Bragança to bring together the technical and financial conditions to implement this project.

In addition to the support provided by SPI, the performance of regional higher education institutions (HEIs) was also fundamental for the success in creating Brigantia EcoPark - IPB and UTAD. Such HEIs assumed the role of "entrepreneurial universities"[17] - representing an active role in improving regional and national economic performance (with a corresponding financial advantage to the institution) as a means of engaging with local political and private actors and of delivering "return"

[16] The municipalities of Eindhoven (Netherlands) and of Magdeburg (Germany) were member of the European Commission-funded project (URBACT typology) REDIS (Restructuring District into Science Quarters), in which both infra-structures were referred as successful examples of such integration.
[17] Defined as such in: Etzkowitz, H., Webster, A., Gebhardt, C. & Terra, B. R. C. (2000) The future of the university and the university of the future: Evolution of ivory tower to entrepreneurial paradigm. *Research Policy*, 29, 313.

on the public investment in higher education & research.[18] Assuming such role also represents a changing attitude of HEIs with regard to the territory they are embedded in - increasingly seen as "living labs" and thus as a potentially interesting research arena where new products could be tested, validated and co-developed with citizens or users and other stakeholders.[19]

As a result, IPB, UTAD and Brigantia EcoPark have a symbiotic relationship in the context of this project. While IPB and UTAD are key partners in the implementation of Brigantia EcoPark, assisting in the development of its R&D and S&T component - the S&T Park of Bragança is also a relevant project for these HEIs, representing a potential opportunity for further engagement and involvement in the development strategy designed for the municipality and for the entire Trás-os-Montes region.

Conclusions

The design and implementation of Brigantia EcoPark is the result of a still-unfinished long-term process, which goes beyond the simple creation of infra-structures related to S&T. Indeed, Brigantia EcoPark is a visible outcome of a successful initiative specially designed for a territory facing the risks and challenges of low density trends. It is also the concrete result of a long-term participatory process - originally restricted to the local level (Bragança) but rapidly expanded to the regional context (Rede EcoCITRAS), which also enabled the structuring of a quadruple helix innovation ecosystem.

The design and implementation of Brigantia EcoPark is also the leading project for an innovation-led development strategy - based on a consistent conceptual design (knowledge hotspot, knowledge economy, sustainability hub, living lab and territorial intelligence). Such strategy is strongly embedded in a comprehensive and integrated approach, in line with the most recent strategic guidelines, objectives and investment priorities set at the European level and in which S&T infra-structures are conceived in the framework of urban sustainable planning.

The focus on sustainability envisaged by Brigantia EcoPark is an illustrative example of such alignment with the most European recent trends and, especially, of how the smart specialization concept can be operated in practice, enhancing endogenous competitive advantages and territorial competitiveness.

The design and implementation of Brigantia EcoPark would not stand as a successful example if there was no specialized technical assistance provided to the project promoters. The support of an international consultancy company along with the active performance of high quality [20] HEIs located in the region of Trás-os-Montes substantially contributed to turning Brigantia EcoPark into an example of a S&T infra-structure leading the development strategy of a low-density territory.

[18] Van Winden, Willem (2013). "City-University co-operation to the next level - A baseline study for the EuniverCities network." P.8

[19] Van Winden (2013). *Id., ibid.*

[20] SCImago Research Group. World University Ranking (2012).