

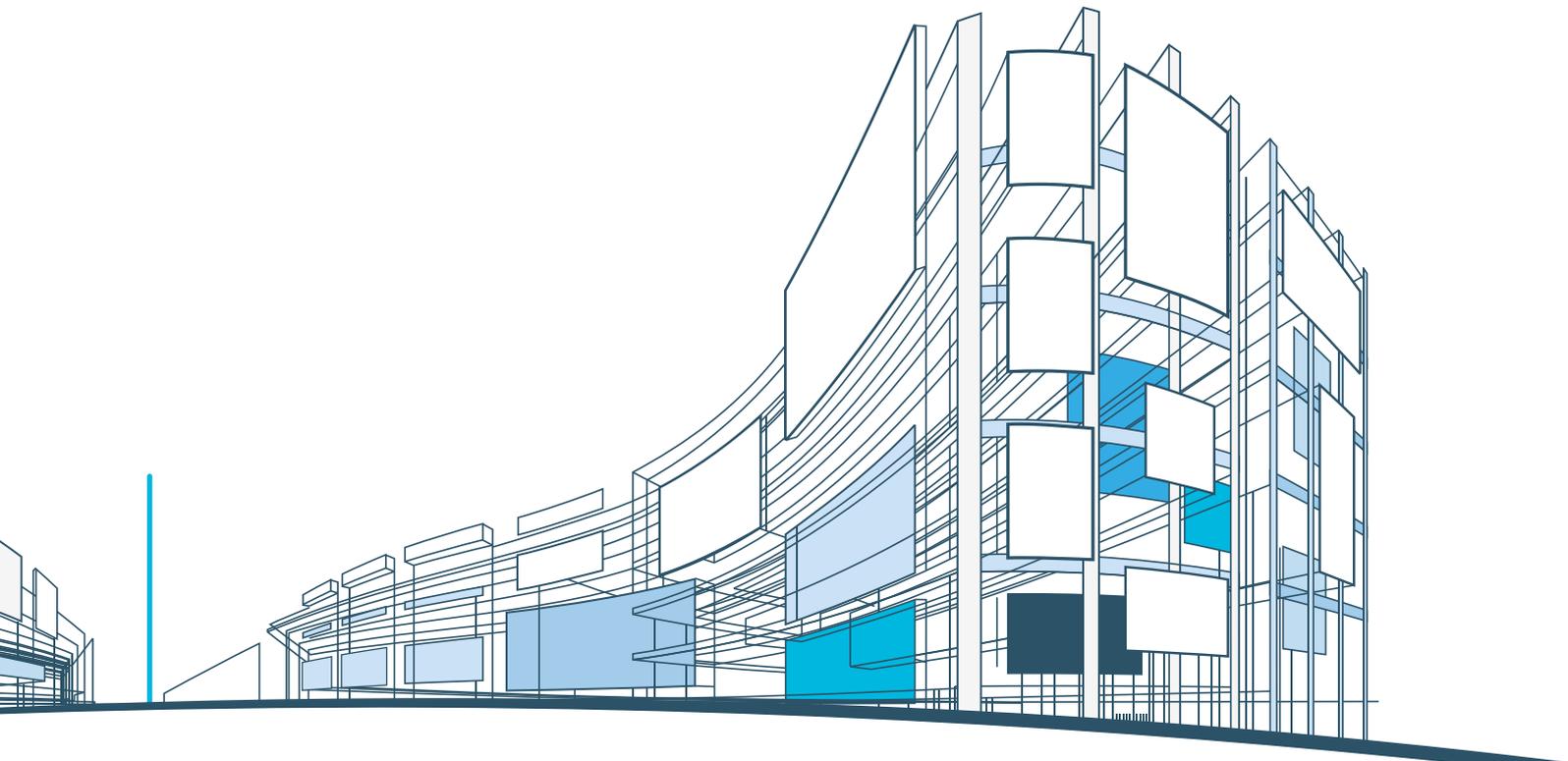


European  
Commission

# Public–Private Partnerships for Science and Technology Parks

Utilising PPPs and related models for the development  
and operation of STPs and Innovation Districts

Insight into case studies and good practices



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# Public–Private Partnerships for Science and Technology Parks

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*Insight into case studies and good practices*

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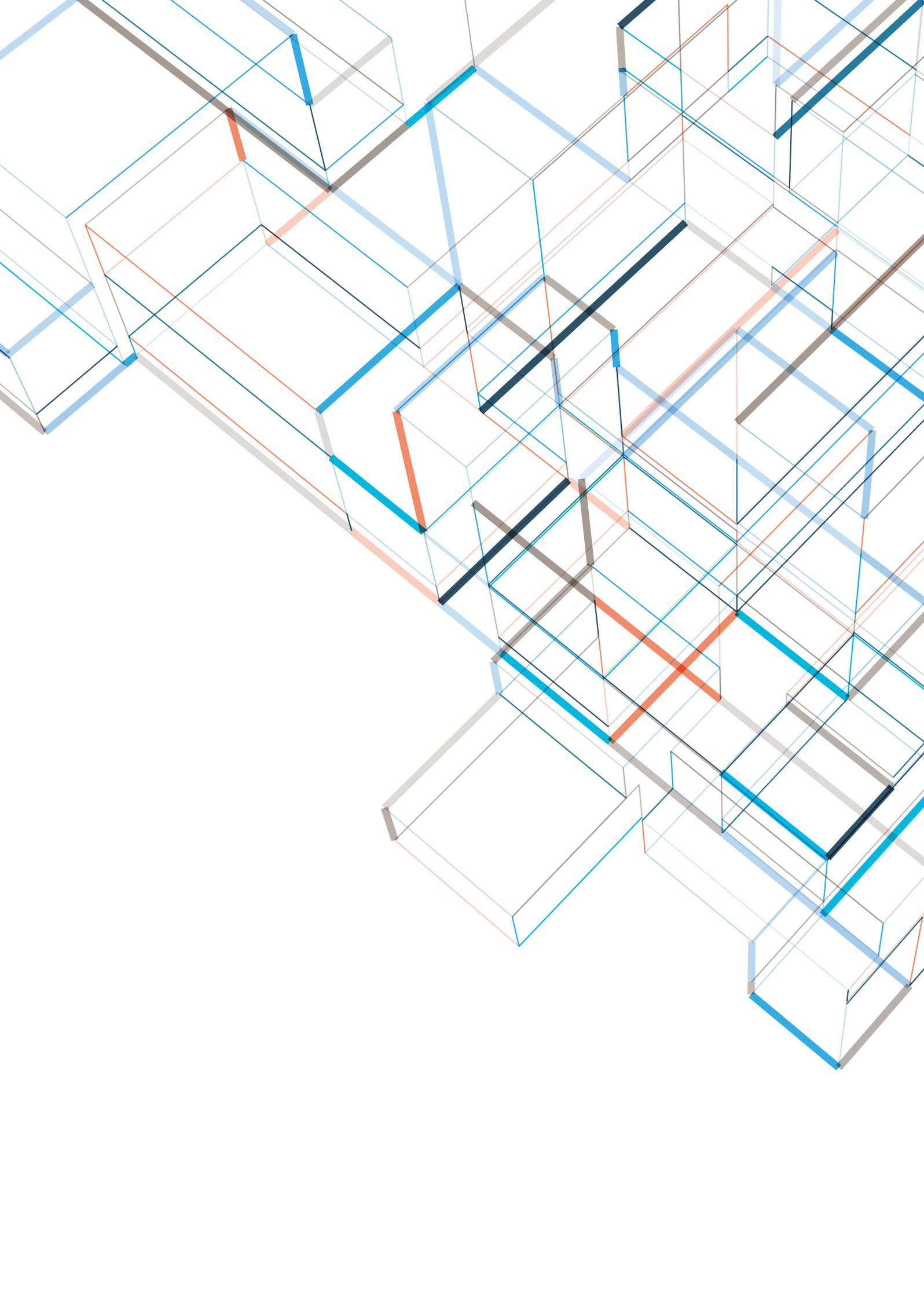
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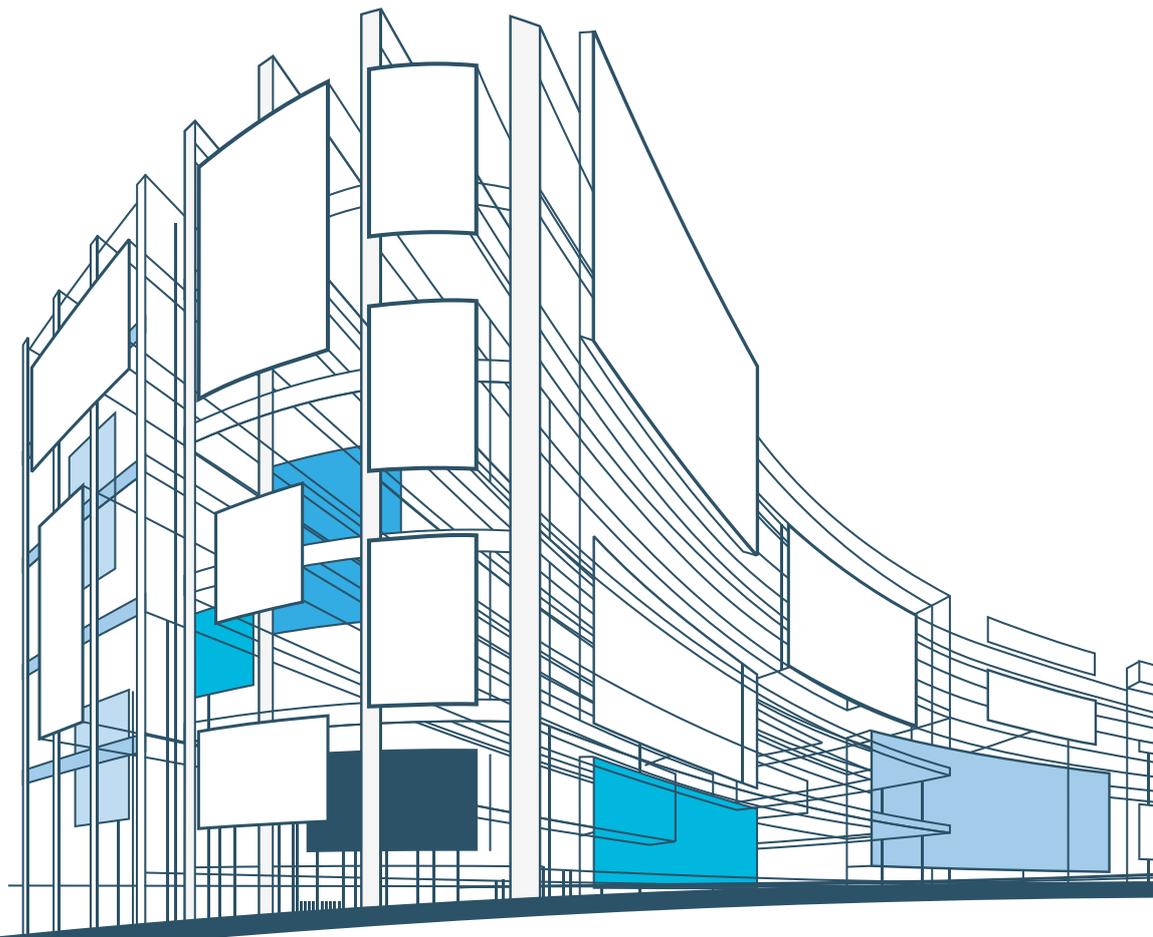
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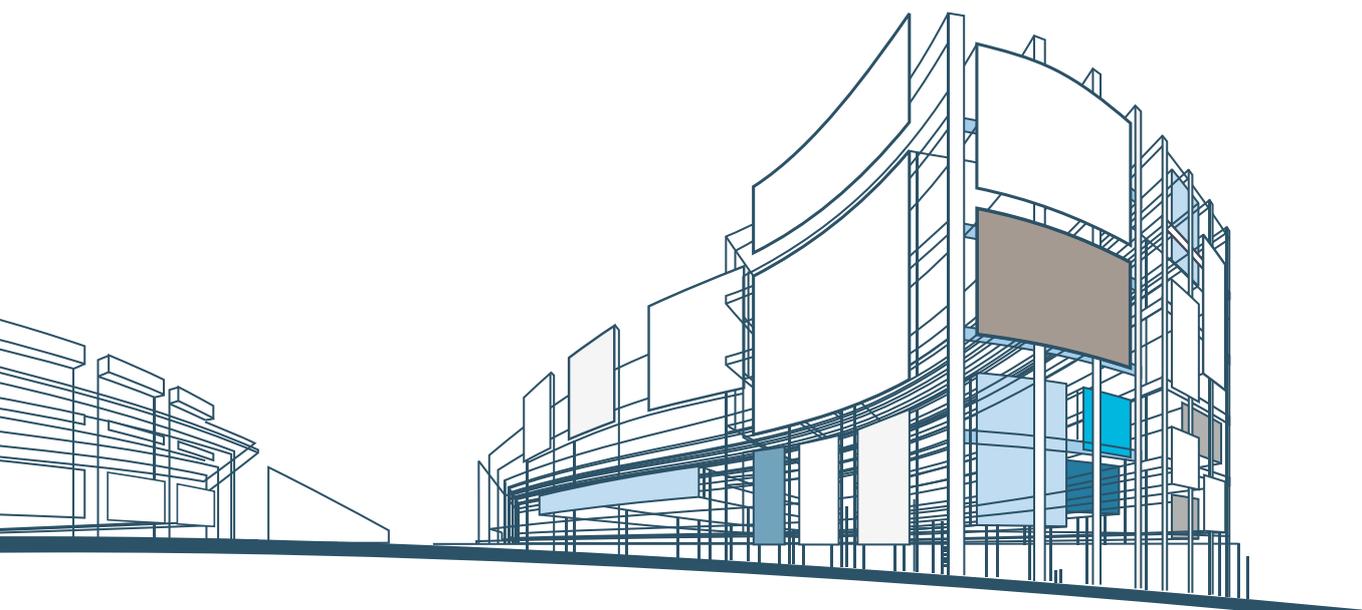
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## Abstract

Public–Private Partnerships (PPPs) have been widely applied as credible models for the development and operation of public infrastructure. Through private sector involvement, the public sector manages to better control costs and debt levels and, in return, offers to the private sector access to new long-term investment opportunities. For PPPs to be successful, proper identification and management of risks are pivotal and reward mechanisms need to be carefully constructed to allow both sides to play to their respective strengths, benefit from the deal and extract value from it.

This study intends to answer two key questions:

(i) How to apply PPPs and similar partnering modalities (e.g. concessionary models) to the development and sustainable operation of Science and Technology Parks (STPs) and Innovation Districts?<sup>1</sup> (ii) What are the key features of currently existing PPPs for STPs and Innovation Districts?

The study was initiated through the distribution of an online survey among members of the International Association of Science Parks and Areas of Innovation (IASP). The survey collected information on Science and Technology Parks or Innovation Districts operating through three main models of Public/Private cooperation: (1) Long-term partnership involving a degree of risk sharing (the closest to a traditional PPP); (2) Jump-in model where private investors are involved at a later stage of a project's development; or (3) Management Partnership. An analysis of survey results covering the three models is presented in chapter 4 of this report.

Chapter 5 presents eight detailed case studies of Science and Technology Parks or Innovation Districts falling under the above referenced model 1. In-depth interviews with the managers of the mentioned parks/districts were conducted to understand the reasons and perceived benefits of entering into a partnership with the private sector. The interviews revealed complex rationales for involving the private sector, going well beyond the evident desire of keeping public debt low, utilising idle land, buildings or other infrastructure, and leveraging private sector management expertise and efficiency.

Private sector involvement has been recognised as beneficial — and an important catalyst — for the development of broader innovation ecosystems bringing together all stakeholders: government, academia, industry and civil society (quadruple helix) around a shared long-term vision and strategy. The involvement of private partners, with shared long-term interests, is believed not

only to generate efficiencies for the realisation of specific projects but to trigger a “crowding-in effect” leading to better results in terms of research commercialisation, investment attraction, innovation and, ultimately, economic growth and job creation.

Public Private Partnerships continue, however, to carry considerable risks, from the perspective of public sector partners, in particular in relation to: (i) specific legal (structuring, enforcement, sanctions and remedies, optionality, etc.); (ii) financial (valuation, revenue projections, allocation of risks and benefits, sustainability, etc.) arrangements and (iii) the need to ensure proper alignment with the private sector around a shared long term vision for the development of a particular STP or Innovation District.

New exploratory research is planned for 2020-2021 — that will build on the results of this study — to bring together expertise on both EU policies and investment, with expertise in finance and private investment to develop a new hybrid financial model for innovation districts. Such a model should be able to inform investment strategies of both public and private investors (in particular institutional investors) and increase the pool of resources and expertise available to support the creation and operation of innovation districts as engines of urban transformation and sustainable and inclusive growth.



# Executive Summary

Public–Private Partnerships (PPPs) have been widely applied as credible models for the development and operation of public infrastructure. Through private sector involvement, the public sector manages to better control costs and debt levels and, in return, offers to the private sector access to new long-term investment opportunities. For PPPs to be successful, proper identification and management of risks are pivotal and reward mechanisms need to be carefully constructed to allow both sides to play to their respective strengths, benefit from the deal and extract value from it.

This study intends to answer two key questions:

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Chapter 5 of this report presents eight detailed case studies – completed through additional desktop research and interviews – of Science and Technology Parks or Innovation Districts falling under the above referenced model 1.

These were: **(1)** Ørestad Innovation City, Copenhagen, Denmark; **(2)** Here East & Plexal, London, United Kingdom; **(3)** Johanneberg Science Park, Gothenburg, Sweden; **(4)** Gav-Yam Negev Advanced

Technologies Park, Be'er-Sheva, Israel; **(5)** Technology Park Brno, Czech Republic; **(6)** Technology Park Ljubljana, Slovenia; **(7)** Ann Arbor SPARK, Michigan, USA; and **(8)** Milan Innovation District (MIND), Milan, Italy.

By analysing the case studies mentioned above the authors have identified some critical success factors, described in detail below, for the development of STPs or Innovation Districts through Public–Private collaboration.<sup>3</sup>

## Public Strategy

Public partners have a vital role to play through the provision of strategic leadership and vision, recognition and legitimacy throughout the lifecycle of science park or innovation district projects. The involvement of the public partner needs to be sustained throughout the project lifecycle and needs to go well beyond the simple provision of land or buildings and leverage all available instruments in the public policy arsenal from urban planning to economic and fiscal incentives, when feasible, in order to attract the necessary critical mass of actors (*cf.* universities and research centres, SMEs, corporates or investors) to the area. In the absence of sustained public engagement and support, that goes beyond the initial provision of land or buildings, even the involvement of private partners may not deliver a sustainable appreciation of the area and its assets. Without adequate public sector support, projects risk to be unable to achieve critical mass, making them unprofitable for private sector partners. Conversely, in the absence of proper private sector oversight, excessive real estate inflation poses a concrete risk of crowding out early stage innovators, thus undermining the sustainability of a given project.

The re-development, in collaboration with the private sector, of capital assets in public possession (be they land and/or buildings) can be organised and financed in different ways. In some cases, where concessionary models are utilised (e.g. the 99 years concession used for MIND), the private partner invests significant capital, manages and operates the infrastructures and

also delivers a return to the public partner throughout the lifetime of the project.

In other cases, public land is transferred to a publicly owned but privately managed organisation (as seen in the case study on Copenhagen). Another alternative is to recover the publicly borne cost of construction (debt) through the tenant companies that become the eventual owners of the buildings (as in Ljubljana).

All these alternatives have advantages and disadvantages in terms of certainty, predictability and flexibility.

In each and every one of the scenarios described above, duration, conditions, financial and state aid implications are all elements that warrant attentive consideration from the very outset. The referenced options constitute alternatives to traditional public procurement of construction services, their main benefit being that the long-term strategic interests of the public and private partner(s) are fully aligned behind the success of the project.

## Preparation

Proper feasibility analysis needs to be undertaken before initiating any element of an STP or innovation district project. This process is, by definition, lengthy and depending on the scale and complexity of individual projects, it may take several months, or even years. The feasibility phase needs to incorporate extensive consultation with stakeholders and potential end-customers of the local innovation ecosystem (including academics, trade associations, venture capitalists, and technology transfer experts) with a view to establishing the existence of the necessary demand to make the project successful. Once feasibility and demand analysis are complete, detailed specifications for the project can be developed, including scope, valuations and financial projections as well as legal and financial structuring.

Some of the analysed case studies have shown that this preparation phase may take several years before the STP or Innovation District becomes operational. A thorough preparation helps ensure the long-term success and financial sustainability of the project.

## Contributions of PPP partners

The case studies indicate that, in general, public sector partners contribute the land and drive the development of projects (conduct of studies, management of administrative procedures, mobilisation of stakeholders, networking and promotion).

Private partners, generally, deliver financial resources for the development of infrastructures as well as know-how and resources for management and operation of the STP/District. That being said, our case studies covered both projects in which single developers provided financing for development of the infrastructure in its entirety, as well as instances in which financing for construction of the infrastructure was recovered from eventual tenants that decided to purchase the space they occupy.

An element that is often overlooked, and consequently under-resourced, is the development and orchestration of the innovation community, an activity that requires resources, both human and financial, as well as specific expertise.

The stronger the private partner and the higher its financial contribution to the development of the STP, the stronger is its role in decision-making on the strategy and management of the STP. Where private partners are numerous, and consist of either several smaller real estate developers (Johanneberg Science Park, Gothenburg) or a group of innovative SME tenants, the initial project promoter has a strong position in the STP management company and say in its strategy (*cf.* city of Ljubljana, City of Ann Arbor and the University of Michigan, Chalmers University and the city of Gothenburg).

## Governance

As a general rule, representation of all triple helix stakeholders (government/city, academia, the private investors/partners) and, to an extent, the civil society<sup>4</sup> in decision-making or supervisory bodies (*e.g.* the Board of Directors) is common practice to ensure a balance between strategic goals on the one hand and the effective and efficient operation of STPs/

Districts on the other. For instance, the industrial specialisation of a project is often jointly defined and decided upon by all partners starting from the very initial preparatory phase of the project, with potential adjustments made throughout the lifecycle of the project. Academia plays a major role by delivering the high-quality human capital necessary to accommodate the growth and expansion of a park or district.

## Location, connectivity and liveability

Most of the projects covered by this study are located in immediate proximity – as an extension of urban areas – to large cities of regional or national significance, with strong economies and business concentration. Many of the urban areas in question exhibit strong and stable demand in specific industries combined with buoyant real-estate markets. The notion that PPPs can only be successfully deployed in geographical areas that exhibit significant real estate inflation seems to be disproved by several examples of successful STPs or Districts being created in smaller cities and regions where proper planning and identification of focus areas, building on local strengths, has occurred.

In many cases, new STPs/Districts are part of large-scale urban regeneration efforts and involve the repurposing of large-scale legacy infrastructure (*i.e.* HereEast and MIND). Instances exist of entirely “green field” developments (*e.g.* Gav Yam Negev and Ørestad Innovation City) that have managed to successfully grow thanks to long term investments driven by forward looking strategies, but these seem to remain exceptional cases.

One of the fundamental roles of public partners involved in the conception of new STPs – and even more of new Innovation Districts – is to take full account of the connectivity and liveability elements of their projects. STPs and Districts that are integrated into broader local regeneration plans, benefit enormously from upgraded and newly developed transport links, amenities, educational, healthcare and sporting facilities, as well as from the availability of affordable housing.

This emphasis on connectedness and liveability inevitably becomes a fundamental element of the attractiveness of an innovation district and will determine, in the long-term, its ability to attract the human and financial resources necessary for its growth and expansion.

## Sectoral focus and specialisation

Determining if a new STP/District should have a specific sectoral focus is an essential question. Careful identification of local industrial strengths and niches is a pre-requisite for any successful long-term PPP. Public authorities also have an important role to play leveraging their ability to locate anchor tenants on new STPs/Districts such as public universities or research centres operating in relevant domains (*e.g.* Gav Yam, Plexal).

The lengthy process of “profiling” to identify the industrial sectoral focus, and of assembling a network of industrial partners, can take (several) years to complete. But alignment with local industry and international demand is likely to significantly improve a project’s success likelihood.

Smart specialisation strategies can also form an important starting point for administrations, be they local, regional or national, to identify strategic areas to focus on, in which existing or emerging comparative advantages exist. Adhering to local smart specialisation strategies would also enable local authorities to leverage EU funds for additional development of the local ecosystems.

## Stakeholders

Structured involvement and consultation of stakeholders throughout the planning and operation of an STP/District is of vital importance. Innovation ecosystems have complex and diverse value chains and planners may need to engage with constituencies as diverse as academics and researchers, institutional and early stage investors, bankers, civil society organisations, philanthropic institutions, successful entrepreneurs, etc.

The involvement in the planning and development of a new STP/District of all levels of governance (local, regional, national) is also essential, especially with respect to complex, large-scale projects. The MIND project, provides a best practice example in managing the involvement of different governance levels through the creation of AREXPO, a public company whose shareholders include the national government, the regional government, Milano Municipality, and three strategic local partners: the provincial authority, the local municipality and the Fair of Milan.

## Governance

In the majority of observed cases, the public partners are usually not engaged in the management of day-to-day operations of the STP and/or Innovation District and, in a minority of cases, even their involvement in setting specific policies and strategies is minimal. Public Partners are generally consulted either through specific advisory bodies (*i.e.* Steering Committees) or represented in the board of directors of the STP/District, in cases where these are set-up through formal creation of a Joint Venture between public and private partners.

Such arrangements are intended to achieve three objectives: **(i)** ensuring that the private partner has a great degree of latitude in developing and managing the infrastructure and – especially in the case of Innovation Districts – service provision to tenants, **(ii)** insulating Public Sector partners from the commercial risk of a particular project that is transferred to a private operator, and **(iii)** ensuring that the public partner retains a level of influence on strategic decision making.

Transferring risk to the private sector and administrative efficiency remain core factors behind the decision to form PPPs in connection with STPs and Innovation Districts. However, the quantification and management of commercial risks for these types of projects remain difficult for private sector players, especially if compared to more traditional real estate development.

The flexibility of governance structures also seems to emerge as an important element. STPs and Innovation Districts are, by definition, dynamic

projects that should remain open to newcomers that may want to jump-in at later stages of development depending on specific circumstances and needs.

## Balanced growth and expansion

Public sector partners generally relinquish control of significant real estate assets to private sector developers, managers, operators or tenants, while retaining, in a limited number of cases, only small amounts of surface space (*e.g.* 5,000 m<sup>2</sup> of the 75,000 m<sup>2</sup> in total in Ljubljana).

Partnerships between the public and private sector need to balance the inevitable tendency of private partners to focus on monetisation of the real estate, by aiming for high or full occupancy rates with the need to ensure that occupants have relevant profiles (bringing value to the composition of the cluster) and that adequate investments are made in laboratories, common areas and amenities. The latter three are particularly important, not just for an STP or District to enable the delivery of high-quality research (which is an essential part of its core mission), but also to ensure that a pleasant environment facilitating informal social interaction is created. Socialisation and the resulting cross-fertilisation are recognised as important pre-requisites for triggering the type of cross-organisational collaborations that are so essential to driving innovation.

In many cases, additional buildings and infrastructures are added at later stages once the project matures, its viability is demonstrated, and private investors recognise its potential. In managing expansion, it is important to ensure continued quality monitoring of any potential new tenants to ensure that they can catalyse and accelerate the ecosystem further, by exploiting synergies with existing anchor institutions (*e.g.* universities and research centres) and tenants.

## Occupants/tenants and services

Critical mass is absolutely essential for an STP or Innovation District to successfully get off the ground. The public sector has an important role to play in helping a project to reach the tipping point at which

private investors become interested, by leveraging its control or influence over public or semi-public institutions (e.g. universities, research centres, public administration offices, hospitals). The decision to transfer to a new STP or District such significant anchor institutions increases the attractiveness of the project, often by relocating significant human capital to the premises.

The process and criteria utilised for the selection of tenants is also significant. In most of the cases covered by this report, potential tenants have to undergo a stringent evaluation process intended to determine the nature and innovativeness of their activities, their potential for growth both locally and internationally, and their relevance to the STP/District. STP/District managers are often very selective in their screening of potential tenants and the use of selection committees, with broad representation is frequent. The length of contracts, leases, concessions, etc. has a strong impact on the amount of flexibility that private sector partners can apply to the selection of tenants. Longer contractual arrangements mean that break-even points can be projected further into the future and greater stringency applied to tenant selection even at the cost of lower occupancy rates in the short-term.

The creation of a supportive environment, with broad ranging services provision, that amplifies the socio-economic impact of the research and innovation generated onsite, is a critical element of success. In many ways, the real estate infrastructure “hardware” cannot operate successfully unless it is complemented by appropriate “software” in the form of a plethora of support and ancillary services.

In particular, most STPs/Innovation Districts, especially when attracting significant populations of early stage and start-up companies need to provide adequate services and programmes to support their growth and expansion. The range of services and programmes in question is broad and varied and often includes the provision of suitable incubation facilities and related acceleration programmes (often run in collaboration with corporate sponsors) as well as advisory services (often in collaboration with external suppliers) related to, for example, identifying

and protecting intellectual property, raising early stage investment, and advertising and marketing.

All the above-listed support services, are frequently complemented by additional outreach activities, for example alumni programmes that have proven very beneficial in facilitating trust and connections building between the public and the private sector and between organisations inside the STP/District and the outside world (both Ann Arbor and Brno have good experiences with harnessing alumni networks).

Proximity is valuable for companies and research institutions that are co-located on a particular site. But proximity among private actors is not the only benefit of an STP/District. In the case where particular sites attract significant numbers of people – or are embedded in urban and sub-urban areas – proximity to users and potential customers offers an important additional benefit in the form of the possibility of accessing large pools of potential users and customers for piloting of new solutions or technologies. Such an approach, commonly referred to as a living lab approach has gathered considerable momentum in recent years and is actively being implemented/explored in at least three of the cases covered (Johanneberg Science Park, Plexal and MIND).

## Financing and budget

Most of the examined STPs/Innovation Districts function (or intend to operate) on the basis of at least two differentiated revenue streams: **(1)** Their operational budget and **(2)** Revenue linked to externally funded projects or services provided.

Operational costs are often covered through a mixture of private and public (local, regional or national authorities, universities, etc.) contributions. Additional sources of funding will typically include rents, private foundation sponsorships, consultancy, (non-rental) membership fees from public, private and academic tenants, innovation-related services to tenant companies, and competitive projects from national or EU programmes.

Interesting, innovative and seemingly sustainable (financial) models that emerge from the analysis

include the use of a portion of capital gains tax proceeds on the real estate to support the growth and acceleration of technology start-ups (as in Ann Arbor). This generates a virtuous cycle as growing companies occupy vacant space, thereby generating real estate appreciation which in turn increases capital gains tax receipts.

The major part of the surpluses from the operation of Science Parks and Innovation Districts are normally re-invested in the area to expand buildings, infrastructures or to broaden the range of services available to tenants. This in turn increases the attractiveness of the STP/District.

The distribution of dividends to the private partners is also practiced, especially in later stages of projects. Some STPs and Innovation Districts currently run surpluses but would need to raise additional private sector capital if they wanted to expand.

One of the key challenges in the planning and conception of a new STP/Innovation District is the estimation and projection – often over very long periods of time – of future levels of revenue and profitability. The calculation of future proceeds of an STP/Innovation District is fundamental to demonstrate the commercial viability of a project to private sector partners. At the same time, overestimating potential revenues may compromise the viability of a project while underestimating them could trigger a loss of value for the public sector partner.

Calculations and projections of these types need to be carefully undertaken on a case by case basis and constitute a key difficulty in the set-up of large-scale PPPs for STPs and Innovation Districts.

## Performance measurement

The selection and measurements of key performance indicators for STPs and Innovation Districts operating as PPPs varies considerably between the cases covered by this study.

Some projects try to identify and measure the level and intensity of collaborations and partnerships as reliable proxies of a functional innovation ecosystem. Others put the emphasis on tenants' satisfaction, job creation or overall value added to the local economy. In all cases, however, a consensus exists that hard economic indicators may fail to capture the positive socio-economic externalities of an STP or Innovation District and that hard indicators need to be complemented by social impact indicators and metrics.

# 1. Introduction

As mentioned on the website of the Smart Specialisation platform<sup>5</sup>, ‘Smart Specialisation is conceived within the reformed Cohesion policy<sup>6</sup> of the European Commission, and is a place-based approach characterised by the identification of strategic areas for intervention based both on the analysis of the strengths and potential of the economy and on an Entrepreneurial Discovery Process (EDP) with wide stakeholder involvement. It is outward-looking and embraces a broad view of innovation including but certainly not limited to technology-driven approaches, supported by effective monitoring mechanisms’...

‘Science and technology parks (STPs) and Innovation Districts are very common instruments used by regional and national authorities for regional development. Their main objective is to foster science-based growth poles to stimulate economic diversification away from declining industries. Today, STPs are present in many European regions. They concentrate a wide range of innovative companies and research organisations and as a consequence the overall knowledge intensity of these places is very high. STPs and Innovation Districts are thus likely to include seeds for the domains of knowledge-intensive specialisation, on which regions can rely to increase their competitiveness. This is why STPs and Innovation Districts seem well placed to play a key role in innovation strategies for smart specialisation (S3).’<sup>7,8</sup>

However, there are barriers<sup>9</sup> to effectively attract investment to build such STPs<sup>10</sup> (cf. R&D&I infrastructures), including:

- lack of finance for (i) operating expenses (OPEX) of infrastructures and (ii) development of a cross-sector innovation communities
- political volatility resulting in shifting policy and funding priorities
- limited institutional capacity in some Member States (largely due to high turnover of staff)
- pressure to maximise loan dispersion (or absorption in the case of grants)
- political pressure to make projects self-sustainable from the very beginning
- slow pace of cultural change within universities and research institutions (especially in relation to collaboration with industry and commercialisation of R&D results)
- absence of robust financial models capturing the synergies between real estate and innovation components of these types of projects<sup>11</sup>.

To explore some of these challenges in greater detail, the European Commission’s Joint Research Centre (JRC) organised a number of dedicated workshops focused on the different models of STP financing, management and operation.

Against this background, the JRC’s Competence Centre on Technology Transfer<sup>12</sup> (CC TT) was tasked in 2017-2018 with conducting a study on reshaping the capacity and development strategy of a newly built technology park in South-East Europe and improving its (financial) sustainability. One of the key recommendations emerging from this study was that a concession-based PPP should be set-up where a private sector partner would be responsible for additional development and operation of the park and for ensuring its sustainable expansion and growth.<sup>13</sup>

The current study -undertaken by five external experts in close collaboration with the International Association of Science Parks and Areas of Innovation (IASP) and its vast network of Members- intends to build and substantiate the recommendation made in 2018 and to explore how Public-Private Partnerships (PPPs) and related partnering modalities, such as concessionary models, can best be utilised and applied for the construction and operation of (financially) sustainable Science and Technology Parks (STPs) and Innovation Districts.

The experts engaged for this study were of the opinion that a necessary preliminary step was to analyse currently existing STPs and Innovation Districts operating as PPPs, as a way of identifying relevant best practices. In so doing the experts decided to depart from the stringent OECD definition of Public Private Partnerships and to adopt a very broad definition covering many forms of public-private collaborations.

The goal of this study was achieved through the analysis of several case studies<sup>14</sup> covering several existing or emerging models for the development and operation of STPs and Innovation Districts. The focus has been placed on cases where long-term contractual arrangements are in place between public and private sector that go beyond the simple outsourcing of construction projects. While some of the cases explored

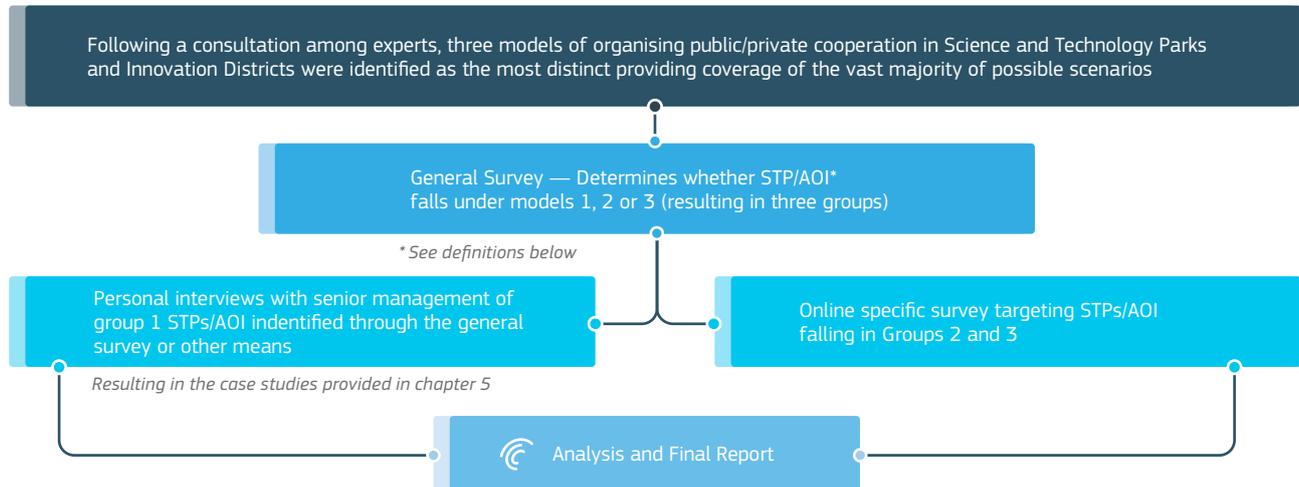
in this study cannot be referred as true PPPs, they nonetheless represent best practice and successful examples of public and private sector coming together in the conception, construction and management of STPs and Innovation Districts.

This study also introduces a broad spectrum of available models and considers overlaps, similarities and differences between them. It also sheds light on the ways in which cities apply innovative approaches to the design, financing, and delivery of large-scale urban regeneration projects (including the redevelopment of large-scale legacy sites) focused on R&D&I.

Advantageously, this study can serve as a case-based reference guide for practitioners including developers and managers of STPs and Innovation Districts, policymakers and stakeholders.

## 2. Methodology

**Figure 1.** Methodology and steps in preparation



This section describes the methodology used for the preparation of this study.

First, together with IASP and the experts, three general/broad models of collaboration between public and private partners with respect to Science and Technology Parks and Innovation Districts were identified.

Afterwards, a general survey was created and distributed to member organisations of IASP to determine whether they considered themselves to be/operate as PPPs, using the three collaboration models identified earlier. More specifically, respondents were asked whether their organisational structure was captured by any of the three broad categories/models: **(1)** Long-term partnership involving a degree of risk sharing (the closest to a traditional PPP); **(2)** Jump-in model where private investors are involved at a later stage of a project's development; or **(3)** Management Partnership. These three broad scenarios do not aim to capture every possible scenario but were deemed adequate as a taxonomy for the purposes of this study. Additional permutations and hybrids of these models exist, but they can generally be reduced to the three baseline models described above.

Application of these models can occur at different points in the lifecycle of a specific project. In some instances, for example, the initial and riskiest phase of a project is completed entirely by the public sector. In this case, an initial set of buildings and facilities is constructed

by the public sector and initial operations are launched. Once the viability of the project is demonstrated a private partner(s) is/are identified and urbanised land<sup>15</sup> is handed over for additional construction and development of the park, often through concessions covering the whole, or part, of the site. In many cases, the concessionary models used make provisions for the flow-back of a portion of the proceeds generated by operation of the park to the public authority that initiated the project. Such de-risking of a project by the public sector has proven extremely attractive to private investors that would not necessarily be prepared to cope with the volatility and uncertainty linked to a project at its very outset.

Resulting the general survey results, respondents were distributed among the three groups mentioned above. Afterwards specific questionnaires were developed for each group (see Annex 1A, 1B and 1C respectively).

The eight case studies covered in this report were prepared through in-depth interviews<sup>16</sup> conducted by the experts and include projects identified as falling within group 1 as a result of the general survey or projects identified through desktop research and the networks and experience of individual experts. Most of the cases covered in Chapter V of this report come close to the traditional PPP model or resemble several of its elements. Information on Group 2 & 3 projects was collected through an online specific survey<sup>17</sup> whereby the results analysed by the IASP team.



## 3. Background

This chapter comprises five sections and provides background information to help set the scene and scope of the study. The first section provides an overview of relevant definitions used in this study. The second explores the nature of PPPs, especially in the EU context. The third looks at the financing and execution of PPPs. The fourth looks at the real estate market. The fifth and final section looks at State Aid implications of PPPs.

### 3.1 Definitions

#### 3.1.1 Definition of Science Parks and Areas of Innovation by IASP

Despite some overlaps, IASP differentiates between the concepts and respective definitions of a Science and Technology Park (STP) and an Areas of Innovation (AOI).

The IASP definition of a Science and Technology Parks states that:

“A science park is an organisation managed by specialised professionals, whose main aim is to increase the wealth of its community by promoting the culture of innovation and the competitiveness of its associated businesses and knowledge-based institutions.

To enable these goals to be met, a Science Park stimulates and manages the flow of knowledge and technology amongst universities, R&D institutions, companies and markets; it facilitates the creation and growth of innovation-based companies through incubation and spin-off processes; and provides other value-added services together with high quality space and facilities.<sup>18</sup>”

The IASP definition of an Area of Innovation (AOI) states that:

“'Areas of Innovation' are places designed and curated to attract entrepreneurial-minded people, skilled talent, knowledge-intensive businesses and investments, by developing and

combining a set of infrastructural, institutional, scientific, technological, educational and social assets, together with value added services, thus enhancing sustainable economic development and prosperity with and for the community.<sup>19</sup>”

#### 3.1.2 Definition of an Innovation District

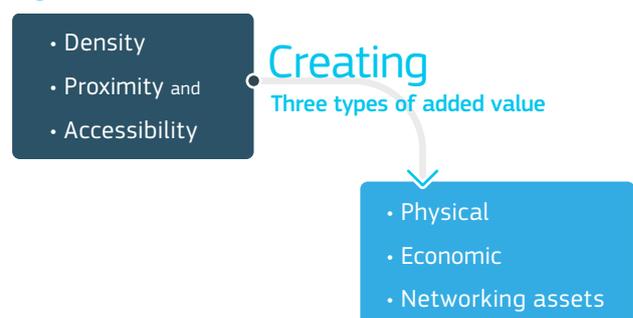
Innovation districts are related to science parks and areas of innovation as defined in the previous section. Large multi-stakeholder innovation districts, of which the current study examines several, seem a relatively recent development that has emerged alongside traditional science and technology parks. They are closely related to areas of innovation, of which they, effectively, seem to represent a sub-set.

The Global Institute on Innovation Districts (GIID), a recently established platform gathering practitioners, non-governmental organisations, researchers, real estate investment funds and global infrastructure developers, defines innovation districts as:

“dense, walkable hubs of economic activity where innovation, entrepreneurship, creativity, and place making intersect and where actors collaborate as a collective to increase their competitive potential.<sup>20</sup>”

A recent study<sup>21</sup> focusing on how innovation districts are addressing economic and social divides claims that over 100 innovation district projects already exist across the world sharing three common traits:

**Figure 2.** Common traits of Innovation Districts and asset creation



On conceptual and impact level, the research finds that innovation districts are used as a tool for “inclusive innovation” to ensure that local

communities also benefit from the economic and educational opportunities that they generate. This approach is commonly referred to as “responsible neighbourhood regeneration”.<sup>22</sup>

The GIID is partnering with the Brookings Institution, an independent think tank based in Washington, DC. Brookings finds that innovation districts “build on and revalue the intrinsic qualities of cities: proximity, density, authenticity, and vibrant places”<sup>23</sup> and recognises the potential of innovation districts to act as catalyst of urban regeneration.

One of the key findings of this study is the importance of thorough planning for the success of innovation district projects. The initial inception and evaluation phase of each large-scale project is essential for its long-term success and sustainability. This phase usually requires an in-depth assessment of the area’s potential including its value chains, even where these extend beyond the geographical boundaries of a particular area. Such assessment tends to focus on three core asset types: economic, physical and networking (connecting) assets, and comprise an analysis of:

- the clearly distinctive or unique features of a particular area
- its sectoral focus and strengths
- the commercialisation potential of local university and company R&D<sup>24</sup>

A study by the Brookings Institution suggests that cities are starting to realise that they can capitalise on radically undervalued and underleveraged assets in their [public] possession. This applies not just to wealthy metropolises, but also to poorer or indebted cities that often sit on significant assets – such as public land – that are not being utilised well or developed.<sup>25</sup>

### 3.1.3 Definition of a Public-Private Partnership

PPPs tend to be diverse and unique animals and their complexity is well captured by the mantra among experts: “when you’ve seen one Public-Private Partnership, you’ve seen one Public-Private Partnership”.<sup>26</sup>

No single widely accepted definition of a PPP, or uniformly and internationally recognised one, exists. PPPs include a variety of long-term contractual arrangements.

According to most definitions, including the one used by Eurostat, only projects that bundle together construction and operation are considered to be true PPPs.

The PPP Knowledge Lab<sup>27</sup>, of which both the European Investment Bank (EIB) and European Bank for Reconstruction and Development (EBRD) are partners, brings together relevant and authoritative resources on PPPs in one location, to assist governments and practitioners to design and deliver better infrastructure projects. It was launched in 2015 by a number of Multilateral Development Banks with the support from the Public-Private Infrastructure Advisory Facility (PPIAF, a multi-donor technical assistance facility).<sup>28</sup> The PPP Knowledge Lab aims to provide reliable, trustworthy knowledge about Public-Private Partnerships. The Reference Guide of the PPP Knowledge Lab provides a broad definition of a PPP:

“A long-term contract between a private party and a government entity, for providing a public asset or service, in which the private party bears significant risk and management responsibility and remuneration is linked to performance.”<sup>29</sup>”

The European PPP Expertise Centre based at the EIB has the objective of supporting the public sector across Europe in delivering better public-private partnerships (PPPs).

The European PPP Expertise Centre uses a definition similar to the one above, but specifies that in PPP arrangements the public authority either makes performance-based payments to the private partner for the provision of the service; or grants the private partner a right to generate revenues from the provision of the service.<sup>30</sup>

PPPs typically share the following features, according to the European PPP Expertise Centre:

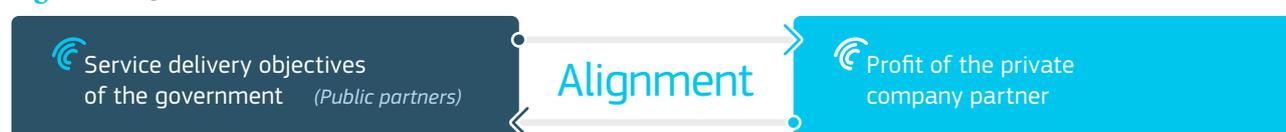
- based on a long-term contract;
- are between a public authority and a private partner;

- focus on the provision of services rather than assets;
- entail the transfer of certain project risks to the private partner, notably with regard to designing, building, operating/maintaining and/or financing the project;
- focus on the specification of project outputs rather than project inputs, taking account of the whole life cycle of the project;
- apply private financing (often “project finance”) to underpin the risks transferred to the private partner; and
- remunerate the private partners, either through performance-based payments for the provision of the service, or through the right to generate revenues themselves from the provision of the service.

The United Nations Economic Commission for Europe (UNECE) recognises that in many developing countries and emerging markets, governments have made PPPs a priority. The UNECE International PPP Centre of Excellence (ICoE) has been created to explore good practices of international PPP projects and to assist governments in implementing such projects. According to its Guidebook on Promoting Good Governance in Public-Private Partnerships,<sup>31</sup> the Centre identifies two broad categories of PPPs: “institutional” PPPs referring to all forms of joint ventures between public and private stakeholders and “contractual” PPPs, consisting in the use of concession models (the ‘user pays’). The latter has experienced a strong surge in popularity in the recent past.

The definition proposed by the OECD states that PPPs are “long-term contractual arrangements between the government and a private partner whereby the latter delivers and funds public services using a capital asset, sharing the associated risks”.<sup>32</sup>

**Figure 3.** Alignment of interests



The 2012 OECD recommendations on the governance of PPPs also provide a good overview of the principles

that public authorities should consider before entering into PPPs, including “value-for-money”.

The effectiveness of the alignment of public and private interests depends also on a sufficient and appropriate transfer of risk to the private partners. In a typical PPP contract, the government specifies the quality and quantity of the service it requires from the private partner. The private partner may also be completely entrusted with the design, construction, financing, operation and management of a capital asset required for service delivery as well as the delivery of a service to the government, or to the public, using that asset.

In the cases of large-scale innovation districts where numerous stakeholders are involved, projects tend to be conceptualised in close cooperation between public and private partners to a process very much akin to co-creation, within the applicable legal framework and regime for the respective type of contracts.

This goes well beyond traditional public procurement of construction work and points towards intricate and highly structured concessionary models involving extensive liaison and negotiation between public and private partners.

Traditional public procurement for construction differs from more complex concessionary or partnership structures in that the role of the private party goes beyond the one-off real estate construction, adding the right and obligation to operate and exploit the area for the shared benefit of the public and private stakeholders. In these circumstances, a long-term shared vision about the development and management of the area is an important precondition for success. Negotiations between public and private sectors in this context can be lengthy and complex and public sector partners are often at a disadvantage when it comes to skills and expertise,

especially on questions relating to valuations and revenue modelling.

For the purposes of this study, we adopt a broad definition of PPPs, including not just the structured forms of cooperation covered above but also looser forms of collaboration among the public and private sector in the planning, delivery and operation of STPs or Innovation Districts.

## 3.2 PPPs in the broader sense

### 3.2.1 PPP Concessions in the EU context

“Concession” is one of the most commonly used words, and probably the least precise one, in PPP terminology.<sup>33</sup> The vagueness and frequent usage of the word concession makes comparison of projects across countries and sectors more difficult as similar projects often use different terminologies and different ones the same, even if referring to different concepts.<sup>34</sup>

Eurostat<sup>35</sup> makes a useful differentiation between PPPs and concessions. PPPs require that a government entity is the direct source of the majority of the revenues that the [private] partner is entitled to receive under the contract. This is the case regardless of whether the demand for or use of the asset originates from the government entity itself (*e.g.* a hospital paid for by a government entity) or from users (*e.g.* a road, paid for by a government entity on a demand (toll) basis). If the majority of the private partner’s revenue is sourced directly from the users of the asset, Eurostat will consider the project to be a concession. Member States of the EU may have different or more specific national definitions of a PPP.

According to the UNECE 2008 Guidebook on Promoting Good Governance in Public-Private Partnerships, concessionary models have the longest history of public-private financing and are actually a form of PPPs.

Concessions are defined as contractual arrangements whereby a facility is given by the public to the private sector, which then operates it for a certain period of time. This often includes the design and construction of the facility as well. Contracts foreseeing extensive involvement of the private sector (*i.e.* “Design, Build, Finance and Operate” (DBFO) are considered concessions.

Concessions allow for the mobilisation of private capital, know-how and expertise to complement public resources (such as land for instance) and enable new investment in public infrastructure and services without increasing public debt. The EU Concessions Directive (2014/23/EU) applies to contracts whose value is equal to or greater than € 5 225 000. Concessions can be either for works or for services, as illustrated below:

- For works concessions the contracting authorities or contracting entities (*i.e.* acting on behalf of the public sector) entrust the execution of works to one or more economic operators, who in turn are awarded the right to exploit the works with or without additional payment.
- For services concessions, the public entity entrusts the provision and management of services to one or more economic operators, who in turn are awarded the right to exploit the services with or without additional payment.

An essential element of concessions is the transfer of [operating] risk to the private partner (the main risk being that the revenues generated do not cover the private partner’s overall investment). The EU Directive assumes the existence of such a risk for the purposes of defining a “concession” (Article 5):

“ [...] The concessionaire shall be deemed to assume operating risk where, under normal operating conditions, it is not guaranteed to recoup the investments made or the costs incurred in operating the works or the services which are the subject-matter of the concession. The part of the risk transferred to the concessionaire shall involve real exposure to the vagaries of the market, such that any potential estimated loss incurred by the concessionaire shall not be merely nominal or negligible. ”

In principle a project is financially viable for the private partner if the revenues generated by operating or exploiting the project’s assets cover not only the full costs for the investor but also provide a sufficient return on investment. The complexity of PPPs implemented through concessionary

arrangements lies in striking a balance between the necessary amount of investment, the risks of the project and the economic and social benefits of the project for both the public and private sector.<sup>36</sup>

Duration is a key element in any concessionary arrangement. Article 18 of the Directive stipulates that:

“...the maximum duration of the concession shall not exceed the time that a concessionaire could reasonably be expected to take to recoup the investments made in operating the works or services together with a return on invested capital taking into account the investments required to achieve the specific contractual objectives.”

An essential principle for concessions is that users will pay for services or use of the infrastructure throughout the lifetime of the project. In the case of innovation districts, the users will be the businesses and tenants that pay rents. Ultimately, therefore, it is the users that generate the revenues that the private partner (concessionaire) needs to recover the costs of building and operating the facilities.

Simple land-lease contracts may also be used for the development of STPs and Innovation Districts. However, these do not qualify as concessions and therefore legislation on concessions does not typically apply.

Mixed contracts containing elements of supply, works and service contracts and of concessions may be fully or partially covered by EU Directive 2014/24/EU on public procurement.

### 3.2.2 Benefits and downsides of Public-Private Partnerships

The PPP model offers significant advantages over traditional public procurement for construction in terms of efficiency, service quality, value for money and above all the existence of a shared long-term vision between the public and the private partner.

The Commission, in its Guidelines for Successful Public-Private Partnerships<sup>37</sup>, has identified four primary functions for the private sector in PPP schemes:

- to provide additional capital;
- to provide alternative management and implementation skills;
- to provide added value to the consumer and the public at large;
- to provide better identification of needs and optimal use of resources.

In short, PPPs bring savings to the public purse and improve the quality and efficiency of public spending by leveraging the expertise and know-how of the private partners, ultimately helping to align public and private interests.

The provision of equity or debt finance by the private sector partner explicitly builds a mechanism for managing the costs and risks associated with PPP. This is in stark contrast to direct public sector funding where risks are ultimately transferred to taxpayers or end users.

Risk identification, quantification and allocation is at the core of any PPP. A clear understanding of what risks are allocated or transferred and to whom is a precondition for the drafting of every PPP or concessionary agreement. The appropriate application of risk allocation principles is what determines whether a given PPP project will be ‘bankable’, and whether it will be sustainable. A useful reference in this respect is provided by the report “Allocating Risks in Public-Private Partnership (PPP) Contracts”<sup>38</sup> that provides methodological indications on how to map the allocation of risks between public and private sectors in PPP transactions, as well as information on possible mitigating strategies.

The complexity of PPPs have led some to question their effectiveness and efficiency beyond the initial construction phase, with questions raised about their long-term cost for the public sector.<sup>39</sup> However, recent studies, focusing on emerging innovation ecosystem models, find that PPPs for Innovation Districts are capable of combining the market efficiency with the benefits of public direction, support and legitimacy.<sup>40</sup>

A report by the European Court of Auditors (ECA) found that delays, cost increases and underuse were

partly attributable to inadequate ex-ante analyses and unsuitable approaches. The institutional and legal framework was assessed as not sufficiently adequate for EU supported PPP projects and a number of PPP projects were not able to generate their expected benefits. Risk allocation was also found to be often inadequate, resulting in reduced attractiveness or excessive risk exposure for private partners.<sup>41</sup>

An additional ECA report covering the effectiveness of EU funding provided to start-up incubators and related infrastructures (often a key ingredient of STPs and Innovation Districts) found that infrastructure quality was generally good, but that the support services offered to end users tended to be poor.

At the Member State level, management systems did not pay sufficient attention to the operational activity of business incubators. Financial sustainability could also have been better addressed. The ECA recommended that the following elements be incorporated in the design of the procedures for selecting and supervising EU co-financed projects:

“ In the project selection criteria, greater emphasis should be placed on the expected results of the projects rather than on the delivery of physical outputs... During the project assessment process and when contractual obligations are being defined, more use should be made of expert knowledge of business incubation activities...<sup>42</sup> ”

### 3.3 Project financing and execution of PPPs

Several financing models are available for PPPs. One of the basic models is the Build-Own-Operate-Transfer (BOOT) where the private partner builds, owns and operates the assets or facilities. At the end of the project lifetime and after a previously agreed and specified period of time, the private partner is obliged to return (transfer) the assets (such as land and/or buildings) back to the public partner. In permutations of this model, the private partner may never truly own the assets but just operate them (BOT). Another model is the design-construct-manage-finance (DCMF), traditionally used for public hospitals for example.

In **table 1**, we compare traditional public procurement for one-off construction of a publicly owned and publicly managed project against a scenario in which the private sector is involved in almost all stages of the project: from the inception (proposal of the solution) through to the construction, continuous investment, operation and management, all the way to the long-term “right to use” the area under a concessionary contract.

Mixed public-private ownership is observed in about 30% of STPs in the EU.<sup>43</sup> A number of these operate under models that lie somewhere between the two extremes illustrated in **table 1**.

**Table 1.** Compare: Levels of Private Sector Engagement

	Identify Infrastructure Need	Propose Solutions	Project Design	Project Financing	Construction	Operation / Maintenance	Ownership
<b>Traditional Procurement for Construction (no PPP)</b>	Public Sector				Private Sector (One-off development)	Public Sector	
<b>Complex, long term &amp; far reaching PPP with strong private sector involvement (clear PPP/ concession)</b>	Public Sector	Public + Private Co-creation		Private Sector Partners Private Sector Operation + Continuous Investments / Usage & Deriving Profits, Concessionary elements		Private Partners often become co-owners. In concessions: "ownership" or the right to use is limited in time.	

**Source:** Based on Brookings Institute analysis and expert interviews

### STP investments at the EIB

The European Investment Bank (EIB) has co-financed the development of several science parks across Europe, typically with about 50% participation in the total project costs.

The Bank performs a holistic evaluation of projects it considers for funding,<sup>44</sup> this is commonly referred to as “appraisal”. This due diligence process involves an assessment of the financial viability of the project, an analysis of risks and related mitigation strategies, the counterparty’s capability to operate the project, market dynamics, etc. In addition, in order to be eligible, projects should contribute to EU economic policy objectives such as the promotion of economic and social cohesion in the EU.

The table below compares the appraisal approaches taken by a hypothetical private investor and by the EIB to a fictitious infrastructure project, called ‘Project X’.

**Table 2.** Compare: approach to potential investment

Project X	Private investor's approach to potential investment	EIB's approach to potential investment
<b>Evaluation</b>	Project is considered viable if an acceptable risk/return profile is offered. <sup>45</sup>	Economic appraisal takes a broader view to include other societal benefits and the value generated for all stakeholders
<b>Degree of interest from the respective investor</b>	Interested to invest only on reasonable economic terms (considering the risks, etc.)	While financial profitability and return is required for a project to be funded, lower financial returns do not necessarily mean lower economic and social impact.

From an institutional investor’s point of view, portfolio diversification has an important role to play in making investments with limited financial returns but generating significant positive societal externalities.<sup>46</sup>

“ By combining different types of projects and fostering synergies between investments, a diversified portfolio that gives good financial returns on some projects can compensate for (cross-subsidise) poor financial returns of other projects, which nevertheless achieve good Non-Financial Impacts. ”<sup>47</sup>

### Canada: Emerging models for bridging infrastructure finance

A new initiative of USD 35 billion offers a model that uses state support to attract private sector and institutional investment to new revenue-generating infrastructure projects that are of public interest. The Canada Infrastructure Bank<sup>48</sup> seeks to address a gap in the market between government-funded infrastructures, procured traditionally or as a public-private partnership, and projects that are privately funded.

### Ukraine: Incentivising private investors in countries with limited resources

A review of policy and institutional frameworks for industrial parks in the Ukraine discovered several mechanisms where countries with limited state resources attempt to attract private real estate investors and incentivise them to achieve government objectives.

The paper<sup>49</sup> covers a number of examples of developing countries trying to establish PPPs and attract private investors. In Chile, for example, the government provided guarantees (in the form of a minimum income) to increase the financial viability of proposed PPP projects.

### China invests heavily in integrated science parks and science cities infrastructures

China is making significant investments in integrated R&D&I infrastructures. Tus-Holdings<sup>50</sup> is an S&T investment holdings group linked to Tsinghua University. Tus-Holdings develops and operates science parks, business incubation centres and technology research and development facilities.

It offers intelligence and financial services, including venture capital investment.<sup>51</sup> The network of Tus-Holdings covers more than 50 cities and regions, including Hong Kong, the US, Canada, Japan, Malaysia, Thailand, Egypt, Italy, UK, Russia, etc., and is an important new actor of China's innovation system.<sup>52</sup>

TusPark is responsible for the construction of innovation and entrepreneurship services system. TusPark has the world's largest science park network with 5 completed parks around China with an area of 5 million square meters and 15 million square metres park area under development according to their website. Their parks host more than 3000 companies. TusPark (Beijing) is one of their largest holdings and is a single university science park, with a built area of 770,000 square metres, and more than 1000 resident companies. It has become an important platform for Tsinghua University to serve local society and promote the "brand" internally as well as internationally.

Tus-City has adopted a model focus on integrating urban development with innovation ecosystems. For example, Tus (Hefei) is a multi-functional integrated science and technology park set up by Tsinghua University, the provincial government of Anhui and the Hefei municipal government. It has a planned floor space of 1.7 million square metres.

Tus-Incubator is one of the earliest and largest networks of incubators in China comprising 150 facilities. Many Tus incubators are supported by the government that provides the space, covers operational fees, and sets up the cooperation fund with Tus-Holdings. Tus-Holdings provide the team and knowledge necessary to operate the facilities.

The BOO (Build-Own-Operate) model appears to be the prevailing model in Chinese cities. For the purposes of an investment a Special Purpose Vehicle (SPV) is normally created with public and private participation (such as 80% private / 20% public). The government pays for services to finance the build-up phase of an SPV project (reducing the risk). At the end of the development phase there is an initial public offering (IPO) repaying the investors.

Tus-Holdings is also expanding abroad, for instance with a participation in the large-scale Tushino project in Moscow. Tus-Holdings entered into a consortium together with the Russian Direct Investment Fund to co-invest, alongside with sovereign wealth funds from other countries, in the redevelopment and repurposing of the former Tushino airfield in Moscow turning it into a major multifunctional STP. This would turn it into the largest innovation centre in Russia. The total investment will exceed 90 billion Russian Rubles. The project includes plans to also build residential and recreational facilities.<sup>53</sup>

### 3.4 Significance of the real estate market

Large scale infrastructure projects are often complex and numerous factors need to be considered when thinking about their financing.

One of these factors is the size and strength of the regional or local real estate market. Public sector asset owners such as regional governments or local municipalities often wish to support and incentivise the development of an STP or Innovation Area/District by making land available and expecting that magic should happen. However, and well beyond a government's ability to position on a site important anchor institutions or attract international corporations, the buoyancy of the local real estate market will have a significant impact on the attractiveness of a particular project for private investors.

In weak real estate markets with strong public policy ambitions and support, public intervention can have a catalysing effect for the development of the project. This is especially the case where the public sector invests in the conceptualisation of developments or in improving the connectivity of a particular area or site.

When the local real estate market is reasonably strong, attracting private investors is considerably easier and higher demand means that tenant selection can be more stringent (*e.g.* application of sectoral preferences, or demand for R&D intensive tenants only).

In other words, the surrounding environment influences the potential for and development of a science park or innovation district. In overheated real estate markets, private investors can drive the process, while in a location with flat demand more active public intervention is needed (see figure below).

**Figure 4.** The Real Estate Market



Location is also important, in particular whether the area is located in a densely populated urban, suburban or entirely rural area. There seems to be a consensus that the tendency is to locate STPs in immediate proximity to a city or even within the city boundaries, taking advantage of urbanisation benefits while revitalising often marginalised communities in urban suburbs.

### 3.5 PPPs and State Aid in the EU context<sup>1</sup>

The EIB 2016 report<sup>54</sup> on PPPs and state aid provides an overview of the relevance and application of state aid principles to PPPs.

An important consideration is that all possible state aid issues must be addressed at the very early stage of project preparation (and certainly before any transfer of public land or assets), in order to avoid later stage difficulties.

A general principle and requirement is to avoid distorting the market by over-compensating the private partner in PPP arrangements or otherwise providing undue or discriminatory benefits. This can be ensured by running fair and transparent public procurement processes while, for instance, charging a risk-adjusted price for the provision of any state guarantees offered to PPP projects.

The price agreed with the private partner must be fair and not give undue advantage. In commercial decisions, such as the sale or leasing of land, the public partner must strive to act in the same way as any market operator would and seek to extract the best value based on a market price or arm's length negotiations. In other words, the procuring authority

(usually the public partner) should act as a "Market Economy Operator".

There are cases in which the private partner is given the right to use land for symbolic amounts in exchange for the provision of certain services as part of the PPP. In such situations, the "peppercorn" rents cannot be considered in isolation for the purpose of state aid assessment, but the rent must instead be assessed as part of the wider package of rights and obligations of the private partner. Exceptions apply, including the ones contained in the General Block Exemption Regulation<sup>55</sup> (GBER). As a whole, state aid considerations should duly incorporate a feasible mechanism for monitoring the various benefits accrued by the private partner so as to ensure compliance with any financial or other thresholds established in view of a GBER exception.

Another relevant element of EU state aid legislation is the possibility for a private investor to benefit from preferential access under more favourable conditions to research infrastructures or the premises, facilities and activities of an innovation cluster, provided that the private partner has financed at least 10% of the investment costs. In order to avoid overcompensation, such access shall be proportional to the partner undertaking's contribution to the investment costs and these conditions shall be made publicly available (Article 26 and Article 27 GBER).

<sup>1</sup> This section is intended to be a very simplified introduction on the subject-matter and nothing herein can in any way be considered as an interpretation of the applicable rules and regulations.

Often, for complex, long-term PPPs, such as innovation districts, the type of procedure for selection of the private partner could be a “*competitive dialogue*”. This procedure was designed mainly for procuring PPPs and economic infrastructure projects.<sup>56</sup> The competitive dialogue and the more recent “*competitive procedure with negotiation*” allow dialogue/negotiation with economic operators where the awarding body is not totally sure about the best way of realising its objectives.<sup>57</sup> As opposed to the “Open Procedure”, these are not first resort procedures and there are a number of limitations and conditions for their use. Article 26 of EU Directive 2014/24/EU<sup>58</sup> on public procurement provides that competitive procedures with negotiation or competitive dialogues can only be used in specific situations where the following criteria are fulfilled:

- the needs of the contracting authority cannot be met without adaptation of readily available solutions; and/or
- the works, supplies or services include design or innovative solutions; and/or
- the contract cannot be awarded without prior negotiations because of specific circumstances related to the nature, the complexity or the legal and financial make-up or because of the risks related to them; and/or
- the technical specifications cannot be established with sufficient precision [...]

The competitive procedure with negotiation or competitive dialogue may also be used where, in response to an open or a restricted procedure, only irregular or unacceptable tenders are submitted.

## 4. IASP questionnaires and results: PPP models identified and how these are used

As described in chapter 2, this study was initiated with the preparation and distribution of a general survey among IASP members and partner projects. The aim was to identify which of these have been created as, or are managed as, PPPs. The survey also intended to determine which of three models/types of public private collaboration each project entailed: (1) a close long-term PPP involving a degree of risk sharing (the closest to a typical PPP of the three models); (2) a Jump-in model where private investors enter the partnership at a later stage of development or (3) Management Partnership.

These three PPP models will be described in this chapter and a summary of the survey results will be presented (whereby a complete overview of all survey results for group 2 and group 3 are contained in Annex 2A and 2B respectively).

### 4.1 Description of the three main PPP models

#### 4.1.1 Model 1: “Full Partnership model”

Under this model the public partner(s) and one (or more) private partners reach an agreement to jointly build or exploit an STP/District. The definition of public partner covers different levels of governance (national, regional, and municipal) as well as government agencies, but also public universities, banks etc. The parties involved in the agreement will agree on the percentage stakes that each will have in the project.

Typically, this model entails the whole construction or redevelopment of a site, where little infrastructure exists and where there are no operational facilities. The parties agree on the governance model, the management, the strategy, mission and other important aspects that need to be decided upon before the initiation of the project.

Regardless of the distribution of “ownership” which can vary, the most significant feature of this model is that the partnership is formed before the project is launched or in its very early stages, and all parties in the partnership define together the mission, goals and strategy of the project. Typically, the parties involved will create an intermediary organisation in charge of owning, building and managing the project.

This is an emerging model and usually involves a concessionary type of contract for the development of mixed-use areas. One example of this is the Milan Innovation District (MIND) (see the case study number 8).

#### 4.1.2 Model 2: “JUMP IN” PPP model

Under this model an STP or Innovation District is launched on the exclusive initiative of a public agent (city, region, etc.), as is the case for most STPs/Districts. After a variable period of time, the owners of the park decide that the project should open for private investors to jump-in so that it can continue to develop and grow.

In these cases, private investors are invited to undertake additional development of a site through the construction of infrastructure (office buildings, dry labs, workshops, co-working spaces, etc.) or through the provision of value-added services such as private incubators, accelerators, etc. They are free to commercially exploit the facilities or services that they make available and they are not necessarily integrated into the management structure of the STP or innovation district and do not participate in strategic management decisions.

Carefully designed agreement between the owners of the park (public) and those ‘jumping in’ (private) are of critical importance. The private investors need to agree to the general policies of the STP, in particular the criteria for company/tenant admission and the

right of the owners to a veto on various matters including tenant admission.

The main reason for use of this type of PPP model is for the public owners to attract additional investment to an STP/District in order to fully develop its potential without the investment of additional public resources.

The attraction of the private sector to a site also has significant promotional value as it sends positive signals to the broader market.

In some cases, some STPs offer to resident companies the possibility of buying office space or land to build their own premises. In this case, said companies, technically become investors in the park. For the purposes of this study, we focus on private investors that develop additional infrastructure or provide services and do not consider investments made by STP resident companies.

#### 4.1.3 Model 3: “Management partnership”

Under this model one or more public agents launch an STP/District, of which they are the owners. They also decide that managing the operation of such a project would better be outsourced to a private company providing the necessary experience and expertise.

The public partner and private operator reach an agreement detailing the responsibilities of each party, their respective competences, levels of

decision-making, the business models, remuneration that the management company is entitled to, the length of the agreement, performance monitoring metrics, etc.

The private company responsible for managing the park, programmes and services will generally not invest money in the construction of premises or facilities, although exceptions exist in which management companies own some premises on the site.

In most cases, the managing company invests in the conception and delivery of services that the STP provides to its residents, frequently including not just maintenance and up-keeping services but also high value-added services like incubation and acceleration.

## 4.2 Results

### 4.2.1 General survey results — Private investments in STPs and AOIs

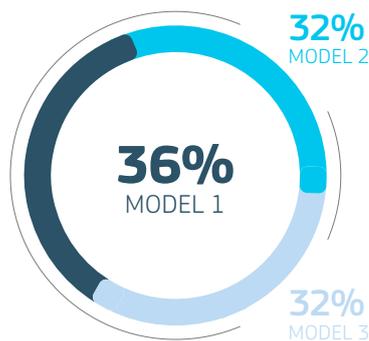
The first general survey was conducted in February 2019 and sent to all IASP Full and Affiliate members (283 STPs/AOIs from 75 countries) and a few non-members. It consisted of the following main question on the applicability of the three broad models: *Has your STP or area of innovation (also referred to as innovation district) been created as a result of a collaboration between the public and private sectors, in any one of the following 3 models?*

**Table 3.** Three broad models for public-private collaboration for the development of STPs and AOIs

<p><b>MODEL 1: PPP</b></p>	<p>PPP often refers to projects with a strong collaboration between public and private and a significant risk sharing of the private partner. The definition as proposed by OECD: “long term contractual arrangements between the government and a private partner whereby the latter delivers and funds public services using a capital asset, sharing the associated risks”.</p>
<p><b>MODEL 2: Jump-in Model or late stage private investment</b></p>	<p>The park or district is launched and owned by a public agent. At a certain point, private investors are given the opportunity to develop some elements of the park and exploit these. In most cases the private investors build offices and/or workshop space to rent it out to tenants.</p>
<p><b>MODEL 3: Management partnership</b></p>	<p>The park or district is promoted, launched and owned by the public sector but the owners outsource the management of the project to a private company, or invite the private sector to participate (with capital increase or other forms of contribution) in the management company of the STP, or take over the management entirely. The responsibilities, risks and profits of the parties are fixed by a negotiation between the public and the private partners.</p>

Fifty eight replies were received from organisations in 35 countries, whereby 14 of the respondents answered that their organisations do not operate through any of the three models described above. This resulted in a sample of 44 organisations that recognise themselves as PPPs of one type or another. Of the 44, 36% selected Model 1 (16 organisations from 14 countries; China, Czech Republic, Denmark, Egypt, India, Iran, Italy, Kosovo\*, Mexico, Portugal, Slovenia, Switzerland, United Kingdom and USA), 32% chose Model 2 (14 organisations from 10 countries; Botswana, Canada, Estonia, France, Greece, Iran, Korea, Morocco, Spain and United Kingdom) and 32% chose Model 3 (14 organisations from 12 countries; Austria, China, Colombia, Greece, Iran, Portugal, Romania, Russia, Saudi Arabia, Thailand, Turkey and United Kingdom):

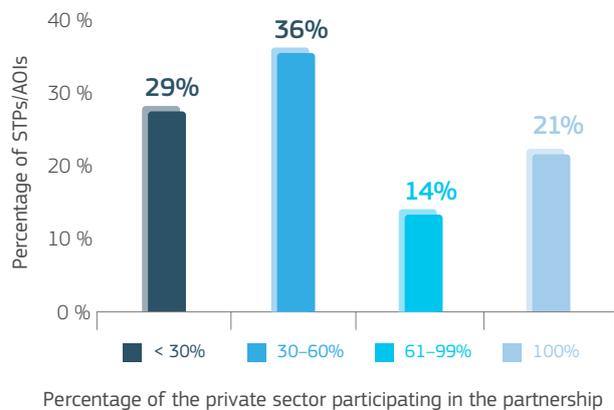
**Figure 5.** PPP Models in STPs/AOIs



**Source:** IASP 2019

The 16 STPs/AoIs that selected Model 1, also were asked two short sub-questions in the framework of the general survey, which related to (i) the percentage of the private sector participating in the partnership and (ii) the stage when the partnership was established. Of the 14 respondents, over 70% indicated private sector ownership of over 30% and at least 35% indicated majority private sector ownership:

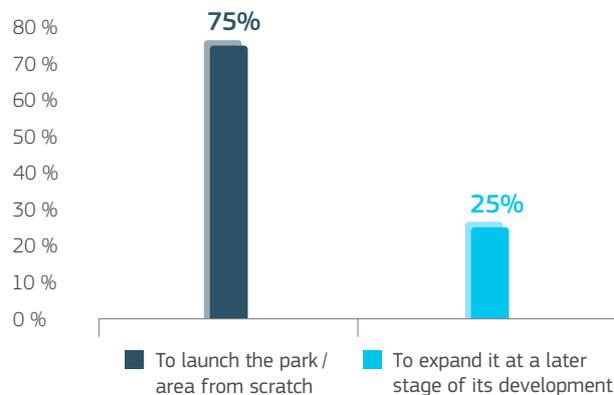
**Figure 6.** Percentage of private sector in the partnership



**Source:** IASP 2019

The majority (75%) of STPs/AOIs operating under model 1 stated that this was established from the very beginning of the project's lifetime when the STP/AoI was launched, as illustrated below:

**Figure 7.** How the PPP scheme was organised



**Source:** IASP 2019

Some of the 16 respondents, that were identified as operating as a model 1 PPP, were then selected for case studies and interviewed (using the questionnaire in Annex 1A as a guideline, of which results are provided in Chapter 5 of this report).

\* This designation is without prejudice to positions on status, and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo declaration of independence

### 4.2.2 Specific online survey results of groups 2 & 3

#### MODEL 2: "JUMP-IN" PPP MODEL

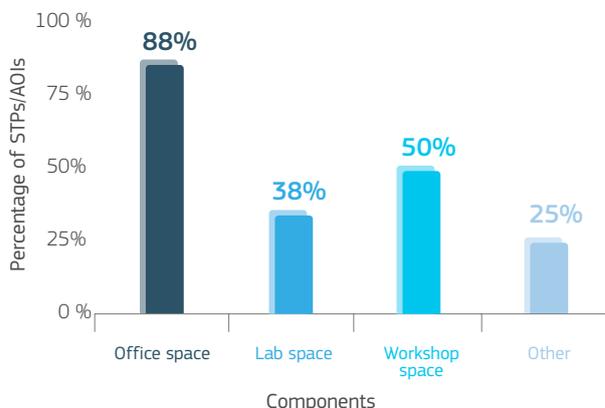
A second, more detailed online survey<sup>59</sup>, was later sent to 16 organisations from eight countries (Botswana, Bulgaria, Estonia, France, Germany, South Korea, Spain and United Kingdom) which were identified as belonging to group 2. Eight organisations from six countries (Botswana, Bulgaria, Estonia, Germany, South Korea and Spain) replied to the questionnaire.

Details of these 8 organisations are contained in the [table 4](#).

The second survey results indicate that for model 2, the park/area development typically starts as a public initiative, and later on, private investors are given the opportunity to get more involved (like *e.g.* given the opportunity to develop some elements of the park and exploit these). For example one park was managed by a public body (*cf.* a Regional Development Agency), and as they were only able to sell plots, and the market demanded buildings (offices and workshops), they collaborated with private investors, which undertook the necessary construction of buildings and offered the premises for rent.

The survey respondents also defined which components of the STP/AOI/Innovation District were created through a PPP investment<sup>60</sup>:

**Figure 8.** Components of STPs/AOIs created through a PPP investment



Source: IASP 2019

According to the management of surveyed areas, 75% of respondents indicated that the interest from private partner investors in the real estate development of the STP/AOI was greater compared to locations outside the STP/AOI.

Further, the role of each partner in different phases of the PPP project was evaluated. The results indicated that in most cases the private investors' role is either to build several buildings or to actually deliver the full construction (normally through standard procurement procedures). Considerable variations exist within the sample with the public and private partners collaborating more or less actively to all phases of the project. In some cases, the public partner led the planning exercise and left construction to the private

**Table 4.** List of organisations which considered Model 2 as applicable: "JUMP-IN" partnership

Year of Creation	Built area (m <sup>2</sup> )	Number of resident companies	Numer of employees working	% foreseen of Private investors	% foreseen for Public Partner
1991	4,200,000	1,100	18,000	65%	35%
2012	36,000	199	850	80%	20%
2003	70,000	100	2,000	10%	50%
2000	235,000	168	4,000	70%	30%
1991	150,000	140	2,400	5%	95%
1992	400,000	630	19,970	70%	30%
2016	40,000	28	450	30%	70%
2003	100,000	400	4,500	65%	35%

Source: IASP 2019

sector, in other cases the involvement of the public sector included supervision of construction work and in others, the private sector was partially involved even in the planning phase.

In the case where the private investors buy or lease land with long-term contracts from the public partner, the question was asked if the public partner was free to spend these funds on their financial and/or development goals. A great majority of the public partners said they are free to spend the funds as they see fit, while some indicated that they had to transfer the sales proceeds to the public owner (e.g. the regional government, which in many cases seems to have given the permission to reinvest the revenues into further development of the parks' infrastructure).

In the case where the private investors buy or lease land with long-term contracts from the public partner (for their own development purposes), 88% of the respondents said that the usage profile for this land was restricted (e.g. industry, tech, start-up,...), however 12% posed no restriction towards the private partner. The type of control STP/AOI managers exercise over the type of companies that private investors attract can be divided into two main categories: (i) 75% of STPs/AOIs can veto proposed tenant companies, if they don't meet the general admission criteria, while (ii) 25% of private investors can bring companies at their full discretion.

In most cases (75%) the private partner/investor was allowed to stay indefinitely (in other words the land/buildings were sold), whereas 25% of the survey respondents indicated the private partner was granted a time-limited lease/concession to use the land/buildings.

When asked what penalties were for private partners that did not deliver on contractually agreed upon obligations, respondents pointed to a number of remedies at their disposal, including legal action, the application of financial penalties as contractually laid down or the exercise of rights of withdrawal.

Risks and mitigation strategies were also covered. In particular, the risk of tenant companies not meeting

the necessary specifications was significant for several respondents with mitigation strategies ranging from increased cooperation with the private partner in company selection, to the delivery of negative feedback to relevant government authorities. The risk of low land parcels uptake by developers was addressed by leveraging special economic zone incentives and through aggressive promotion and the risk of sub-par construction or delayed construction is frequently addressed through land clawback clauses in contracts.

Fifty percent of the survey respondents were convinced that the economic viability/sustainability of the STP/AOI *without the real estate contribution from private partner investors* was possible, while twenty-five percent thought that projects would remain viable, but that services provision would need to be significantly reduced. The remaining 25% considered private sector investment essential<sup>61</sup>.

### MODEL 3: "MANAGEMENT PARTNERSHIP MODEL"

A specific questionnaire<sup>62</sup> was also sent to 15 organisations identified as operating under model 3 covering 12 countries (Austria, China, Colombia, Greece, Iran, Portugal Romania, Russia, Saudi Arabia, Thailand, Turkey and United Kingdom). Four organisations from 3 countries (Austria, China and Turkey) responded. Due to this very limited sample size, the answers should serve only as a possible indication.

**Table 5.** List of organisations which considered the Management Partnership model as applicable

Year of Creation	Built area (m <sup>2</sup> )	Number of companies	Number of employees
2002	372,000	260	3,900
2005	34,000	70	1,300
2006	7,000	78	596
1994	770,000	1,000	35,000

The survey respondents confirmed that in their case the STP/AOI management has been transferred to a private management organisation. In some cases, the private company in question is publicly owned. For example, some of the projects have a private sector representative in their Board of Directors

(BoD), or in Steering Committees. Organisations that serve as representatives can be for instance an exporters' union or industrial zone managers. In other cases, affiliates are shareholders in the park management company, which can in turn be a limited liability company.

Three out of the four STP/AOIs also stated that there is a financial contribution in the form of equity by the private partners in the management company of the STP/AOI. Half of the respondents indicated that the public sector has a majority of seats in the BoD. For the other 50%, the reverse is true. The CEO is typically appointed by the BoD or the majority shareholder (such as the university).

The respondents highlighted the following priorities and financing modalities for continued operation and expansion:

- Use of own resources and loans
- Increase rental turnover and occupancy rate, construction of new buildings and rental space
- Rental income, projects, grants, and services as key revenue streams

In the majority of cases the Private Operator Company is allowed to manage the assets of the public STP/AOI. However, this remains subject to the supervision of the Board of Directors. In overseeing the private sector operator, the Public Partner ensures that public interests are safeguarded through a variety of supervisory practices including regular audits.

The following KPI's were identified, to monitor project implementation:

- Occupancy rate
- Total revenue,
- Resident companies' turnover and exports
- Annual gross profit and its growth rate,
- IPRs generation
- Rate of innovation
- Number of graduated incubator companies
- Number of facilities
- Created added value
- Positive media coverage and customer reviews

## 5. Case studies based on personal interviews with managers of STPs and Innovation Districts

Following the identification of projects that fall within the three categories of the IASP survey described in the previous chapter, eight specific STP and innovation district projects (including but *not* limited to the STPs/Districts identified as a result of the general IASP survey) of interest which follow model 1 were selected to function as case studies:

1. Ørestad Innovation City, Copenhagen, Denmark
2. Here East & Plexal, London, United Kingdom
3. Johanneberg Science Park, Gothenburg, Sweden
4. Gav-Yam Negev Advanced Technologies Park, Be'er-Sheva, Israel
5. Technology Park Brno, Czech Republic
6. Technology Park Ljubljana, Slovenia
7. Ann Arbor SPARK, Michigan, USA
8. Milan Innovation District (MIND), Milan, Italy

The personal interviews with selected science park or innovation district managers were conducted by **four independent experts** (Filippo Addarii, Hardy Schmitz, Paris Kokorotsikos and Robert Bush) **between April and July 2019**, where for each selected STP/Innovation District following **four broad categories of questions** were covered (which is somewhat reflected in the structure of provided case studies): (1) Institutional set up and Partnership, (2) Contribution of each PPP partner, (3) Role of PPP partners in the management and at operation of the STP/District and (4) ex-post view of the PPP venture. A full list of questions that was used as a basis for the interviews are provided in Annex 1.A.

The **length** of the case studies varies due to several factors. To mention one, this is for instance the complexity of the MIND project, which is still at an early stage, but which envisages a very particular 99 year-long concession. It must be clearly stated

however that all case studies are equally valuable and important for the purposes of this study. All case studies have been checked for their quality and completeness and all respective experts have been asked to provide clarifications. Where necessary, the interviewed managers have also been contacted to provide further information and/or clarifications.

The **sequence** of presentation tries to reflect as much as possible the homogeneity and continuity, and to an extent it also tries to serve as a cross-comparison. The order of presentation is to aid the flow of content; no preference is reflected.

## 5.1 Case study: Ørestad Innovation City, Copenhagen, Denmark

Based on an interview with Carolina Benjaminsen, CEO

Fast Facts: Ørestad Innovation City	
Country	Denmark
City	Ørestad, Copenhagen
City population	21,000 inhabitants, 20,000 students and 20,000 work in the area. The Copenhagen Metropolitan Area has approx. 2 million population.
Year of creation	The city part: 2000 – ongoing; The Innovation District: 2017 - ongoing
Area / Built area	When fully realised 3,100,000 m <sup>2</sup>
Main sectors	The building environment, Hospitality, Education, Technology and Tech start-ups
Number of companies	39
Number of employees	20,000 work in the area (see above). The organisation itself has three full time employess and two student helpers.
Website	<a href="https://en.oicc.dk/">https://en.oicc.dk/</a>

Figure 9. Ørestad South in year 2000



© Ørestad Innovation City Copenhagen

Figure 10. Ørestad South in year 2019



### 5.1.1 Institutional Set-Up and Partnership

Ørestad Innovation City is a new Innovation District located in Copenhagen's Ørestad neighbourhood, in the southern part of the city. It was established in 2017 through a PPP involving partners belonging to both the state, private and academic sectors. Ørestad Innovation City is an emergent Innovation District and was established in a completely new city area only 2 km away from City Hall and 8 minutes' drive from the main Nordic airport. To give an impression of the size and scale the area is about 5 km x 600 m or 3.1million sq. m. with a coefficient of intensity for the construction 1.0<sup>63</sup> meaning that in practice 3.1.m. sq. m. floor space can be built. Not long ago the area was a green field, but in the last decade, developments have grown significantly with a focus on sustainability of urban solutions. And now, the area holds the necessary critical mass of people to enable the formation of an Innovation District, with 20 thousand students, 21 thousand workers and 21 thousand inhabitants. All numbers that are expected to grow significantly over the next couple of years.

According to real estate data both years since the formation of Ørestad Innovation City (2017 and 2018) have been positive years in Denmark, and also in general terms the country was (and is at the time of writing) experiencing a recovery from the economic crisis, partially driven by the national and regional focus on sustainability and the green economy. The main motivation for establishing the Innovation District was to tap into the physical capital that was being developed in the area by creating the intangible infrastructure necessary to produce innovation, growth and liveability. Nevertheless, Ørestad Innovation City does not solely focus on the development of ancillary services but initiates projects where individual actors from academia, private and public sector cannot easily identify the existence of cross-sectoral synergies and opportunities.

The rationales behind the choice of a PPP were mainly risk sharing and administrative efficiency – by lowering the distance between private and public actors the project was aiming at creating mutual advantages to all partners involved. The initiative came from

Copenhagen City and Port Development Corporation, a publicly owned, privately run organisation tasked among others with the development of Ørestad and therefore interested in making it a success. Shortly after, private partners and universities started to take an interest in the project, with members<sup>64</sup> (academic, public and private partner organisations) rising from the initial 14 to 40 in just two years. While the risk was initially perceived as a question of whether or not the time was right for an initiative like that, now that the project has proved initially successful, the main challenge will be to reach innovation levels that will make it attractive for other private and public partners to join in and relocate to the area.

Beside the City and Port Development Corporation the other public partners at the moment are two large universities (Copenhagen and Aalborg), a high school, the waste and water authority, the public transport agency, a national television and radio, and a multitude of private organisation, including major Nordic real estate, private equity and pension funds such as Solstra, ATP, KLP and NREP. The pension funds involved in the Innovation District are developing part of the physical assets of the area, which gives them long-term interests in the area in general. Real estate developers are involved in a similar way as all other members, including the pension funds. Being part of Ørestad Innovation City enables them to make it an attractive area known for its ability to connect people and organizations, drive innovation across sectors, and nurture liveability aspects beyond their own buildings. Currently no business associations/chambers of commerce are involved in the project.

### 5.1.2 Contribution of each PPP Partner

Since Ørestad is already a part of Copenhagen, albeit in the process of further development, the core mission of the District in this case is not to support the creation of physical assets, but rather that of intangible, network assets that connect what is already there.

The development of Ørestad started about 20 year ago by placing a metro line in a green field area, allowing then subsequently to develop the area. The financial model behind this way of developing urban

areas is described by Bruce Katz as The Copenhagen Model<sup>65</sup> whereby the solution entails, among others, the transfer of vast amounts of public land to a new publicly owned, privately managed corporation:

“The Copenhagen model works because the public sector participates for the long term, reaping enormous benefits as value naturally appreciates from smart public investments. It combines the efficiency of market discipline and mechanisms with the benefits of public direction, legitimacy and low-cost finance.”<sup>66</sup>”

The Ørestad Innovation City partnership is built around a rather lean legal form based on an expression of interest in the development of the District. By becoming part of the professional in the Innovation District, which is coordinated by a not for profit organisation, each partner (member) takes part in the development of Ørestad and is granted access to services aimed at improving the way they operate, such as matching with other entities and more generally maturing their projects. Other services available for start-ups and larger corporate members include access to networks, conferences, participation in project groups as well as being part of the common branding (visibility) of the area.

Ownership is divided between tenants, with a small fraction belonging to the City and Port Development Corporation. The Corporation financed the major part of starting-up the Ørestad Innovation City whereas at the moment the funding is rather more equally split (50-50 public and private) and despite having a member base of mostly private firms (approx. 80%). The District is managed by a Board of representatives from the members with a specific composition: out of the 10 members of the board, four to seven must come from the private sector, one to four must come from the public sector, and one to four must come from the educational sector.

### 5.1.3 Role of PPP Partners in the management and Operation of the Science Park

The operational costs of Ørestad Innovation City are shared as follow: a little more than one third is provided by the City and Port Development Corporation, and the rest is split between the remaining public partners and the private ones (whereas the terms for membership for tenant companies are the same as for the real estate developers). Contributions to funding the operations are directed from the different members to the coordinating organisation by means of a membership fee. Members are normally located within the Innovation City area with Ørestad being the "epicentre", however universities and companies with long term interests in Ørestad can join the ØICC too. Offices in Ørestad can also be rented without becoming a member. The membership fee varies depending on how many employees the organisation has, in order to make it easy for small companies and start-ups to join as well. The fee starts from DKK 5000 annually (which is less than EUR 700) for start-ups and organisations with up to five employees and can reach up to about the equivalent of EUR 20000 annually for large companies with more than 500 employees. You can find more information on the specific business model on the official website of the ØICC.<sup>67</sup>

The strategy of the Innovation District is set by the Board, who nevertheless nurtures a participatory approach from all partners. By opening the decision-making process, in fact, the Board aims at creating a strong engagement from all partners. This is an element which is deemed necessary in order to enable the district's structure to an extent that is conducive of innovation and growth. Ørestad Innovation City's strategy is aligned with the national and regional strategies and singles out the very specific advantages of joining in, starting from the fact that being a new part of the city there is no preconceived idea of what should become of the area. Currently, the Innovation District is generating a surplus, which nevertheless would not be possible without the real estate component. The district's budget comes from different sources, the main ones being the membership fees and in some cases tenancy rents. Normally the Ørestad Innovation City does not get payments for rent as these go directly

to the owners of buildings. The Innovation District is also aiming to generate income through projects that are initiated by partners and catalysed through the network infrastructure set up by the district. According to the legal form under which Ørestad Innovation City was funded, the district cannot run a deficit, and would be forced to cease its activities before incurring in one. The district has been growing its membership base at a fast pace since its inception, but it is now facing the challenge of keeping attracting the best organisations in terms of innovation potential. The more Ørestad matures, the harder it becomes for it to seek new high value innovators in the region. This translates into the need to look at the global arena for players that are interested in investing in Copenhagen. Being a mixed neighbourhood, with no possibility to establish large industry production sites, Ørestad will continue to look for knowledge intensive organisation, with a focus on seizing the opportunities that derive from a strong relationship between university and business.

#### 5.1.4 Ex-post view of the PPP Venture

Although the Innovation District is of fairly new construction, it is possible to have a first glimpse at the ex post evaluation of Ørestad Innovation City. The main KPI that has been monitored thus far concerns the enabling of a better and stronger economy for the organisation, looking at the number and quality of members attracted, and building a robust and trust driven relation among members of the Innovation District. At the same time, there has been an interest in monitoring the level of collaboration that has been enabled by the Innovation District project, looking for example at the number of other innovative public-private partnerships that were created. The theme of sustainability in modern cities also lies at the heart of Ørestad Innovation City. This leads to a specific focus on the areas of traffic management (working towards making cities less dependent on cars), and social sustainability within buildings (an approach to office space allocation based on generational shuffling that allows to create a more innovation-prone environment). Among the lessons learned in the first months of operations there has been the positive reaction from the top tier management within the member organisations, who has demonstrated great interest in the project. At the same time, it will be important for the future to identify the correct approach to filter down in the management chain in order to get a hold on the right people that allow to tap into the full extent of the organisations' innovation potential.

## 5.2 Case study: Here East & Plexal, London, United Kingdom

Based on an interview with Gavin Poole, CEO, and Mike Magan, COO of Here East-Plexal Innovation District

Fast Facts: Here East and Plexal	
Country	United Kingdom
City	London
City population	City: 9 million Metropolitan Area: 14 million
Year of creation	2012 (established after a tender)
Area / Built area	Campus: 1,200,000 sqft in total of premises; Building of Plexal: 80,000 sqft
Main sectors	Creative and emerging technologies, mobility, AI, healthtech, cybersecurity, fintech, the Internet of Things.
Number of companies	150 start-ups in Plexal; 20 larger businesses in the premises of the bigger buildings
Number of employees	Here East is hosting in total 4000 people, out of whom 1000 students. Approx. 700 people are employed in the start-up building.
Website	<a href="https://hereeast.com/">https://hereeast.com/</a> , <a href="https://www.plexal.com/">https://www.plexal.com/</a>

Figure 11. "Here East, former Olympic International Broadcast Centre"



"Here East, former Olympic International Broadcast Centre" by Sludge G, licensed under the Creative Commons Attribution-Share Alike 2.0.

### 5.2.1 Institutional Set Up and Partnership

Here East ([www.hereeast.com](http://www.hereeast.com)) is a brand new Innovation District in East London, at Stratford, in the wider area of London 2012 Olympic Games venue. It was established after a PPP tender in 2012, for transforming the Olympic Games Press and Broadcast Centre Area and Buildings, into an Innovation District, with special purpose buildings serving innovation, start-up entrepreneurship in creative and emerging technologies, R&D and tertiary education.

The project aimed not only to capitalize on expensive infrastructure, that had become idle after the Olympics, but also to have an impact on the wider Hackney Community, related to employment and education and to serve as a regional regeneration vehicle, based on vibrant, technology sectors.

The tender provided that the Public Body (Landlord is the London Legacy Development Corporation/ reporting to Mayor of London office) will lease the space and buildings for 200 years, while the private partner will in turn invest GBP 150 million to refurbish the existing buildings (70% of current infrastructure) and to add premises according to a plan, that would lead to the creation of London's and one of Europe's biggest Innovation Districts. The successful bidder (based on both quantitative and strategic/qualitative criteria), Delancey, a Real Estate Funds advisory group, backed by funds like DV4, started immediately works in the existing buildings. While some tenants were already in place as from 2013, the iconic, start-up innovation building, branded as PLEXAL, commenced operation in October 2016.

There is just one partner in the Management Company of Here East Innovation District - the Private Investor Delancey, which has been the same throughout all stages of development. The Landlord, which provided the 200 years leasing contract, had no other financial contribution to the project than the real estate but has been continuously consulted during the planning and construction phase.

### 5.2.2 Contribution of each PPP Partner

The Here East Innovation District was formed with a rather classical PPP procedure, where the public partner contributed the land, mandated the scope of the project and the private partner following an agreement on a common vision, invested GBP 150 million for refurbishment, adaptations and initial operation costs till break-even of the Management Company. The company was set for operating the infrastructure, and in addition also to set up the Here East Innovation Ecosystem, with several intangible important services to innovative tenants, start-ups, SMEs, big companies and university departments moving there.

The shares of the Management Company belong 100% to the investor. The private partner is 100% responsible for covering any deficit from the operation (as happened in the initial operating years) as well as with commercial risks of the project.

Additional projects that were created in the district, outside of the initial PPP contract, and which were funded by the public sector include the GBP 13 million Cybersecurity Innovation Centre. These projects were attracted through competitive procedures.

In addition to the socioeconomic impacts the public sector benefits also indirectly from the increased assets value around the Here East Innovation District.

### 5.2.3 Role of PPP Partners in the management and operation of the Innovation District

The policies and strategies of Here East and the specialised substructures such as Plexal ([www.plexal.com](http://www.plexal.com)) are developed by the management team, the landlord (public partner) having no institutional involvement in that. However, the management team is constantly in close cooperation and consultancy with all relevant London City Departments (Foreign Direct Investments Dept.) as well as relevant government departments at central level (Dept. of Transport, Health, Work and Pension, even the strategy team of Downing Street No10/the Prime Minister's office), adjusting strategy and projects, according to the local/municipal and national innovation-related opportunities and priorities.

Any surplus generated by Here East following investment repayment, will be used for expanding current infrastructure, alongside to the distribution of dividends to investors.

Although Here East is operationally a fully private venture, its management team is very selective when it comes to tenants. They interview candidate tenants and evaluate their business, or future businesses of start-ups, in terms of sector dynamics and relevance to sectors focused by Here East, and the potential of businesses to grow globally and become serious scale-ups.

Thus, the content of business is much more important, than the need to fill the space with rent paying tenants. The long-term lease gives the management team (which has quite a clear vision) the freedom to deliver results, according to the business plan of Here East, without making compromises on initial strategy.

#### 5.2.4 Ex-post view of the public-private venture

Although Here East Innovation District is a rather new venture, significant successes have already been recorded.

The management team implements a business plan with KPIs for letting and jobs creation.

The Campus has 1,200,000 sqft in total of premises out of which 80,000 sqft correspond to the building of the start-up focused Innovation Centre Plexal (mainly in form open space hot desks and small offices, further 130,000 sqft are occupied by University and College departments and the rest is mix of offices, studios and high ceiling spaces for special purposes. Companies of all sizes occupy from 10 – 10,000 sqft space. The three main building are the Press Centre, the Broadcast Centre, and the Theatre (conference venue), encompassing the beautifully landscaped open area named The Yard. The buildings offer flexible working space, with large open floors, retail units, large-scale studios, including active television studios supported by a state-of-the-art data centre and lots of space where start-ups can develop and grow.

Today there are 150 start-ups in Plexal, 20 larger businesses in the premises of the bigger buildings

described above, which also host several departments of London Colleges and Universities. Here East is hosting in total 4000 people, out of whom 1000 students (60-70 PhDs) and close to 700 are those employed in the start-up building.

As with other Innovation and Technology Parks, the qualitative criteria are also important, alongside numerical achievements. SMEs are attracted to Here East with a scope of improving and growing their business, by osmosis with innovation and knowledge developers present in the Innovation District.

Start-ups are attracted also, by the very well-designed conducive environment for innovation and entrepreneurship. In addition, individuals and companies, outside of Here East are attracted to the knowledge and entrepreneurship events taking place there.

The managers of Here East were invited to comment on their experiences and potential advice they could give to other STP/Innovation District developers (although it is clearly quite early for an ex post evaluation).

Their opinion on the applicability of the PPP model for/in STPs and Innovation District is, that it is difficult to develop a triple “P” strictly based on financial and technical parameters, without a shared vision. Significant communication is needed, among the partners and stakeholders, who should collaboratively develop this vision.

In their case a big percentage of the partnership proposal scoring, during the evaluation, was based on the vision and strategy for the buildings, alongside the technical and financial capability. Thus, the vision was proposed, agreed and approved by each side during that bidding process.

Classical PPP approaches placing emphasis on financial and technical criteria, availability payments, structure etc., are not suitable for Innovation Projects where vision is equally (or even more-) important. Thus, such PPPs could exploit the Here East example where vision was on par with financial and technical aspects of the tender.

## 5.3 Case study: Johanneberg Science Park, Gothenburg, Sweden

Based on an interview with Mats Bergh, CEO

Fast Facts: Johanneberg Science Park	
Country	Sweden
City	Gothenburg
City population	1 million (metro area)
Year of creation	2010
Area / Built area	When fully realised 27,000 m <sup>2</sup>
Main technology sectors	Urban development, Energy, Materials
Number of companies	17
Number of employees	23
Website	<a href="http://www.johannebergsciencepark.com">www.johannebergsciencepark.com</a>

**Figure 12.** The district of Johanneberg Science Park located inside the campus area of Chalmers University of Technology



© Johanneberg Science Park

### 5.3.1 Questions regarding the institutional set up of the partnership

The Park ([www.johannebergsciencepark.com](http://www.johannebergsciencepark.com)) was formally launched January 2010 but was not fully operational until summer 2011. The year-and-a-half was used to recruit a team, identify additional partners including Real Estate Developers. The initial sponsors were Chalmers University of Technology, the only private technical university in Sweden, based in Gothenburg and the City of Gothenburg. There remained uncertainty about whether private industry was going to see the value of the Park. The year-and-a-half was spent interacting with industry, while the first sponsors became also the park's "ambassadors". At present, the form of the science park is a joint venture between the city, the university and a number of private companies (originally, the venture was 50/50 shared between the university and the city).

The key mission of the Park is to focus on sustainable urban development as well as energy systems and basic materials development. The period of profiling to identify these fields took about 10-15 years. A network was built of national private partners in Sweden from across these sectors of industry. Issues to be addressed include optimising city transportation systems, reducing social inequality. The location of the park is itself urban, central in the city and close to the university.

At the time of creation, the economy was fine, and the project was not borne out of a crisis. There was an existing science and technology park which was already fully occupied with tenants so that there seemed to be surplus unmet demand for additional facilities. This was combined with a strong need for more knowledge in how to develop the major Swedish cities as cities of the future in particular from an environmental perspective. The challenges are complex, and a range of different entities are needed to address those. The primary rationale for forming a PPP was the need to bring together the different types of stakeholders from academia, private sector/industry, and government in order to fulfil the mission.

The PPP was formed via a handshake between the Chairman of Chalmers University and the City Mayor of Gothenburg. At present the legal form is a not-for-profit limited partnership through a joint venture. The partners include Chalmers University of Technology, the only private technical university in Sweden (owned by a foundation), two Cities (Gothenburg and Mölndal aiming to develop also a city network), two local real estate development companies for the physical environment at the side, one national real estate developer able to replicate the good practices, knowledge and experience gained to other cities across the country, several industrial partners including some of the largest and internationally renowned Swedish corporations.

Regarding funding for science park activities, the University and the City have slightly different needs and approaches. The University does traditional fundraising in particular research areas requiring either more academic knowledge or the transformation of already existing knowledge into innovation and for whose commercialisation it relies on the network of private industrial partners and tenants of the science park. The City is mostly interested and contributes to the development of particular products aiming to improve the urban planning process and the infrastructure and transportation system, making them more accessible with the ultimate view to reduce social inequalities. The process of co-creation of solutions for the needs of the city is related to the concept of a living lab. Johanneberg Science Park together with the city aim to develop projects that use on occasion [parts of] the city as a living lab / test bed for future solutions.

Four processes are central to the park: creating a network of partners, creating collaboration projects, communicating the results - sharing the knowledge and developing the infrastructure (buildings, labs, etc.). The fourth process of the physical development of the science park area is entrusted to the real estate investors, which generally retain the ownership over the facilities. The park management serves as a facilitator for these processes, having the role of a network collaboration partner for the real estate developers, for which service the park receives a set fee.

The biggest risk at the inception phase was probably getting the support of the real estate development partners. At the initial formation, neither the City nor the University had committed physical assets to the Project. The Park team was responsible for programming activities including identifying the urbanisation challenges to focus on, outreach and communication activities including building the network of industry partners.

The PPP Partners were involved in all phases of the park project development, including private equity. In the beginning, the focus was to bring industry into the Park as an equity partner buying equity in the company. However, the length and complexity of the negotiations would require Board of Directors approval. So, the model switched (developed) to partnership instead of ownership. Currently both models are used, and the park is in the process of evaluating the advantages and disadvantages of these two models including from a legal point of view. This is also relevant for the allocation of the IPR created, which at the moment this is regulated at the level of product contracts, while the science park itself does not take equity for this IPR. This is also a topic that is currently in discussion.

As to the contributions of each partner, the University provided access to the academic research and scholarship. The private partners provided funding in the form of equity. The real estate developers (experienced university campus developer in Sweden) provided access to land necessary for the physical extension of the park (mainly parking lots). They retained ownership over this land, while the University retained the right to be offered first the possibility to buy it in case it is to be sold in the future. Thus, if a real estate partner wishes to sell real estate assets that are being used by Park members, Chalmers has the right of first refusal.

Industry would pay rent or lease facilities as well as provide guidance for the types of research it required to drive commercialisation of R&D from the University. Initially, the Park negotiated a percentage of the rental income but moved to a monthly flat fee in order to have more predictable and stable cash flow. Additionally, the Park develops projects which are eligible for state

and development bank funding. The relationship with industry is largely based on partnerships around specific projects (where the private partners supply expertise for these R&D projects for instance on product development) as well as a membership model not based on an equity ownership model.

Regarding the funding for the operational costs for the (non-product-related) activities of the science park, approx. 60% comes from the public organisations/ authorities, while 40% is provided by the private partners. The Municipality as well as the University are providing the funding in the form of a set fee (amount is equal for both). This fee has not changed since the inception of the project. The park would however need more resources for its expansion. The park also has a partnership with the Regional Development Organisation for West Sweden, which has doubled the funding for operational costs throughout the years.

Public financing is also provided through national R&D collaboration projects. Thus, the park receives funding for implementing specific projects, part of which funding can be and actually is used to develop the operations of the science park itself. Specific public funding is available to develop SME innovations. Lump sum payments were causing asset liability mismatches. Now payments are provided on a throughout the year basis.

Without the real estate development partners, the park would still be economically viable. However, the impact would not be as good without the environment created such as labs, high quality office spaces, meetings spaces and other physical infrastructure that the real estate component brings to the Park. The environment is seen as very important by the park management not only for socialising, but also as an important incentive for attracting industry tenants.

### 5.3.2 Questions regarding the role of the PPP partners in the management and operation of the science park/AOI/Innovation District

The Board consists of 14 regular members: nine from industry, two from municipalities, two from the University and one Chairman. The Board meets four to five times per year. There are several subcommittees including a Finance Committee, Strategy Committee and a Partnership Development Committee.

There are two classes of shares. The A Series consists of the City of Gothenburg and the Chalmers University. They are the original founders of the Park. The B Series consists of the private and other stakeholders. The Series A holders consider the long-term development objectives of the Park. The Series B have a more immediate focus.

The science park strategy is to an extent aligned with the smart specialisation strategy in the scope of sustainable community development. In the West Region of Sweden there are six Science Parks. There is some collaboration and also some overlap in scope and mission.

For the operations of the science park, looking mostly at the economic/technical aspects, the not-for-profit Park generates an intentional negative balance every year in order to not create a tax liability for its equity owners. Additionally, the possible generation of direct profits for the park (such as from the IPR, etc.) needs to be managed in full compliance with state aid rules.

Regarding the strategy for selection and admission of future tenants to park premises, the primary objective is to identify tenants that are high potential innovators. The real estate developer has the right to fill the space with any tenant if an innovative tenant cannot be identified. There has not been a problem filling the Park with the targeted tenants, however. There is regular communication and consultation between the PPP partners (incl. clearly the real estate developer) on this.

Additionally, because of the programming and real estate options of Johanneberg Science Park, the older Science Park in Gothenburg is able to offer

complementary services to its existing tenants through an active collaboration.

The Johanneberg Science Park is a member of the Chamber of Commerce allowing access to more companies and in that way to extend its network. Occasionally, they jointly hold events.

### 5.3.3 Questions regarding the ex-post view of this PPP venture

The following main factors serve to measure the impact of the park activities:

- Network growth
- Joint collaboration projects
- Social media reach
- Event attendees

As regards the experiences and lessons learned since the inception of the park, its management has learned how to deal with the timelines, political agendas and processes of political organisations.

An STP shall allow members and stakeholders to demonstrate success on terms that matter to them. For example, the industry members and academia seek commercialisation successes. So, the Park creates as many opportunities to develop innovations important to them. Furthermore, the Park also generates added value by giving traditional real estate developers access to the best academic research available which they could then apply and use for their development and operations. This way, the science park could be seen as a "training camp" for growth and innovative development for businesses. This means that the real estate developers and their sub-contractors and partners are in a way willing to operate [often within the framework of various projects] as pilot customers for technologies developed in the park.

The University does not really have a traditional TTO offering. The University supports its faculty and students through incubation types of initiatives, however. It is worthy to note that in Sweden individual researchers own their own research results.

The University has no claims to the IP developed by the researcher at the University. The provision of a TTO offering would thus have less of a priority.

Following the first few years of operation the park gained considerable commercial traction and the interest of potential tenants increased.

There are collaborations and projects that the Park has helped facilitate. In case of projects that create commercial traction, the Park is not an equity participant; it does not have significant transparency on what projects have had commercial success and it does not exploit patents or data that might be generated through its collaborations. However, the Park is generally aware that its Partners and members see commercial benefit from collaborations that the Park helps facilitate. In this regard and despite the fact that nothing concrete has been decided yet, the

Park is generally considering how to participate in the commercial success of some of these collaborations. It is exploring ways in which it could generate additional revenue streams, particularly with regards to energy systems, for instance.

The Park does not directly own any real estate. The private partner real estate developers own almost 100% of the real estate that is accessed through the Park. Chalmers has the benefit of having two main campuses as opposed to the local public university which has real estate assets dispersed throughout the City.

Key advice to science parks that are now being planned or initiated is to focus on the needs of local industry. The more focused the programming and offerings are to the local needs of industry, the greater the likelihood of success.

## 5.4 Case study: Gav-Yam Negev Advanced Technologies Park, Be'er-Sheva, Israel

Based on an interview with Mr. Uzy Zwebner, co-founder and partner of Gav-Yam Negev Advanced Technologies Park and president of Innovation Basecamp

Fast Facts: Gav-Yam Negev Advanced Technologies Park	
Country	Israel
City	Be'er Sheva
City population	220,000
Year of creation	City: 1906 Park: 2012 (operations commenced) Partnership: see explanation in text
Area/ Built area	117.5 dunams
Main technology sectors	Cyber security, AI, IT, IOT, Big data and Health R&D
Number of companies	72 (12 MNC's)
Number of employees	2500
Website	<a href="http://www.gavyam-negev.co.il">www.gavyam-negev.co.il</a>

**Figure 13.** Gav-Yam Negev Advanced Technologies Park



© Gav-Yam Negev Advanced Technologies Park

#### 5.4.1 Institutional set up and Partnership

The Gav-Yam Negev Advanced Technologies Park ([www.gavyam-negev.co.il](http://www.gavyam-negev.co.il)) is a park located in the Negev region, the southern area of Israel at the city of Be'er-Sheva, and next to Ben-Gurion University. The park initially was developed as a triple helix PPP initiative, between Ben Gurion University of the Negev, Be'er-Sheva Municipality, and a leading technology infrastructures developer, KUD International. Later on, Gav Yam, one of the largest real estate companies in Israel, joined into the partnership. The Park became one of Israel's leading Innovation and R&D Centres with world level appeal.

The initial discussions about the development of the Park started almost 15 years ago, between the University of Ben-Gurion and the city of Be'er-Sheva, while the establishment of PPP partnership with KUD, took place 10 years ago, and the commencement of operation of the Park in 2012. The location, for which the initial concepts were developed, was rather a desert area, while today the park is at the heart of a vibrant new urban conglomeration, with focus on Technology and Innovation, having contributed significantly to the development of the greater Negev area.

The rationale of the PPP partnership was quite clear: the University contributing the technology leadership, the Municipality representing the public interests (while the land was given to the park by the state) and the private partner brought in finance and management / development knowhow.

KUD is a subsidiary of the Japanese Kajima Corporation, which among others, specializes in the development of technology and R&D infrastructures. At a later stage, Gav Yam, a local company of the IDB group, well known for development of high tech and office buildings, joined the partnership and became the main managing partner.

The initial JV was formed with a direct competitive dialogue.

Following several shareholders equity participation, capital increases and name changes, currently the Park is managed by the Gav-Yam Negev JV of the PPP partners.

#### 5.4.2 Contribution of each PPP partner

As mentioned above, it is a conventional PPP partnership, where the land is provided by the state and the financing was secured by the private investor.

The shareholders structure has evolved significantly with time. During the early development period, the state had a higher stake due to land and grant contribution. Today, the private sector shareholders own the majority of the shares, after several capital increases, including the IPO (Initial Public Offering) organised by the Gav Yam, as well as, by transformation of initial loans to equity (the private partners paid the initial phase loans and got equity in Gav Yam Negev, with a process of loan to equity swap).

The state is still supporting the project, strategically, by providing incentives for attraction of companies. Nevertheless, the responsibility to break even of the venture lies with Gav-Yam Negev Company, which enjoys financial autonomy.

The project depends on its real estate component to thrive and grow, though it's very selective when it comes to tenant's acceptance. Tenants are accepted only if they bring their R&D operations in the Park. Beside the R&D-intensive international and local companies, there are some services as food, gym, minimarket, energy centre and more.

It is worth noting that many prominent tenants of the park are part of CyberSpark the Israeli Cyber Innovation Arena. This initiative is an integral part of the Gav-Yam Negev Advanced Technologies Park. It is a joint venture of the Israeli National Cyber Bureau in the Prime Minister's Office, Be'er-Sheva Municipality, Ben Gurion University of the Negev and leading companies in the cybersecurity industry. The CyberSpark Arena is located inside the park.

### 5.4.3 Role of PPP partners in the management and at operation of the Technology Park

The policies, strategies and business plan of the Gav-Yam Negev, are formed by the BoD of the JV, where all PPP partners participate, *i.e.* the President of the University, the Mayor of Be'er-Sheva, while a CEO together with the senior management of the Joint Venture is appointed by the private partners.

The Master Plan and specialisations/directions of the Park are jointly developed and decided by the three triple helix partners, while the Government is also informally involved and consulted, and even contributing, for example by encouraging National Initiatives, like the National Cyber Securities Research Center to be housed within the Park. The University plays a critical role in determining the desired technology specialisations of future tenants to be accepted and making sure new graduates for the relevant R&D areas will be available each year. All partners are adamant about restricting tenancy to R&D activities of companies only.

The surplus of the JV, coming from its operation, is invested in further expansion of the infrastructure. Currently the infrastructure has reached 60,000 m<sup>2</sup> of specialised premises, while at the final stage it's expected to reach 200,000 m<sup>2</sup>. The annual economic value of the park to the city and the region is estimated today by USD 150 million and will go up to USD 1 billion a year, once the park is completed.

Private incubators are also housed within the Park, having their own business and operation management, in compliance with the overall strategy and Master Plan of the Park. The government supports these incubators.

### 5.4.4 Ex-Post view of the PPP venture

There are 3 types of KPIs for success and impact, evaluation, followed by the management of Gav-Yam Negev:

- a.** Creation of jobs for University graduates as a national mission; today out of 2,500 engineers and scientists employed at the Companies and Research Institutions within the Park, 80% are coming from Ben Gurion University, Be'er-Sheva city and the surroundings. The final target is employment of 10,000 high tech experts, once the infrastructure reaches 200,000 m<sup>2</sup> built floor space.
- b.** The completion of the stages of development of the park in time. Now it's within its target with 60,000 m<sup>2</sup>. built premises.
- c.** The connection of Business tenants with Academia and R&D. There are 70 companies, out of which 30 start-ups, many of them linked in a way with the University and R&D Institutes.

The success of the Park is based on its foundation model and initial Master Plan, which envisages offering of added value, through the combination of tangibles (infrastructure of international standards) and intangibles (services) to the tenants. The park is much more than just a real estate project, but mainly an advanced technology eco-system. Main areas developed at the eco system are Cyber, IT, AI, IoT, big data and more.

It is evident, that maturity and success of the first of stages, establish a solid basis and make it easier for the JV to attract finance for the subsequent development stages, as has already been proven, by the recent IPO for the last (4) buildings. In addition, success is proven by the international attendance, that the park receives on a daily basis for exporting know how. In this regards it is worth making a reference to Innovation Basecamp ([www.baseca.mp](http://www.baseca.mp)) - a privately owned business platform, a business development and investment vehicle aimed for global economic development by innovation. It is based on a partnership between private and academic entities and government involvement, having the mission to help high potential research projects become leading breakthrough technology start-ups.

If the management had a chance to look retrospectively at the master plan and stages of development, it would have insisted on a more thorough elaboration of land lease models applied, which were a bit short term (<20 years, less than usual long term leases for similar projects), a fact that created frequent renegotiation of the land lease agreements.

Currently, the park management is looking at additional tools and support packages for international companies by promoting the special incentives, talent advantages and spirit to the tenants that will take positions in the coming years. As to start-up tenants, the park intends to achieve a twofold target: attracting prospective tenants and creating additional income lines through the creation of an own seed capital investment fund.

In conclusion, Gav-Yam Negev is a successful PPP STP with satisfied triple helix partners and a showcase for other PPP STP developers.

## 5.5 Case study: Technology Park Brno, Czech Republic

Based on an interview with Roderick Barker, General Manager

Fast Facts: Technology Park Brno Based on the case study and website	
Country	Czech Republic
City	Brno
City population	City: approx. 400,000 Metropolitan area: 1.2 million
Year of creation	1993
Area / Built area	Phase 1: 56,000 m <sup>2</sup> of office space. Phase 2 11,000 m <sup>2</sup> with 3 new buildings. Masterplan allows for 190,000 m <sup>2</sup> of built-up area in phases 3 and 4.
Main sectors	No specific industry or research focus
Number of companies	More than 20 companies
Number of employees	More than 5000 employees
Website	<a href="http://technologypark.cz/en/">http://technologypark.cz/en/</a>

Figure 14. Technology Park Brno



© Technology Park Brno

### 5.5.1 The institutional set-up and partnership

The impressive development was officially launched in 1993. The first ideas developed around 1990/1 just after the collapse of the communist government in Czechoslovakia. The initial idea was to provide for expansion space for newly created companies around the renowned Brno University of Technology (BUT). The development site was ideally located: directly adjacent to the large properties of BUT, part of the inner city of Brno in a green suburban environment.

The main motive was the apparent need of additional capital, world-class administrative efficiency and the need to gain the experience of a seasoned commercial partner.

A famous alumnus of the BUT, Sir Frank Lampl, inspired and sped up the planning and starting process of the new company. As a successful international businessman, he had developed contacts to the city government and BUT and developed as the person of trust. He was able to convince the shareholder of BOVIS (the large UK construction group of which he was part of the international management team) to expand their activities to the East. There was no formal tendering process. The joint venture contract was, as the current General Manager calls it: “a straightforward PLC company joint venture contract as they are standard in the real estate development business”.

The development success is impressive: To date, Phase 1 has been completed with 56,000 m<sup>2</sup> of office space. Phase 2 has reached 11,000 m<sup>2</sup> with 3 new buildings. The masterplan allows for 190,000 m<sup>2</sup> of built-up area in phases 3 and 4.<sup>68</sup>

### 5.5.2 Contributions of each partner

The initial plan was to create a joint venture of 200 hectares, but due to restitution problems the initial project phase started with a 50%50% joint venture Technologicky Park Brno (TPB, also called Czech Technology Park, <http://technologypark.cz/en/>) and covered 9 hectares (as a long lease to the company) and a matching CZK 80 million by BOVIS. The 50% share of BRNO was equally split by the city government of BRNO and the BTU. The BOVIS 50% share did not change, however, BOVIS itself

were a subsidiary of P&O, a large conglomerate (main business in ports and ferries). Later on, P&O restructured and sold a lot of their real estate to invest into their cruise ship business and port operations. In the years prior to 2000 TPB carried a lot of losses. They kept these losses in the books to avoid write-downs. Even though the general performance of the development was highly satisfactory, this very debt-driven financial structure was not compatible with the strategy of the holding company. Subsequently P&O was purchased wholly by Port of Dubai Holding company, now the holding company of the former Bovis/P&O's 50%. As of 2019 it was planned that the City of Brno takes over the share from Dubai.

The nominal equity of the company has remained the same. Though, all projects were financed via debt. This was possible as basically all buildings were built as pre-let buildings to large international companies with prime tenant valuations. Only from 2002 cash-flow was positive and money was re-invested and debt re-paid. Dividends were only paid once – in 2004. On the other hand, these financing structures meant that the tenant focus was tuned to large inward investment projects of renowned and stable multinational companies.

In the early 1990s, many international companies were looking for sites to open locations in Czechoslovakia. A lot of substantial government incentives were put in place to gain inward investments. Initially incentives were targeted towards production related industries, later in the 1990s service industries were included. The area managed to become the prime site for the new locations of IBM, Red Hat, Hewlett Packard, VELUX, MANN+HUMMEL, Emerson and the like. The organization boasts to actually having gained the dominant share of foreign investments of the whole country (“we lost only one of the major deals”).

### 5.5.3 The Role of the PPP partners in management and operations

From the start of the project the current manager of the park has been in responsibility as General Manager as a permanently seconded specialist to the joint venture by BOVIS. The team totals four people: Facility Management, Marketing, Administration, and Real Estate Development (the manager).

All innovation related support elements of start-up support, incubation centres, accelerators, know-how transfer are performed exclusively by BUT, which is, as previously mentioned, one of the shareholders in the Joint Venture company. The strategy of the TPB is therefore the strategy of a classical real estate company. The Board consists of the responsible General Manager of P&O, the Port of Dubai Representatives (2) and the city representatives (2), who are two senior politicians. Shareholder meetings are just once a year.

The most important recent change is the systematic opening towards regional SME: some of the leases of large international conglomerates were discontinued. Subsequently these buildings were let to profitable strong SMEs at good rates compatible with the financing strategy of the real estate company. The selection criteria are:

1. Older than three-years-old
2. Stable and sizeable number of employees
3. Good business perspective

Profitability (EBITDA or earnings before interest, taxes, depreciation and amortisation) is the main performance indicator of TPB. The surplus income is used to reinvest and pay back loans. Profit and loss are shared by the JV partners according to their shares. The tenant structure is critical to a real estate company which is highly leveraged. Any major shift towards smaller less well rated companies would have influence on the ability to refinance.

Due to the high share of private ownership and being a strictly profit oriented organisation it could not apply for any regional development funds from the EU. There is no specific industry or research

focus. However, as the City of Brno intends to buy the shares from the Port of Dubai, an alignment of the strategy towards the development strategies of the regions can be expected.<sup>69</sup>

The ecosystem development is mainly in the hands of the university. However, it is closely monitored strategy of TPB to attract international tech companies only. This profile is a topic in the Board Meeting.

### 5.5.4 Ex-post view of the PPP-Management

Private owners have inflated profit expectations, thus slowing down growth. With more equity and more land supply the park could have grown faster. The location was formidable since its inception and still is. The management feels that the term “technology park” is overrating their profile. He’d rather call it a business park focused on technology companies.

The advice for future technology park developments: Have strong committed private shareholders, manage their expectations well. Think long term. PPP only work in hot growth areas with sound real estate fundamentals.

## 5.6 Case study: Technology Park Ljubljana, Slovenia

Based on an interview with Matej Cerar, CEO (2019) and Simona Vernon, Entrepreneurship Director

Fast Facts: Technology Park Ljubljana	
Country	Slovenia
City	Ljubljana
City population	300,000
Year of creation	1995
Area / Built area	75,000 m <sup>2</sup>
Main technology sectors	ICT, Electromechanics, lasers, medical, biotech
Number of companies	300
Website	<a href="https://www.tp-lj.si/en">https://www.tp-lj.si/en</a>

Figure 15. Technology Park Ljubljana



© Technology Park Ljubljana

### 5.6.1 Institutional Set Up and Partnership

The Technology Park Ljubljana (TPL [www.tp-lj.si](http://www.tp-lj.si)), is quite an early triple helix initiative. The Company for development of the Park was established in 1995 as an initiative of the largest R&D Institute of Slovenia Jozef Stefan ([www.ijs.si](http://www.ijs.si)). Later in 2001 the Municipality of Ljubljana entered the ownership structure, provided the land and after completion of phase one of four buildings (out of seven) the Park commercially opened in 2007. The rest of the partners are the National Institute of Biology, National Institute of Chemistry, the City of Ljubljana and the private companies LEK pharma (now part of Sandoz), ISKRA ICT complex, and ISKRATEL.

The partnership for TPL development was formed through public consultation. Apart from the conceptual need to have the triple helix on board the project, the contribution of:

- land by the municipality and attraction of EU grant,
- the private partners offer of the majority of funding in form of equity and commercial credits; and
- the Institutes offer of technology leadership,

led to a practical PPP partnership. All parties participated from the conception of the final Infrastructure project (2003-2005) till the commencement of the operation of TPL by forming a not-for-profit-foundation.

Phase one with four buildings had a cost of about EUR 48 million while the second Phase with three more buildings had a cost of additional EUR 15 million.

The financial structure of the partnership underwent various changes with time, mainly due to hard efforts for loan repayment during the early operation period. Commercial commencement coincided with the years of the crisis (around 2007). Several of the SME tenants undertook repayments of the loan (in a form of debt for equity) and then became owners of the premises they occupy. Thus, today out of 75,000 m<sup>2</sup> of TPL, the

Management Company (foundation) of TPL owns only 5,000 m<sup>2</sup>, while the rest are owned by the SME tenants.

The current Management Company shares distribution is: City of Ljubljana (City of Ljubljana Holding Co) with 85.7% of shares, the R&D Institutes own 9.6% of shares and the rest is owned by the initial founding companies.

The Board of Directors (BoD) has a composition which reflects the triple helix partnership.

### 5.6.2 Contribution of each Partner

As referred above, the municipality provided the land as well arranged for the attraction of an EU grant by the European Regional Development Fund (ERDF), the Institutes and especially the Josef Stefan coordinated stakeholders' alignment throughout phases, as well as the technical maturing documentation preparation.

The private partners contributed EUR 4 million in equity and guaranteed EUR 24 million of loans. As also mentioned above, loans were finally paid by tenant companies in a form of debt to equity and property swap, so today 100 SMEs own 70,000 m<sup>2</sup> of the 75,000 m<sup>2</sup> of TPL, however these SMEs have no shares in the management company of the Park.

Today the Management Company is sustainable and is earning its income by a model 40/40/20, *i.e.* 40% proceeds coming from the rents of 5,000 m<sup>2</sup>, 40% by performing innovation/technology related projects for the greater region and 20% by offering technology related services to tenants.

The 40% income from public sources for special programs is gained from EU or national sources through competitive procedures and not direct funding.

The Management Company is staffed with 18 experienced experts, so it's one of the rather sizeable STP management companies, among IASP peers. The success in attracting funds for special programs (start-up support, international cooperation, tech-transfer, IPR, training, etc.) and the added value of services offered, make it economically viable with such an extensive staffing. It could be viable with fewer activities and less income, too.

### 5.6.3 Role of PPP Partners in the Management and Operation of the Park

The decisions on the policies and strategies need to be taken unanimously by the board. Due to the fact, that SME owners of premises located in the park are not represented in the Board of Directors, there is an ongoing initiative for creation of an Advisory Board of owners/tenants for consultation and coordination with the TPL Managing Board.

The Strategy of the Park goes through 3 major steps:

- Step 1: the creation of tangible and intangible infrastructure development, buildings, services programs (accomplished)
- Step 2: Internationalisation step (on going)
- Step 3: Strengthening the R&D within the Park (immediate future target)

The strategy is aligned to national and local innovation and smart specialisation strategies.

The income of the Management Company is sufficient for break-even of its activity costs, but for a further expansion of the Park's infrastructure, new PPP schemes will be needed.

In any case, even in the event of a deficit, the public sector has no responsibility to cover the debt, thus the Management company should continuously put an effort aiming towards a break-even activity.

For the selection and admission of tenants, TPL convenes special purpose committees applying the selection criteria (innovation and strong internationalisation focus of candidate tenants).

### 5.6.4 Ex Post view of the PPP venture

TPL is a successful STP, acknowledged by local and international stakeholders and peers, especially for its services to start up and innovation community even outside of Ljubljana city. Hosting or supporting more than 300 SME and start-up companies with 1,500 highly qualified employees, yielding over EUR 0.5 billion turnover, running eight national and regional start-up programs, supporting over 60 start-ups with EUR 3.5 million investments annually, and coming out as a winner of many international best practices awards, are just a few factors of the evaluation metrics.

Today the Park Management team places more emphasis on the qualitative criteria such as how many people from all over the country are attracted to the Park events, how many tenants are happy with the services of the Management Company, the number of international cooperation projects they carry out (today the value of the international and Horizon partnership programs under execution amounts to about EUR 4 million).

The combination of high-level infrastructure with high quality services and the continuously and internationally expanding footprint of TPL, not only make the Park very attractive for innovative companies, but also lays a solid basis for a further expansion of the infrastructure and attraction of investors based on PPP. This has become now easier compared to the period when the project commenced.

Despite some difficulties experienced at the initial conception phase, the Park has proven its capabilities and success.

The current management, evaluating the history of the Park and having the chance to reflect on negative and positive lessons learned, states that:

- Not enough thought and strategic approach has been given in the initial planning for linking expectations and content (tenants/innovation/sectors) with the rather large in size planned infrastructure. For the planning of a next phase, the strategy and business plan should determine the expansion around the content/type and quality of tenants, so buildings will serve specific purposes, rather than being built and then to have to deal with occupancy/viability pressure.
- Although it was not the intention of the park management (taking a content strategic approach, instead of infrastructure development driven project) during the enthusiastic — but also influenced by the world recession — inception period of the STP, certain premises were given to banks, consultants, lawyers and other non-tech companies aiming to achieve quickly a viable financial structure. Nevertheless, at the end the TPL did work and it served the initial triple helix model. The project has a significant country level impact, while it could have been in an even better position with a more careful strategic planning.

## 5.7 Case study: Ann Arbor SPARK, Michigan, USA

Based on an interview with Paul Krutko, President and CEO

Fast Facts: Area of Innovation Ann Arbor SPARK	
Country	United States of America
City	Ann Arbor State: Michigan (population 9,995,915)
City population	121,885
Year of creation of Ann Arbor SPARK	2006
Area / Built area	City has an area of 28.70 square miles (74.33 square kilometres); Rented/dedicated building: 18,000 square ft.
Main technology sectors	Automotive & mobility technology, biotechnology, digital health/ med devices, artificial intelligence, e-commerce (consumer products and services), cyber security, augmented and virtual reality, financial technology, internet of things/big data
Number of companies	Washtenaw County (Ann Arbor MSA): 8,212 establishments; Downtown district: approx. 180 companies
Number of employees	<ul style="list-style-type: none"> <li>• About 61,000 in the city of Ann Arbor;</li> <li>• About 152,000 for county (Ann Arbor MSA);</li> <li>• Approx. 3000 in the downtown district</li> </ul>
Website	<a href="https://annarborusa.org/">https://annarborusa.org/</a> (Ann Arbor SPARK website) <a href="https://www.a2gov.org/">https://www.a2gov.org/</a> (city government)

**Figure 16.** Area of Innovation Ann Arbor SPARK



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### 5.7.1 Questions regarding the institutional set up of the partnership

In 2005, the new President of the University of Michigan (UofM), Mary Sue Coleman was concerned about how effective the University was in impacting the regional economy through the commercialisation of its research. This was an important concern because the University of Michigan is one of the largest research universities in the United States, with a current budget of USD 1.5 billion annually. The President's question centred around why University of Michigan was not generating the start-ups and spinouts like MIT (Massachusetts Institute of Technology) and Stanford given that the University of Michigan's research budget was larger than both and why there was not significant technology company growth through investment and job creation in the Ann Arbor region.

The President convened a national advisory panel of alumni which included Rick Snyder, who later became the Governor of Michigan (serving between 2011 and 2019) and who had recently left his position as the CEO of Gateway (a major American computer hardware company acquired by Taiwanese corporation Acer in 2007). Snyder was leading a venture capital firm in Ann Arbor at that time. The advisory panel developed a triple helix organization called Ann Arbor SPARK which was an initiative which assembled private sector, academia - the University of Michigan, Eastern Michigan University, and Washtenaw Community College as well as local government. Snyder was named the first chairperson of the SPARK board of directors.

The initiative had three initial objectives for UofM:

- Help start-ups grow out of the University Michigan.
- Improve the capabilities of The University of Michigan's Technology Transfer Office.
- Direct some of the school's fundraising proceeds (target 10%) into early stage companies without any geographic restriction.

Overall, SPARK's primary mission was and is to bring together private and public partners, like the Michigan Economic Development Corporation<sup>70</sup> (MEDC), Michigan Works! Association<sup>71</sup>, city and municipal partners, University of Michigan, and by 2019 eighty private sector companies to support the growth of existing companies and the creation of new technology-based companies and jobs in the counties surrounding Ann Arbor.

One mandate was to tie into the University's alumni network and talent pool to help market Ann Arbor as an attractive place to start a company or relocate an existing one. The University of Michigan's 500,000 living alumni community is one of the largest in the country. Its graduates include such Silicon Valley luminaries such as Larry Page, a co-founder of Google.

At present Ann Arbor SPARK ([www.annarborusa.org](http://www.annarborusa.org)) has evolved into an area of innovation serving companies scattered throughout the downtown innovation district and the surrounding region. In the downtown district alone, there are approximately 180 companies with over 3000 employees in existing private real estate. SPARK provides services and support where they are domiciled and also rents an 18,000 square foot building that houses offices, events space, start-up tenants, etc.

### 5.7.2 Questions regarding the contribution of each PPP partner

The operating company was structured as a non-profit. In order to cover the non-profit's operating expenses, the University of Michigan committed USD 300, 000<sup>72</sup> annually to the operating budget with the private sector and local government expected to match.

Within the first 12 months of SPARKS' launch, Pfizer left the City of Ann Arbor as a result of the next generation of Lipitor failing its clinical trials. Hundreds of jobs in the community were lost. Pfizer also provided an anchor for corporate social responsibility in the region. Another cathartic event included the financial distress of Borders Books, a local bookstore that had become a global chain. Borders closed its doors, creating significant vacancy in the downtown and a resulting loss in customers for restaurants and shops nearby creating additional vacancy.

The nascent Ann Arbor SPARK partnership capitalised on its triple helix structure as a result of Pfizer's withdrawal creating lemonade out lemons. The University acquired Pfizer assets at a significant discount which it then incorporated into as a research and development asset of the University. The SPARK program with its primary focus on the technology company growth and on traditional economic development activities was well positioned to dramatically impact the growth of the region's GDP.

Contemporaneously, Larry Page, a University of Michigan alumnus decided to place the Google's United States AdWords operation inside the SPARK Innovation District. The Google operations initially were located in the downtown core area of the city abutting the University.

The State of Michigan was also seeking to improve its overall economic development posture and identified the Ann Arbor Innovation District as a geography to support through its SMARTZone program. The State allocated a portion of the revenues generated from taxing real estate value growth as a result of business activity in the district to support the growth and acceleration of technology start-ups. The initial funding raised through this scheme in 2002 was \$60k. Over the ensuing 15 years, this allocation has risen to USD 3.5 million per annum supporting technology companies. The State of Michigan recently passed legislation to reauthorize this program in Ann Arbor for an additional 15 years.

A virtuous cycle was created: as growing tech companies filled up vacant space, market rates for the space increased thereby further increasing the tax base. For example, Google occupied a multi-story building that had been previously a bank headquarters. Even though it did not fully occupy the building, their presence attracted other tenants. In 2005, the vacancy rates in the Innovation District were greater than 20%. Vacancy rates are now running at less than 2%. Capital costs<sup>73</sup> are usually borne by the companies themselves in negotiation with landlords or developers. In the Google example, the company was responsible for their own capital costs.

### 5.7.3 Questions regarding the role of the PPP partners in the management and operation of the STP

The ownership of Ann Arbor SPARK evolved over 15 years. Originally, the structure was a tacit partnership between local government and the University of Michigan. A non-profit entity was formed under Federal and State laws in which the Board consisted of private sector representatives, the local municipality, and academia. Every year the budget of SPARK is determined by a board consisting of members from local government, academia and private sector who devise a program of activities based on funding contributions from each of those sectors.

Presently there are 80 private companies who annually fund SPARK, including large corporations such as Google and Toyota and smaller local firms. These private companies have a mix of motivations ranging from being good corporate citizens as well as seeking to benefit from the showcase of technology that is presented. Some of the private sector funders use money from their own foundations to support SPARK, not money from their operations. In the report for 2018 which is publicly available on the organisation's website<sup>74</sup> the total budget is USD 6.47 million, the major part of which dedicated to acceleration, incubation and grants to early stage companies while the operating budget was USD 1.875 million. The funding sources for this operating part were roughly split into 1:1:3 respectively for public (which includes government & municipal funding), academia (university) and private contributions and sponsorships.<sup>75</sup> Some companies provide non-budgetary contributions, an example of which are credits given to SPARK by Google for social media marketing.

The City of Ann Arbor's motivation is that SPARK has enabled a professional staff that it otherwise would not have been able to afford without the benefit of additional resources from the private and academic sectors. City of Ann Arbor contributes USD 75,000 to the yearly USD 7.0 million effort (rounded total budget).

During the 2008 – 2012 timeframe, Michigan was still viewed as a flyover State for venture capital investing. Recognizing Ann Arbor SPARK's success in

nurturing start-ups and accelerating their growth, the State of Michigan through the Economic Development initiative of the Governor, created a state funded VC fund of USD 24 million paid to be housed at SPARK. SPARK made pre-seed investments in over 100 companies across the State of Michigan with half of the portfolio being located in the Ann Arbor region as a locus of technology start-ups. The State required that 50% of the its funding must be matched by other sources. To date, USD 560 million of additional capital came into the portfolio companies. 70% of the companies originally invested in are still in existence.

On the non-start-up side there is a variety of city and local government support with the university providing approximately 15% of the funding, the private sector about 30%, and the remainder coming from a variety of city and local government sources<sup>76</sup>. After a national search, the group hired Krutko<sup>77</sup> in 2011, an experienced Silicon Valley economic development executive as its second CEO. His tenure has been marked by the ability<sup>78</sup> to attract technology companies from Silicon Valley to locate facilities in the Ann Arbor area of innovation.

#### 5.7.4 Structure/Governance

Since 2011, SPARK has attracted approximately USD 1.5 billion in investment in company investment and 15k new jobs. In 2018, USD 150 million was the investment by the private sector, signalling that the private sector role is a mature one.

It is estimated that 50% of all start-ups in the State of Michigan happen in and around the Ann Arbor area of innovation. Ann Arbor attracts successful entrepreneurs from across the state and the nation.

The local chamber of commerce primarily works with the private sector companies serving the local market. SPARK's focus is on companies from the start-up phase through mature players like the Toyota North America Research Facility that are growing the regional GDP by selling goods and services outside the region to national and global markets and not local ones.

SPARK CEO sees himself as helping to lead strategic projects on behalf of the stakeholder members of Ann Arbor's triple helix by developing the concept, bringing new and current players to the table, and providing an environment and community to facilitate partnerships and investment.

SPARK can be seen as a premier example of an emerging Area of Innovation / Innovation District model in the US. This model is coming more and more to the fore and to some extent replacing "science parks" as the leading model.

## 5.8 Case study: Milan Innovation District (MIND), Milan, Italy

Based on an interview with Marco Carabelli, Managing Director of Arexpo Spa; Andrea Ruckstuhl, CEO of Lendlease Italia; and Francesco Mandruzzato, head of Project Financing Lendlease Italia<sup>79</sup>

Fast Facts: MIND – Milan Innovation District	
Country	Italy
City, population	Milan, approx. 1.4 million, metropolitan area 4.3 million
Year of creation	Concession contract approved in 2020
Status (Q2 2020)	Construction
Area / Built Area	The entire site land area: 1 million m <sup>2</sup> . Gross leasable area for private function: roughly 477,500 m <sup>2</sup> . Gross built area for Public anchors: over 300,000 m <sup>2</sup> .
Main technology sectors	Life Sciences, Healthcare, Biotechnologies, Smart City solutions
Total committed investment by private partner	Approx. EUR 2.5 billion over the 99 years period.
Website	<a href="http://www.mindmilano.it/en/">www.mindmilano.it/en/</a>

Figure 17. Milan Innovation District - MIND (in construction)



© Lendlease, credits CRA

Milan Innovation District (MIND, [www.mindmilano.it/en/](http://www.mindmilano.it/en/)) is the first Innovation District so defined in Milan, a city that already constitutes the economic and innovation hub of Italy. Milan hosts the headquarters of 3,100 multinational companies and attracts almost 50% of all private equity and venture capital investments in the country. Milan is the capital of Lombardy, a region hosting about 23% of Italian start-ups, 28% of national scientific publications and 30% of national patents. Its GDP in 2017 was around EUR 370 billion, roughly 20% of Italy's GDP and competing with Île-de France, Bavaria, Baden-Württemberg and London. The region hosts 14 Universities, 4 Art Academies, 12 national research centres, and 19 research and treatment hospitals, and one of JRC (European Commission) main research centres, located in Ispra (Varese).

Despite such an abundance, MIND is unique. It has been conceived as a flagship project for the nation with the capability to compete on the global innovation space. This is due to both defining features of the project and contextual factors. First of all, MIND is the legacy project of EXPO, the Universal Exhibition hosted in the city in 2015. The international event embodied Italy at its best, something which became evident both in the national perception and for the international audience. Public institutions invested EUR 1.6 billion to realise EXPO and 21 million people visited from all over the world, thus becoming a matter of national pride. To crown such a success the Italian government championed the establishment of a new research centre on the future of health – the Human Technopole – for which it committed to fund EUR 1.5 billion in 10 years. The research centre was conceived as the legacy project of EXPO 2015, which was dedicated to nutrition and human wellbeing.

At the same time its purpose was to support the growth of Italian industry and promote national lifestyle associated to health and quality of life. The focus on economic and social impact was not secondary either at the time, given the difficulties Italy had been going through since 2012, following the global financial crisis. In those years Italy lost 1.1-1.2 million jobs and was on the verge of defaulting on its sovereign debt.

The Human Technopole, and later on MIND, came to be designed around the idea of fostering economic growth and social progress building on the industrial strengths of Milan and broader Lombardy region, and realigning the country to global technological and innovation trends. At the time of MIND's establishment, the national economy was in times of sluggish recovery from the recent crisis, while the regional economy was growing at a moderate pace (+1.5-2.5%) and the regional Life Science production was booming (+13.7% with respect to 2017). Just recently the city of Milan has also started to experience a quick expansion of real estate developments, with commitments of roughly EUR 10 billion from multiple developers for the period 2019-2029.

Having been conceived at times of economic crisis, the key motive for the set-up of MIND was to capitalise on the positive experience of Milan 2015 Expo, which helped to put the city on the map as one of the world's innovation hubs, and to create a gateway for the regional and national excellences in terms of scientific research and industrial production in the life sciences. A further purpose emerged over time: a city-scale lab to experiment with the new solutions for urban living such as driverless public transport with no private cars allowed inside the site, zero CO<sub>2</sub> emissions, and local energy production. According to a preliminary study that was commissioned to The European House Ambrosetti in 2017. According to the study, the foreseeable socio-economic impact of a STP/Innovation District in the area is substantial, with an aggregate multiplier of R&D activities of 2.84 (meaning that for every EUR 100 invested EUR 284 of expenditure are generated, 25% of which coming from the manufacturing sector). The same multiplier is estimated to amount to 2.23 for investments in the healthcare sector, and 1.44 in university education, with an overall economic impact (direct, indirect and induced impacts on the expenditure linked to the activities of MIND) of EUR 6.9 billion during the first 10 years of operation<sup>80</sup>. The study also estimates the generation of additional EUR 3 billion in terms of added value and EUR 1.3 billion of additional tax revenues in the same period.

### 5.8.1 Institutional Set Up and Partnership

The rationale behind the PPP, which was formed through traditional tender under public procurement law, was a combination of reasons, including the need to tap into private capitals to boost the effects of the public investments (both in terms of land acquisition and the budget of the newly founded Human Technopole) and the need to share the risk burden for the regeneration project. Moreover, since the beginning the public counterpart pushed for the realisation of the project in accordance with a tight timeline, avoiding delays and postponements, meaning that the involvement of a private partner was considered also as a means to increase administrative efficiency.

The two main partners involved in the PPP are, for the public sector, Arexpo – publicly owned company whose shareholders are the Ministry of Economy and Finance (39.28%), Lombardy Region (21.05%), Municipality of Milan (21.05%), Milan Fair Foundation (16.80%), Città Metropolitana of Milan (1.21) and the Municipality of Rho (0.61%) – and, for the private sector, Lendlease – Australian developer specialised in urban regeneration and infrastructure projects operating in North America, Europe, South East Asia and Australia, with total value of regeneration projects worldwide about AUD 76 billion<sup>81</sup>. Other stakeholders play a key role in the development of the area, including the three public “anchors”: the University of Milan, the Human Technopole and the Galeazzi Hospital, which will provide a solid base for the creation of the innovation ecosystem. The PPP on which MIND is based involves Arexpo and Lendlease. Both partners were involved in the planning and will be involved in the construction and operation phases (although with different roles, as explained in detail below), and the legal form of the partnership is a concession contract.

The key steps in the set-up of MIND were the signing of the agreement for the development of the area at the end of the tendering procedure in March 2018, and the signing of the concession of the area from Arexpo to Lendlease, which occurred in April 2019. At that point both the City Councils of Milan and Rho have to finalize the approval process for the Urban

planning for the concession contract to design, build, finance and operate (in PPP jargon called DBFO) starts – due by mid 2020. This is the pivotal moment when Arexpo hands over the control of the MIND project to Lendlease (more precisely a half of the area, as explained below). The contract will last for 99 years, quite a remarkable lapse of time which is equivalent to three cycles in real estate projects. Such a timeframe forces the private developer to take a long-term view on value creation by design, aligning its interests with public value creation. This is the achievement of a long journey started with a failure, which in hindsight was responsible for triggering the innovation process.

In 2014, the public auction to purchase the land of the EXPO at the end of the event went void. The opening bid was EUR 315 million for roughly 1 million square metres located in the periphery of Milan. The area has an important development potential due to its strategic location (close to Milan city centre and communication hub for the rest of the region) and was equipped with all the necessary infrastructures in preparation for the 2015 EXPO. But the constraints on development – less than half of the site could be developed anew – and the loss of land value caused by the economic crisis, made the proposition unconvincing.

This was a serious risk for the success of the EXPO itself, since Milan had been selected thanks to the regeneration plan of the area. Arexpo, which had the mandate to acquire the land (for about EUR 180 million), manage all the infrastructure operations in preparation of the event, and had to step in and change the plan for the hand over to the private sector after the event. In 2016, Arexpo launched the Strategic Plan for the development and improvement of the area as a new Science and Technology Park (STP) dedicated to Life Sciences, Healthcare, Biotech, Pharma, Agri-food, Nutrition and Data Science. The plan was backed by government with the creation of the Human Technopole and a new scientific campus of the University of Milan, two public anchors that once operational are to bring a critical mass of users: Human Technopole 1,500 scientists and University of Milan 18,000 students and 4,000 staff. The plan attracted the interest in partnering of several public

organisations and private companies. In 2017 Galeazzi Hospital finalised its plan to relocate in MIND joining as third public anchor attracting further 8,000 people every day, including 500 researchers, 700 doctors, and 1,100 nurses and caregivers. Such a new setting finally made the offer appealing to market operators. At the time of writing the Human Technopole, the University of Milan and the Galeazzi Hospital are the three major confirmed public anchors.<sup>82</sup>

In 2017, an invitation to tender was launched and the response of the market was positive, reaching beyond national borders. In the tender's provisions the private sector was called to partner in the regeneration and development of the area starting with the design of the masterplan, business plan and innovation strategy, and then in the development and management of the site for 99 years. More precisely, the contract was divided into two phases: i) an advisory service phase to assist Arexpo on technical, economic and financial aspects of the masterplan and business plan for the entire site (1 million square metres) in 2018-2019, up to the approval of the Urban planning by the local municipalities; and ii) a development phase, based on a concession of development rights amounting up to 477,500 m<sup>2</sup> for a 99 years leasehold period, in exchange for the payment of a yearly rent fee to Arexpo.<sup>83</sup> As outcome of the tender procedure, the Net Present Value of the yearly rent fee for the surface right is equal to ca. EUR 250 million for the 99 years. In addition, the concessionaire will contribute to urbanization infrastructure costs for a EUR 135 million value.

In December 2017 Lendlease was selected as preferred bidder and awarded the contract, making MIND the first project for an Innovation District the company has embarked on. This to stress the role that the innovation strategy, discussed in greater detail below, has taken over the other components of the development project. In 2018, when phase 1 started, it had not yet become evident to Lendlease and Arexpo the pivotal role that the potential of research & innovation and the involvement of the public anchors – excellence in the field in their own capacity – would take for the success of the project. In April 2019 Arexpo signed the concession contract

with Lendlease. as soon as both the City Councils of Milan and Rho approve Urban Planning and the related Planning agreement, the 99 years concession comes into force and Lendlease formally starts operating as developer of MIND for the following 99 years (phase 2).<sup>84</sup>

### 5.8.2 Contribution and role of PPP Partners

In terms of mutual contribution to the project, Arexpo is the owner of the land, part of which is provided in exchange of a periodic rent to the private partner. The gross leasable area measures roughly 477,500 m<sup>2</sup> and will be conceded for 99 years. Beside the area subject to private development, the areas to be occupied by the public anchors measure over 300,000 m<sup>2</sup>. The overall value of public investments in the area, including the market value of all constructions and infrastructures built for the universal exposition, is about EUR 2 billion. Together with such investments, Arexpo was also responsible for the project conception, in particular through the Strategic Plan for the development and improvement of the area as a new Innovation District dedicated to the Life Sciences, Healthcare, Biotech, Pharma, Agri-food, Nutrition, Data Science and the city of the future. Crucially, Arexpo provided a privileged channel of interaction with public authorities, favouring an efficient compliance of administrative procedures and constant stakeholder alignment.

On the other hand, the private counterpart, Lendlease, committed to investments for what adds up to a total of roughly EUR 2.5 billion over the 99 years period. This estimate, which refers to the final value of the overall development carried out by Lendlease, takes into consideration the EUR 250 million NPV for the 477,500 m<sup>2</sup> surface right and the EUR 135 million of urbanisation infrastructure costs, plus all the costs Lendlease will face for the construction of the innovation district itself. The estimate will also vary according to the private investments that international private operators will make in the area thanks to MIND's attractiveness, even though it is difficult to make a proper assessment of the total amount at such an early phase. From the point of view of the operations Lendlease will be responsible for the project construction which is expected to

last at least 10 years, and after the construction phase for the management of the Innovation District. Although the economic sustainability of the project would be ensured by real estate dimension alone (*i.e.* renting of spaces and serviced building to tenants), the long-term value creation for MIND will come from investing on the innovation component. In particular, Lendlease aims at putting in place a set of new instruments to capture the value generated by the innovation dimension of the site - namely the innovation ecosystem - generating a value multiplier for real estate, business and social domains.<sup>85</sup> This includes the definition of an industrial strategy - initially defined 'MIND Innovation Strategy' and then evolved in the bespoke 'Federated Innovation' - that takes in consideration and amplifies the human capital and infrastructures of MIND's public anchors and the regional strengths in the Life Sciences sectors and smart city services. According to the PPP agreement, the operational costs of the activities carried out within MIND will be covered by Arexpo, Lendlease, public and private sector players. Being at such an early stage of development, MIND has not generated any surplus from its operations, but in the future it is imaginable to conceive an ecosystem model in which the surplus is partly reinvested in the district itself to increase its competitiveness, partly employed to fund initiatives at the regional level that support the growth of the whole ecosystem which in turn will benefit MIND.

Although MIND is still in its inception phase, its strategy is being developed through tight collaboration and co-creation between Arexpo and Lendlease, through the help of a team of national and international consultants that include Carlo Ratti Associati, PlusValue Advisory, Urban Insight, PWC, and Land. CARIPLO Factory (Fondazione CARIPLO) and Birds&Birds for the innovation ecosystem component. The strategy draws on the research by The Brookings Institution, which has defined Innovation Districts as "geographic areas where anchor institutions and companies cluster and connect with small firms, start-ups, and business incubators. Physically compact, transit-accessible, and technically wired, they offer mixed-use housing, office and retail"<sup>86</sup>. They are an emerging 21st Century model of

innovation that differs from the isolated, sprawling development patterns of science parks and science corridors, and aim at generating models whereby innovation is more horizontal and open, increasing the amount of cross-fertilization across actors and sectors.

While all construction and management decisions concerning the area interested by the PPP are and will be made by Lendlease, all main stakeholders will be involved and consulted on significant matters relevant to the management of the Innovation District through a strategic committee composed by the top management of all anchors and major tenants (currently Arexpo, Lendlease, Human Technopole, Galeazzi Hospital, the University of Milan, and Fondazione Triulza), meeting monthly/bimonthly. In order to add strength to MIND's decision making structure, especially from the point of view of its innovation roadmap, an international advisory council has been set up with the participation of global leading figures in the fields of technology, science, finance and economics including Physics Nobel Laureate Barry Barish, Alexandre de Rothschild, Greg Papadopoulos and Laura Tyson, and which others will join in the future. The international advisory council is chaired by Alberto Sangiovanni Vincentelli, founder of two NASDAQ listed software companies (Synopsis and Cadence Design Systems) and Professor of Electrical engineering and computer science at the University of California Berkley, with which MIND has established a partnership.

In order to inform MIND's strategy, which is currently under definition, a lengthy process of research was carried out. From the research emerged that the life sciences truly hold great potential in the Lombardy region. Production in the Life Science value-chain (excluding services) in Lombardy was worth EUR 63.4 billion in 2017, equal to the 31% of the national production and to the 12.4% of the regional GDP (against the 10% of the national level). Health services (including both public and private hospitals, specialised facilities and ambulatories and socio-sanitary services) in Lombardy were responsible in 2015 for production values equal to EUR 127 billion (+4,4% compared to 2014), an

added value of 76.6 billion (+2.1%), and employed 1.4 million people in the public sector and 775,000 in the private or semi-private sector. Growth in the Life Science value-chain has been positive in the last two years: +13.7% in production value (vs +4.7% at the national level) and +13.4% in added value (vs +2.7%). Moreover, during the last 5 years employment has been rising steadily, especially for young people. Beside the desk research, the study also consisted in a round of 60 interviews with local high-level representative of the Milanese innovation ecosystem, including policy makers, university top researchers, professors, and deans, venture capitalists, bank foundations, and technology transfer experts.

The rationale behind the industrial/innovation agenda is in fact to exploit the capabilities of MIND's current anchors (Human Technopole, Galeazzi Hospital and University of Milan) in terms of R&D in order to generate economic and social value at scale through the creation of a sustainable ecosystem composed of research institutions, start-ups, corporations and the financial sector. Beside the life science specialisation, the innovation strategy has second main focus: the city of the future standing for smart city solutions. The overall MIND's innovation/industrial strategy is aligned with the regional smart specialisation strategy (S3), and the national industry 4.0 strategy. MIND will in fact aims at becoming both a gateway between Italy's top innovators and the rest of the world, and a one-stop-shop for foreign investments in the life sciences. For this reason, MIND is building ties with all major agencies operating at regional and national level such as Confindustria, Assolombarda, Farmindustria, Confindustria dispositivi medici and Assobiotech-Federchimica, among others. The tenant strategy is a key element of MIND's overall strategy and particular attention is being paid to guarantee a robust balance between the need to achieve occupancy targets and the need to attract top innovators. This is currently being done through a multi-faceted approach that includes an open call for proposal and one-to-one meeting with top global corporations and high value-added start-ups. The idea in this case is to maintain strategic relationships with the company's top management in order to discuss the involvement of the most

suitable/innovative units in terms of RDI. Moreover, in light of the need for MIND to attract the best innovators, the concept of a living lab (MINDLab) was also devised as a public open call for ideas. The purpose behind MIND Lab is to create a space for experimentation based on the interaction of the different types of users coexisting within MIND's ecosystem, where its community is generated by becoming a testbed for disruptive innovation. Efforts in developing an innovation ecosystem along with the real estate plan has been rewarded by the signature of a partnership with 70 companies (both SMEs and multinational) at the end of 2019 and the development of a spoke innovation framework called 'Federated Innovation' to enhance their collaboration within MIND either by locating in the site or developing and testing cutting-edge solutions such as automated, electric public transport.

As mentioned before, the project was designed around the life science sector, with the aim of creating a supporting environment that would amplify the socio-economic impacts of the research produced by MIND's tenants. But MIND also aims at becoming a new vibrant area of the city, capable of attracting different types of publics, from workers to students, but also visitors and city users in general. This ambition is testified by features of the masterplan such as a high density of green spaces and the common ground – an approach to ground floor design that transforms it in a public space, available to all users. Moreover, part of the area is currently being let to the entertainment industry: two large facilities are being used to film television productions, and a large arena is used to host major music events.

Geographically, MIND is located in a suburban environment right on the border delimited by Milan's outer ring road. It is served by major transport connections (railway and road) on the axis that links Milan to Italy's north-west (Torino) and France (Lyon). Despite its physical location – MIND aims at becoming part of the city, both in terms of connection to the downtown area/non-discontinuity of the urban fabric, and as a new gravitational centre for Milan's urban life. MIND is also located at the convergence of two

main typologies of suburban space, namely small sizes urban sprawls such as the municipalities of Baranzate, Bollate, Arese, Rho, Roserio, Pero and Mazzo, and a formerly industrialised area, which has undergone a process of deindustrialisation and is now looking for a new identity. Adjacent to MIND are also located two recent medium-large scale real estate developments (Cascina Merlata and UpTown), and Milan Fair, the largest exhibition centre in Europe (750,000 m<sup>2</sup>).

Finally, although not a precise vertical specialisation, social impact constitutes the main horizontal focus for MIND, with Fondazione Triulza already operating in this space at the local level and all the public Anchors actively engaged in increasing positive socio-economic impacts of RDI activities. The attention for the social dimension is a milestone

against which all MIND's activities will be measured through an ad-hoc evaluation framework which puts side by side impact consideration with more traditional economic input-output indicators. Beside evaluation efforts MIND is also strongly committed to delivering solutions aimed at scaling its social impact. Among these, Programma 2121 is a bespoke programme developed in partnership with the Italian Ministry of Justice, and all local and regional public authorities, to support the work inclusion of detainees in the Bollate prison, located just down the road from MIND's main access. The programme, whose pilot successfully ended in April 2019 with the first 10 detainees reintroduced in a productive job outside the prison walls, aims at scaling in the next three years thanks to the job opportunities offered by MIND's construction sites.



## 6. Conclusions and future work

Given the limited amount of cases explored in this study, distilling conclusions that can be generalised remains somewhat challenging. The evolution of different partnership arrangements remains intimately tied to very specific situations and to the nature, structure and dynamics of individual ecosystems.

The cases where actual PPPs or concessionary arrangements have been deployed (*cf.* first model)<sup>87</sup>, seem to indicate that there are many reasons for entering these type of arrangements including: **(i)** a need to keep public debt low; **(ii)** the desire to valorise idle land, buildings or other infrastructures; and **(iii)** to attract private investor management expertise and efficiency. The attraction of private partners with long-term interests in particular is believed not only to bring efficiencies in general project realisation but also effectiveness in bringing research and innovation to the market.

Public sector partners willing to promote and drive the construction of STPs or Innovation Districts have limited ability to plan, construct, and operate complex innovation infrastructures. The shift towards more extensive use of various forms of Public Private Partnerships has occurred organically in different places based on local needs and circumstances. More complex and wide-ranging arrangements are starting to emerge, focused in particular on the redevelopment of legacy infrastructure (like is the case with Milano and London for example).

Public Private Partnerships do, however, carry considerable risks, from the perspective of public sector partners, in particular in relation to: **(i)** specific legal (structuring, enforcement, sanctions and remedies, optionality, etc.); **(ii)** financial (valuation, revenue projections, allocation of risks and benefits, sustainability, etc.) arrangements and **(iii)** the need to ensure proper alignment with the private sector around a shared long term vision for the development of a particular STP or Innovation District.

Based on the above, and building on the results of the current study, new exploratory work is planned in 2020-2021 to bring together expertise on both EU policies and investment with expertise in finance and private investment to develop a new hybrid financial model for Innovation Districts. Such a model should be able to inform investment strategies of both public and private investors (in particular institutional investors) and increase the pool of resources and expertise available to support the creation and operation of Innovation Districts as engines of urban transformation and sustainable and inclusive growth. The new study will address issues and questions in four inter-related domains, namely: **(1)** financial, **(2)** legal, **(3)** economic and **(4)** technological. In the technological domain for example, digital data and privacy - amongst others - will be considered, as it has been identified as an emerging asset class for STPs and Innovation Districts. This is especially so in cases where Innovation Districts or STPs are integrated in the industrial production and urban fabric becoming a primary source of data collection, processing and storage, on a plethora of societal and economic phenomena. This set of functions can be of great value for industry and economic partners. Its value added is to be assessed and included in designing the partnership with the private sector. Definition of ownership and exploitation of data must be part of a public-private partnership contract. The private sector gives great value to this additional source of information and its related functions. On the other hand, the unbridled exploitation of data – especially citizen data – might trigger societal backlashes. This is a field to be explored with great attention and prudence as it will certainly contribute in addressing the question of sustainability but also requires consideration of important legal and ethical elements.

# Endnotes

- 1 The study was conducted based on (1) an identified need emerging, in particular, from policy makers and practitioners in Central, East and South-East Europe related to the general financing and management structure of STPs, their long-term sustainability and the models for engagement of private investors and industrial partners either from the outset of a project or at later stages respectively; as well as (2) a desire to explore emerging models in advanced economies.
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- 3 The information presented above is a reflection of the findings of the case studies and is not intended to be exhaustive or to counter evidence (empirical, analytical or anecdotal) emerging from other studies and publications.
- 4 The Quadruple Helix is an innovation model where government, industry, academia and civil participants work together to co-create the future and drive structural changes far beyond the scope of what any one organisation or person could do alone. Compared to the Triple Helix the Quadruple adds civil society in the partnership. The model has been increasingly discussed and encouraged, including in the context of Open Innovation 2.0 in the EU. For more information refer to: Open innovation 2.0 yearbook 2017-2018, Directorate-General for Communications Networks, Content and Technology, European Commission, Publications Office of the EU, 2018.
- 5 See <https://s3platform.jrc.ec.europa.eu/what-is-smart-specialisation> (accessed June 2020)
- 6 Regions still lagging behind in terms of growth or income – mostly located in the South and East of Europe – will keep benefiting from important EU support. Cohesion Policy will continue investing in all regions, as many of them across Europe – including in richer Member States – struggle to achieve industrial transition, fight unemployment and hold their own in a globalised economy;
- 7 See <https://s3platform.jrc.ec.europa.eu/science-parks> (accessed June 2020)
- 8 Nauwelaers, C., Kleibrink, A., & Stancova, K. (2014). The Role of Science Parks in Smart Specialisation Strategies. S3 Policy Brief Series, No. 08/2013. European Commission, Joint Research Centre, Institute for prospective Technological Studies. Spain. [online]. Available from: [https://publications.jrc.ec.europa.eu/repository/bitstream/JRC90719/jrc\\_90719\\_policy%20brief\\_final.pdf](https://publications.jrc.ec.europa.eu/repository/bitstream/JRC90719/jrc_90719_policy%20brief_final.pdf).
- 9 These barriers were determined during the working meetings among the expert group and their dialogues with several institutional investors and intermediary stakeholders.
- 10 The European Strategy Forum on Research Infrastructures (ESFRI) is a self-regulated body that plays a key role in policy-making on Research Infrastructures in Europe. In a report of 2016 by the Working Group on Innovation several developments were noted. The report recognised that in the construction and upgrade phases of the development of research infrastructures (that includes the design, engineering and commissioning) industrial partners act mainly as a provider either under standard procurement conditions or in close collaboration. Tight deadlines seem often to incentivise scientific and industrial partners to jointly develop solutions on shared problems. In a collaborative environment technology transfer can take place in both directions – to and from the private industrial partner. The report also argues for the use of the term “Technology Infrastructures” which better reflects the need for a technology-driven collaborative model as opposed to the more traditional science-driven research infrastructures. More information on how technology transfer happens in “co-solution” mode can be found in the report: Working Group on Innovation Report to ESFRI 2016, [https://www.esfri.eu/sites/default/files/wginno\\_final\\_report\\_032016.pdf](https://www.esfri.eu/sites/default/files/wginno_final_report_032016.pdf).
- 11 In the domain of STPs and Innovation Districts, risk sharing is typically applied to the real estate/infrastructure part of the project rather than the research, development and innovation. The formal distinction between the “hardware” (buildings) and the “software” (services and activities) matters for the contract but in reality not for the (financial) sustainability of the business. This means that if the software fails (i.e. insignificant scientific production, scientific outcomes not turning into innovation and then marketable products bringing value, etc.) then the entire success and longer term sustainability of the hardware is also compromised. Some Innovation District projects have therefore opted to devise two separate financial strategies for the hardware and software parts respectively considering the positive and negative impacts.
- 12 The EC Competence Centre for Technology Transfer (CC TT), based at the Joint Research Centre, was launched in late 2018. The CC TT provides technology transfer policy related expertise and services to the European Commission and other institutions of the Union and operational support services to a broader range of stakeholders including: Member States and individual institutions facing technology transfer related challenges and issues. The CC TT takes a holistic approach to the technology transfer process and provides services in three interconnected domains capturing a complex value chain. These are: (1) Technology Transfer Capacity Building, (2) Technology Transfer Financing, and (3) Innovation Ecosystems Design. The present study has been initiated with a view to increase the knowledge of the centre and its stakeholders with the latest developments in the domain of creating and running science parks and innovation districts based on real case studies.
- 13 Lund, E., Peretti, L., Kokorotsikos, P., Taylor, S. (2018). Reshaping the functional and operational capacity of Sofia Tech Park. Report by an independent panel of international experts. [online]. Available from: [https://ec.europa.eu/knowledge4policy/sites/know4pol/files/report\\_reshaping\\_the\\_functional\\_and\\_operational\\_capacity\\_of\\_sofia\\_tech\\_park\\_2018.pdf](https://ec.europa.eu/knowledge4policy/sites/know4pol/files/report_reshaping_the_functional_and_operational_capacity_of_sofia_tech_park_2018.pdf).
- 14 The need for a study exploring good practices in this field has also been recognised by UNCTAD in 2015 stipulating that: “Particularly in developing countries, where innovation systems present well-known weaknesses, it is important

that the Government and other actors considering investing in the establishment of STI parks be able to draw on solid evidence of good practices in STI park design, governance and operation. Areas in which such evidence would be particularly useful, and which the Investment, Enterprise and Development Commission may wish to consider in its discussions, include the following [among others]:

- How should a tenant selection policy for STI parks be defined and fine-tuned?
- What are the most successful models of public-private partnerships in the operation of STI parks?
- What are the main dimensions along which the performance of STI parks should be measured and what indicators are best suited for this?" For more information refer to: United Nations Conference on Trade and Development, 2015 "Policies to promote collaboration in science, technology and innovation for development: The role of science, technology and innovation parks."

- 15 Urbanisation of land is a term in urban planning (and development). For the purposes of this report here we mean the transformation of rural or large plots of land in city areas to plots with urban planning permits, technical infrastructure such as road, utilities etc. ready to receive investments in "overstructures" (buildings). The rural or urban area plot that is urbanised according to the process could be public but could also be private.
- 16 See the survey questions prepared to guide the expert interviewers in Annex 1.A for group/model 1.
- 17 See the survey questions distributed online in Annex 1.B for group/model 2 and Annex 1.C for group/model 3.
- 18 The expressions "technology park", "techno pole", "research park" and "science park" encompass a broad concept and are interchangeable within this definition. IASP, definitions from the industry of science and technology parks and areas of innovation: <https://www.iasp.ws/our-industry/definitions>.
- 19 There are many different models of areas of innovation – spanning from the broader city or region model with innovation activities in different locations within the area, to more place-specific projects like innovation districts, knowledge quarters, science parks, innovation hubs and the like. As a common feature they all have a management team tasked to execute a strategy conducive to growing innovation activity in the area. IASP, definitions from the industry of science and technology parks and areas of innovation: <https://www.iasp.ws/our-industry/definitions>.
- 20 The Global Institute on Innovation Districts, <https://www.giid.org/>
- 21 Wagner, J. (2019). New insights on how innovation districts are challenging economic and social divides. The Global Institute on Innovation Districts. [online]. Available from: <https://www.giid.org/how-innovation-districts-are-challenging-economic-and-social-divides/>.
- 22 Ibid.
- 23 The Brookings Institute, <https://www.brookings.edu/innovation-districts/>.
- 24 Wagner, J., Katz, B. & Osha, T. (2019). *The Evolution of Innovation Districts: The New Geography of Global Innovation. The Global Institute on Innovation Districts.* [online]. Available from: <https://www.giid.org/the-evolution-of-innovation-districts-download/>.
- 25 Dettler, D. & Fölster, S. (2017). *The Public Wealth of Cities.* Brookings Institution Press. [online]. Available from: <https://www.brookings.edu/book/the-public-wealth-of-cities/>.
- 26 McKinsey Global Institute. (2019). How can the private and public sectors work together to create smart cities?. [online]. Available from: <https://www.mckinsey.com/industries/capital-projects-and-infrastructure/our-insights/how-can-the-private-and-public-sectors-work-together-to-create-smart-cities>.
- 27 PPP Knowledge Lab. (2020). [online]. Available from: <https://pppknowledgelab.org/>.
- 28 Public-Private Infrastructure Advisory Facility (PPIAF), <https://ppiaf.org>.
- 29 <https://pppknowledgelab.org/guide/sections/1-introduction>.
- 30 European PPP Expertise Centre. (2020). Appraisal. [online]. Available from : <https://www.eib.org/epec/>.
- 31 UNECE "Guidebook on Promoting Good Governance in Public-Private Partnership", UNECE, 2008, <http://www.unece.org/fileadmin/DAM/ceci/publications/ppp.pdf>.
- 32 OECD. (2012). Recommendation of the Council on Principles for Public Governance of Public-Private Partnerships. [online]. Available from: <https://www.oecd.org/governance/budgeting/PPP-Recommendation.pdf>.
- 33 Jeffrey Delmon, "Understanding Options for Public-Private Partnerships in Infrastructure: Sorting out the forest from the trees: BOT, DBFO, DCMF, concession, lease...", Policy Research Working Paper, The World Bank Finance Economics & Urban Department Finance and Guarantees Unit, January 2010.
- 34 Ibid
- 35 Eurostat. (2016). A Guide to the Statistical Treatment of PPPs. [online]. Available from: <https://ec.europa.eu/eurostat/documents/1015035/7204121/epec-eurostat-statistical-guide-en.pdf>.
- 36 Looking beyond the strict EU context, the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) notes that: "In concessions, payments can take place both ways: concessionaire pays to government for the concession rights and the government may also pay the concessionaire, which it provides under the agreement to meet certain specific conditions. Usually such payments by the government may be necessary to make projects commercially viable and/or reduce the level of commercial risk taken by the private sector, particularly in the initial years of a PPP programme in a country when the private sector may not have enough confidence in undertaking such a commercial venture.", ESCAP, 2008, [https://www.unescap.org/ttdw/ppp/ppp\\_primer/225\\_concessions.html](https://www.unescap.org/ttdw/ppp/ppp_primer/225_concessions.html).
- 37 European Commission, Guidelines for Successful Public-Private Partnerships, [https://ec.europa.eu/regional\\_policy/sources/docgener/guides/ppp\\_en.pdf](https://ec.europa.eu/regional_policy/sources/docgener/guides/ppp_en.pdf).
- 38 The Global Infrastructure Hub Ltd (GI Hub), Allocating Risks in Public-Private Partnership (PPP) Contracts, 2016 Edition, [https://ppp.worldbank.org/public-private-partnership/sites/ppp.worldbank.org/files/documents/GIHub\\_Allocating\\_Risks\\_PPP\\_Contracts\\_EN\\_2016.pdf](https://ppp.worldbank.org/public-private-partnership/sites/ppp.worldbank.org/files/documents/GIHub_Allocating_Risks_PPP_Contracts_EN_2016.pdf).

- 39 Carbonaro, G., Catalano, G., Delponte, L., Vignetti, S. (2017). Research for REGI Committee – Public Private Partnerships and Cohesion Policy. [online]. Available from: [https://www.europarl.europa.eu/RegData/etudes/STUD/2017/602010/IPOL\\_STU\(2017\)602010\\_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2017/602010/IPOL_STU(2017)602010_EN.pdf).
- 40 Katz, B. & Noring, L. (2017). The Copenhagen City and Port Development Corporation: A Model for Regenerating Cities. Centennial Scholar Initiative, Brookings. [online] Available from: [https://www.brookings.edu/wp-content/uploads/2017/05/csi\\_20170601\\_copenhagen\\_port\\_paper.pdf](https://www.brookings.edu/wp-content/uploads/2017/05/csi_20170601_copenhagen_port_paper.pdf).
- 41 European Court of Auditors. (2018). Public Private Partnerships in the EU: Widespread shortcomings and limited benefits. Special Report. [online]. Available from: [https://www.eca.europa.eu/Lists/ECADocuments/SR18\\_09/SR\\_PPP\\_EN.pdf](https://www.eca.europa.eu/Lists/ECADocuments/SR18_09/SR_PPP_EN.pdf).
- 42 European Court of Auditors. (2014). Has the ERDF successfully supported the development of business incubators?. Special Report. [online]. Available from: [https://www.eca.europa.eu/Lists/ECADocuments/SR14\\_07/SR14\\_07\\_EN.pdf](https://www.eca.europa.eu/Lists/ECADocuments/SR14_07/SR14_07_EN.pdf).
- 43 Rowe, D. (2014). Setting up, Managing and Evaluating EU Science and Technology parks - An advice and guidance report on good practice. Report prepared for the European Commission. [online]. Available from: [https://ec.europa.eu/regional\\_policy/sources/docgener/studies/pdf/stp\\_report\\_en.pdf](https://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/stp_report_en.pdf).
- 44 European Investment Bank. (2020) Appraisal. [online]. Available from: <https://www.eib.org/en/projects/cycle/appraisal/index.htm>.
- 45 Gatti, S. (2013). Government and Market-based Instruments and Incentives to Stimulate Long-term Investment Finance in Infrastructure. OECD Working Papers on Finance, Insurance and Private Pensions, No.37, OECD Publishing.
- 46 Medda, F., Caravelli, F., Panayiotou, A., Rapti, E. (2013). Assignment 29: Strategic UDF Investing and Project Structuring, Appendix 4: Portfolio Structuring Model. Concept Paper. [provided by Mazars LLP and submitted to European Investment Bank]. Available from: [https://www.eib.org/attachments/documents/jessica\\_strategic\\_udf\\_appendix%204\\_en.pdf](https://www.eib.org/attachments/documents/jessica_strategic_udf_appendix%204_en.pdf).
- 47 Ibid.
- 48 Canada Infrastructure Bank. (2020). [online]. Available from: <https://cib-bic.ca/en/about-us/>.
- 49 Public Private Partnership Development Program. (2015). Review of policy, legal and institutional framework for industrial parks in Ukraine. [online]. Available from: <http://ppp-ukraine.org/wp-content/uploads/2015/12/annex-11-final.pdf>.
- 50 [www.tusholdings.com](http://www.tusholdings.com).
- 51 Perez, B. (2016). Chinese science park developer Tus-Holdings eyes expansion with US\$388m investment in 21Vianet. South China Morning Post. [online] Available from: <https://www.scmp.com/tech/china-tech/article/1953292/chinese-science-park-developer-tus-holdings-eyes-expansion-us388m>
- 52 Tus-Holdings (2013) TusHoldings homepage. [online]. Available from: [www.tusholdings.com](http://www.tusholdings.com).
- 53 Russian Direct Investment Fund. (2018). Russia-China Investment Fund and Tus-Holdings expand comprehensive cooperation in the technology & innovation sector. Press release. [online]. Available from: [https://rdif.ru/Eng\\_fullNews/3412/](https://rdif.ru/Eng_fullNews/3412/)
- 54 European Investment Bank. (2020) Appraisal. [online]. Available from: <https://www.eib.org/en/projects/cycle/appraisal/index.htm>.
- 55 Commission Regulation (EU) No 651/2014 of 17 June 2014 declaring certain categories of aid compatible with the internal market in application of Articles 107 and 108 of the Treaty (Text with EEA relevance).
- 56 Burnett, M. (2018). Using Competitive Dialogue and the Competitive Procedure with Negotiation – Making better choices for better value for money. European Institute of Public Administration. [online]. Available from: <https://www.eipa.eu/using-competitive-dialogue-and-the-competitive-procedure-with-negotiation/>.
- 57 Ibid.
- 58 Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014 on public procurement.
- 59 See Annex 1.B for the list of questions and Annex 2 for more details on the answers that have not been presented in the main body of the report.
- 60 “Other” refers to that both the public administration and the private investors create all the different types of investment; each under its own responsibility. The public partner cares about the incubation stage of innovative companies; the private investors focus on grown up companies.
- 61 In a specific case it was indicated that one of their strategic goals was to bring in as many collaborations (high tech and medium tech companies, VCs and business angels, training institutions, business development agencies and associations, banks etc.) as they could, such that the park, as an innovation platform, was able to provide enough services or services of such a high quality to its tenants or stakeholders, thus bringing added value. As a result, their management goals were only targeting attracting investments which might create buildings/infrastructures with the purpose to enrich the local ecosystem providing space for R&D, science, education where those activities are to contribute and collaborate with their recent innovation structures as the Research and Labs Complex, the Incubator, the Innovation Forum (Convention centre) and the Experimentarium (Interactive centre for science and technology). Moreover, they were expecting those collaborations to ensure more value to their location but also financial long-term contribution from the operations themselves. In another case, the business model was entirely based on revenues from private sector rentals and leases.
- 62 See Annex 1.C for the list of questions and Annex 2 for the remaining answers that have not been presented in the main body of the report.
- 63 Data from the official website: <https://oicc.dk/>.
- 64 Clarification: The residents living within the zone of the innovation district are not part of the organisation. However there is coordination and a mutual exchange and dialogue with the residence through the home owners’ association.
- 65 Katz, B. & Noring, L. (2017). The (Secret) Copenhagen Model for Regenerating Cities. Next City. [online] Available from <https://nextcity.org/daily/entry/copenhagen-model-regenerating-cities-norhaven>.

- 66 Ibid.
- 67 <https://oicc.dk/en/membership>.
- 68 See more information on the masterplan for future development incl. images on the website: <http://technologypark.cz/en/o-projektu/aktualne-ve-vystavbe/> and <http://technologypark.cz/en/o-projektu/uzemni-plan/>.
- 69 Months after the interview with the manager, the editors of this report learned that the City of Brno acquired the 50% shares of the private partner. See official website of City of Brno: <https://www.brno.cz/brno-aktualne/co-se-deje-v-brne/a/mesto-kou-pilo-dalsich-50-akcii-technologickeho-parku-1/>.
- 70 <https://www.michiganbusiness.org/>.
- 71 <https://www.michiganworks.org/>.
- 72 For 2018 the precise amount according to the publicly available Annual Report state that the total contribution from University side is \$ 390,000 (University of Michigan, Eastern Michigan University & Washtenaw Community College). The report can be accessed on the website: <https://annarborusa.org/wp-content/uploads/2019/05/SPARK-Annual-Report-2018-Final-Web.pdf>.
- 73 Capital costs are typically defined as fixed, one-time expenses incurred on the purchase of land, buildings, construction, and equipment used in the production of goods or in the rendering of services.
- 74 Ann Arbor SPARK. (2018). Annual Report. [online]: Available from: <https://annarborusa.org/wp-content/uploads/2019/05/SPARK-Annual-Report-2018-Final-Web.pdf>.
- 75 The precise amounts as presented in the Annual Report for 2018 for the Operating Budget Sources are as follows: Public 339,500 USD, Universities 390,000 USD, Private/Foundation 1,145,500 USD.
- 76 The list of public and private funding organisations is available in the Annual Report 2018.
- 77 Bomey, N. (2011). Ann Arbor SPARK picks Silicon Valley economic development executive as next CEO. The Ann Arbor News. [online] Available from: <http://www.annarbor.com/business-review/ann-arbor-spark-picks-silicon-valley-economic-development/>.
- 78 Bomey, N. (2011a). New Ann Arbor SPARK CEO Paul Krutko lays out job creation philosophy. The Ann Arbor News. [online]. Available from: <http://www.annarbor.com/business-review/new-ann-arbor-spark-ceo-paul-krutko-lays-out-job-creation-philosophy/>.
- 79 Together with Fiorenza Lipparini and Marco Sebastianelli, Filippo Addarii has been assisting the private sector developer Lendlease in the role of strategic consultant through PlusValue Advisory Ltd., from the design to the implementation of the innovation ecosystem of MIND. Their active involvement in the project has been a unique source of information and first hand insights. However the case study has been written with the commitment to objectivity and impartiality as suitable to trained researchers.
- 80 The European House Ambrosetti. (2017). Impatto socio-economico dei primi insediamenti nel parco della scienza, del sapere e dell'innovazione. [online]. Available from: <https://www.ambrosetti.eu/ricerche-e-presentazioni/report-arexpo-2017/>.
- 81 Lendlease Annual report 2019 states that: "As at 30 June, the estimated end value of the pipeline was \$76.1 billion, up seven per cent on the prior year. The pipeline comprises \$61.2 billion of urbanisation projects and \$14.7 billion of Communities projects", <https://www.lendlease.com/-/media/llcom/investor-relations/asx-announcements/2019/lendlease-group-2019-annual-report.pdf>.
- 82 Fondazione Triulza is the fourth public anchor. From a strictly real estate perspective is not relevant, but it plays a strategic role for the development of MIND community as civil society hub of project. It gathers 68 major national and local organisations and has been active in the site since 2015. It's the fourth component of the Quadruple Helix model.
- 83 At the end of 2019 Lendlease won the public tender for the project financing of the new campus of Statale University in MIND. Both sq.m. and investment have to be added to the final calculation of the private sector's contribution to the project.
- 84 At the time of writing it was not possible to estimate the potential impact of COVID-19 on the planning timetable of MIND. However, part of the innovation strategy of MIND has been repurposed to contribute to the national effort in responding to the health crisis and socio-economic disruption caused by the former.
- 85 Addarii, F. & Lipparini, F. (2017). Vision and Trends of Social Innovation for Europe. European Commission. [online]: Available from: <https://op.europa.eu/en/publication-detail/-/publication/a97a2fbd-b7da-11e7-837e-01aa75ed71a1>.
- 86 Katz, B. & Wagner, J. (2014). The Rise of Innovation Districts: A New Geography of Innovation in America. The Brookings Institution. [online] Available from: <https://www.brookings.edu/wp-content/uploads/2016/07/InnovationDistricts1.pdf>.
- 87 Since the answers to the online questionnaire relating to the remaining two models have already been presented in a statistical and anonymised way, this final section will mostly be based on the interviews.
- 88 To avoid repetition with the main body of the report several questions and answers have been omitted here, please refer to Chapter 4.
- 89 A study has have been conducted on the macroeconomic effects of a major STP in Germany. The study measure inter alia employment figures and related direct and indirect effects taking into consideration e.g. suppliers. For more information please refer to: "The economic significance of Adlershof: Impact on added value, employment and tax revenues in Berlin", 2011, study conducted by the German Institute for Economic Research (DIW) and published by WISTA-MANAGEMENT GMBH, [https://www.adlershof.de/fileadmin/user\\_upload/downloads/DIW\\_Studie\\_adlershof.pdf](https://www.adlershof.de/fileadmin/user_upload/downloads/DIW_Studie_adlershof.pdf).
- 90 Lendlease is an Australian developer that operates globally investing, developing and managing innovation districts. It has a global portfolio of roughly 100bn US dollar urban regeneration projects and leads on Milan Innovation District, one of the case studies analysed in the present report.

# Acronyms, Annexes and Bibliography

## Acronyms

**AI:** Artificial Intelligence

**AOI:** Area of Innovation (see IASP definition)

**BoD:** Board of Directors

**BOO:** Build-Own-Operate

**BOOT:** Build-Own-Operate-Transfer

**BUT:** Brno University of Technology

**CC TT:** Competence Centre on Technology Transfer at the Joint Research Centre

**CEO / COO:** Chief Executive Officer / Chief Operating Officer

**DBFO:** Design, Build, Finance and Operate

**DCMF:** Design-Construct-Manage-Finance

**EBITDA:** Earnings before interest, taxes, depreciation, and amortization

**EBRD:** European Bank for Reconstruction and Development

**ECA:** European Court of Auditors

**EDP:** Entrepreneurial Discovery Process

**EIB:** European Investment Bank

**ERDF:** European Regional Development Fund

**EU:** European Union

**GBER:** General Block Exemption Regulation

**GDP:** Gross Domestic Product

**GIID:** Global Institute on Innovation Districts

**IASP:** International Association of Science Parks and Areas of Innovation

**ICoE:** International PPP Centre of Excellence

**ICT:** Information and Communication Technologies

**IOT:** Internet of Things

**IPO:** Initial Public Offering

**IPR:** Intellectual Property Rights

**IT:** Information Technology

**JRC:** Directorate-General Joint Research Centre, European Commission

**JV:** Joint Venture

**KPI:** Key Performance Indicator

**MEDC:** Michigan Economic Development Corporation

**MIND:** Milano Innovation District

**MIT:** Massachusetts Institute of Technology

**NPV:** Net Present Value

**OECD:** Organisation for Economic Co-operation and Development

**ØICC:** Ørestad Innovation City Copenhagen

**OPEX:** Operating expenses

**PPIAF:** Public - Private Infrastructure Advisory Facility

**PPP:** Public-Private Partnership

**R&D&I:** Research, Development and Innovation

**R&D:** Research and Development

**S3:** Smart Specialisation Strategies

**SMEs:** Small and medium-sized enterprises

**SPV:** Special Purpose Vehicle

**S&T:** Science and Technology

**STP:** Science and Technology Park, or simply science park, see full definition by IASP

**TPB:** Technologicky Park Brno

**TPL:** Technology Park Ljubljana

**TTO:** Technology Transfer Office

**UNECE:** United Nations Economic Commission for Europe

**UofM:** University of Michigan

**VC:** Venture Capital

# Annex 1

## Annex 1.A

**Suggested questions for the personal interviews with STP/AOI/Innovation District managers from Group/Model 1 (closest to PPP in OECD definition)**

Questions regarding the institutional set up of the partnership

1. When was the Park/AOI/Innovation district founded?
2. What was the key motive to found the Park/AOI/Innovation district?
3. Location and macro-economic conditions at the time of establishment.
  - A. Was the Park/AOI/Innovation district established in an urban, suburban or rural environment?
  - B. Was the Park/AOI/Innovation district established in times of either: a booming economy, moderately growing economy, flat or in recession?
4. What was your rationale for forming a PPP?
  - A. need of additional capital
  - B. administrative efficiency
  - C. risk sharing
  - D. all of the above
  - E. other
5. How was the PPP formed?
  - A. traditional tender under public procurement law
  - B. competitive dialogue (or equivalent)
  - C. public consultation
  - D. other
6. What risks were identified at project inception, how were these allocated and to which of the partners respectively, and how could these risks be mitigated?
7. What type of organizations participated in the PPP at each stage (and at the end if different):
  - A. For the Public Sector:
    - a. public research institute or organization (PRO)
    - b. public university
    - c. local municipality
    - d. regional authority
    - e. national authority
    - f. publicly owned company
    - g. combination of the above
    - h. other
  - B. For the Private sector:
    - a. a bank
    - b. a real estate fund
    - c. a specialized real estate developer company
    - d. industry
    - e. other
  - C. Did the composition of the partnership change throughout the life of the project?
    - a. No
    - b. Yes. If yes, how
8. Were the PPP Partners involved in all phases of the development? How has the composition of the PPP scheme altered during the various phases of the project development, including possible involvement of new partners?
  - A. planning:
  - B. construction
  - C. operation
  - D. other
9. Throughout the stages of development of the project there were:
  - A. different types of partnerships
  - B. one type from the very beginning till now
  - C. other
10. What's the Legal form of the partnership
  - A. Concession contract
  - B. joint venture
  - C. leasing
  - D. foundation (not for profit)
  - E. other

**11.** Can you provide the Heads of Terms (HOTS) anonymised? Usually, the main purpose of this document is to outline the requirements for each of the partners.

- A. Yes, I can and will
- B. No

Questions regarding the contribution of each PPP partner

**12.** What was the contribution of the:

- A. Public Partner:
  - a. land
  - b. project conception
  - c. stakeholders alignment
  - d. feasibility study
  - e. technical documentation (incl. regulation and public administration procedures)
  - f. subsidy
  - g. loan
  - h. guarantees
  - i. other
- B. Private Partner:
  - a. funding in the form of equity
  - b. [part of] the project financing (non-equity)
  - c. project construction
  - d. loans
  - e. management (of the STP, area, innovation district, etc.)
  - f. contributions in kind, please specify
  - g. technical expertise (management, design, marketing etc.)
  - h. other

**13.** Can you share the financial model of the investment, in aggregate form?  
Out of the total investment of the project "X million", what % approx. was the respective value of:

- A. land provided by the public partner (state/region/municipality/university): %
- B. existing buildings provided by the public partner: %
- C. project equity provided by the private partner: %
- D. project grant provided by the public partner: %
- E. loan drawn by the private partner: %
- F. loan drawn from International Financial Institutions (IFIs such as the EIB) and guaranteed by the public partner: %
- G. equity from private sector: %
- H. other: %

**14.** As per your PPP scheme, does the contract foresee/contain any kind of termination clause, in case any of the partners should wish to leave the partnership?

- A. Yes, duration is contractually set at limited period to automatically end after \_\_\_\_\_ years
- B. Yes, upon request from one of the partners (specify if compensation is due)
- C. Only upon breach of the concessionary/partnership agreement
- D. No specific rules on this (referral to general legislation)
- E. other

**15.** What part of the total operational costs of the activities included to the PPP comes from:

- A. public source funding: %
- B. private partner[s]: %
- C. other

**16.** How is the public financing provided:

- A. through an annual lump sum by the government/municipality/university/public partner
- B. in the form of government support programs such as specific schemes supporting SMEs, incubating/accelerating startups, transfer etc.
- C. regional development funds
- D. other

**17.** Would the science park / area / innovation district still be economically viable/ sustainable without the real estate component?

- A. yes
- B. yes, but it wouldn't be able to provide as many services or services of such a quality to its tenants or stakeholders, thus bringing added value
- C. no

Questions regarding the role of the PPP partners in the management and operation of the science park/AOI/Innovation district

**18.** How is the policy and strategy of STP/AOI determined?

- A. Board representation
- B. Presence in management team
- C. Inclusion of tenants
- D. other

**19.** Does the public partner define and control the policy and strategy of the science park/area/innovation district?

- A.** Yes. Please explain what the participation is of the public partner in the overall policy and strategy of the project
- B.** Yes, to a limited extent
- C.** No
- D.** other
- 20.** Is the science park/area/innovation district strategy aligned with national and regional innovation/smart specialization strategies?
- A.** Yes, fully
- B.** Yes, to an extent
- C.** No, the strategy is rather independent and/or specific for this project
- D.** other
- 21.** Does the project generate from its usual operations:
- A.** Surplus income
- B.** Deficit /negative balance
- C.** other
- 22.** In the case of surplus income from operation (and after repaying any outstanding loans), how is this income invested?
- A.** For expansion of infrastructure
- B.** For special SME innovation
- C.** For university entrepreneurship (such as start-up programs)
- D.** For increased salaries or for hiring additional staff/researchers
- E.** For further basic research projects
- F.** dividends
- G.** other
- 23.** In case of a deficit, which one of the PPP partners is expected to bear it and is there a pre-agreed rule on that?
- A.** The Public Partner[s]
- B.** The Private Partner[s]
- C.** other
- 24.** How are the needs to generate revenue and achieve occupancy targets reconciled with the need to attract high potential innovators that can drive development of the ecosystem as tenants?
- A.** Through strict admission criteria
- B.** Through joint evaluation committees for future tenants (which for example have to submit info on the scope of their tenancy at the park, avoiding pure commercial activities tenancy, etc.)
- C.** Through open calls for proposal
- D.** Other
- 25.** Are Chambers of Commerce or Business Associations involved in the /science park/area/innovation district and if yes - how?
- A.** Yes – How?
- B.** No
- C.** other
- Questions regarding the ex-post view of this PPP venture
- 26.** How do you measure success/impact? ù
- 27.** What are the positive and what the negative lessons learned from the specific PPP STP project?
- 28.** If you had the chance to start from the beginning such a venture what are the main parameters you would modify compared to the ones that were followed?
- 29.** Do you observe that the value-adding services provided in the park/area/district (such as operating a TTO) and/or the facilities and amenities available for use by the tenants (such as entertainment or sport) have increased the attractiveness (the demand) as well as the rent price per square meter?
- A.** Yes, especially the services
- B.** Yes, especially the facilities and amenities
- C.** Yes, both the services and the amenities
- D.** No, neither has had a noticeable effect
- E.** other
- 30.** In your experience, how does the stage of development of the science park (its maturity) influence potential investors' readiness to become involved? Is it true that in later stages, where commercial traction has been demonstrated, it becomes easier to attract private investors?

**31.** What is the latest ratio (%) of the public research infrastructure of the park as compared to the private real estate developments and buildings (measured in total built area used)?

- A.** The public R&D infrastructure amounts to approx. .... % of the total built area
- B.** The public general infrastructure amounts to approx. .... % of the total built area
- C.** The private partner real estate development amount to approx. .... % of the total built area

**32.** Has the park management considered the potential for additional revenue streams from *e.g.* becoming a minority investor (or as part of an investment fund) in the tenant companies of /or companies collaborating with/ the park?

- A.** Yes, this is already the case
- B.** Yes, options are being explored
- C.** No, but the management is open to explore further
- D.** No, this falls outside the competence of the STP/innovation area/district
- E.** Other

**33.** Are there other sources of income derived not from real-estate or government subsidies?

- A.** Exploitation of New patents
- B.** Exploitation of generated data
- C.** other

**34.** Finally what is your key advice to new STP developers that choose the pure PPP model?

## Annex 1.B

### Online Questionnaire for Group/Model 2: respondents involving jump-in private investors after the commencement of operations

- 1.** We have understood that in your case the park development started as a public initiative but in the later phase private investors got more involved. Is this right?
- 2.** Please define which components of the STP/AOI were created through a PPP investment? (Multiple choice)
  - A.** a. Office space
  - B.** b. Lab space
  - C.** c. Workshop space
  - D.** d. Other, please specify
- 3.** What was/is the role of each partner in different phases the PPP project?
  - A.** planning:
  - B.** construction
  - C.** operation
  - D.** transfer (if applicable)
  - E.** growth/expansion to new areas
  - F.** other
- 4.** In case that the private investors buy or lease land with long term contracts from the public partner, is the public partner free to spend these funds on his financial and/or development goals?
  - A.** Yes
  - B.** If not: what regulations are in place?
- 5.** In case that the private investors buy or lease land with long term contracts from the public partner for their own development purposes, are there park specific regulations regarding the investment?
  - A.** No
  - B.** Yes, architectural
  - C.** Yes, usage profile restricted (industry, tech, start-ups...)
  - D.** Yes, obligations to link into energetical, infrastructural, media concepts
  - E.** Yes, obligations to build within a certain time
  - F.** Yes, only leasehold
  - G.** other

- 6.** What control do you (the STP/AOI Managers) have about the type of companies that a private investor who has developed premises in your park may wish to rent space to?
- STP/area/district can veto some of these companies, if they don't meet the general admission criteria (set by the public partner)
  - Private investors can bring in companies at their own full discretion
  - Other
- 7.** Is the Private Partner Investor allowed to settle and stay in the Science Park indefinitely or do you envisage some time limitation?
- Private Partner can stay indefinitely (land/buildings are sold)
  - Private Partner has been granted time-limited lease/concession to use the land/building for limited period
  - Other
- 8.** What % of the total built floor area in the Park/AOI is given (or planned to be given) to Private Partner Investors and what % will be kept by the Public Partner (used mostly for public research infrastructure or public services)?
- % foreseen for Private investors
  - % foreseen for Public Partner
  - Other
- 9.** What are the consequences if the Private Partner does not deliver what was originally agreed or put don in regulations (*e.g.* does not pay the agreed service charge, dilutes the agreed company focus, does not build in time, etc.)?
- 10.** What other risks were identified, how were these allocated and to which of the partners respectively (public owner vs. private investors), and how could these risks be mitigated?
- 11.** Would the STP/AOI development project be economically viable/ sustainable without the real estate contribution from private investors?
- Yes
  - yes, but it wouldn't be able to provide as many services or services of such a quality to its tenants or stakeholders, thus bringing added value
  - no other

- 12.** Would you define the interest from Private Partner Investors in the real estate development at your science park/area/district as higher or lower as opposed to locations outside the park (which normally have less regulations / requirements)?
- Higher
  - Lower
  - Other

## Annex 1.C

### Online Questionnaire for Group/Model 3: Management by Private Partner

You have kindly answered our questionnaire regarding your PPP experience. We are trying to get some more detailed information on how/ why the management of your Park/AOI has been entrusted to a private organisation.

- We have understood that in your case the park management has been transferred to a private management organization. Is this right?
- Please describe the arrangements you have for participation of the private sector in the management structures of STP: *e.g.* Board of Directors (BoD) participation of institutional partners from private sector like:
  - Chambers of Commerce
  - Association of Industries
  - National-regional banks
  - Personalities from the business world
  - Other
- Please describe if there is any financial contribution in form of equity by any of the private partners in the management company of the STP/area/district.
  - Yes
  - No
  - Other
- Who has the majority at the Board of Directors? Who appoints the CEO?
  - Public Partner
  - Private Partner
  - Other

5. What are the future plans and methods of development and financing?
6. How are the powers of the Private Management/Operator defined?
7. To what extent is the Private Company Operator allowed to manage the assets of the [at least partially] public science park?
8. How does the Public Partner ensure that the Private Operator acts not only in private interest but also ensure that Public/Policy considerations are taken into account in all of the management actions?
9. Are there any risks identified? How are these allocated (owner vs. management), and how can these risks be mitigated?
10. How do you measure success/impact?
  - A. Self-assessment process/system
  - B. External evaluation process/system
  - C. Other
11. Kindly tell us the main indicators (KPI) that you use:

# Annex 2

## Results of the Specific Online Surveys for Groups 2 and 3

*In an attempt to avoid repetition we include here the additional information that has not already been presented (or not graphically presented) in the main body of the report.*

### Annex 2.A

Results from the survey to Group 2:  
JUMP-IN MODEL (Group 2)

**MODEL 2**  
**JUMP-IN MODEL**  
**or late stage private investment**

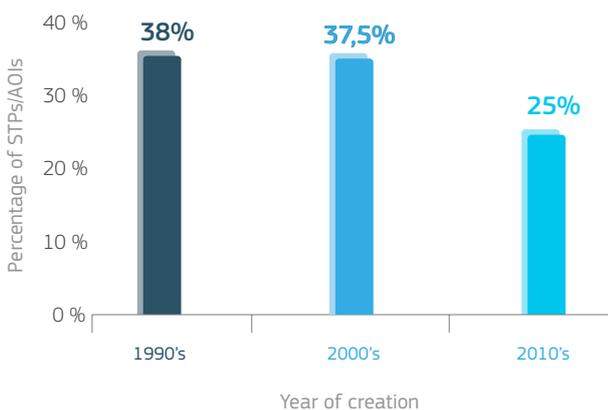
The park or district is launched and owned by a public agent. At a certain point, private investors are given the opportunity to develop some elements of the park and exploit these. In most cases the private investors build offices and/or workshop space to rent it out to tenants.

Universe: The questionnaire was sent to 16 organisations from 8 countries (Botswana, Bulgaria, Estonia, France, Germany, South Korea, Spain and United Kingdom).

Sample: 8 organisations from 6 countries (Botswana, Bulgaria, Estonia, Germany, South Korea and Spain) replied to the questionnaire.

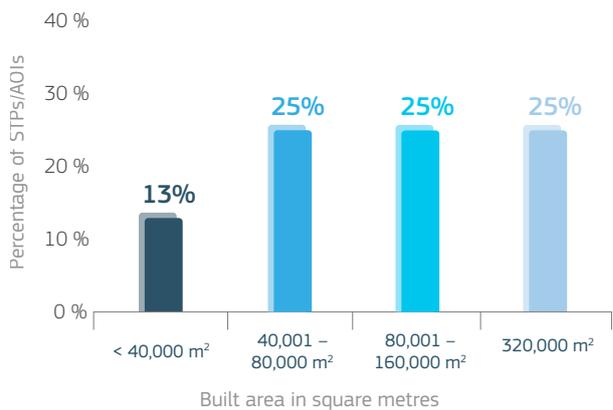
#### STP/AOI/Innovation district sample basic data

**Figure 18.** STPs/AOIs sample – Year of creation

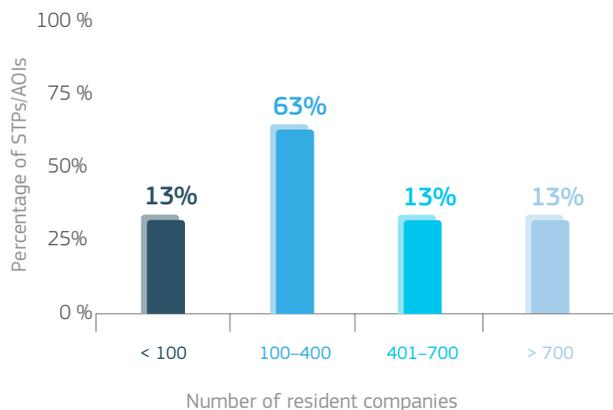


Source: IASP 2019

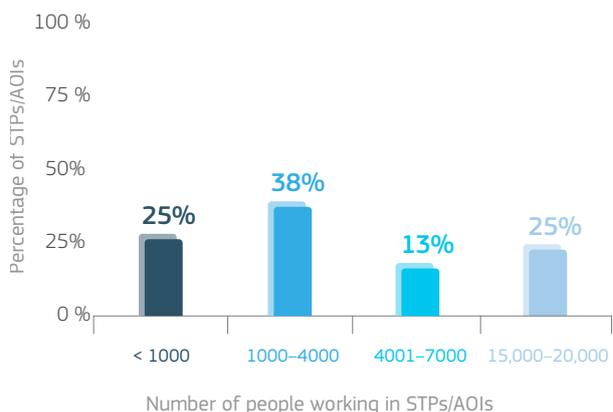
**Figure 19.** STPs/AOIs – built area (m<sup>2</sup>)



**Figure 20.** STPs/AOIs – resident companies



**Figure 21.** STPs/AOIs – employees



Source: IASP 2019 (Figures 15, 16, 17)

**JUMP-IN MODEL or late stage private investment responses**

1. We have understood that in your case the park/area development started as a public initiative but in the later phase private investors got more involved. Is this right?

**Figure 22.** Started as public initiative



**Source:** IASP 2019

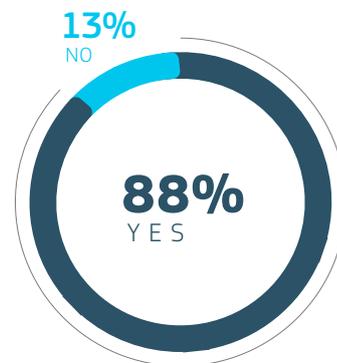
2. Question two is answered in full in main body of the report, see chapter 4.
3. What was/is the role of each partner in different phases of the PPP project? Please describe the actions taken and by whom in each phase.

Summary of the responses: this question was asked and understood rather broadly. In most cases the private investors' role is either to build several buildings (which can happen also at later stages of the project development and growth and which is the typical model for a jump-in partnership) or to actually deliver the full construction (normally through standard procurement procedures for construction).

- One of the science parks responded that for the planning, construction and subsequent operation the private partner solely delivers the resources for the project implementation respecting the requirements and code of action of the STP.
- In another case while the construction was completed entirely by the private partner, the activities during the planning and operation phases were/are taking place under public supervision (still lead by the private partner).

- It can also be that the planning is entirely public, while the construction, operation and growth phases happen jointly in partnership.
- Finally, in one of the project respondents both the public and private partners are active in all phase meaning that the public partner (park management company) develops and operates during incubation and growth phases, while the private investors follow with focus on grown-up companies leaving the protected incubation period (either as real estate investors or invest directly into their own grown-up company straight into their own premises).
- 4. In the case that the private investors buy or lease land with long term contracts from the public partner, is the public partner free to spend these funds on their financial and/or development goals?

**Figure 23.** Freedom of public partners to spend funds



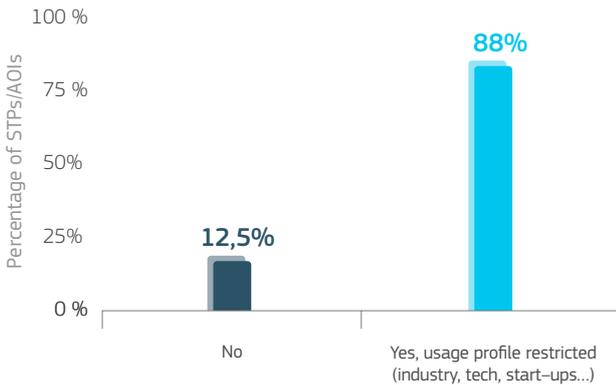
**Source:** IASP 2019

**A.** If not, what regulations are in place?

Answer	
<b>No</b>	Basically, the public partners have to transfer the sales proceed to the public owner - the regional government; however, in many cases, the latter gave the permit to reinvest the revenues into further development of the park infrastructure.

5. In the case that the private investors buy or lease land with long term contracts from the public partner for their own development purposes, are there STP/AOI/Innovation district specific regulations regarding the investment?

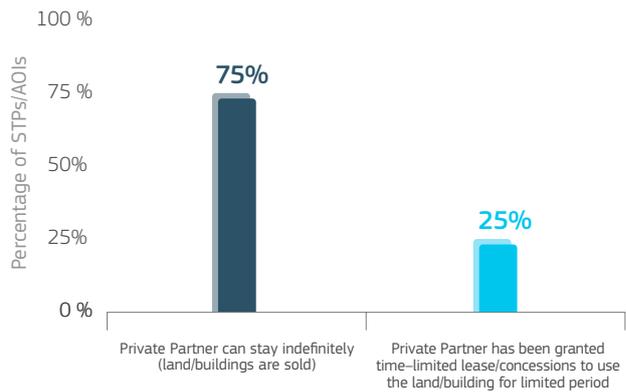
Figure 24. Specific regulations for STP/AOI investment



Source: IASP 2019

7. Is the Private Partner Investor allowed to settle and stay in the STP/AOI/Innovation District indefinitely or do you envisage some time limitation?

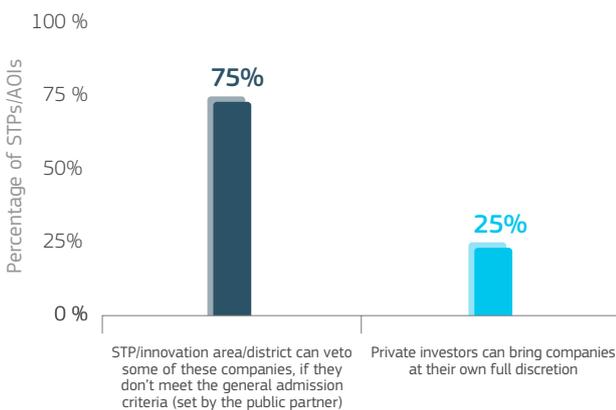
Figure 26. Time limitations for private partners to stay in STP/AOI



Source: IASP 2019

6. What control do you (the STP/AOI/Innovation District Managers) have over the type of companies that a private investor who has developed premises in your park may wish to rent space to?

Figure 25. Type of control STP/AOI managers have over types of companies proposed by private investors



Source: IASP 2019

8. What percentage of the total built floor area in the STP/AOI/Innovation district is given (or planned to be given) to Private Partner Investors, and what percentage will be kept by the Public Partner (used mostly for public research infrastructure or public services)?

Answer	
Percentage foreseen for Private investors	Percentage foreseen for Public Partner
65%	35%
80%	20%
10%	50%
70%	30%
5%	95%
70%	30%
30%	70%

**9.** What are the consequences if the Private Partner does not deliver what was originally agreed or put down in regulations (e.g. does not pay the agreed service charge, dilutes the agreed company focus, does not build in time, etc.)?

Answer
Penalties or other legal actions; reversal of the purchase contract
Terms are specified in the long-term lease and there are financial penalties
The City Council can exercise its right of withdrawal.
Our park is managed by a public body (Regional Development Agency). As we are only able to sell plots, and the market demands buildings (offices and workshops), we collaborate with private investors, which assume the investment in buildings construction and offer the premises for rent.
We have specific rule in the contracts
If the Private Partner does not deliver what was originally agreed, they are subject of fine according to the contract.

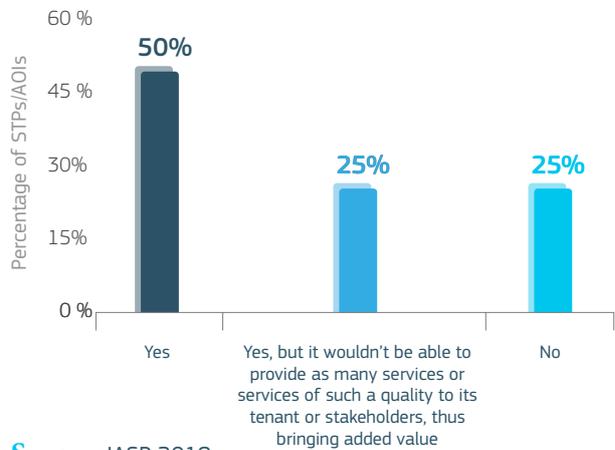
**10.** What other risks were identified, how were these allocated and to which of the partners respectively (public owner vs. private investors), and how could these risks be mitigated?

Answer
Low uptake of land parcels development in the park-mitigated by offering special economic zone incentives and more aggressive promotion
It will cope with the risk by government management
Carrying out a continuous control.
If they pretend to rent the premises to a company that doesn't meet our requirement, we send a negative report to the municipality, so the company wouldn't get the licence. If we sell a plot and the private partners do not build the constructions in a certain time or the building is not according to the approved project, we can get the plot back.
When the companies fail.
The main risk addressed in the process of setting the deals is the usage profile of the tenant companies. The risk is mitigated by setting a threshold limit. The hosting STP team has established a business development unit that is in an active collaboration with the private investor. It is aiming to assist their efforts to attract the most appropriate and value adding tenant companies to the STP/AOI.

No big risks as real estate development is a very straight forward business. In terms of services and community, the STP still plays significant role and brings extra value for the real estate.

**11.** Would the STP/AOI/Innovation District development project be economically viable/sustainable without the real estate contribution from private investors?

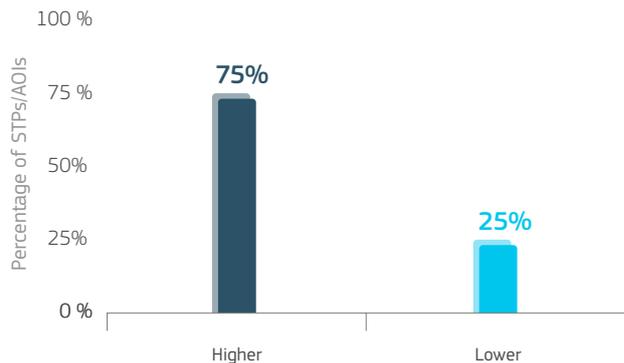
**Figure 27.** Viability of STP/AOI without private investor support



Source: IASP 2019

**12.** How would you define the interest from Private Partner Investors in the real estate development at your science park/area/district, compared to locations outside the STP/AOI/Innovation district (which normally have fewer regulations / requirements)?

**Figure 28.** Interest in STP/AOI real estate from private investors compared to other locations



Source: IASP 2019

## Annex 2.B

### Results from the survey to Group 3: Management Partnership Model

<b>MODEL 3</b> <b>Management partnership</b>
The park or district is promoted, launched and owned by the public sector but the owners outsource the management of the project to a private company, or invite the private sector to participate (with capital increase or other forms of contribution) in the management company of the STP, or take over the management entirely. The responsibilities, risks and profits of the parties are fixed by a negotiation between the public and the private partners.

Universe: The questionnaire was sent to 15 organisations from 12 countries (Austria, China, Colombia, Greece, Iran, Portugal Romania, Russia, Saudi Arabia, Thailand, Turkey and United Kingdom).

Sample: 4 organisations from 3 countries (Austria, China and Turkey) replied to the questionnaire.

**Table 6.** STP/AOI/Innovation district sample basic data

Year of creation	Built area [m <sup>2</sup> ]	Number of companies	Number of employees
2002	372,000	260	3,900
2005	34,000	70	1,300
2006	7,000	78	596
1994	770,000	1,000	35,000

#### Management partnership responses<sup>88</sup>

1. We have understood that in your case the STP/AOI/Innovation district management has been transferred to a private management organisation. Is this right?

2. What are the future plans and methods of development and financing?

<b>Answer</b>
Our technopark is self-sustainable. For some new investment, we are planning to use our own resources with some loan.
Development of rental turnover, occupancy rate increase, construction of new buildings and rental space.
Science and technology park management finances itself by the rents, projects, grants, provided services etc. In development of the area from the 10th year of the creation a Build-Operate-Transfer mentality is accepted. For sure the common social and trading areas are built and operated by the management.

3. How are the powers of the Private Management/Operator defined?

<b>Answer</b>
Management is an Inc.
Management and development of the science park
The private management has a visionary operation and it gives flexibility
Strong

4. To what extent is the Private Company Operator allowed to manage the assets of the (at least partially) public STP/AOI/Innovation district?

<b>Answer</b>
Land is fully allocated to the management company. Some rights are for general manager (GM) up to a level and all rights are for Board of Directors.
100%
Fully permitted
More than half, when it is necessary.

5. How does the Public Partner ensure that the Private Operator acts not only in private interest but also ensure that Public/Policy considerations are taken into account in all of the management actions?

<b>Answer:</b>
All technoparks in Turkey are running under a law and Public/Policy consideration is defined in that law.
Have to prove management decisions equally (state/region/city)
The public partner is represented by the governor of the city. So, it's his natural duty to promote the Ecosystem
Operate the company in accordance with company law.

6. Are there any risks identified? How are these allocated (owner vs. management), and how can these risks be mitigated?

<b>Answer:</b>
There is some audit done by the Ministry (running the law) and by Holding, separately, to reduce the risk.
Occupancy rate too low, risks at management.
STPs are operated under a law and the director of the board is the governor of the city so there is not any identified risk.
Operate the company in accordance with company law. Ensure that major decisions are passed through the Board of Directors for discussion.

7. How do you measure success/impact?

<b>Answer:</b>
Both self and external evaluation.
External evaluation process/system.
Ministry of industry and technology.
External evaluation process/system.

# Annex 3

## Brainstormed Questions



••• *The questions listed below have arisen before and during the discussions among the expert authors engaged for the present study. Despite the fact that it falls outside the scope of the study to attempt to answer all of them or answer them in detail it is nevertheless considered useful to list these brainstormed questions and some identified issues. The case studies have directly or indirectly answered part of them. For a list of questions that were actually asked and discussed with science park managers please refer to the Annex 1. Also be aware that some of these questions are so complex that they would require a separate study.* •••

At the inception phases of a Science Park or Innovation Districts it might be difficult to convince potential real estate developers to commit to a long-term collaboration. Is it only when a project matures that a PPP structure becomes feasible/suitable or is it better to organise from the very beginning?

Does the public actor effectively serve as a catalyst in facilitating the development of innovation ecosystem and if so, how?

In theory, private investors seem to have a conservative approach and insist their involvement be based on a sound business model guaranteeing good returns on the real estate side. However, if you bring in too many real estate developers or involve them too early without proper arrangements you might end up with the wrong mix of tenants and/or give up control over the project's overall development letting it become a pure business park. How do you find the balance?

Is there still a potential for legacy sites (brownfield) that have been mismanaged?

Is it true that in rural areas a much greater intervention is needed to achieve the same results as in buoyant larger city environments?

Broader regional impact of successful ecosystems if measured would be the impact of the project multiplied by x 1.8 up to 2.<sup>89</sup> Is this achievable in practice? Some of the experts expressed that this has already been proven in cases where the focus is on high value-added deep tech.

The success of each project is claimed to depend on the attraction of a critical mass of stakeholders to operate in or interact with the science park. How do you actually attract stakeholders?

Developing a business park and office space rented to software or purely service-based companies should not be taken as equivalent to Science and Technology Parks /Innovation Districts. In this regard, to what extent can the intensity of technology transfer activities as well as other added value services be used to measure the success of large multi-stakeholder projects?

Investors always consider the financial risks. Under what conditions would large-scale experienced private investor developers such as Lendlease<sup>90</sup> invest in cities where the investment climate (the economic, financial, and socio-political conditions) are less favourable and where the real estate market is weaker?

Is the efficiency of the private sector or is the reduced financial burden on the public partner the key incentive / expected benefit for organising a PPP/concession in the science, technology and innovation domain?

Have the value-added services provided in the park and/or the facilities and amenities available for use by the tenants increased the attractiveness as well as the rent price per square meter?

How does the stage of development of the science park (its maturity) influence potential investors' readiness to become involved? Is it true that in later stages, when commercial traction has been demonstrated, it becomes easier to attract private investors?

# Bibliography

- Addarii, F. & Lipparini, F. (2017).** *Vision and Trends of Social Innovation for Europe*. European Commission. [online]: Available from: <https://op.europa.eu/en/publication-detail/-/publication/a97a2fbd-b7da-11e7-837e-01aa75ed71a1>
- Ann Arbor SPARK. (2018).** *Annual Report*. [online]: Available from: <https://annarborusa.org/wp-content/uploads/2019/05/SPARK-Annual-Report-2018-Final-Web.pdf>.
- Bomey, N. (2011).** *Ann Arbor SPARK picks Silicon Valley economic development executive as next CEO*. *The Ann Arbor News*. [online] Available from: <http://www.annarbor.com/business-review/ann-arbor-spark-picks-silicon-valley-economic-development/>.
- Bomey, N. (2011a).** *New Ann Arbor SPARK CEO Paul Krutko lays out job creation philosophy*. *The Ann Arbor News*. [online]. Available from: <http://www.annarbor.com/business-review/new-ann-arbor-spark-ceo-paul-krutko-lays-out-job-creation-philosophy/>.
- Burnett, M. (2018).** *Using Competitive Dialogue and the Competitive Procedure with Negotiation – Making better choices for better value for money*. European Institute of Public Administration. [online]. Available from: <https://www.eipa.eu/using-competitive-dialogue-and-the-competitive-procedure-with-negotiation/>.
- Canada Infrastructure Bank. (2020).** [online]. Available from: <https://cib-bic.ca/en/about-us/>.
- Carbonaro, G., Catalano, G., Delponte, L., Vignetti, S. (2017).** *Research for REGI Committee – Public Private Partnerships and Cohesion Policy*. [online]. Available from: [https://www.europarl.europa.eu/RegData/etudes/STUD/2017/602010/IPOL\\_STU\(2017\)602010\\_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2017/602010/IPOL_STU(2017)602010_EN.pdf).
- Delmon, J. (2010).** *Understanding Options for Public-Private Partnerships in Infrastructure: Sorting out the forest from the trees: BOT, DBFO, DCMF, concession, lease....* Policy Research Working Paper. The World Bank Finance Economics & Urban Department Finance and Guarantees Unit. European Commission. (2003). *Guidelines for Successful Public-Private Partnerships*. [online]. Available from: [https://ec.europa.eu/regional\\_policy/sources/docgener/guides/ppp\\_en.pdf](https://ec.europa.eu/regional_policy/sources/docgener/guides/ppp_en.pdf).
- Detter, D. & Fölster, S. (2017).** *The Public Wealth of Cities*. Brookings Institution Press. [online]. Available from: <https://www.brookings.edu/book/the-public-wealth-of-cities/>.
- European Commission Directorate-General for Communications Networks, Content and Technology. (2018). *Open innovation 2.0 yearbook 2017-2018*. Publications Office of the EU.
- European Commission Joint Research Centre. (2020)** *Smart specialisation platform*. [online]. Available from: <https://s3platform.jrc.ec.europa.eu> Accessed: June 2020.
- European Court of Auditors. (2014).** *Has the ERDF successfully supported the development of business incubators?. Special Report*. [online]. Available from: [https://www.eca.europa.eu/Lists/ECADocuments/SR14\\_07/SR14\\_07\\_EN.pdf](https://www.eca.europa.eu/Lists/ECADocuments/SR14_07/SR14_07_EN.pdf).
- European Court of Auditors. (2018).** *Public Private Partnerships in the EU: Widespread shortcomings and limited benefits*. Special Report. [online]. Available from: [https://www.eca.europa.eu/Lists/ECADocuments/SR18\\_09/SR\\_PPP\\_EN.pdf](https://www.eca.europa.eu/Lists/ECADocuments/SR18_09/SR_PPP_EN.pdf).
- European Investment Bank. (2020)** *Appraisal*. [online]. Available from: <https://www.eib.org/en/projects/cycle/appraisal/index.htm>.
- European PPP Expertise Centre (EPEC). (2020).** [online]. Available from: <https://www.eib.org/epec/>.
- European PPP Expertise Centre (EPEC). (2016).** *PPPs and State Aid*. European Investment Bank report. [online]. Available from: [https://www.eib.org/attachments/epec/epec\\_ppp\\_and\\_state\\_aid\\_en.pdf](https://www.eib.org/attachments/epec/epec_ppp_and_state_aid_en.pdf).
- European Strategy Forum on Research Infrastructures (ESFRI). (2016).** *Report to ESFRI. Working Group on Innovation*. [online]. Available from: [https://www.esfri.eu/sites/default/files/wginno\\_final\\_report\\_032016.pdf](https://www.esfri.eu/sites/default/files/wginno_final_report_032016.pdf).
- Eurostat. (2016).** *A Guide to the Statistical Treatment of PPPs*. [online]. Available from: <https://ec.europa.eu/eurostat/documents/1015035/7204121/epec-eurostat-statistical-guide-en.pdf>.
- Gatti, S. (2013).** *Government and Market-based Instruments and Incentives to Stimulate Long-term Investment Finance in Infrastructure*. OECD Working Papers on Finance, Insurance and Private Pensions, No.37, OECD Publishing.
- German Institute for Economic Research (DIW). (2011).** *The economic significance of Adlershof: Impact on added value, employment and tax revenues in Berlin*. Published by WISTA-MANAGEMENT GMBH. [online]. Available from: [https://www.adlershof.de/fileadmin/user\\_upload/downloads/DIW\\_Studie\\_adlershof.pdf](https://www.adlershof.de/fileadmin/user_upload/downloads/DIW_Studie_adlershof.pdf).
- International Association of Science Parks and Areas of Innovation. (2020)** *Definitions*. [online]. Available from: <https://www.iasp.ws/our-industry/definitions>.
- Katz, B. & Noring, L. (2017).** *The (Secret) Copenhagen Model for Regenerating Cities*. *Next City*. [online] Available from: <https://nextcity.org/daily/entry/cope-nhagen-model-regenerating-cities-norhagen>.
- Katz, B. & Noring, L. (2017).** *The Copenhagen City and Port Development Corporation: A Model for Regenerating Cities*. Centennial Scholar Initiative, Brookings. [online] Available from: [https://www.brookings.edu/wp-content/uploads/2017/05/csi\\_20170601\\_copenhagen\\_port\\_paper.pdf](https://www.brookings.edu/wp-content/uploads/2017/05/csi_20170601_copenhagen_port_paper.pdf).

- Katz, B. & Wagner, J. (2014). **The Rise of Innovation Districts: A New Geography of Innovation in America.** The Brookings Institution. [online] Available from: <https://www.brookings.edu/wp-content/uploads/2016/07/InnovationDistricts1.pdf>
- Lendlease Group. (2019). **Annual Report.** [online]. Available from: <https://www.lendlease.com/-/media/llcom/investor-relations/asx-announcements/2019/lendlease-group-2019-annual-report.pdf>.
- Lund, E., Peretti, L., Kokorotsikos, P., Taylor, S. (2018). **Reshaping the functional and operational capacity of Sofia Tech Park.** [online]. Available from: [https://ec.europa.eu/knowledge4policy/sites/know4pol/files/report\\_reshaping\\_the\\_functional\\_and\\_operational\\_capacity\\_of\\_sofia\\_tech\\_park\\_2018.pdf](https://ec.europa.eu/knowledge4policy/sites/know4pol/files/report_reshaping_the_functional_and_operational_capacity_of_sofia_tech_park_2018.pdf).
- McKinsey Global Institute. (2019). **How can the private and public sectors work together to create smart cities?.** [online]. Available from: <https://www.mckinsey.com/industries/capital-projects-and-infrastructure/our-insights/how-can-the-private-and-public-sectors-work-together-to-create-smart-cities>.
- Medda, F., Caravelli, F., Panayiotou, A., Rapti, E. (2013). **Assignment 29: Strategic UDF Investing and Project Structuring, Appendix 4: Portfolio Structuring Model.** Concept Paper. [provided by Mazars LLP and submitted to European Investment Bank]. Available from: [https://www.eib.org/attachments/documents/jessica\\_strategic\\_udf\\_appendix%204\\_en.pdf](https://www.eib.org/attachments/documents/jessica_strategic_udf_appendix%204_en.pdf).
- Nauwelaers, C., Kleibrink, A., & Stancova, K. (2014). **The Role of Science Parks in Smart Specialisation Strategies.** S3 Policy Brief Series, No. 08/2013. European Commission, Joint Research Centre, Institute for prospective Technological Studies. Spain. [online]. Available from: [https://publications.jrc.ec.europa.eu/repository/bitstream/JRC90719/jrc\\_90719\\_policy%20brief\\_final.pdf](https://publications.jrc.ec.europa.eu/repository/bitstream/JRC90719/jrc_90719_policy%20brief_final.pdf).
- OECD. (2012). **Recommendation of the Council on Principles for Public Governance of Public-Private Partnerships.** [online]. Available from: <https://www.oecd.org/governance/budgeting/PPP-Recommendation.pdf>.
- Perez, B. (2016). **Chinese science park developer Tus-Holdings eyes expansion with US\$388m investment in 21Vianet.** South China Morning Post. [online] Available from: <https://www.scmp.com/tech/china-tech/article/1953292/chinese-science-park-developer-tus-holdings-eyes-expansion-us388m>.
- PPP Knowledge Lab. (2020). [online]. Available from: <https://pppknowledgelab.org/>.
- Public-Private Infrastructure Advisory Facility (PPIAF). (2020). [online]. Available from: <https://ppiiaf.org>.
- Public Private Partnership Development Program. (2015). Review of policy, legal and institutional framework for industrial parks in Ukraine.* [online]. Available from: <http://ppp-ukraine.org/wp-content/uploads/2015/12/annex-11-final.pdf>.
- Rowe, D. (2014). Setting up, Managing and Evaluating EU Science and Technology parks - An advice and guidance report on good practice. Report prepared for the European Commission.* [online]. Available from: [https://ec.europa.eu/regional\\_policy/sources/docgener/studies/pdf/stp\\_report\\_en.pdf](https://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/stp_report_en.pdf).
- Russian Direct Investment Fund. (2018). Russia-China Investment Fund and Tus-Holdings expand comprehensive cooperation in the technology & innovation sector.* Press release. [online]. Available from: [https://rdif.ru/Eng\\_fullNews/3412/](https://rdif.ru/Eng_fullNews/3412/).
- The European House Ambrosetti. (2017). Impatto socio-economico dei primi insediamenti nel parco della scienza, del sapere e dell'innovazione.* [online]. Available from: <https://www.ambrosetti.eu/ricerche-e-presentazioni/report-arexpo-2017/>.
- The Global Infrastructure Hub Ltd (GI Hub). (2016). Allocating Risks in Public-Private Partnership Contracts.* [online]. Available from: [https://ppp.worldbank.org/public-private-partnership/sites/ppp.worldbank.org/files/documents/GIHub\\_Allocating\\_Risks\\_PPP\\_Contracts\\_EN\\_2016.pdf](https://ppp.worldbank.org/public-private-partnership/sites/ppp.worldbank.org/files/documents/GIHub_Allocating_Risks_PPP_Contracts_EN_2016.pdf).
- Tus-Holdings (2013) TusHoldings homepage.* [online]. Available from: [www.tusholdings.com](http://www.tusholdings.com).
- United Nations Conference on Trade and Development. (2015). Policies to promote collaboration in science, technology and innovation for development: The role of science, technology and innovation parks.*
- United Nations Economic Commission for Europe. (2008). Guidebook on Promoting Good Governance in Public-Private Partnership.* [online]. Available from: <http://www.unece.org/fileadmin/DAM/ceci/publications/ppp.pdf>.
- United Nations Economic and Social Commission for Asia and the Pacific (ESCAP). (2008). Introductory course on public-private partnerships (PPP) in infrastructure development.* [online]. Available from: [https://www.unescap.org/ttdw/ppp/ppp\\_primer/225\\_concessions.html](https://www.unescap.org/ttdw/ppp/ppp_primer/225_concessions.html).
- Wagner, J. (2019). New insights on how innovation districts are challenging economic and social divides.* The Global Institute on Innovation Districts. [online]. Available from: <https://www.giid.org/how-innovation-districts-are-challenging-economic-and-social-divides/>.
- Wagner, J., Katz, B. & Osha, T. (2019). The Evolution of Innovation Districts: The New Geography of Global Innovation.* The Global Institute on Innovation Districts. [online]. Available from: <https://www.giid.org/the-evolution-of-innovation-districts-download/>.

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