HOW STP MANAGERS CAN TURN TECHNOLOGY DEVELOPMENT ACTIVITIES INTO VALUE-ADDED BUSINESS SUPPORT PROGRAMMES AND A VERY EFFECTIVE PROMOTIONAL ASSET

PLENARY SESSION 1

Technology and business: balance and priorities
in STPs and AIs

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Executive Summary

Technology and knowledge are recognised as key drivers and strategic components in the mission of STPs. To foster innovation as well as technology, economic and social development, their role is to create bridges and connections between universities and R&D institutions on the one hand, and market-oriented organisations and companies on the other hand. None of those strategic stakeholders should be ignored or left behind in the definition of the value-added services being offered. Therefore, deciding whether to put more emphasis on technology rather than business development or business development rather than technology is both a critical and hard to solve issue for STP managers. However, does a choice really have to be made?

This paper illustrates how STPs can actually use internal technology development to support their business activities, while creating tremendous commercial and networking opportunities for their tenant companies and external stakeholders.

Full paper text

Most STPs worldwide are strongly connected to research organisations and universities and are heavily engaged in the commercialisation of R&D outcomes. Our STP is moreover directly engaged into internal technology developments by being a partner in international research projects funded under the FP7 and CIP programmes of the European Commission.

Those are highly competitive schemes, involving technology-oriented organisations with a very high level of scientific excellence, though Technoport at the same time is a generic and heavily market-oriented business park, the mission of which is to support the commercial development and fast growth of innovative companies in Luxembourg. The core services being offered to those stakeholders include business strategy, marketing, advertising, social uptake of innovation, attraction of talents, international distribution of products and commercial partnerships, aimed at the promotion, diversification and sustainable growth of businesses and entrepreneurship at national level.

We have always tried to keep a strict balance between technology and business inside our STP. Both approaches are actually perceived as needed to make our offer fully efficient. As indicated in a recent report by the European Commission, Directorate-General of Regional and Urban policy, "key to STP success is the provision of a non monetary value proposition related to R&D (proximity to a university or large research laboratories, presence of large anchor organisations or other local concentration of R&D activities) and to the availability of business services that enhance the development prospects of client companies"[1].

Instead of focusing on the supply side of technology transfer only, and to keep in pace with ongoing business demand for digital, green, health-related and industrial innovation, our approach is to allow hands-on testing and co-development of technologies in a natural interaction process implemented at demonstration and open space facilities located at the heart of our facilities.

In this specific context, upstream technology is fully included in our model as a way to foster and leverage tenant businesses and create opportunities for ground-driven collaborations between different institutions and stakeholders. Practical examples of that strategy include the development and implementation at the STP's level of 4D reconstruction technologies, augmented reality displays, recommendation and expert systems, emotion capture tools, man-machine interactions, indoor and outdoor localisation as well as social and urban gaming methods.

Those tools are currently being derived from two specific European research projects:

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[1]

European Commission, Directorate-General for Regional and Urban policy. (2013). *Setting up, managing and evaluating EU science and technology parks: an advice and guidance report on good practice.*

- the first one, c-Space[2], is a creative ICT project in the field of 4D content and ubiquitous media sharing, funded under the FP7 programme of the European Commission. It is generating new ways to produce, display and use enriched personalised content, based on a mix of augmented reality technologies, emotion recognition tools, geo-localisation, and highly-customised projection and display of information in real-time into the surrounding space.

- the second project, i-locate[3], is aimed at simplifying the life of users by helping them "navigate" inside buildings, using their smartphone, to reach their place of destination (e.g. inside a public office, a university, a clinic, a shopping mall, etc.) and providing easy access to alerts and information which may be relevant to improve the user experience while on site. The technology includes optional tracking functionalities for asset and facility management as well as for logistics purposes.

From our experience, such strategic technology developments can be of great support to address the challenges experienced by most STPs today, e.g. attracting large companies to the park, providing hosted businesses with distinctive services, bringing life to the buildings, contributing to the cohesion of the local communities, and last but not least collaborating with foreign companies, able to virtually present their products and test the local markets at the level of the STP. Buildings at the park become more trendy and attractive and draw an extended deal flow of visitors to the tenant research labs, university buildings and hosted companies. Schools, service companies, traditional industries, public institutions, designers and big brands, which may not be natural clients of the STP, are making use of the 3D spaces and tend to enter into unexpected collaborations with the tenant businesses. The flow of innovation inside the park is supported by challenging and inspiring services, based on emotion and interest automatic capture, as well as personalised recommendations.

Beyond offering the traditional innovative ideas and opportunities for integration or further technical development collaborations, the technologies co-developed and implemented provide direct and easy access to a large number of value-added services of high commercial and business interest to our community of clients and stakeholders. New programmes can be offered to our tenant companies including smart promotion and visibility, virtual interactions with potential customers, rapid prototyping, training and skill development tools, team building and co-creation related events, based on insight on emerging social and technological acceptance challenges, access to enlarged networks and clusters as well as dynamic, challenging and stimulating work and collaborative spaces.

The following sections provide further information on the tools being deployed inside our STP, the challenges being addressed as well as the related impact and added-value in terms of business services.

1. TECHNOLOGY AS A PROMOTIONAL TOOL FOR TENANT BUSINESSES AND THE STP ITSELF

1.1. Smart advertising of products and services inside the STP

The diffusion of innovation, whether technology-based or not, requires specific efforts in terms of advertising and exposure. To fulfil their role, STPs need to pay special attention to the way the park itself but also each individual tenant company in the buildings are being promoted and showcased towards the outside world. "The sustainability of a science park depends mostly on its tenants. This is the (often underestimated) key to a successful park. Tenants are the most important source of revenues from the use or sale of physical infrastructure (rent, use of telecommunication facilities, purchase of land or offices) and from access to technical (congress hall, training rooms) and technological facilities (testing, experimentation, and research). Tenants are also the most important marketers of the park's strategic approach and services. The types of indirect marketing

provided by tenants include word-of-mouth with their suppliers, clients, and partners, feedback and references provided to potential entrants in the park, and their guests' perceptions of the park's infrastructures and services"[4]. In line with that statement, Technoport is actively engaged in the promotion and marketing of its tenant businesses. By augmenting and revolutionising the way users can create, enrich and display advertising data inside the STP, the technologies implemented in c-Space greatly support us in fulfilling that mission. By providing a new disruptive technology unleashing users to create 4D content in a completely new way, c-Space actually fosters the creation of new market opportunities for tenant companies in our buildings. c-Space allows the automatic reconstruction of very high-resolution 4D models, integrates fast simplification and compression techniques for time varying 3D content, and promote collaborative interactive experiences, for instance for tagging, annotating or sharing content within an "augmented" real space context. The system is being used at Technoport for the dynamic presentation of the products and services available from our tenants. Such innovative and virtual presentations of businesses, mixing reality and augmented content, allow to showcase a number of concepts and technologies in a very smart and engaging new way, with active participation from the targeted audience. STPs typically host companies engaged in the development of highly disruptive products and services, the added-value of which is not always easily communicated by businesses to the right audience. There is therefore a strong need for engagement, feedback and interaction with potential target customers on an ongoing basis. Augmented reality-based advertising promotes the take-up and growth of young start-up companies as well as the launch of innovative products and services by multinationals and large firms, based on highly attractive, immersive and engaging displays. That approach is especially relevant to foreign businesses, able to virtually present their products inside the park and test their market potential. Such collaborations and partnerships strongly encourage well performing foreign companies to set up a local venture at the STP if successful. It provides incentives to participate in the soft landing programmes of the park and ensure a regular deal flow of new "exhibitors" inside the STP, turning it into an attractive and dynamic outward organisation. The park is actually in a position to better collaborate with businesses from different sectors, whether large or small, technology- or service-oriented, located inside or outside its own facilities, at both national and international level.

1.2. Enhancing the customer experience and getting feedback from stakeholders

Innovative companies and researchers may both suffer from being "locked" in vertical or specialised knowledge-related flows. In a very fast evolving technological environment, it is crucial for science park managers to develop collaborations across different market segments and enter into open innovation processes by encouraging co-design and co-development of products. That vision is boosting the development of living labs around the world, the relevance of which for STPs was extensively presented and described at the last XXIX World Conference of Science and Technology Parks[5].

Technoport includes a living lab, open space and fabrication facility. Interactive tests are being organised on a regular basis with relevant stakeholders in order to gather feedback and insight during innovative developments as well as for the marketing of new products. "What is at stake is the opportunity to make open innovation mechanisms more effective and, given one region's technological platform, innovation through related variety more likely, because of a greater range of possible co-inventing industries"[6]. The practical methodologies used may differ from one country to another but the global philosophy is to integrate users as much as possible in the strategy of the organisations.

To foster collaborations and exchanges in the process, digital technologies can be extensively used. Emotion recognition in particular is bringing specific and highly distinctive added-value to the services being offered. Emotions play a key role in our lives, being a fundamental aspect in our

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[4] European Investment Bank, the World Bank, Medibtikar, Ville de Marseille (2010). *Plan and manage a science park in the Mediterranean: guidebook for decision makers*.
[5] Juan A. Bertolin&Paco Negre (2013). e'LivingLab: The Science and Technology Parks and Living Labs binomial as an innoconnector for the creation of SmartRegions. *XXIX World Conference of Science and Technology Parks*. Tallin: IASP.
[6] Nicola Bellini&Jukka Teräs&Håkan Ylinenpää (2012). Science and Technology Parks in the Age of Open Innovation. The Finnish Case. *SYMPHONYA Emerging Issues in Management*.

cognitive processes, not only on human creativity and intelligence, but also in rational human thinking and decision-making.

Hence, the C-space project is meant to develop the required tools to adapt content to individual users based on their emotions. It fully integrates an emotion-recognition algorithm which allows a collaborative process to be carried out through the analysis of user interaction patterns with a given product or service, monitoring the reactions of people to different presentations of products or when performing a specific action. These reactions are measured by facial expression and gestures, which are being detected using the front facing camera that many smartphones and tablets have embedded. The tool is being implemented at Technoport in order to study whether a specific innovation from any given stakeholder (research centre, SME, large industrial company, designer, institution, … or possibly the STP itself) is fully in line with the expectations of the client or end user or if some specific steps in the required process are generating frustrations, misunderstandings or confusion among the targeted audience.

From a general point of view, new computer-based interactions bring tangible market benefits, by providing insights on technology use cases, the underlying business processes and last but not least the relevance and benefits of the offer for each targeted stakeholder. The entire range of tenant businesses, from industrial stakeholders to consumer device manufacturers, IT developers, marketing agencies, multimedia companies and other creative industries, consider the service as highly powerful and relevant for early customer feedback and actual ground validation of their innovative services and product prototypes. The flow of knowledge and innovative output inside the park is not only enhanced and supported by a smart combination of challenging and inspiring coaching and business development services, but also technology-based emotion and interest automatic capture, as well as personalised recommendations. Those technologies are extremely useful to staff members involved in technology transfer and entrepreneurship promotion activities at the level of the STP. Cultural barriers and communication gaps between academics and businesses, engineering and sales forces, technology-oriented teams and marketing ones, entrepreneurs and investors, business and social communities,… can be illustrated, analysed and more easily tackled with the support of feedback gathered and interactions generated by the monitoring tools being tested at the STP and the availability of related living lab services gathering insights from different people to solve a given challenge.

2. TECHNOLOGY AS A SERVICE ENHANCER, GOVERNANCE AND COMMUNITY BUILDING TOOL

2.1. Using localisation services to optimise facility management

Territorial integration is a requirement for any and all STPs. Therefore, the promotion of the park to relevant national and international economic actors, accessibility, as well as links with other innovation-related stakeholders in the region should be taken into consideration with special care. Technoport is ideally located in a science city in Esch-Belval, in the south of Luxembourg, nearby a number of university buildings and research centres, as well as institutions, residences and service providers. However, such careful infrastructure development planning is not always sufficient in itself to foster the social and economic dynamics needed to optimise innovation and interactions in a given spatial context. A two-fold issue is being faced by STPs today in terms of facility management: routing the right people to relevant places on site in an efficient and user-friendly manner, inside large-scale and possibly fast-changing business environments, and providing visitors with smart advice and recommendations on what to see and where to go inside the STP, taking into consideration the actual behaviours and expressed needs of the related stakeholders. From that point of view, smart routing is offering great support for dynamic facility management, based on a global and accurate view of "cultural" paths inside the buildings, based on real users' activities and personal requirements. It can actually greatly enhance business uses and networking activities inside any given facility and infrastructure. "GeoFencing is emerging as a key technology enabler for a new generation of mobile applications, services and business models. [...] Applications become proactive, running automatically when nearing a relevant location, and targeting their services to the user and to the location. [Systems can actually] notify you when walking by the desk of a person you need to talk to, based on your workflow system to-do list". At the level of STPs, such systems can be ideally used to organise smart visits of tenant companies and premises, and organise matchmaking activities inside the buildings. This requires to have access to geographical information of outdoor and –most notably– indoor spaces, which is the specific topic being addressed

by the i-locate project. While outdoor data can be easily accessed as Open Data, a notable example being OpenStreetMap, the availability of geographical information of indoor spaces is often not available on a large scale. Yet, in case of STPs, having access to geographical data of indoor spaces could allow new business activities and bring a number of social benefits, especially when routing is combined to the gathering of aggregated statistics on the way and the extent to which people are making use of the different indoor facilities. i-locate offers a full localisation framework and integrate several hardware and software technologies, allowing indoor localisation on a wide area at variable levels of precision. The software components fulfil the business logic required for localisation/tracking, routing (indoor and outdoor), asset management, event management, secure communication, gathering of crowdsourced geographical information, as well as data access and visualisation. Although the technology comes with small complexity, accurate positioning information is provided. The toolkit is interfaced with existing technologies made available on site by the partners and allows integration, in an interoperable manner, of further technologies. It therefore opens doors for a set of different B2B, B2C and B2G services in various technological ecosystems. Aligning the offer of innovative services to the natural interactions and movements of people in spaces allows to provide a much more satisfying and engaging experience than traditional signage. By smoothly guiding and routing people inside its indoor areas and facilities, Technoport can actually optimise the management and marketing of its technical and business infrastructures, making the entire park much more attractive for event organisation, study tour or business meeting purposes. Location-based services and smart routing are especially relevant for managing shared spaces, as illustrated by the example of universities. "Students really value GPS-generated features like PC and printer availability, which guide students to unoccupied computers and printers on campus, using real-time data feeds in conjunction with GPS mapping. These location-based services are great examples of new technology making a genuine difference to day-to-day living"[7]. STPs connected to a nearby university can ideally share smart routing technologies with that local stakeholder, as a way to further optimise flows of visitors and promote exchanges between the two structures. That option will be explored by Technoport in the near future on the site of Esch-Belval in Luxembourg, where a brand new university campus is currently being built.

2.2 Creating and animating community-building spaces

If smart routing as here above described is especially important in multi-site and multi-polar STPs, at which the physical localisation of companies and the functions of the different sites may not be clear to visitors, requiring continuous and dynamic routing of stakeholders, the fostering and animation of exchanges inside the park is a requirement for any given STP, large or small, university-based or not. From that point of view, a lot can be learnt and implemented from the most recently developed projected 3D and urban gaming technologies. Gamification is increasingly recognised as a "powerful tool to engage employees, customers and the public to change behaviors, develop skills and drive innovation"[8]. Localisation technologies and gaming tools are moreover ideal to organize contests, business challenges and co-creation scenarios which are appealing to the general public. Urban gaming technologies can be used by STPs as a way to actually influence, support and improve cities in their growth and change. "Having built science parks, developed countries created competitiveness clusters and are moving more and more towards Smart Cities. Smart Cities are cities where the technological level of infrastructure and the socio-economic impact this has is taken to a higher level: a modern infrastructure that addresses urbanization, sustainable development, technological needs and economic development. A good illustration of this concept is Shanghai's Smart City where new technology has been integrated into urban life. Emerging countries today are taking this very same path"[9].

C-Space is actually implementing a number of strategies borrowed from gaming applications as well as specific tools aimed at fostering immersive and localised social media interactions. A number of participants in c-Space have outlined the relevance of connecting the proposed services in the project to different social networks, in order to stress the creation of communities of users with similar interests. At the same time, in-house interactions during events, presentations and networking activities are greatly enhanced by the possibility to project news, scenes, facts,

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[7] Griffiths, H. (2012). Location-based services: Where are we going next? *The Journal of Higher Education Web Professionals* .
[8] Gartner (2012). Gamification, engagement strategies for business and IT.
[9] BearingPoint (2012). Of science parks and men. Convergence Letter.

messages and figures onto the surrounding space in real-time. Adding a gaming dimension to business services allow to further engage and stimulate any kind of audience and stakeholders specifically targeted by the STP. This is very crucial to animate indoor spaces but also to expand the actual physical borders of the park, promote its services beyond them and open social interactions to further networks and partners. The relevance of that approach for STPs is very well illustrated by the following quotation from Dr David Hardman, MBE, CEO, Birmingham Science Park Aston (BSPA): "we struggled (initially) to find knowledge economy 'people' in Birmingham, we couldn't connect with them. Therefore the concept of 'Without Walls' emerged as a way of accessing these individuals, levelling the playing field and supporting the development of the knowledge economy in Birmingham. We needed to make this technology available to Science Parks to enable them to become homes of communication. The ultimate aim is to make the 'communities' that Science Parks create not just be based on their physical location but be based on their active connectivity"[10].

Conclusion

c-Space and i-locate are only examples of the way science park managers can build upon technology developments to better fulfil their missions in terms of business development, social inclusion and networking. They however illustrate the benefits which can be driven from tightly connecting research and commercial activities at the level of the STP and demonstrate how efforts put on research and technology-related aspects internally can have a commercial impact on the overall mix of activities being carried out. Our practical experience demonstrates that new concepts, methods, technologies, prototypes or products arising from R&D projects can actually support STP managers in their various missions and create strong added value for a very large audience, including hosted businesses, researchers and external communities. We are willing to further share our pilot projects and expertise with other STPs and innovation market players, who may be interested in adapting the concept to their local companies, partners and stakeholders. Interactions with emerging technologies at a very early stage can actually and dramatically influence the way people work, communicate, learn from and inspire each other inside any given virtual or physical environment. As innovation and creative hubs, STPs may greatly benefit from that potential to fulfil their complex and fast-changing missions and communicate on their unique and continuously improving value propositions.

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[10] Birmingham City Council. (2013). Science Parks Without Walls: project evaluation, final report.