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Design Option Paper:
A Digital Innovation Hub in Central Bohemia: experience from the
Leipzig's Smart Infrastructure Hub – Digital Innovation Hub

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1. Introduction

This Design Option Paper (DOP) has been prepared in the context of the Smart Accelerator II for Central Bohemia Region project. Its overall purpose is the systematic development of the innovation environment in the region through implementation of the RIS3 strategy for the Central Bohemia Region, which aims to stimulate and exploit the knowledge of the Entrepreneurial Discovery Process (EDP) and build on the strengths of the region, strengthening weaknesses and exploit its business potential and competitive advantage. As part of the Smart Accelerator II, twinning activities are contemplated to bring unique, relevant, and adaptable instruments to the region. For this purpose, RIS 3 Manager, Jakub Pechlat, RIS 3 Strategic Project Developer, Pavel Jovanovic and RIS 3 Twinning Manager, Athziri Moreno, visited on November 25-29, 2019, the City of Leipzig and met with regional authorities, representatives of SpinLab, The HHL Accelerator and key players of the innovating ecosystem.

In particular, SpinLab our partner in this twinning, had accumulated particular experience in collaborating with the City of Leipzig for the designing, implementing and delivering an innovation instrument tackling the digital transformation challenge for large and Small and Medium Enterprises (SMEs) using their startup ecosystem. With this in mind, they develop what their Digital Innovation Hub called the Smart Infrastructure Hub focusing on the digitalization and networking of industries (energy, health and smart cities) with a high social interest. The tool was implemented as an accelerator program to stimulate the enabling technologies supporting these sectors. Its methodology could be of inspiration for Central Bohemia to establish its first Digital Innovation Hub in the region, which was the main objective of transferring the knowledge of this unique approach to Central Bohemia. This DOP is a deliverable of the twinning activity.

This DOP has the purpose to serve as a guide for Central Bohemia for the development of a Digital Innovation Hub by combining the experience gained through the twinning and having regional authorities, research organizations and industry partners at the core to help ensure that every company, small or large, high-tech or not, can grasp the digital opportunities.

1.1. Structure of the paper

The paper is intended to serve as a guide for Central Bohemia Innovation Center (SIC) and Central Bohemia Region to pursue the establishment of a Digital Innovation Hub (DIH) to enable the digital transformation of Small and Medium Size Enterprises (SMEs).

Section 2 provides a description of the similar challenges that Central Bohemia and Leipzig face in the area of such transformation and the role that a DIH plays, how it operates and the connection to the Regional Innovation Strategy for Smart Specialisation (RIS3) and the road to the network of European DIHs.

Section 3 is dedicated to the Leipzig model of DIH called Smart Infrastructure Hub, its framework conditions, target group for the initiative, and the process by which the DIH operates. This section contains the rationale behind the implementation of the DIH and fully describes the actions and outcome from the DIH and its strategies and phases to achieve it.

Section 4 it presents a blueprint for a DIH in Central Bohemia. This section describes what is the goal to be achieved with this one-stop-shop to support the industry in their digital transformation, the collaboration strategy to follow as well as the technological focus and governance strategy. It also elaborates on an effective communication strategy to reach out to potential beneficiaries and how to build a brand that could differentiate the regional DIH from potential competitors.

Section 5 outline the main financing resources for the regional DIH at European and national level and a suggested combination of public and private funding to reach a sustainable business model.

Section 6 shows a risk analysis highlighting potential risks of the regional DIH and actions to mitigate them.

1.2 Glossary

Digitalisation	Not just the act of acquiring IT systems and equipment. It involves changes across fundamental business dimensions: process, product and business models.
Digital transformation	A fusion of advanced technologies that integrates physical and digital systems and when combined with innovative business models and processes, leads to the creation of smart products, services and significant improvement of productivity.
SME	Small and Medium Size Enterprise.
Digital Innovation Hub	One-stop-shops that help companies to become more competitive with regard to their business/production processes, products or services using digital technologies. They are based upon technology infrastructure (competence center) and provide access to the latest knowledge, expertise and technology to support their customers with piloting, testing and experimenting with digital innovations. DIHs also provide business and financing support to implement these innovations, if needed across the value chain. As proximity is considered crucial, they act as a first regional point of contact, a doorway, and strengthen the innovation ecosystem. A DIH is a regional multi-partner cooperation (including organisations like Registered Training Organisations (RTOs), universities, industry associations, chambers of commerce, incubator/accelerators, regional development agencies and even governments) and can also have strong linkages with service providers outside of their region supporting companies with access to their services.
European Digital Innovation Hub	A single organisation or a coordinated group of organisations with complementary expertise, with a not-for-profit objective that support companies, especially SMEs and mid-caps, and/or the public sector in their digital transformation.
Target group	The organisations to which the initiative is directed.

2. Background

2.1 Description of the common challenge: digital transformation of SMEs

Digital transformation is defined by the European Commission (EC) as a fusion of advanced technologies that integrates physical and digital systems and when combined with innovative business models and processes, leads to the creation of smart products, services and significant improvement of productivity (DigitaliseSME, 2020).

Digitalisation is not just the act of acquiring IT systems and equipment. It involves changes across fundamental business dimensions:

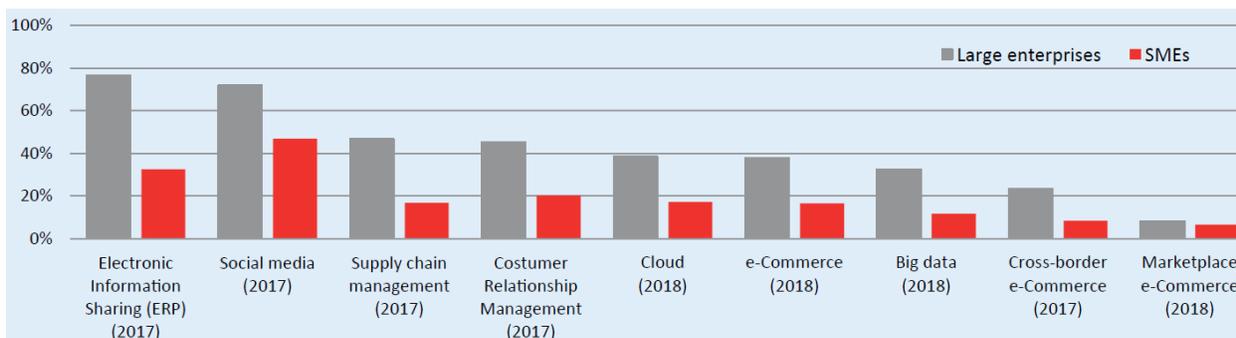
- **Processes.** Digitalisation involves increasing automation in production and integrating simulation and data analytics into processes and supply chains. As a result, substantial and continuous gains in productivity and resource efficiency can be realised over full product lifecycles from product design to lifecycle management.
- **Products.** With the emergence of the Internet of Things (IoT), digitalisation has entered the realm of products, with information and communications technology (ICT) increasingly embedded in all types of products. Examples are self-driving cars, wearables, and smart home appliances.
- **Business models.** Digitalisation re-shuffles value chains and blurs the boundaries between products and services. Smart and connected products both drive and adapt to changes in customers' behavior, resulting in co-created, highly personalised products and services.

Thus, digital transformation differs from automatisisation and informatisation: it requires systemic changes of business processes, business models, and economic relations within and around the enterprise. Creating an environment for the digital transformation of SMEs operating in the traditional sectors of the economy should envisage a palette of specialised technological and business consultations that can be delivered by competence centers, collaboration of public and private sectors initiatives (for example on skills-building and common standards), as well as a comprehensive financial framework to support SMEs.

Digitalisation of SMEs

Digital technologies such as High-Performance Computing (HPC), IoT, Big Data, Block-Chain, Robotics and Artificial Intelligence (AI) allow businesses to produce higher value products and services, and improve production processes. However, the level of digitalisation remains uneven across parts of the economy, across regions and across individual organisations. The adoption of digital technologies varies strongly according to company size, sector, and location. The slow uptake of digital technologies poses a risk to the SMEs' ability to grow and create new jobs.

Figure 1. Adoption of digital technologies, EU (% enterprises)



Source: Desi Report 2019 – Integration of Digital Technology (source: Eurostat)

According to a study from the European Investment Bank, EIB (2019) and OECD (2019) the **key challenge is that less than 20% of European SMEs are highly digitalised compared to nearly 50% of large corporations**. Digitalisation levels are particularly low in traditional sectors such as construction and basic goods manufacturing. There is the risk that the digital gap will increase over time as the companies driving digital change continue to digitalise at a faster rate while others fall even further behind, losing their overall competitiveness. If this issue is not addressed by European countries, it will hamper economic convergence and growth prospects in many sectors of their economy.

At the industry level, the EIB study shows clear sectoral gaps in SMEs estimated demand for digitalisation. Nearly 60% of the total ICT spending (and digitalisation demand) comes from the financial services, ICT, and advanced manufacturing sectors (such as automotive, electronics, life sciences, drug manufacturers, and mechatronics). Meanwhile, traditional sectors, such as education, healthcare, construction, and transportation account for less than 12%. Moreover, European SMEs are underinvesting in disruptive and high-potential digital technologies compared to global leaders in this area, such as the United States and China.

However, an OECD report explains this disparity, highlighting the fact that the United States is responsible for 70–80% of global Venture Capital (VC) investments across all technologies, including AI. Europe's strength, on the other hand, is in core AI systems, i.e., fundamental research in AI that does not target a specific sector or activity, currently underrepresented (in light of their potential) in industrial applications (e.g. in IoT, autonomous vehicles, and robotics). Thus, Europe is expected to reap the business value from its AI investments later than both China and the United States (Private Equity Investment in Artificial Intelligence – OECD report 2018).

SMEs mainly invest in technologies for business optimization (such as CRM technology) rather than on implementing transformative digital projects. Overall, **SMEs often lack information and awareness of new digital possibilities. They lack the skills needed to identify the right technology options for their business and manage organisational change, or they lack financing solutions to effectively implement change.** This matter because SMEs are the backbone of regional and national economies, they represent over 90% of all enterprises and provide two-thirds of all jobs (OECD, 2019). SMEs are also the industrial fabric of many regions and cities.

On the other hand, **we need to take into consideration other reasons for this hindrance: 1) low levels of investment in intangible assets, such as R&D, 2) insufficient numbers of**

highly skilled workers; and 3) the overall low quality of scientific and technological infrastructure.

More importantly, **the current global pandemic of COVID-19** besides imposing a heavy toll in terms of human lives, it has impacted on the economy in a dramatic way. According to the OECD Centre for Entrepreneurship, SMEs, Regions and Cities (CFE), the economic impact affects both larger and smaller firms. However, **the effect on SMEs is especially severe, particularly because of higher levels of vulnerability and lower resilience related to their size.** SMEs are affected on both the supply and demand sides and are even more vulnerable to social distancing than other companies (OECD-CFE, 2020). When SMEs represent 90% of total companies in the vast majority of economies **is therefore urgent to enable their resiliency through digital transformation.** It is important that companies exploit the opportunities the digital technologies offer and they need the know-how to make the best use of them. **In the middle of this scenario one of the key enablers fostering the digitalisation of SMEs are the Digital Innovation Hubs.**

2.2 What is a Digital Innovation Hub?

In **April 2016**, as part of the Digital Single Market strategy, the **European Commission (EC) launched the Digitising European Industry (DEI)** initiative, which aimed to reinforce EU's competitiveness in digital technologies and to ensure that every business in Europe - whichever the sector, wherever located, whatever the size - can fully benefit from digital innovation. To reach this goal the EC put in place **five key action lines**:

- 1) Member States joining forces in a common European platform, co-investing into further development of digital innovations and reinforcing EU competitiveness.
- 2) EU investments in Public-Private Partnerships for Research and Innovation are contributing to build key digital technologies and their integration in future digital industrial platforms.
- 3) The EU supporting a network of Digital Innovation Hubs (DIHs) covering all regions to help companies, especially SMEs, make the most of digital opportunities.**
- 4) When necessary, EU regulations being reviewed to make them fit for the digital age.
- 5) Several EU actions supporting the development of digital skills to ensure all Europeans count with the necessary skills to live and work in an increasingly digital society.

Thus, **Digital Innovation Hubs were designed as tools to support businesses (in particular SMEs and non-technological industry) in their digital transformation.** According to the EC, **Digital Innovation Hubs (DIHs) are “one-stop-shops that help companies to become more competitive with regard to their business/production processes, products or services using digital technologies. They are based upon technology infrastructure (competence centers) and provide access to the latest knowledge, expertise and technology to support their customers with piloting, testing and experimenting with digital innovations. DIHs also provide business and financing support to implement these innovations, if needed across the value chain. As proximity is considered crucial, they act as a first regional point of contact, a doorway, and strengthen the innovation ecosystem. A DIH is a regional multi-partner cooperation (including organisations like Registered Training Organisations (RTOs), universities, industry associations, chambers of commerce, incubator/accelerators, regional development agencies and even governments) and**

can also have strong linkages with service providers outside of their region supporting companies with access to their services.” (EC, 2016).

Figure 2. Digital Innovation Hub Model



Source: Roundtable on Digitising European Industry: Working Group 1 - Digital Innovation Hubs, 2017

The ambition is that all companies should have a DIH within their region. Companies can benefit from DIHs to better understand how to improve their processes, products and services through digital technologies. Furthermore, the services provision by existing hubs can be strengthened by the establishment of a pan-European network of DIHs, where companies can access all necessary competences not available in their local hubs. A very practical result is the DIHs catalogue established under the S3 Platform. The DIH catalogue is a comprehensive database of Digital Innovation Hubs across the EU, that allows search across countries, evolutionary stages, technical competences, services provided, technology readiness level, and market sectors (industries of economy) (S3 Platform).

According to the S3 Platform’s DIHs catalogue there are already 328 fully operational DIHs across the EU27. Of these, 128 digital innovation hubs are within the High Enabling Region, 164 are within the Mid-Enabling Region (mainly Southern and Central European countries), and 50 are within the Modest Enabling Region (mainly Eastern and South-Eastern European countries). There is, however, a **regional disparity in the number of DIHs per SME across Europe**, with the Modest Enabling Region being underserved (approximately 10,000 SMEs per DIH) compared to the other two regional clusters (approximately 3,500 SMEs per DIH).

According to the S3 Platform, this is the criteria that has to be met in order to be included in the catalogue as a fully operational DIH:

- Be part of a regional, national or European policy initiative to digitalise the industry.
- Be a non-profit organisation.
- Have a physical presence in the region and present an updated website clearly explaining the DIHs’ activities and services provided related to the digital transformation of SMEs/Midcaps or industrial sectors currently insufficiently taking up digital technologies.
- Have at least 3 examples of how the DIH has helped a company with their digital transformation.

In the Czech Republic there are currently 7 fully operational DIHs:

1. Czech Institute of Informatics, Robotics, and Cybernetics (CIIRC) Czech Technical University (CTU) in Prague. Focus on Industry 4.0 and Society 4.0 concepts.
2. Research Center for Informatics of the Czech Technical University in Prague. Focus on artificial intelligence, machine learning, computer vision and pattern recognition, robotics and autonomous systems, bioinformatics, medical information processing, graphics, visualization and HCI, and embedded security.
3. National Center of Competence for Cybersecurity in Brno – South Moravia. Focus on cybersecurity.
4. DIGIMAT: South Moravian Digital Manufacturing Hub in Kurim – South Moravia. Focus on digital technologies into manufacturing companies.
5. IT4Innovations National Supercomputing Center in Ostrava - Moravian-Silesian. Focus on High Performance Computing (HPC).
6. South Bohemian Digi Hub in Ceske Budejovice – South Bohemia. Focus on education in digitalisation.
7. Technologické Centrum in Hradec Králové. Focus on virtual and augmented reality, Industry 4.0, Smart City, and Internet of Things.

Digital Innovation Hubs already play an important role in the ecosystem and its development. They are key enablers fostering the digitalisation of SMEs. In broad terms, the **services available through digital innovation hubs may be categorised under three pillars:**

- 1) **Innovation activities.** Concerned with identifying opportunities for digitalisation, and developing and validating innovative solutions based on cutting-edge technologies; **test before invest.**
- 2) **Business development.** Concerned with helping companies apply their solutions, assess the business implications/impact, and manage changes to the business models; **find investment, develop business plans, incubation and acceleration,** and
- 3) **Skills creation.** Concerned with building innovation capacity through enriching human capital, **train the trainer program.**

2.2.1 How a Digital Innovation Hub (DIH) operates?

According to the Joint Research Centre (JRC) the Digital Innovation Hubs (DIHs) are diverse in terms of organisation from regional bodies to clusters or research centers. They differ also in their geographical coverage (regional or beyond). The competences that are available in-house vary from business development skills, startup support or technical skills to communication and engagement competences; however, these can be easily expanded through their networks since DIHs draw upon many external partner skills, either located in the region or further away.

Hosting organisations could be competence centers, cluster organisations, university departments, research institutes, innovation agencies, chambers of commerce, science parks, or newly created dedicated DIHs (JRC, 2020)

To engage successfully with new customers, DIHs need to provide services that are relevant to local SMEs and industry needs, and build trustful relations. Holding a network of long-term partnerships between complementary organisations, such as knowledge institutions, industry

clusters, incubators and innovation agencies in the region/country can also be a basis to become a DIH and can help in reaching out to the target group.

The organisational setup of a DIH can be adapted to regional conditions and contexts. Generally, a DIH can be formed from existing organisations taking on the title and/or rebranding themselves; by bringing together several existing actors in a (new) virtual organisation; and/or by creating an entirely new organisation. There is no one-recipe.

The type of services a DIH provide varies by region and capacities available, although in the section before the main pillars of services, this are some of the concrete services provided by the DIHs:

- Raising awareness, through showrooms, events, workshops, interactive demonstrations, factory tours, etc. through direct contacts with potential beneficiaries or through marketing or public events.
- Analysis of the company's specific needs and possible digital solutions to improve their competitiveness (for example using a self-assessment maturity test).
- Transformation plan, proposing new business models.
- Experimentation, testing, piloting.
- Collaborative research projects, mobilising partners to form consortia and apply for different calls.
- Matchmaking, encounters between supply and demand or by matching complementarities and fostering synergies.
- Training and skills development.
- Economic studies and analytical insights.
- Internationalisation.
- Financing, either providing funding assistance for digitalisation activities (vouchers) or suggesting opportunities with different innovation support calls.

Regarding funding, most DIHs employ mixed-funding models but are mainly biased towards public funding from European, national, or regional programmes. Private funding for DIH is limited and is generally in the form of membership fees and contributions (often in kind) from partners (Casorati & Verbeek, 2020). DIHs initiated in close connection to existing strategies, such as the RIS3, can have advantages since could receive funding from one or a few sources, such as the European Regional Development Fund (ERDF) and Digital Europe Programme (DEP), rather than a large number of smaller ones. However, most DIHs do not appear to be directly financed by the smart specialisation strategies in their regions (Mörner et al, 2019).

However, some DIHs focus on developing more commercially-oriented approaches:

- **Private-public partnership model.** These DIHs are pooling together resources from both the private and public sectors. Private partners bring commercially centered approaches to the DIHs' modus operandi. Meanwhile, public sector partners provide access to research centers, scientific infrastructure, and basic funding, which are essential for supporting innovation and developing advanced digital solutions.
- **Research and technology organisations model.** These DIHs are leveraging the financing models used by research and technology organisations across Europe. Some research and technology organisations (RTOs) have broadened their financing mix, combining grants with repayable sources of financing. While basic research is largely

publicly funded, RTOs are now leveraging their expertise to take on more project-oriented research, which is often funded by private and public counterparties. They are also monetising their discoveries via tech-transfer funds, IP management, and spin-offs. In terms of their financial profile, RTOs are generally non-profit organisations, and their revenues from dissemination and deployment are re-employed to fund new innovation cycles. They generally operate according to a three-stage innovation dynamic, which broadly correlates with a three-part funding model: 1) public core funding to support exploration of needs and competence-building; 2) competitive public and private income for technology development; and 3) customer revenues from dissemination and deployment.

- Advanced digital innovation hubs are adopting similar approaches, **expanding beyond basic capacity-building programs** to offer specialised, fee-based services such as advanced training courses, memberships, and tailor-made solutions (JRC 2019, 2020).

In addition, strengthening the link between DIHs and banks is essential. Even though banks may act as a source of funding for digitalisation, they often lack the expertise to properly assess digital projects. Further, their lending products are not always suitable for these projects, especially given the high-risk and complex business models of digital initiatives. Thus, promoting stronger cooperation between DIHs and banks or other financial investors is important. **A suggestion from the European Investment Bank has been that DIHs could design and develop an independent “digital score” for digital projects. This score could be used by banks and investors to improve risk assessments and strengthen the due diligence process (EIB, 2020).**

At governance level, a DIH can follow different models:

- An association governed by an assigned President, a board and its members (different levels of membership).
- An association coordinated by the Board of Directors consisting of industrial and university representatives. In cooperation with the Board of Directors the DIH’s Advisory Board advises and decides on strategic issues in relation to the development of the DIH.

Once a DIH is fully operational, it is necessary to build connections with other hubs at regional, national, and European level in order to access additional facilities, fill missing competencies and get support in developing new services and tools. To this end a DIH would engage in collaboration with national and EU actors for matchmaking, to facilitate R&D projects and address joint funding opportunities. Such funding opportunities can be from INTERREG Programmes or from the proposed Interregional Innovation Investment Instrument for interregional collaboration in common value chains (ERDF) (Kalpaka et al, 2020).

Monitoring and assessment

Finally, monitoring and assessment are fundamental in measuring the impacts of DIHs. The practical handbook developed by JRC in 2020 suggests to use a mix of summative and formative evaluation. Summative evaluation is the type of evaluation that measures outcomes for accountability purposes while formative evaluation focuses on receiving feedback for learning and ongoing change, equally important is to take into consideration the world context. It is preferred to use an evaluation framework that serves both purposes at the same time and provides valuable insights to policy makers and the DIH management. Evaluation is often seen as a threat as it is

usually associated with accountability, rather than as a learning and development tool. The key to success lies though in making it integral to the DIH process and not introducing it retrospectively (Kalpaka et al, 2020).

Thus, is highly recommended to implement some of the JRC' recommendations for a Digital Innovation Hub in Central Bohemia. The assessment framework should gather data on both beneficiary level from direct effects, but also indirect effects such as company growth and ecosystem development. Some of the effects can be considered “softer” such as awareness of digital opportunities, but this can eventually generate “harder” results (JRC, 2020).

2.2.2. Moving to European Digital Innovation Hubs (EDIHs)

While the challenges facing individual regions are substantial, the common shared challenge is in creating and growing a Europe-wide network of Digital Innovation Hubs. Based on the available documents about the coming European Multiannual Financial Framework for 2021-2027, is evident that Digital Innovation Hubs will play a key role and they will be supported through the Horizon Europe Programme (supporting experiments where highly innovative companies work together with DIHs to develop novel digital solutions to improve their businesses), **and the Digital Europe Programme** (furthering capacities of DIHs to bring the benefits of strategic digital technologies, such as High Performance Computing, artificial intelligence, cybersecurity and advanced digital skills to all businesses, in particular SMEs, and the public sector) (EU, 2019).

Particularly, as part of the Multiannual Financial Framework, the European Commission proposed that the **Digital Europe Programme** focused on building the strategic digital capacities of the EU and on facilitating the wide deployment of digital technologies, to be used by Europe's citizens and businesses. Among others things, the Programme **aims at building up and strengthening the network of European Digital Innovation Hubs as follows:**

Figure 3. Aims of the Digital Europe Programme with regard to DIHs



Source: Digital Innovation Hubs. Helping companies across the economy make the most of digital opportunities European Union, 2019.

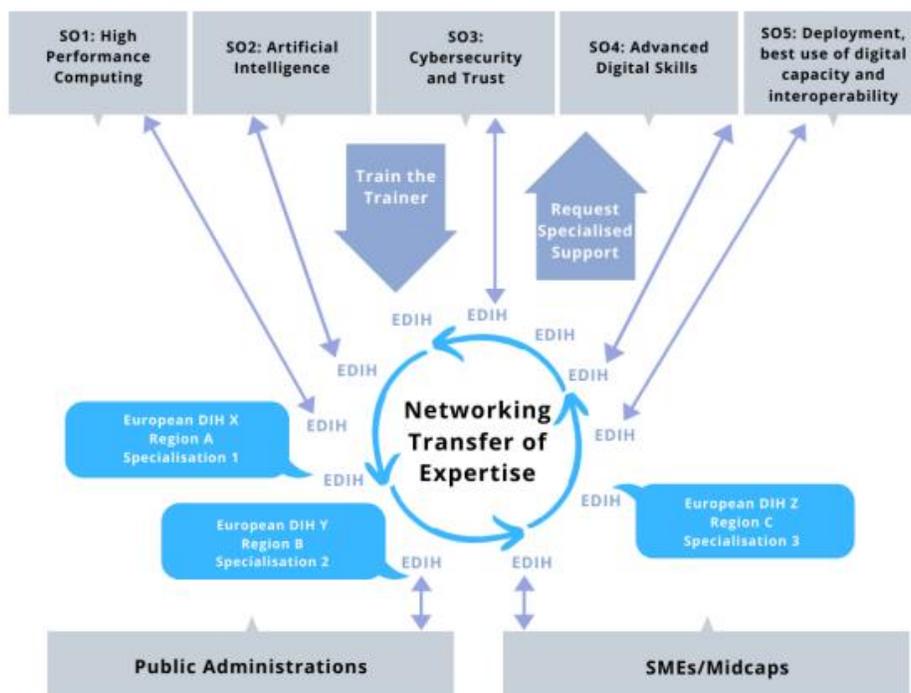
According to the European Commission, a **European Digital Innovation Hub (EDIH):** “*is a single organisation or a coordinated group of organisations with complementary expertise, with a not-for-profit objective (that is all money earned by them or donated to them is used in pursuing the*

EDIH's objectives and keeping it running) that support companies, especially SMEs and mid-caps (middle capitalization enterprises), and/or the public sector in their digital transformation.

More specifically, the functions of the European Digital Innovation Hubs are:

- **Test before invest.** Raise awareness and provide, or ensure access to, digital transformation expertise, know-how and services, including testing and experimentation facilities (software and hardware). Special focus will be on the key technologies promoted in Digital Europe Programme: high performance computing (HPC), AI, and cybersecurity. Although not all current DIHs necessarily match these focus areas.
- **Skills and training.** Provide support in the area of advanced digital skills (for example, by coordinating with educational providers trainings for workers and internships for students);
- **Support to find investments.** Support companies, especially SMEs and startups, organisations and public administrations to become more competitive and improve their business models through use of new technologies covered by the Programme. For example, access to financial institutions and investors, supporting the use of InvestEU and other relevant financing mechanisms. Over half the SMEs in a survey carried out by the European Development Bank described external funding needs in the range of €25,000 to €50,000 to initiate digitalisation projects (Casorati & Verbeek, 2020).
- **Innovation ecosystem and networking.** Act as facilitator to bring together industry, businesses and administrations which need new technological solutions on one side, with companies, notably startups and SMEs that have market-ready solutions on the other side. When suitable local partners may not be found, the hubs can network with other EDIHs to find a matching partner elsewhere in Europe.

Figure 4. Schematic overview of the role of EDIHs in Digital Europe Programme



Source: EDIH – European Digital Programme, 2020.

The services of the EDIHs should be complementary to and not replace existing (commercial) services of training suppliers or ICT companies. Through the function “Innovation ecosystem and Networking”, an EDIH works also as a broker and matchmaker between needs of certain companies and possible suppliers. Suppliers can be involved in the “Test before invest” or “Skills and training” activities. Hubs may give preference to local SMEs as suppliers, and if these are not available to other European SMEs, in line with their procurement rules; equal opportunities should be provided to all potential suppliers. Such companies do not need to be part of the consortium of beneficiaries of the grant, but could be involved through subcontracting (EDIH – European Digital Programme, 2020). The EDIHs will also need to develop a monitoring system and Impact Key Performance Indicators (KPIs).

The Member States have an essential role in the selection process of the EDIHs; since **the initial network of EDIHs will be established from a list of hubs designated by the Member States. The EU will select DIHs based on a restricted Call for Proposals** considering quality and balancing regional, technological and application coverage by the network (EDIH – European Digital Programme, 2019 and 2020).

Given the importance of AI and its wide applicability in all sectors, the EC assumes that at least one EDIH in each country will specialize in AI. In addition, at national level, at least one EDIH should focus on HPC and at least one on cybersecurity.

Selection procedure of EDIH in the Czech Republic

In the Czech Republic there was no national policy designed to establish Digital Innovation Hub, instead the DIHs created across the country started as national competence centers established with the support of the Technological Agency of the Czech Republic (TARC) with the aim of strengthening cooperation between the research and application spheres and technology transfer which aligns to the criteria of the DIHs by the S3 Platform.

During the summer of 2020, the Ministry of Industry and Trade carried out a first screening of the DIHs established in the country to look for domestic candidates for EDIHs. Those that perceive themselves as meeting the parameters set by Europe in the European Digital Innovation Hubs in Digital Europe Programme were encouraged to answer the survey. A total of 21 entities from 11 regions (out of 14) of the Czech Republic participated in the survey. The screening mapped mainly the legal form of the organisations, their basic and additional services, their technological and sectoral focus, their customers and geographical coverage, as well as their national and international partnerships and the financial framework of projects.

The study showed that the main target group of DIHs were SMEs and startups. Regarding key technologies the results showed that 33% focus on artificial intelligence (AI), 35% on high performance computing (HPC), 17% on cybersecurity and 15% on selected others. As for the application most of the DIHs are in industry, services for the corporate sphere, public service transport, e-government, cultural and creative industry and agriculture. For funding, most of the capital of the DIH come from private sources followed by state and European funding. As for services, most of them offer a variety mentioned in the list in section 2.2.1. A unique feature that stood out was that 81% were implementing digital projects tackling the coronavirus crisis (Department of Digital Economy and Smart Specialisation. Innovation Ministry of Industry and Trade, 2020).

In a separate process and in accordance with the Digital Europe Programme, the Innovation Strategy of the Czech Republic 2019-2030, and the National Artificial Intelligence Strategy, on 3 November 2020 the Ministry of Industry and Trade announced a “Call for Expression of Interest” to participate in the Digital Europe Programme (DEP) to support the establishment and development of the network of European Digital Innovation Hubs (EDIH). **The intention is to evaluate (by external experts), select and create a list of maximum 6 candidates from the Czech Republic who will be able to apply for the first restricted call of the European Commission planned for the first quarter of 2021.**

The criteria included:

- The geographical scope, sector(s) and application areas targeted, the technologies covered, and how this responds to demand of SMEs and/or the public sector.
- How the EDIH will be set up and/or operated, and how it will build on ongoing activities and existing infrastructures, if applicable.
- A price list for the services provided, representing the "value" of their services.
- How the proposal triggers co-investments by Member States, regional authorities, and industry since EDIHs are dependent on the availability of an equal investment by Member States.
- How EDIH would support SMEs and public administrations in overcoming financial obstacles.
- Targets defined for specific KPIs.

The resulting candidate proposals will be announced by 31 January 2021 and sent to the European Commission. When the first restricted call is announced by the European Commission from the Digital Europe Programme, the candidates can submit their proposals, including proof of being in the list of designated entities (a Letter of Support from the Ministry of Industry and Trade declaring that they have been selected by the Czech Republic to participate in the restricted call).

The European Commission will evaluate the proposals with external experts and will rank the proposals evaluated above threshold, balancing geographical, technological and sectoral coverage, considering the advice from Member States. Finally, through the Member State Committee will endorse the rank proposal and prepares grants for the selected proposals and disburses initial payments (EDIH – European Digital Programme, 2020).

In Central Bohemia Region, SIC is aware of the interest of few organisations, such as the Science Technology Advance Region, STAR cluster, made up of a community of research organisations, companies, and investors specialized in additive technologies, laser and optics technologies and digitalisation to participate in the call.

2.3 Digital Innovation Hubs and Smart Specialisation Strategies for digital transformation

Because the DIHs have a strong regional dimension, there is a strong potential connection to other policy initiatives, and especially to Smart Specialisation Strategies (S3) (Rissola and Sörvik, 2018). Let's remember that Smart Specialisation Strategies (S3) is a place-based approach addressing a region's unique development potential by means of targeted efforts devoted to support the emergence of new domains that may foster regional growth through structural change. It consists both of horizontal measures addressing the regional innovation ecosystem,

regardless of economic domains, and vertically targeted efforts focused on a limited number of priority domains identified through a multi-stakeholders process of entrepreneurial discovery (EDP). **A DIH can play a role both horizontally, by providing digitalisation support to all sectors, and vertically, by leading or taking part in processes of mobilising stakeholders towards digital innovation.** Hence, DIH can become an actor or initiative that support digitalisation and the development of the surrounding innovation ecosystem (Rissola & Sörvik, 2018).

According to the S3 Platform, and the Directorate-General of Communication Networks, Content and Technology (DG CNECT), with regards to S3, while some DIHs focus more on horizontal digitalisation support, others are leading a S3 priority area or alternatively carry out a mixed activity designed with stakeholder partners. While some DIHs assist startups, who are based on digital technologies (as is the case of Leipzig's Smart Infrastructure Hub), others support the development of new products and services by more mature companies that are not fully exploiting the digital opportunities yet.

For authors Rissola & Sörvik from the JRC, **developing a consistent, comprehensive and coherent approach for a productive RIS3-DIH interaction is crucial:** *“The smart specialisation process can identify and articulate the industry needs and the supporting place-based ecosystem (including the role of DIHs in relation to other regional actors), avoiding when possible to create any new organisation that may duplicate existing resources and efforts while building upon what already exists. DIHs can channel and coordinate different support mechanisms, integrating regional, national and EU-level programmes and initiatives, and attracting forefront companies. Regional development agencies and the DIHs should join forces and analyse together if their region has the right expertise needed to help upgrading the local industry and, eventually, bring in external expertise/competencies. DIHs can also be important partners for strategy development and feedback to RIS3 processes, sourcing industry needs and knowledge into the RIS3 entrepreneurial discovery process (EDP) where all key stakeholders jointly set RIS3 priorities”.*

In the EC context, a DIH can be the policy outcome of a S3 process, or an actor implementing parts of a S3 (EC, 2016). Whether the DIH takes a lead or carries out horizontal support seem to depend on the origins of the DIH and the host organisation. It is hard for a DIH to have in-house all relevant resources for digital transformation, as the SME needs a range of services from new technological competencies to business model development or IPR advice. While in the long run this may require the DIH to further develop its competences and adjust its offer to those needs, in the short run this can be compensated by partnering with other DIHs, which is a type of collaboration the EC aims at supporting with the initiative of European Digital Innovation Hub network.

Overall, engaging DIHs in developing the Smart Specialisation Strategies would help aligning regional agendas and investments with EU priorities. In view of the upcoming Digital Europe Programme (DEP) it could be good that DIHs demonstrate a good connection with the regional/national smart specialisation strategies. On the other hand, RIS3 can help DIH identify industry needs and provide support to them accordingly and work for the DIH contributes to integrating different parts of the regional innovation ecosystem.

3. Smart Infrastructure Hub – the Leipzig experience (implementation system)

3.1. German DIHs model

The Digital Innovation Hub - Smart Infrastructure Hub in Leipzig was one of 12 hubs that were established across Germany derived from the Digital Hub Initiative (2016-2017) of the Federal Ministry for Economic Affairs and Energy based on the country's strategy *Mittelstand* 4.0 (SMEs 4.0). According to this Ministry, this initiative was Germany's decentralised answer to Silicon Valley, seeking to strengthen the visibility and the potential of Germany.

The underlying idea of establishing DIHs was to promote the digital transformation in the country. However, in Germany rather than creating new hubs they decided to build upon existing strengths and regions where companies that are considered to be global market or innovation leaders in their industry and industry-specific research and educational institutions were based. Other important criteria included having a startup community or a network of experts that could serve as mentors or advisers. The Digital Hub Initiative looked to foster the networking of such hubs by raising their profile abroad through a major international marketing campaign.

For the coordination of such network a joint brand called “de:hub” and a central operator Hub Agency in Berlin run by the company RCKT (a communication and innovation agency) were created. At the same time, together with the Germany Trade and Invest (GTAI), the government agency responsible for foreign trade and marketing, they communicate Germany's advantages as a location for international startups to the outside world through a designed website, a monthly podcast, social media channels, a variety of events, and continuous press work.

The 12 selected DIHs presented specific innovation programs addressing the challenge of digitalisation and the development of solutions for industry-relevant fields from Artificial Intelligence to New Mobility and Smart Infrastructure, but not exclusively. As mentioned before the goal was to promote digital transformation, particularly in cities that have a strong manufacturing base, where often there are no links between established companies and innovative startups. In this way startup companies can provide established companies with new ideas and established companies can provide young startups with advice and facilitate contacts. The challenge was to link industry-oriented and engineering-oriented thinking with state-of-the-art digital solutions and products. Although each city focuses on a particular industry, the idea is that clusters can emerge where other industries could bring in their expertise as well.

In general, the Digital Hub Initiative represented an overall picture of the digital ecosystem in Germany, divided into 12 DIHs in 16 cities with different areas of expertise and focus where experts from business, science and society work together to digitalize the core areas of the German economy. All of them run by independent operating organisations with its own legal personality. The funding for each DIH was co-financed between national and regional funding.

In parallel, since 2017 the Federal Ministry for Economic Affairs and Energy has been working to introduce new future-oriented rules governing the digital economy in order to ensure that individuals and companies can share the benefits of technological progress. Further efforts still need to be made for companies to integrate digital technologies in their business activities. According to the DESI (Digital Economy and Society Index) report 2020, Germany ranked 18th in the EU28 on “Integration of digital technology in business activities”. It shows that 15% of German enterprises use for example cloud services and big data analysis, which is however, above the EU28 average of 12%. In comparison, Finland ranks No. 2 in this same indicator with 19%.



Figure 6. Germany's regional distribution of the Digital Innovation Hubs

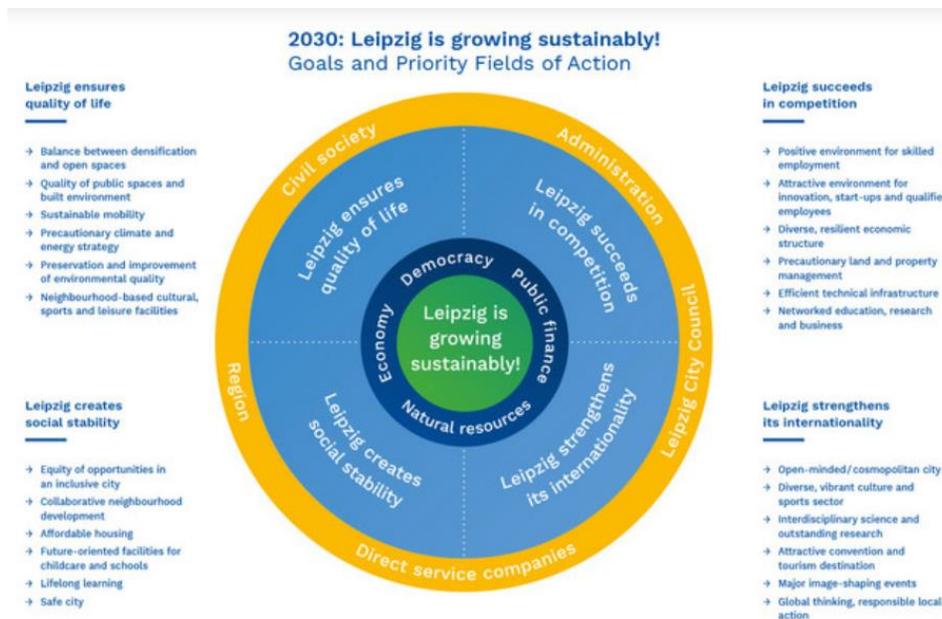


Source: Digital Hub Initiative, press kit. Federal Ministry for Economic Affairs and Energy of Germany

3.2 Framework conditions and approach – Leipzig ecosystem and challenges addressed

With close to 600 thousand inhabitants, Leipzig is one of the most dynamic cities in Germany. According to the statistics from 2005 to 2016, unemployment plummeted from 21.3% to 7.9% and the population has been growing steadily and becoming younger (below 40 years old). The Regional Innovation Scoreboard 2019 classifies Leipzig as strong innovator. The priority areas of Leipzig are enclosed in the Leipzig's Integrated Urban Development Strategy 2030, where the guiding principle is 'Leipzig is growing sustainably!' impacting all the strategic goals and priority fields of action: quality of life, economic competitiveness, internationalisation, and social stability (INSEK Leipzig 2030).

Figure 5. Strategic Vision for Leipzig 2030

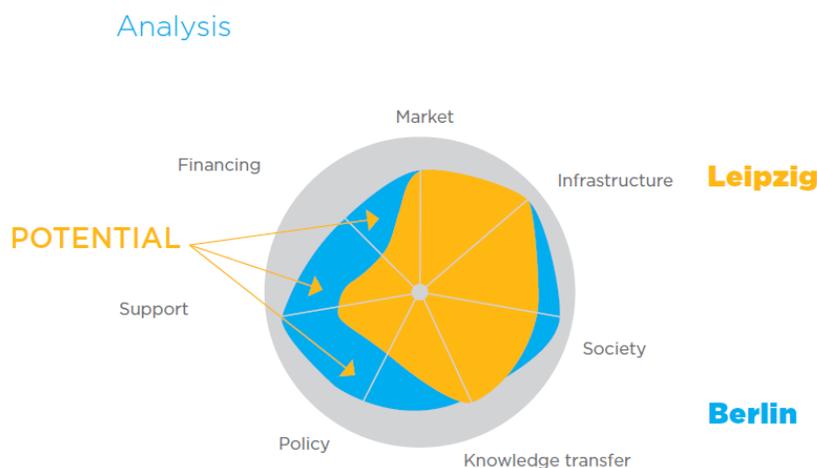


Source: INSEK Leipzig 2030 – Integrated Urban Development Strategy.

According to the Economic Affairs and Employment Department of the City of Leipzig, the city pursues its economic strategy under the motto “strengthening the strengths” by giving particular support to well-developed, high-growth sectors. Leipzig concentrates on five selected industries in which established companies and local hubs focusing on research and development are networked. These industries are: 1) Healthcare and Biotech, 2) Energy and Environment, 3) Automotive and suppliers, 4) Logistics and 5) Media and Creative Industries.

As for Leipzig’s innovation ecosystem, the city was able to build a reputation as an attractive and startup location due to the growth of STEM jobs which grew 13% between 2013 and 2017. Also, although the demographic trend in nearly all German cities are facing a decrease in the workforce, the only two exceptions among the German metropolitan regions are Munich and Leipzig. Institutes, such as Max Planck, Leibniz, Helmholtz, Bio City Leipzig and Fraunhofer, as well as Leipzig University and other universities and colleges have turned Leipzig into an important center of research and a place for prominent energy corporations, such as VNG Verbundnetz Gas AG, European Energy Exchange AG, and Leipziger Gruppe. Moreover, there are between 150–200 startups currently operating in the city established in approximately 20 co-working spaces, focusing on eCommerce, big data and, with the establishment of the Digital Innovation Hub, most recently on eHealth, energy and mobility (smart cities). Many of the widespread event formats for founders, such as the FuckUp Nights, Startup Weekend, Startup Safari, hackathons, founders’ breakfasts and discussion forums are held regularly in Leipzig. In addition, there is a variety of events devoted to startups such as HHL International Investors Day and the accelerate@HHL conference. Leipzig is profiting from its proximity to Berlin, Europe’s foremost startup location. This trend will continue (partly due to rising overheads in Berlin) and looks set to intensify.

Figure 7. Potential of Leipzig’s startup scene



Source: Smart Infrastructure Hub. Leipzig. 2016

However, the biggest deficit lies in the financing of startups, for nearly thirty years after German reunification, the capital stock of private individuals and SMEs is still far smaller than in other regions. The establishment of the Digital Innovation Hub in Leipzig has seen a slow but steady interest of national and international investors in the city, in addition the creation of the Smart Infrastructure Venture Capital (private VC), the first from East Germany, is hoping to change this.

Challenge addressed

When it comes to digital maturity, although at national level Germany is at 15% of integration of digital technologies in its SMEs, Leipzig's SMEs lags behind compared to other cities and regions in Germany. Thus, the initiative of the Digital Innovation Hub was an opportunity to come up with new cooperation and business models to address the challenge of finding the right services for them. This is a similar challenge as in Central Bohemia, large companies have been opening digital laboratories, incubators and accelerators to deal with topics of digital transformation, and identify possible applications and to test the possibilities that arise with it. However, the majority of such opportunities remain closed to SMEs due to the resources required. Not all SMEs have defined innovation strategies, or if they have innovation management is often slightly anchored and the opportunities from new technologies are only used in few projects and not in a systematic way (Büttner et al, 2019).

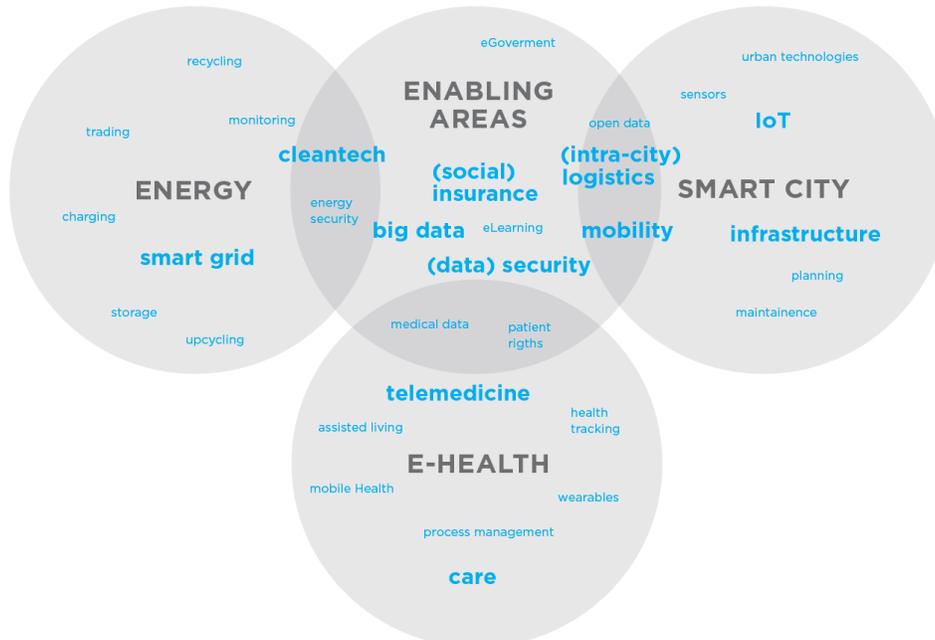
And even when SMEs recognized the importance of digital transformation, many of the them only plan to implement digitalisation projects in the medium or long term (more than 12 months), which could hamper their competitiveness. In this scenario, the Digital Innovation Hub established in Leipzig as an accelerator program represented an opportunity for SMEs to deal with possible digital products and business models at an earlier time.

3.3 Leipzig's DIH – Smart Infrastructure Hub

The establishment of the Smart Infrastructure Hub was thanks to a collaboration between the City of Leipzig, through its Economic Affairs and Employment Department, the HHL Leipzig Graduate Management School and the accelerator SpinLab whom together applied with the project "Smart Infrastructure Hub" to the German Digital Hub Initiative in 2017. Leipzig was selected together with Dresden and with other sixteen location in 12 regions.

Smart infrastructure Hub focuses on the digitalisation and networking of industries with high social interest in the key areas of generation and usage of renewable energy, smart city approaches, and digital healthcare (e-health). Bearing in mind that applications on these areas depend on fundamental technological developments in many other areas such as big data, (data) security, networked mobility, inner-city logistics and transport, cleantech and the IoT. To such end, the Smart Infrastructure Hub works under a brand that links many players and projects in the fields before mentioned and where a regional hub coordinator (SpinLab) links and moderates between those actors, building a strong network that becomes one of the core competencies of the hub.

Figure 8. The vision of the Smart Infrastructure Hub is the digitalisation of sectors with a strong social interest



Source: Smart Infrastructure Hub Leipzig, 2017.

The elements and their roles in the Leipzig's Digital Innovation Hub are as follows:

1. Advisory Board, chaired by the Mayor of Leipzig and two vice-mayors related to the digital area; from the economic and science fields there are members from local universities and experts from the region; hospitals; consulting groups; industry representatives (automotive, energy, transportation); civil society through foundations, communities, and SpinLab and Smart Infrastructure Ventures.

2. SpinLab – The HHL Accelerator who runs the six-months accelerator program for startups and serves as the regional hub manager.

The SpinLab accelerator is an equity-free program and place where early phase startups can go to get necessary coaching and access to relevant networks to help them scale their businesses as quickly as possible. SpinLab supports innovative founding projects in the fields of energy, smart city, eHealth and cross-sectional technologies, it offers intensive coaching, mentoring program, as well as numerous contacts to investors. The selected startups per call can use free co-working spaces. Moreover, they get a grant of 6,000 euros with no equity. Even after completing the program, the startup teams are supported in their recruiting efforts, they can plan their expansion through an international exchange program and they get the opportunity to rent office space next to SpinLab.

SpinLab partners with many SMEs that are heavily affected by digital transformation, but lack internal resources to compete against digital leaders in their fields. Therefore, they use the synergies within the hub to effectively support their digital transformation. Through the acceleration program they:

- identify interesting startups in their fields

- run pilot applications and tests with them
- access startup databases
- receive reports and macroeconomic startup trends
- are communicated as innovative companies to shift their mindsets internally and create attention of innovators externally
- participate in workshops that discuss innovation management processes and technology trends in their peer groups

3. City of Leipzig through its Economic Affairs and Employment Department and the Digital City Unit.

The role that the Digital City Unit, established in April 2019, that leads the digital transformation of the city and develop and manage all the digital projects of the city, and the Economic Affairs and Employment Department play in the Smart Infrastructure Hub is:

- Contact points for SpinLab to the City of Leipzig.
- Digital City Unit offer mentorship to startups in the area of smart city.
- Offer to SpinLab participation in international trade events or when SpinLab can't participate in such events they present for them.
- Internationalisation of the brand "Smart Infrastructure Hub" in cooperation with the Hub Agency in Berlin and the Germany Trade and Invest (GTAI).
- Both of these offices participate as advisors in the selection process of the accelerator program. They also work on the internationalization of the brand "Smart Infrastructure Hub" which is shaped locally by enterprises, research facilities and the startup scene.

4. The main players in the core fields Verbundnetz Gas AG (energy), Leipziger Group (Smart City) and the health insurance provider AOK Plus (eHealth).

These 3 players have a seat in the Advisory Board for the strategic development of the accelerator program and participate in the selection process. **In addition, other stakeholders are involved bringing more than 70 SMEs all together:**

- Energy and environmental technology cluster (Energiemetropole Leipzig, NEU e.V.)
- Association for Promotion of the Healthcare Industry in the Leipzig region (VFG e.V.)
- Red Cross Saxony, the regional chapter of the International Red Cross
- Leipzig Heart Institute
- DELL technologies
- Seecon Engineers, engaged in urban and rural planning
- Enviam Group, a leading regional energy service provider in Germany
- EEX European Energy Exchange

One way the startups and these players can interact is through the Open Innovation Labs, where together with employees and students from educational institutes can come up with new business models and pilot projects in creativity workshops.

From January 2020 a new additional feature was launched within the Smart Infrastructure Hub, the *Leipzig Trails*, guided business information tours for 1 to 12 participants maximum. They give participants from interested delegations from SMEs, big corporates and other institutions the chance to establish contacts, exchange information, network and develop opportunities with potential investors and other parties, that are interested in business cooperation with companies and research institutions in Leipzig's innovation ecosystem. **NEU e. V. arranges the trips** for interested parties on request and these are organized by an event agency. The

topics included in the ‘trails’ are **Energy trading and services, Energy technology and generation, Mobility, Logistics and Environment/water/sewage.**

5. Smart Infrastructure Ventures.

A recently established instrument, a mainly privately funded venture capital fund focusing on seed and early stage deals in Central Germany (Saxony, Saxony-Anhalt, Thuringia). This fund helps to attract additional venture capital from other private investors and at the same time it can co-invest with existing state-owned regional funds.

6. Research and transfer projects.

Leipzig hosts several higher education institutions with researchers in the smart infrastructure sectors, such as the University of Leipzig, HTWK Leipzig, HHL Leipzig Graduate School of Management among others. Additionally, the DBFZ German Biomass Research Centre, the UFZ Helmholtz-Centre for Environmental Research, the Fraunhofer IMW or the Institute of Applied Informatics (InfAI) also cover those topics in the areas of energy, smart city and eHealth. At the moment of writing this DOP and according to the Digital City Unit of Leipzig there were 20 public-funded research projects in Smart Infrastructure areas with an overall volume of 100 million euros. Some of the project partners in these projects are: the City of Leipzig itself (Triangulum, a HORIZON 2020 Smart Cities and Communities project), InfAI (SEPL Smart City Platform), HTWK Leipzig (hydrogen power storage and solutions for East Germany), and the University of Leipzig (SPARCS – sustainable energy positive and zero carbon communities), among others.

These elements lay in four pillars: communication, network, community and facilities.

To standardize the characteristics and categorize the **target groups**:

- early-stage startups, especially those developing concepts in the fields of eHealth, energy, and Smart City
- SMEs
- experts, mentors
- research organisations
- spinoffs
- students
- investors
- local government
- media

3.4. Description of the accelerator program

SpinLab runs the accelerator program, such program is funded through contributions from investors and established companies (partners) such as AOK Plus, Leipziger Gruppe, VNG, arvato Bertelsmann, Deutsches Rotes Kreuz, Porsche, EEX, Sächsisches Staatsministerium für Soziales & Verbraucherschutz, envia M, Helios, LEAG, seecon, PYUR, CMS Hasche Sigle, Dell Technologies, Deutsche Bank, Grazia Equity, High-Tech Grunderfonds, KPMG, Madsack Mediengruppe, Mittelstandische Beteiligungsgesellschaft Sachsen, Quarton International, and Technologiegrunderfonds Sachsen, **in addition to the City of Leipzig**. Moreover, these local partners offer certain services for free to the startups, such as, advisory in law and tax, this is due to the alumni of the HHL Graduate Management School.

SpinLab, was created in 2014 by the HHL Leipzig Graduate School of Management to offer established companies the possibility to develop new business models with the support of students, academic staff and external experts within the innovation lab. By 2018, according to a study by the Cologne University of Applied Sciences on startup accelerators, the SpinLab ranked in the top 3 startup accelerators in Germany. In the same year the HHL Leipzig Graduate School of Management positioned No. 2 by the worldwide ranking Times Higher Education (THE) and by the Wall Street Journal for their unique qualities of their masters' curricula in management (THE, 2018). These achievements created a strong collaboration in supporting the growth of the entrepreneurial community to scale up their businesses and strengthen Leipzig's innovation ecosystem. The SpinLab provides to startups and spinoffs access to technology, coaching, mentoring and more recently venture capital.

From 2017, the SpinLab reshaped the program to Smart Infrastructure Hub. This six-month accelerator program focuses on early-stage startups in the areas of energy, smart city, eHealth and crosscutting topics. The program at glance:

- **Month 1.** Is getting to know what are the needs of the selected startups for a fast growth. In this first month SpinLab organises introduction events to many of the official partners they work with that can help scale the startups, and/or offer substantially discounted products or services for the startup. Also, in this month mentoring on legal and taxes issues is done, as well as how to pitch the startups.
- **Month 2.** Emphasis is placed on defining the company's overall strategy, and expanding the team. How to define the mission, vision, and strategy; the leadership and founder personality skills; how to manage internal processes, and recruit the first employees.
- **Month 3.** It focuses on how the startup can start generating revenue and secure investments. How to finance the startup, how to get venture capital, building a financing plan and acquiring public grants.
- **Month 4.** During this month, the startups have to get ready for the Investors Day (organized in cooperation with the HHL Graduate Management School), where the startups pitch in front of prominent investment firms from Europe and Germany and partners network of the Smart Infrastructure Hub. It also focusses in getting the startups ready for a successful market entry. The training during this month is devoted to communication and how to establish marketing foundations, public relations and how to find the startups' products market fit.
- **Month 5.** It focuses on getting the startup equipped to scale, integrating key technologies needed, and also negotiation skills to help close deals. The mentoring and coaching during this month address how to build the startup's sales and furthering skills with investor negotiations.
- **Month 6.** The mentoring and coaching focus on getting ready to grow in and out of Leipzig. Finding office space, setting up a subsidiary in Leipzig (if the startup comes from abroad), and preparing for internationalization.

Selection process

The call to the accelerator program opens twice a year in the Spring and in the Fall to early-stage startups. The program has become very competitive, according to SpinLab the call is open for 4 months and receive close to 200 applications but only 6 startups are selected in each call. The platform use for the application process is called F6S, where startups founders can apply to

startup programs from all over the world. The selection process last 2 weeks and focused in 3 main issues:

- 1) core industries of the Smart Infrastructure Hub,
- 2) IP copyright, and
- 3) the team.

Each application is reviewed by 2-3 experts from the network who give feedback to all applications. Regarding the online scoring the evaluators need to consider if it is an original idea, if the idea is easy to understand, if the product or service has a relevant market size, if it is within a rising or declining market, the diversity in the team members (fields of specialisation), the motivation, if the material is understandable (complete material, orthography, presentation), if it can be implemented in the key partners from the Smart Infrastructure Hub, and the evaluator also score the startups' pitch decks.

During 2 days from the 2 weeks selection process, the top 10 startups per category (energy, eHealth, smart city), present via online or in person to the evaluators, that means 30 pitch and interviews on those 2 days. After the selection process is finished and the 6 startups are selected the negotiations with the founders begins in the sense of who signs the contract from the team and work on the visa permits for those members of international startups that move to Leipzig for the accelerator program, this assistance is provided by SpinLab. Interesting to notice that each cohort of the accelerator program doesn't have many Leipzig based startups, which says much about the successful attraction of startups from other parts of Germany and outside, mainly United States, Canada, Russia, etc.

Benefits of the programs

Each team accepted into the program gets an award of 6,000 euros (without giving up any equity) directly from the SpinLab. This will help with covering living and traveling costs in Leipzig. The startups who are not based in Leipzig, that choose to expand operations to Leipzig or relocate there entirely after the program receive an additional 4,000 euros from the City of Leipzig. In addition, the selected startups are eligible to compete for four awards, the Best Investors Day pitch, the Most Sustainable Idea for Leipzig, Community Award, and Fastest User Growth, each award is for 5,000 euros, and it is possible that one startup can win all awards. These awards are made possible via the cooperation with the City of Leipzig.

Regarding mentoring of the core areas, what is expected from the key main partners Verbundnetz Gas AG (energy), Leipziger Group (Smart City) and AOK Plus (eHealth) is a key account manager (KAM) that can help build pilot projects with the startups participating in the accelerator program. Also, since SpinLab enjoys a robust network of mentors it works as intermediary to get advantageous deals for the startups from the network partners, such as access to many required technologies like software and cloud solutions. These technology deals fall mainly in three categories: hardware, software, and services. Within hardware, smart production systems and internet of things (sensory systems). Within the software category, general software development followed by cloud infrastructure, artificial intelligence and cybersecurity. In the services category, big data analytics and applications of AI.

Figure 9. Example of horizontal and vertical mentoring approach from the Smart Infrastructure accelerator program

Key areas	Energy	Smart City	Health
Mentoring areas	Additional workshops, consultancy conferences	Additional workshops, consultancy conferences	Additional workshops, consultancy conferences
Sales			
HR			
Tax			
Law			
Marketing			

Source: SpinLab

Smart Infrastructure Venture

The SpinLab manages the **Smart Infrastructure Venture**, the first ever regional venture capital for early stage startups, including startups that haven't produced turn over yet, but have released a Minimum Viable Product (MVP) and gained first customer traction. It is funded by 30 investors mounting a capital of 10 million euros. The VC started operations in early 2020 for initial investments of 100,000 to 500,000 euros. A big difference of this VC is there are no employees at Smart Infrastructure Ventures, ensuring an efficient decision making alongside an increased accountability and alignment of interest from those investors involved.

Internationalisation program

After completing the program, the selected startups receive assistance with recruitment, they can plan their expansion through an international exchange program, and they can also rent office space in the SpinLab. The internationalisation program is a soft-landing program with other accelerator programs in Israel (Herzliya's Accelerator Center), Chile (Chrysalis Incubator) and China (International Universities Innovation Alliance). The program offers up to 4 weeks of free space and networking activities with local ecosystems. During the Twinning in November 2019, SpinLab offered a soft-landing program to SIC, if SIC could provide the necessary space and activities to the startups, a good way to attract startups into Central Bohemia.

3.5. Marketing and communication strategy

According to SpinLab statistics, since 2015 it has supported around 65 startups, which have acquired a total of 17.3 million euros in funding and created around 200 jobs. Regarding marketing and communication strategy, SpinLab positions the Smart Infrastructure Hub to the outside as follows:

- Regional partners: the Economic Affairs and Employment Department and the Digital City Unit of the City of Leipzig.
- Federal partners: German Trade and Invest from the Federal Ministry of Economic Affairs and Energy
- International partners: Israel, Chile and China
- Ambassador program - they are individuals that live in different parts of Europe, so far, who help promote the open calls and whenever that individual sign up a team for the Smart Infrastructure accelerator program he/she gets a remuneration.

When it comes to marketing strategy to position the Smart Infrastructure Hub within the local ecosystem, SpinLab uses:

- Networking events
- Investors Day
- Community Party
- Feedback survey - one month after the completion of the program SpinLab sent a survey to all selected startups for feedback and improve their reach out strategy.

One of the goals of the Smart Infrastructure Hub is for the startups to be able to explain their digital solutions to the industry and the authorities, this is one of the differences of the Digital Innovation Hubs established in Czech Republic which offers technical expertise but could improve their marketing and communication skills. According to SpinLab's marketing strategy to build a hub you have to share information for the people when they need it as a point of true value. Which means that SpinLab offers SMEs and even big corporation to scout startups for the digital solutions. Therefore, they use the synergies within the hub to offer them:

- identify interesting startups for SMEs and big corporations
- run pilot applications and tests with them
- access startup databases
- receive reports and macroeconomic startup trends
- SpinLab startups are communicated as innovative companies to shift their mindsets
- promotes "intrapreneurship" (enhance entrepreneurial mindset and attitude within big companies)
- participate in workshops that discuss innovation management processes and technology trends in their peer groups

Internal digital communication

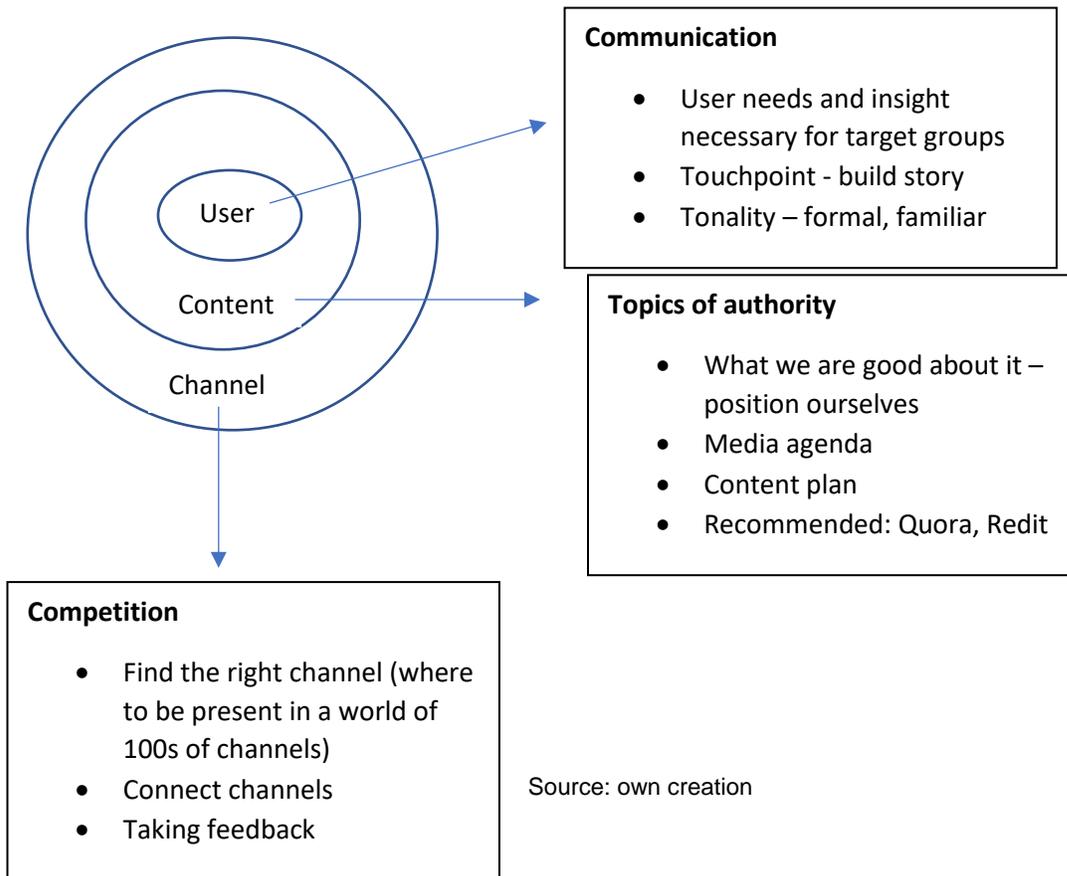
Communicating with so many startups and partners belonging to the hub can be quite challenging. SpinLab uses mainly two platforms for internal communication:

- Slack - individual channels for the startups and use also as follow-up after the program is finished.
- Wiki – relevant info such as: how to... deals, financing, recommendation on mentors, lawyers, etc., everybody can edit the communication. Wiki works with google documents/drive. Worth to mention is that Stiki, one of the startups from SpinLab, is the software company that SpinLab use for its Wiki site for teams.

With this approach they intent to put all relevant info in one place, for example "how to build up your startup sales" and in one place you have the videos, workshops, contacts, 1on1 sessions, etc.

SpinLab brands the Smart Infrastructure Hub by using the Golden Circle communication strategy (why) – how (channel) – what (content), for this the brand has to rely on data and good interpretation of it.

Figure 10. Smart Infrastructure Hub – Digital Innovation Hub’s Branding strategy



Source: own creation

Photos: Individual Twinning 27-29 November, 2019



RIS3 team participating in the Twinning

RIS3 Manager, Jakub Pechlat (center)
RIS3 Developer, Pavel Jovanovic (right)
RIS3 Twinning manager, Athziri Moreno (left)



Training on digital communication, branding and positioning of a Digital Innovation Hub from the SpinLab's experience



Training on digital communication, branding and positioning of a Digital Innovation Hub from the SpinLab's experience

3.6 Strengths and challenges

The Smart Infrastructure Hub – Digital Innovation Hub enjoys many strengths but also faces some challenges. The hub is now maturing and scaling up as a market companion for the Leipzig ecosystem, all stakeholders having their own interest are motivated to build together. Thus, **among the strengths** we can identify the following:

- **Connected ecosystem** between government, private sector and startup communities.
- **High degree of competitiveness** of the accelerator program, which has grown since it started. From receiving between 50 – 80 applications to the current 200, where only 6 are selected.
- Being **attached to one of the most prestigious business schools from Germany**, the HHL Leipzig Graduate School of Management, also plays a strength in the accelerator program, since many of the alumni are either in key positions across the ecosystem or are strong promoters of SpinLab or even investors.
- **Internationalization aspect**, not only the SpinLab offer services in German and English but also in Spanish. Moreover, the partnerships with other accelerators programs from other countries add to the internationalization possibilities for the startups.
- **Proximity to Berlin** gives them a lot of resources to help grow their startups, **but at the same time they have their own identity as well.**
- **Extensive mentor network** of around 60 experts currently.
- **Regional venture capital** funded by 30 investors mounting a capital of 10 million euros.

- **Attractive benefits to selected startups**, free space, a grant of 6,000 euros at entry, zero equity, pilot project opportunities for startups with SMEs and big corporations, etc.

On the other hand, during our visit in November 2019 we were able to interview City officials, as well as SpinLab representatives and we could also identify some of the **challenges that the Smart Infrastructure Hub – Digital Innovation Hub faces, among them:**

- **the public procurement for innovation process.** The Digital City Unit acknowledge this by expressing that although the solutions offered by the startups from the Smart Infrastructure Hub are linked to regional specific priorities and develop in an enabling environment there is still the **challenge to bridge the innovators and early adopters within the city government.** The solution for this could be to involve more the people responsible for public procurement into the activities of the Smart Infrastructure Hub, for example, be present (but not part of) of the selection process or investor day and witness the startups' pitch.
- **another challenge that was identified has to do more with perception.** According to a representative of the Digital City Unit, **the government is trying to run as fast as it can but probably for SpinLab can look as a slow responder to the startup needs**, which means there is room for improvement in the cooperation.
- for SpinLab representatives the challenge is in **continuing building and consolidating the brand Smart Infrastructure Hub.**

4. Implementation possibilities in the Central Bohemia Region

4.1 Digital Innovation Hub concept for Central Bohemia

As described before, Digital Innovation Hubs are designed as tools to support businesses, in particular SMEs and non-technological industry, in their digital transformation. They should fulfil the goal of being a one-stop-shop to support the industry in their digital transformation with knowledge, services, and access to technology, testing facilities, and different technology and business solutions.

According to the Digital Economy and Society Index 2020, **Czech Republic's strongest dimension is the integration of digital technologies with e-commerce as the main driver. However, in terms of the adoption of concrete digital technologies such as big data analysis or cloud, Czech companies are still below (8%) the EU average (12%) (DESI, 2020).**

This situation is also true for Central Bohemia, SMEs lack highly specialized R&D equipment for the implementation of their own innovation activities and integrate advanced technologies resulting in the achievement of relatively low added value outputs. Also, the limited cross-sectoral cooperation of business entities with the research sector does not allow for a sufficient transfer of knowledge and know-how (SIC, 2020).

The public health crisis that came with the COVID19 pandemic made more urgent for SMEs to apply advanced digital technologies in order to either resume their business, benefit from remote working capabilities and/or apply new business models and innovations in an effort to stay operational and competitive. Thus, **the establishment of a DIH in Central Bohemia can help in many ways the recovery of SMEs economic performance. And for an economy that relies on the automotive industry, engineering, chemical industry or other domains of**

specialisation identified on the RIS3 strategy, such as, biotechnology/life science, electronics, it is vital to help SMEs in these sectors to adapt to technological change. The manufacturing industry is facing the latest challenges brought by changes in methods of production, organisation, communication and distribution across the supply chain, and the introduction of digitalisation and robotization (Industry 4.0).

Moreover, in relation to the RIS3 of the Central Bohemia region, **a direct consequence of establishing a DIH could be the improvement of the weak interconnection of the research and business sectors.** Also, the Central Bohemia Region in terms of innovation is one of the so-called moderate innovators according to the Regional Innovation Scoreboard 2019, which means that a DIH in the medium and long term can help the region to move up to the ladder.

The aim of a Digital Innovation Hub in the region is to enable, especially SMEs, access to key knowledge, software, technology platforms, prototype solutions and test systems, thus improving their production and business processes and enabling the production of high value-added products and thus supporting development of a knowledge-based economy.

Despite the fact that in Central Bohemia the startup scene is not developed yet, doesn't mean that they should not be taken into consideration, however, the lessons learnt from the Leipzig's Digital Innovation Hub model for the establishment of a DIH in Central Bohemia are more related to the building of a sustainable network of partners to provide digital services to SMEs and startups (collaboration strategy), the governance (including the involvement of the regional authorities) of the DIH, the communication strategy for building a brand and transversal support to the RIS3 strategy.

Collaboration strategy

One of the pillars of the Central Bohemia's innovation ecosystem are the state-of-the-art research infrastructures located in the region. There are 27 research institutions/centers or universities that have their faculties in the region, the areas of research go from technical and natural science and agriculture to biotechnological and biomedical. According to the regional RIS3, the main areas of research in the Central Bohemian Region are as following:

- Laser technologies, photonics - HiLASE, ELI BEAMLINES (both located in the municipality of Dolní Brezany)
- Biotechnology and Biomedicine - BIOCEV, Institute of Biotechnology AS CR (both located in the municipality of Vestec)
- Materials Engineering / Materials Research - Rez Research Center), SVUM a.s. (both located in the municipality of Celakovice)
- Nuclear energy - Nuclear Research Institute Rez
- Space and space technology research - Astronomical Institute of the CAS (located in the municipality of Ondřejov)
- Energy-efficient construction and reducing the negative impact of human activities on the environment – University Center for Energy Efficient Building (UCEEB) from the Czech Technical University CTU (located in the municipality of Bustehrad)
- Hydrogen technologies - UJV Rez

Many of these research organisations mentioned above are perfectly equipped to help SMEs make the best use of the benefits and possibilities that digital technologies can bring to them. **Some of the equipment these research organisations possess are unique in the world**

offering digital solutions in the field of artificial intelligence (data collection, analysis, interpretation, and display for process automation), and additive technologies (3D metal printing), which can help SMEs in strategic sectors increase the added value of their production and increase productivity and efficiency of their operation. Practically all of them collaborate with the private sector which gives the research organisations the benefit of practical experience.

On the other hand, thanks to the different Central Bohemian Innovation Center (SIC)'s support programs for SMEs and startups, such as innovation vouchers and coaching program, has allowed for the organisation to build a level of trust in the past five years and a network of potential customers in need of assistance in their digital transformation.

Hence, from the Leipzig experience we can take the lesson that a Digital Innovation Hub in Central Bohemia region should aim to be a regional multi-partner cooperation with strong linkages to the local ecosystem providing access to the latest knowledge, expertise and technology to support SMEs and startups through piloting, training, testing and experimenting with digital innovations. Hence, the DIH in Central Bohemia should be built upon four pillars: communication, network, community and facilities

4.2. The desired outcomes of a regional Digital Innovation Hub

Regarding SMEs, to engage them successfully, **the Digital Innovation Hub that could be established in the region needs to provide services that are relevant to their issues in their current conventional production and build trustful relations.** The challenge to reach out to the SMEs is significant and a lot of commitment and high-quality expertise is required to address their business needs. Also, **creating demand opportunities from companies to work together with supply organisations in a trusted environment is a critical aspect of it.** Using a language that SMEs can understand and propose them service procedures that can keep bureaucracy to a minimum are also important factors to approach SMEs effectively. To manage this, the DIH must start from industry needs, identifying the target groups, and what kind of services offer is needed for their digital transformation. **Such analysis could and should connect to the analytical side of the EDP of the RIS3 strategy, which is seen as a good practice among the Digital Innovation Hub established across Europe.**

If these conditions are met we can foresee some of the desired outcomes of a Digital Innovation Hub in Central Bohemia:

- Increasing the competitiveness of local SMEs by introducing advanced production technologies and digitalisation of business and production processes.
- Building of a technology-based startup community.
- Increasing SMEs profitability and added value services and products.
- Increasing the cooperation of SMEs with research institutions.
- Building a specifically focused ecosystem in the field of digitalisation, advanced production technologies and new materials.
- Increasing number of people trained in advance technologies and skills development.
- Connecting the regional Digital Innovation Hub with the national and European network of DIHs benefiting SMEs to access additional facilities, fill missing competencies and get support in developing new services and tools.

- Supporting SMEs to improve their business models through the use of new technologies increasing their access to financing solutions (available at national and European level) to effectively implement change.
- The DIH as an actor helping implement part of the RIS3 by offering horizontal support to strategic domains.
- Building a brand recognized at regional, national and European level.

4.3 Technological focus and governance of the regional Digital Innovation Hub

A prior analysis should be conducted that could tell which sectors in the region have the highest digital competitiveness, the greatest unrealised digital potential, and the lowest digital competitiveness and choose which sector to target first. The Digital Innovation Hub in Central Bohemia could be supported by the research organisations that are within the main research areas aligned to the regional RIS 3. Thus, in accordance to their specialisation, complementary expertise and equipment the focus of the potential DIH could be the following:

Technological focus

- **Additive technologies:** 3D printing of metallic materials with laser sintering of powdered metals, surface treatment
- **Laser and optics:** surface modifications, micro-machining
- **Plasma technologies:** plasma coating, plasma gasification
- **Artificial Intelligence:** mathematical modeling and simulation, augmented reality
- **Digital skills:** training
- **Target group:** SMEs and startups
- **Sectoral focus:** aerospace and automotive industries, the medical industry, the foundry industry and/or the security and defense industry

Governance

From the different management systems presented in this DOP and the Leipzig experience, **a governance model for a Digital Innovation Hub in Central Bohemia could have the following structure adapted to the regional conditions and context:**

A combination of research and technology organisations model with public-private partnership

- **Advisory Board (AB)**, formed by representatives of the participating research organisations and/or universities, industry partners, and the Central Bohemian Innovation Center (SIC). The chair of the Advisory Board should be selected among the members. This AB may have different levels of membership. The AB advises and decides on strategic issues in relation to the development of the DIH.
- **DIH coordinator.** An organisation that will undertake the management of the DIH, submitting grant proposal, coordinating working packages, financial accounting, etc. This role can be taken by one of the research organisations.
- **Research organisations.** Those that can provide knowledge, expertise, and infrastructure support for the digital transformation of SMEs within the regional strategic areas, such as, HiLASE, ELI BEAMLINES, BIOCEV, Institute of Biotechnology, among others.

- **Industry partners.** Private companies pooling resources and bringing not only commercially centered approaches but providing specialized training and consulting to SMEs in the fields of their expertise.
- **SIC.** Due to the role it plays in the regional ecosystem and connection to SMEs and startups, SIC could be the member to broker matchmaking and stimulate the demand side for digital solutions encouraging SMEs and startups to try participating in workshops to demonstrate what the members of the hub offer and change their mindset that the latest equipment is within reach to help them implement digital solutions.
- **Experts network.** Creation of an experts' network within the hub able to assess companies' needs and evaluate the implementation of digital projects and develop together with SMEs new business models and advise on funding opportunities.

The DIH could start as a digital platform granting access to SMEs to test solutions in the research organisations and carry out trainings and consultancy in the SMEs to eventually build a physical space that could become a research excellence center for additive technologies where state-of-the-art equipment, cutting-edge research, education services and entrepreneurship come together in one place. Once the DIH is fully operational it can build connections with other hubs at national, and European level in order to access additional facilities, fill missing competencies and get support in developing new services and tools.

Services provided

The regional DIH would need to provide the right type of services needed, which means that its business model needs to be customer demand-driven and flexible enough to address different scenarios. Some of the services that a regional DIH could offer:

- Raising awareness through direct contacts or through marketing or public events.
- Analysis of company's needs (digitalisation audit).
- Transformation plan, proposing new business models.
- Testing before self-investment: experimentation, testing, piloting.
- Collaborative research projects.
- Fostering synergies between supply and demand (matchmaking).
- Training and skills transfer.
- Suggesting funding opportunities through regional, national and European schemes.

In the long run it might be important for the regional DIH to expand the view to other sectors with great potential, such as agriculture, healthcare, construction, electricity, gas and water supply (smart grids) for example.

4.4. Communication strategy

A regional Digital Innovation Hub needs to develop a great communication strategy to the outside world and to the inside of the hub to maximize its impacts.

To the outside, the DIH needs to communicate its offer and raise awareness about itself **using both online and offline communication activities**, such as having a friendly webpage, using social media channels, newsletters, press releases, press conference, articles and events. **As many of the companies the DIH want to reach are perhaps less technological and not yet**

so digitalised, it is equally important to use non-digital channels to reach them. Offline activities include printed presentation material, tech events, trade events, conferences, among others. Some other examples can be through local radio, TV, also the use of the members and partners' own networks as communication channels are essential.

Furthermore, communication should be about engaging with potential customers/beneficiaries of the DIH services, but also to disseminate knowledge and awareness about different steps that companies can take to digitalise by promoting digital technologies and their potential. For example, to make tutorial-type videos is also useful.

Following the communication strategy of Leipzig's Smart Infrastructure Hub – Digital Innovation Hub, we can take some of their lessons for the regional DIH:

- Regional government: could be one of the promoters of the regional DIH.
- National partners: develop a communication strategy to the outside together with the Ministry of Industry and Trade. Information about the regional DIH can be sent out to trade shows organized by the Ministry of Industry and Trade.
- International partners: once consolidated, the regional DIH can connect to other European DIHs where services can be complementary to each other.
- Ambassador program: individuals with a relevant profile that can help promote the regional DIH within the region and outside of the region. Their services could be remunerated when these ambassadors assist in closing contracts with customers.

Furthermore, the marketing strategy to position the regional DIH within the local ecosystem could take two lessons from the Smart Infrastructure Hub:

- Networking events
- Feedback survey – request feedback from benefited companies to improve the reach out strategy of the regional DIH.

To the inside, the communication should be effective among all DIH members and partners. There should be **quality monitoring of periodical reports** that could result in press releases supporting achievement of the regional DIH. These reports **can include collected information of the needs and opportunities of SMEs and startups in the digitalisation area in Central Bohemia** and how the products and services of the regional DIH can tackle them **or benchmarking reports**. Also, reports on the outcomes of regional DIH interventions expressed as gains in the level of digital maturity of beneficiaries are important.

The use of an internal channel has been found to be essential. For the Smart Infrastructure Hub, the use of the platform Slack has worked very well. Thus, using Slack for the regional DIH can be a possibility, where individual channels for the customers and members and partners can be set up. In this platform the information can be public or private and can include sections easy to follow and with relevant information at close reach, such as a section called “how to...”, where the customers could find information about financing digital projects, recommendation on experts, tutorial videos on-demand, etc.

Competition and setting proposition

Differentiation is one of the most important strategic and tactical activities in which the regional DIH must constantly engage. This is what will build the brand of the regional DIH. Thus, a well-developed marketing strategy of informing stakeholders and customers about how

the regional DIH's own brand or value proposition is superior to other potential competitors is crucial. The regional DIH should meet the needs with its offer. Based on the training in Leipzig, in order to build the brand, the communication strategy should follow a value selling logic:

- Communicate what the regional DIH “is” (a general description) to all target groups.
- Communicate to individual target groups what the regional DIH “does”.
- Communicate to individual target groups the “means”.

By answering these questions:

- Why, the regional DIH should exist? For example, because there is a weakness in the digital area, meaning digital deficit is a digital opportunity.
- What would it provide (value)? Network hub, efficiency, people, expertise, technology, professionalism, competence.
- What would be missing in the world if it didn't exist? A place, a network, a strategy to close the digital gap, future solutions.

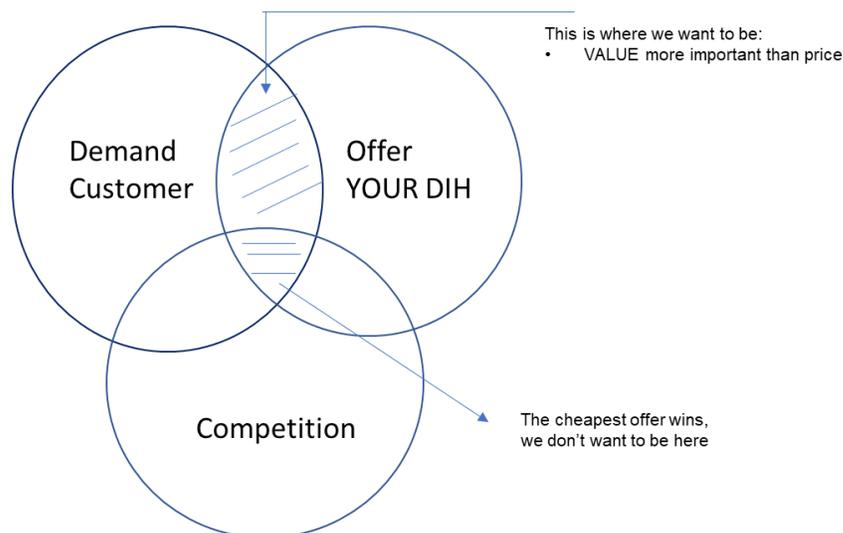
We can start communicating the “is”, “does” and “means” for the regional DIH. For example:

“Our DIH is a _____ that provides (benefits) in _____ market. Our (differentiator) provides (benefits) and (benefits). We started this DIH because (our why) and we do it better than anyone else”

Also, these are some of the variables to consider to make the regional DIH different from potential competitors.

- | | | |
|---------------|-------------------|------------------|
| - Price | - People | - Infrastructure |
| - Coolness | - Personalization | - Expertise |
| - Style | - Digital skills | - Innovation |
| - Diversity | - Creativity | - Networking |
| - Regionalism | - Industry focus | - Co-creation |

Figure 11. Selling proposition of the regional DIH in Central Bohemia Region

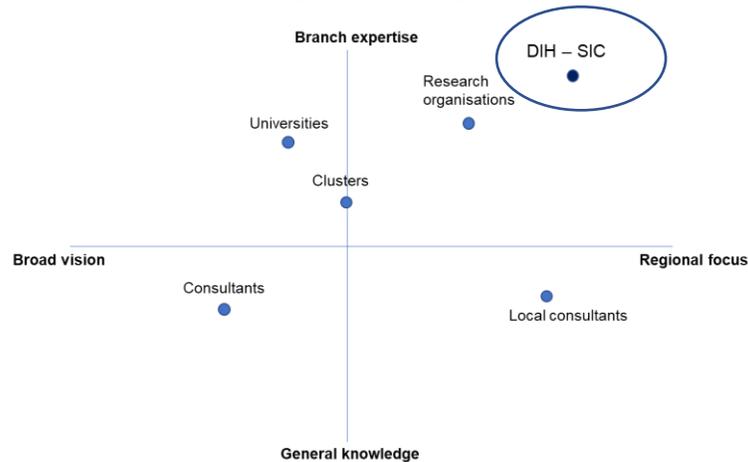


Source: own creation



The ultimate goal is to position the DIH as an expert organisation for digital transformation in Central Bohemia Region.

Figure 12. Positioning in the long-run the regional DIH



Source: own creation

5. Financing plan

5.1. Main and alternative financing resources

Within the EU Digitising European Industry Initiative adopted in April 2016, the Commission has been supporting digital transformation experiments and networking of DIHs through Horizon 2020 projects. However, in the coming European Multiannual Financial Framework for 2021-2027 it is evident that Digital Innovation Hubs will play a key role and they will be supported through:



Source: EDIH in Digital Europe Programme, October 2020

The scheme for European Digital Innovation Hubs (EDIH) is the next financing opportunity for DIHs. With a planned overall budget of €9.2 billion (€2.7 billion for supercomputing, €2.5 billion for artificial intelligence, €2 billion for cybersecurity, €700 million for advanced digital skills, and €1.3 billion for ensuring the wide use of digital technologies across the economy and society), the European Commission wants to support the digital transformation of companies and public sector and promote the development of cutting-edge technological solutions. As described in section 2.2.2, the selection of EDIHs will follow a two-step process:

- Member States will designate potential DIHs.
- The Commission will launch a restricted call for proposals that these DIHs need to apply for.

The EU grant has a co-funding of 50%; while the Member States (or their regions) should contribute at least an equal amount (in-kind or in-cash), leveraging private funding if necessary. The Member State's investments/grants in the hubs need to be considered as a State aid, while the part covered for by industry or by Digital Europe Programme does not constitute State aid. **The budget is expected to cover between 0.5 - 1 million euros per EDIH per year.**

Specific cost items that could be funded through the Digital Europe grants:

- Procurement and/or depreciation costs for equipment and facilities, both hardware and software.
- Qualified personnel of the EDIH for delivering digital transformation services to SMEs or public administrations, including subcontracting for specialists.
- Travel grants for hub personnel and local stakeholders to work with other hubs.

In the Czech Republic, the Innovation Strategy of the Czech Republic 2019–2030, also called “Country for the Future”, considers the Digital Innovation Hubs as a tool to support the digital transformation of SMEs. Most importantly, it aims to match the Digital Europe Programme in co-financing the DIHs helping introduce digital technologies in factories and businesses.

The foreseen distribution of funding for EDIHs in the Czech Republic (minimum of 3 and maximum of 6) is 22.2 million of euros for the duration of the DEP, which means 3.1 million of euros per year. As mentioned before, the European Union will fund 50% of the proposed costs for an EDIH for the duration of the grant (initially 3 years, possibly extended to 4 years). The other 50% can be made up of a combination of national funding, regional funding (cash or in-kind contributions), and/or contributions from the private sector.

Existing DIHs, either funded to run experiments under Horizon 2020 or originating from other initiatives such as a local technology transfer institution, can also qualify to become EDIHs, provided that they pass all the steps of the selection procedures, both at Member State and European level. There will be a second stage for funding EDIH planned by the European Commission, these two stages represent a funding opportunity to the regional DIH of Central Bohemia. The Ministry that is coordinating at State level is the Ministry of Industry and Trade.

5.2. Sustainability

To ensure the financial sustainability of the regional Digital Innovation Hub over time, additional to European and national funds, the DIH business model should include a mix of sources combining public and private financing. **Some services should be kept free of charge**

(networking events and workshops) while others could be commercialized in order to make the companies committing to the process, such as:

- fee-based services such as advanced training courses,
- memberships,
- tailor-made solutions,
- utilisation fees for testing and research facilities, and
- coaching

For some of these more advance services, SMEs and startups could use regional grants. For example, **the program Innovation Vouchers run by SIC could support applications for experiments and piloting or even cover the cost of DIH experts to develop digital projects.**

The only concern of using a mix of funding aiming for synergies is to keep close attention to the issues related to state aid and different administrative requirements from different financing sources. For example, it is important to highlight that according to the European Commission, national vouchers cannot count for the 50% co-funding of Member States, because there would be a risk that the EDIHs are double funded in the context of State aid.

6. Risk analysis of the regional DIH in Central Bohemia Region

It is essential that any potential risks for the establishment of a Digital Innovation Hub in the region are identified. The table below followed a risk identification strategy which included a checklist and assumption analysis.

Risks	Probability /Impact*	Contingency plan
The regional DIH does not manage to reach potential customers who have not themselves identified digitalisation as a priority	M/H	There will be events organized with this in mind. Raising awareness through direct contacts or through marketing or public events will help companies to not only identify digitalisation as a priority but envision potential digital projects.
The testbeds offered by the regional DIH are underutilised or only act as showrooms rather than platforms for experimentation	L/M	Although testbed processes can be complicated, the regional DIH can count with the best expertise for running experiments efficiently, showing potential customers how interconnected technical applications can be a solution to some of their needs.
The regional DIHs act within their usual stakeholder environment	M/M	A communication strategy will contain all appropriate capabilities to reach out to a much larger number of traditional SMEs. Also, matchmaking activities will raise interest outside of the usual stakeholders.
The regional DIH will produce low level of tangible project activities	L/M	The value of the services provided by the regional DIH (combination of the strengths of several research organisations and industry partners) will ensure the attractiveness of project activities.

Low impact of the results of the regional DIH	L/H	The research organisations that could be participating in the regional DIH and were identified in this DOP have an extensive network of regional, national and international stakeholders that can promote the services of the DIH and connection to other DIHs in the country and Europe to fill competences missing in the region. Also, the existence of an Advisory Board and a DIH coordinator constantly monitoring the impact's KPI can guide on how to increase the DIH's impact.
The regional DIH will underperform as proper multi-sided platform	L/M	One of the members of the regional DIH will be the Central Bohemian Innovation Center, which role is to promote and ensure the collaboration with other ecosystem players like regional authorities, SMEs, startups, clusters, etc. Also, the periodically EDP that carries in connection to the RIS3 allows for a throughout map of industry needs.
The regional DIH is not supported by the DEP grants.	M/H	The proposal of the regional DIH will target areas and technologies that will respond to the demand of companies. One of the strengths of its proposal will be the advantage of building on state-of-the-art existing infrastructure of research organisations and expertise of industry partners. Thus, the regional DIH fulfills the criteria for a grant.
The regional DIH fails to become sustainable	L/M	The regional DIH will combine sources of funding, public grants with repayable sources of financing (commercialization of some services).
Services that are considered as priority by the EC, such as cyber security and high-performance computing are not reflected in the services of the regional DIH.	M/M	The regional DIH will have a specialisation based on local strengths and address local needs. However, it will build connections with other hubs at regional, national, and European level in order to access additional facilities, fill missing competencies and get support in developing new services and tools.

*L = low probability/impact, M = medium probability/impact, H = high probability/impact

7. Conclusions

The Central Bohemia Region has an extraordinary opportunity to establish a Digital Innovation Hub (DIH) exploiting the potential that research organisations and other industrial partners have to offer to make positive transformation, notably in innovative infrastructure and the promotion of digitalisation. This DOP had the intention to highlight what needs to be done to bring about that change taking some lessons from the Leipzig model. As a recommendation, SIC should start the conversations with potential research organisations and be part of the creation of a regional DIH since the beginning and play an active role in it.

After analyzing the main lines of research, it was identified that the technological focus for a regional DIH could be in the additive technologies (3D printing of metallic materials), laser and optics (for surface modifications, micro-machining) and plasma technologies (plasma coating, plasma gasification). These represent the offer-side to the companies in the most relevant economic sectors of the region. Thus, one of the challenges of the regional DIH will be effectively

matching stakeholders directly and with respect to the DIH core strengths. Regarding this particularly challenge, several authors (Miörner J., Kalpaka, A. et al, 2019; Evans, D. S., and Schmalensee, R. 2016), come up with a list of recommendations that the regional DIH could follow:

- **Map needs and incentives.** Identify (actor) groups with corresponding incentives related to digitalisation (so that one side's demand is the other side's supply). In addition, the DIH management need to identify the missing pieces required to realise the potential of the intended matchmaking. These missing pieces make up the mechanisms the hub is set to provide.
- **Design matching mechanisms.** Design mechanisms to facilitate matching between two groups, for instance by supplying access to testbeds, technologies or skills and training. The matching mechanism is the focal point for the hub's own activities.
- **Grow gradually.** Start by growing two corresponding sides and matching them with each other. Rather than trying to match all types of actors together at once, focus on capturing the incentives of two groups and bring them together.
- **Data-driven analysis and experimentation.** Gather data and feedback on previous matchings in order to evaluate and improve matching mechanisms.
- **Grow through expansion.** Add new sides that can be matched to the existing ones, so that the platform of the DIH can grow. Adding a new side may include expanding DIH-to-DIH collaboration to facilitate matching across regions.

Furthermore, the goal for the regional DIHs would be to become a one-stop shops that would help companies become more competitive with regard to their business/production processes, products or services using digital technologies. The idea is for the regional DIH to provide access to infrastructure, technical expertise and experimentation, so that companies can “test before invest”. Also, the regional DIH should provide innovation services, such as financing advice, training and skills development that are needed for a successful digital transformation.

Overall, for the regional DIH to succeed it must promote knowledge on digitalisation beyond the usual stakeholders and be a point of technology spill-over responding to the industry needs. Also, as one of the most important lessons learnt from the Leipzig model, creating and consolidating a network that would provide value for the users of the DIH would be essential factor to help brand it and position it. Last but not least, a sound and solid business model will keep the DIH afloat for the long term.

Finally, if the DIH interrelates with the RIS3 strategy for Central Bohemia it could become an actor with transversal support to help advance in two main key areas of change: B: Competitive and innovative companies and C. Quality public research and its contribution to the development of the region.

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