Digital Innovation Hubs Working Group 1 meeting

Report from the Working Group meeting on Bringing Digital Innovation Hubs together and sharing best practices

held on 22 January 2018 in Brussels, Belgium

February

2018 DG

CONNECT

Disclaimer: The views expressed here are those of the workshop participants and do not necessarily represent the official view of the European Commission on the subject.

Executive Summary

On the 22nd of January 2018 DG CONNECT organised the first working group meeting on Digital Innovation Hubs (DIH)[1]. This will be a series of monthly meetings that will go on until the summer of 2018. The objective of the meeting was to share best practices around SME engagement and eco-system building and partnering. Present at the workshop were over 100 participants from all of Europe, representing a variety of stakeholders, such as existing DIHs, national and regional policy makers and EC staff.

During the day 18 DIHs presented their activities and lessons learned on reaching out to SMEs and eco-system building. The main messages were:

- The challenge to reach out to the SMEs is significant and a lot of commitment and high-quality expertise is required to address the business needs of the local SMEs. Key is to create opportunities for demand side companies to work together with supply side companies and organisations in a trusted environment.
- Having and maintaining a network of long-term partnerships between complementary organisations such as knowledge institutions, industry clusters, incubators and innovation agencies in the region/country is a good basis to become a DIH. DIHs should also network with each other to be able to give companies in their region the possibility to work with the best experts/technologies addressing their needs. However, it will be necessary to establish trust between DIHs and to develop a business model to support such cross-EU cooperation.
- There is a need to share best practices among DIHs and ensure knowledge exchange. The Online DIH Catalogue[1] is a good starting point and should be further developed to facilitate the cooperation and sharing of best practices among the DIHs on a national and European level.

To successfully engage with SMEs and industry DIH need to provide services that are relevant and build trustful relations. They should use language that SMEs understand and have procedures that keep bureaucracy to a minimum. Most DIHs have a fixed range of services they provide, at the same time a DIH should be flexible and work with experimentation and co-creation.

Services that DIHs offer typically include access to test facilities, experimentation and piloting, business model development, skills training, access to knowledge and experts, workshops and matchmaking events, financing, project initiation and management, internationalisation and IPR assistance.

A DIH needs to communicate its offer and raise awareness about itself, using both online and offline strategies, such as having a web-page, using social media channels and newsletters. Furthermore, to make videos is also useful. Offline marketing includes printed presentation material, tech event, trade shows and conferences. Many hubs use their networks, such as clusters and chambers of commerce, as communication channels.

The DIHS work according to different business models. Many of the workshop participants argued in favour of charging for the services, to make SMEs commit to the process. Many DIHs keep track of funding opportunities and calls, to finance their activities and to mobilise actors to respond to calls.

[1] http://s3platform.jrc.ec.europa.eu/digital-innovation-hubs-tool

DIHs have in common that they support digital transformation of established industry. However, business models, target sectors, services provided, geographical scopes and what focus that defines the DIH vary. Yet, no region can have all resources that are relevant for digital transformation of all companies in their region. There will always be specialisation and a DIH may not have relevant competences for some clients. This could be overcome by partnering with other DIHs. This type of collaboration is something DG CONNECT aims at supporting.

Many of the DIHs at the workshop argued that it is hard for a hub to have all relevant resources for digital transformation in-house, as the SME needs range from new technological competencies, business model development, IPR knowledge. In general, DIHs have technology partners like research centres, universities, technical universities, training providers, vocational training, special competence centres and technology suppliers; and collaboration with innovation support organisations for IPR and business model activities.

In many places, the regional innovation eco system is complex. So, it can be hard for companies to identify whom to work with or approach for assistance. To overcome this, both to have one-stop shops, where a DIH help and guide SMEs through the innovation support system; and "no wrong door" policies, where all the actors in the regional innovation support system are provided maps and information about what other actors are doing to help the SMEs in the right direction are useful.

A common function is matchmaking, either directly, by organising or participating in events or through information on the web. Some are developing networks of suppliers to team them up and enable them to take larger orders than they can do by themselves. There is also an example of a DIH where some SMEs has come together to set-up a lab for producing actual products.

Several DIHs also work with open innovation approaches, trying to connect, users and suppliers, companies and research. Some set up thematic events, where they invite actors to discuss new solutions. This can be based on a societal challenge or a company need, which is presented by a public- sector actor or a large company, and then suppliers and research facilities discuss how to solve the issue and develop prototypes to test the solution.

Quite a few of the DIHs also referred to connecting to external actors to bring in relevant competences to solve their development needs. Many of the hubs praise different EU programmes to support this linking.

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1. Introduction

Following the High-level governance meeting of the European platform of national initiatives on digitising industry[2] led by Commissioner Mariya Gabriel on the 21st of November 2017, three Working Groups[3] were established to advance the digitisation of the European Industry. Working group 1 is focusing on Digital Innovation Hubs (DIH). This group held it first best practice sharing meeting the 22 of January 2018 and this report serves as work shop proceedings. The DIH Working Group will arrange five more meetings that will take place until the next high-level governance meeting with Commissioner Gabriel in the summer 2018.

The aim of the meeting was to bring together representatives of DIHs. The European Commission´s Directorate General for Communications Networks, Content and Technology (DG CONNECT) has gathered a catalogue of relevant European DIHs. [4] This catalogue serves as a starting point to foster a community of DIHs- DIHs included in the catalogue together with other interested parties were invited to discuss "*how to motivate SMEs to engage with DIHs*" and "*how to create demand for the services of the SMEs*". The purpose was to identify ways to increase the number of SMEs that engage with DIHs to test out digital innovations to improve their production processes, products or business models. A second topic of the day was "*how to move towards a digital ecosystem and partnering approach.*" The purpose was to identify how DIHs and regions can work to strengthen the DIHs and the environment, which in turn can better help SMEs in enhancing their competitiveness.

There were over 100 participants from all over Europe, representing a variety of stakeholder groups, notably managers of existing DIHs, national and regional policy makers and European Commission staff from an array of relevant DGs (DG CONNECT, DG GROW, DG RTD, DG AGRI, DG REGIO). The workshop was also streamed live over the Internet to reach a wide audience and people could ask questions online.[5]

Before the meeting DIHs listed in the catalogue had been invited to come and present their activities and share best practices with relation to the two topics of the day, and many DIHs (21) responded positively.

The day consisted of four main parts, i) setting the scene -policy context and presentation of good practises from two H2020 financed initiatives supporting DIHs; ii) Best practices sharing session 1 – SME engagement; iii) Best practises sharing session 2 – how to support the eco system development; and iv) a group discussion session.[6]

This report follows the structure of the meeting and accounts the main findings from each session in a separate chapter. For interested parties all presentations and the web stream can be found on the Internet.[7]

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[2] https://ec.europa.eu/digital-single-market/en/news/high-level-governance-meeting-european-platform-national-initiatives-digitising-industry

[3] https://ec.europa.eu/digital-single-market/en/news/new-working-groups-advance-digitisation-european-industry

[4] Together with the Directorate-General Joint Research Centres (DG JRC), DG CONENCT have developed an online tool to make the catalogue available: http://s3platform.jrc.ec.europa.eu/digital-innovation-hubs-tool

[5] https://webcast.ec.europa.eu/digital-innovation-hubs-workshop

[6] The agenda can be found in Appendix A

[7] Links to the presentations and the web stream are presented in Appendix B.

2. Setting the scene: the Digital Innovation Hubs initiative policy context and I4MS and SAE experiences

Max Lemke, Head of Unit, the European Commission

Max Lemke, Head of Unit, the European Commission (EC), began the day by introducing the policy context around the European Commission´s effort with DIHs and the current key focus.

The new commissioner for Digital economy and society Mariya Gabriel, has highlighted the role of DIHs as a key component of her portfolio. She has emphasised two aspects, i) to increase the geographical coverage of DIHs and ii) to make DIHs active around skills development.

Gabriel who comes from Bulgaria recognises the need to further broaden the geographical distribution of hubs and to increase the presence of DIHs in the Eastern Europe. She perceives that DIHs can be important tools in supporting industry in these countries to engage in digital transformation, by providing much needed ICT competences.

The skills issue is a topic of growing importance, to succeed with digital transformation. There is a need both to increase the number of engineers and technician with ICT skills, as well as raising general ICT usage competencies in companies. This issue may in the end become the biggest hurdle to succeed with digital transformation. This is a topic where DIHs could play an important role.

The recently launched European catalogue of DIHs is a good tool in that it provides a map of what exist in Europe and what not and to some extent also what works. The DIH catalogue is an important tool for inspiration, and many DIHs can find interesting examples in it and it can also serve as a starting point for collaboration between DIHs. It also shows that there are fewer hubs in the East, which also supports previous observations.

In the coming period DG CONNECT will explore models for how banks could provide financing to investment in intangibles to companies that want to digitally transform. Digital transformation can consist of many activities that do not involve any kind of investment in tangible capital or machinery (the typical products that banks would use as security for financing), therefore sometimes Banks are unwilling to lend companies money for this.

There remain two years of the present Commission, due to this there is a focus on delivering results. The aim to broaden the geographical coverage of DIHs is one of these areas, and skills upgrading and development. To this end, for the upcoming three years the EC will invest 100 m Euro per year in DIHs. However, these funds are not to initiate new hubs, but to top up investments from national and regional funds in DIHs, by supporting collaboration between hubs and other types of pan-European activities, like experimentation and training of hubs in Eastern Europe.

Anne-Marie Sassen, deputy Head of Unit, European Commission

Anne-Marie Sassen, deputy Head of Unit, European Commission went on to elaborate on the specific topics of the day and the agenda and clarifying several issues. Expressing that the overall purpose of the day was to find good practices on how to motivate SMES to engage with DIHs and create demand for services, both by sharing best practices through the presentations, but also stimulate discussions and networking between the participants.

Anne-Marie pointed out that the level of digitisation in Europe differs according to size of company, sector and region; 42% of large companies is highly digitised in the EU vs 16% of SMEs; 56% of companies in computer programming, consultancy and information services are highly digitised, whereas only around 6% of companies in basic metals & fabricated metal products excluding machines & equipment are highly digitised; and 53% of Danish companies are highly digitised vs 8% in Bulgaria and Romania. To this end DG CONNECT is working to "*ensure that every business in Europe, whatever its sector of activity, wherever located and whatever its size, can take full advantage of digital innovations and competences*".

However, in this work the Commission has its role and regions and Member states have theirs. The latter should build up and strengthen national and regional DIHs. Whereas the Commission tops this up with networking, support activities and innovative Cross-border experiments. So far, 15 larger projects have been run and 140 M Euro have been invested to support networks and coach hubs. 125 DIHs and competence centres in 29 Member States and associated countries have received support. There have been 450 experiments of which 80% has had a cross border dimension. This includes ICT Innovation for Manufacturing SMEs (I4MS) and Smart Anything and Everywhere (SAE).

DG CONNECT is focusing on blank spots, where there are no DIHs. For this reason, they have awarded PWC and Oxenta a project to train hubs. These include 30 DIHs directly and 34 associated ones. This activity will be launched in February 2018. Additionally, in autumn 2018 there will be a call launched providing 8 M euro for widening the Smart Anything Everywhere (SAE) and I4MS projects to include industrial regions that are so far underrepresented.

One issue to be clarified was the difference between cluster organisations and DIHs. Both are often located in dynamic eco systems, which they aim to stimulate, but, there is a difference in their purposes. A DIH is an initiative set-up to stimulate the digitalisation of existing industry, it is more demand side oriented in this way. It provides important services demanded by SMEs like testing and prototyping, training and skills development for industry to digitalise. A cluster organisation is more supply side oriented in that its purpose is to stimulate the future growth of the existing industry in the cluster. A DIH can though use local resources from a cluster in fulfilling its purpose, which supports connections between users and suppliers. One part of the definition of a DIH, is that it supports eco-system development, through the growth of local digital transformation competencies and the development of a more dynamic eco system, which creates a beneficial spiral of innovations, like in Eindhoven and Grenoble and becomes an attractive cluster for other actors to relocate to.

Anne-Marie presented the European DIH online catalogue and encouraged DIHs to update their data and for new DIHs to propose their hub to be listed in the catalogue. She also brought up an observation in relation to the DIH catalogue, currently many regions had several DIHs listed. However, to improve communication to external partners she encouraged greater collaboration between these hubs and communicate fewer organisations by creating one-stop entry points.

She brought up the timelines for calls in H2020 in the period 2018-2020 with relation to DIHs and dittoed the message from Max Lemke, that DIHs should be financed by regional and national resources, but H2020 is contributing to create a European wide dimension with a focus on collaboration and highly innovative cross border experiments. There will be 300 M€ in the new H2020 work programme 2018-2020. The calls of importance for DIHs are:

- In the focus area "Digitising and transforming European industry and services."
    - DT-ICT-01-2019: Smart Anything Everywhere (SAE) Initiative, with the "widening" part for industrial regions that are currently underrepresented in I4MS and SAE[8]
    - DT-ICT-02-2018: Robotics – Digital Innovation Hubs[9]
    - DT-ICT-03-2020: I4MS (phase 4) - uptake of digital game changers and digital manufacturing platforms
    - DT-ICT-04-2020: Photonics Innovation Hubs
    - DT-ICT-05-2020: Big Data Innovation Hubs
- In SC2: DT-RUR-12-2018: ICT Innovation agriculture - Digital Innovation Hubs for Agriculture[10]
- Support action: DT-ICT-06-2018: Coordination and Support Activities for Digital Innovation Hub network [11]

Innovation for Manufacturing SMEs initiative (I4MS)[12]

Following this *Mayte Carracedo, Funding Box, project manager of the H2020 Coordination and Support Action I4MS-Go under the Innovation for Manufacturing SMEs initiative (I4MS)* went on to share her experiences with SME engagement.

I4MS is an initiative promoted by the European Commission to support digital innovation in manufacturing SMEs and their competitiveness. This is done by providing access to competences, access to innovation networks of competences and best practice examples; and finally, to provide financial support to SMEs and mid-caps.

They work with DIHs and manufacturing SMEs and try to connect these actors. They support DIHs to be able to help European manufacturing companies to get access to the most sophisticated digital technologies and competences. This they do through a line of activities; they stimulate collaboration between the hubs, so that if a hub cannot support a certain SME themselves they can help them connect to another hubs with the right competences. They organise and participate in events, where they disseminate info on calls, they stimulate the sharing of good practices through their Disruptors award and they stimulate DIHs to co-organise events on enabling technologies. They also have an online space for sharing information on funding opportunities for DIHs. They also have a catalogue of trainings and skills to facilitate digitisation of SMEs.

They have an online space where they nurture a community to collaborate on these topics and share best practices. There is a forum where participants can suggest topics, e.g. how to engage SMEs. In the forum, one can also request support, offer expertise and services; as well as receive request for services from SMEs and Midcaps.

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[8] https://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/dt-ict-01-2019.html

[9] https://ec.europa.eu/research0/participants/portal/desktop/en/opportunities/h2020/topics/dt-ict-02-2018.html

[10] http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/dt-rur-12-2018.html

[11] http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/dt-rur-12-2018.html

[12] http://i4ms.eu

Mayte also shared the experience from a successful project they had run, the Cloud SME Beer project- which has worked with a smal Brewery (Hobsons Brewery) in bringing in cloud technology (from two UK SMEs Saker Solutions and Simul8 Corporation) to improve production and delivery. The project has led to lower production costs of €10,000 per year in savings from reduced waste, energy consumption, more efficient cask utilization and lower transportation costs. It had also led to increased sales from expanded businesses.

Then she went on to share information on two open calls:

- Horse Application Experiments;[13] with a deadline the 28.02.2018, which is targeted to Robotics projects, with a €200,000 max funding per proposal.
- ReconCell Application Experiments;[14] with a deadline the 01.03.2018; which is targeted to Robotics projects, with a € 85,000 limit.

Then there are future calls that will come later on HPC, Logistics for Manufacturing; CPS/IOT; and additive manufacturing.

Smart Anything Everywhere initiative (SAE) [15]

Finally, in this session *Rainer Günzler,* from the *H2020 Coordination and Support Action Smart4Europe under the Smart Anything Everywhere initiative (SAE)* shared his experiences.

Where the focus of I4MS is on manufacturing processes, in Smart Anything Everywhere the focus is on the inclusion of digital technologies into products. Just like I4MS, SAE DIHs will provide companies, especially SMEs, access to knowledge, resources, training, finance, etc. to be able to include digital technologies into their products. This will help in experimenting and adapting existing technologies to specific needs of SMEs, by running smaller projects (Application Experiments) and using cascade funding. [16] They do not have any specific technology or industry focus, but contrarily they think that hardware and software need to meet.

One of their central functions is the Innovation Portal,[17] it is a contact point, service centre and market place for sharing best practices and experiences, facilitating brokerage, coordinating communication and dissemination of knowledge, provide information on new technologies, and support *leverage of Investment and stimulate growth*

Within SAE they cover four main areas Cyber-Physical Systems; Smart Systems Integration; Advanced Computing and Organic and Large Area Electronics. Connected to this are 10 projects and slightly more than 135 DIHs.

Their experience when it comes to SME engagement is that the H2020 form of Innovation Actions is a very effective instrument and that Cascade funding is very SME friendly.

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[13] http://opencalls.horse-project.eu
[14] https://reconcell.inhancer.dk/opencall
[15] www.smartanythingeverywhere.eu
[16] Cascading grants is in H2020 an approach to give financial support to third parties, which are not among the original applicants for H2020 funds. It is a means for applicants to reach and involve legal entities that might not normally be involved in Horizon 2020. For instance, it might provide support for small civil society organisations for which the grant sizes of Horizon 2020 are too large, or involve organisations that can only be identified after the signing of the grant. As such, they open participation in Horizon 2020 to a wider number of potential actors.
[17] www.smart4europe.eu

They have found that to use regional multipliers, such as clusters and chambers of commerce is a useful way to attract SMEs. Awareness raising, in the form of show rooms and success stories have been important to reach out. They also see that the hubs can be very important in linking up companies to competences from elsewhere, and that this happens by an SME contacting their local DIH that then connects with a DIH from another country and not by an SME connecting to a DIH in another region.

They also shared the story about how the Spanish Company Goizper, was provided with a solution from a local competence centre IK4-Ikerlan that worked together with a German RTO Hahn-Schickard. The new solution allows Goizper to incorporate a smart sensor system to their clutch break system.

3. Lessons learned - reaching out to SMEs

This first session had ten DIHs presenting their activities and lessons learned on themes related to reaching out to SMEs and the second session of the day had eight presentations on eco-system and partnering. The DIHs presenting did not always follow this structure strictly. Some of the practices shared in session one, were more relevant for the summary of session two and vice versa, as this report will not write out all details, but summarise commonalities, the practices relevant for SME engagement are presented here, and the ones relevant for networking are presented in the next chapter, despite this not following the actual process of the day.

During the presentations, five main topics relevant to SME engagement emerged, these were: i) adaptable services - experimentation; ii) needs identification process; iii) adequate service portfolio; iv) communication, v) business model, and v) financing.

Adapt service offer to company needs and experiment

For a DIH to be of interest to SMEs and industry in general they need to provide services that are relevant and build trustful relations. Likewise, many DIHs at the workshop emphasised the need to use a language that SMEs understand and to have procedures that are not too bureaucratic to successfully engage with the SMEs.

Most DIHs that presented at the workshop have a fixed range of services they provide, at the same time many advocated an approach of flexibility with the SMEs and working with experimentation and co-creating new solutions, to cater to the difference in demands and to build trustful relations.

Innomine a Hungarian DIH with focus on HPC/cloud and simulation solutions for manufacturing SMEs, emphasised that manufacturing SMEs needs vary significantly, there is no one-size fit all solution possible or one silver bullet, to solve SMEs needs in digitization. At the same time, it is not enough with wise advice only for manufacturing SMEs to digital transform. Their main recommendation is to work with joint experiments with the companies, digital transformation experts and IT development and cloud resources, and possibly related ICT competencies. They see experimentation, as the optimal way for SMEs to test out ICT according to their needs. Another example is the *DIH for Saxony Anhalt – VDTC of Fraunhofer IFF (VDTC)* that run test beds where SMEs come and test out new concepts, they bring their ideas and the VDTC can add and test new technologies to innovate.

The German *KDH (the Competence Centre for Digitalization of Skilled Crafts),* works with craftsmen and their needs vary widely, e.g. car repair shops, carpenters, hairdresser, supplies to dentistry, etc. All these companies differ in how they organise their relations with

customers and suppliers. Therefor the KDH find it impossible to provide a general solution, but organizes workshops with the companies to find adequate solutions for their needs.

Needs identification process

Two different related ways to identify needs were proposed. First, most DIHs before they begin their operations, make an analysis of their future target groups collective support needs to develop the DIH business model and identify what services they will provide. A useful approach to do this is to engage with clusters, industry association and councils to identify geographical and sectorial challenges and needs

As an example, *the Lithuanian Robotics Association DIH*, comes out of the industry association for Robotics companies. The first step in setting up their DIH was to have the members provide information on what kind of services they needed. Based on this they defined their services and identified who locally or internationally would have relevant skills to satisfy the needs. The Croatian *EDITA DIH* also includes a long-term perspective in assessing the specific industry direction and trying to identify what direction the SMEs are going and what will be industry standards in five years and make this the basis for support to the companies. They also point to the need for a DIH to assess its own capabilities and own maturity level. This aggregated customer needs analysis is then followed up on a frequent basis, but foremost it is also developed in meeting with the individual companies.

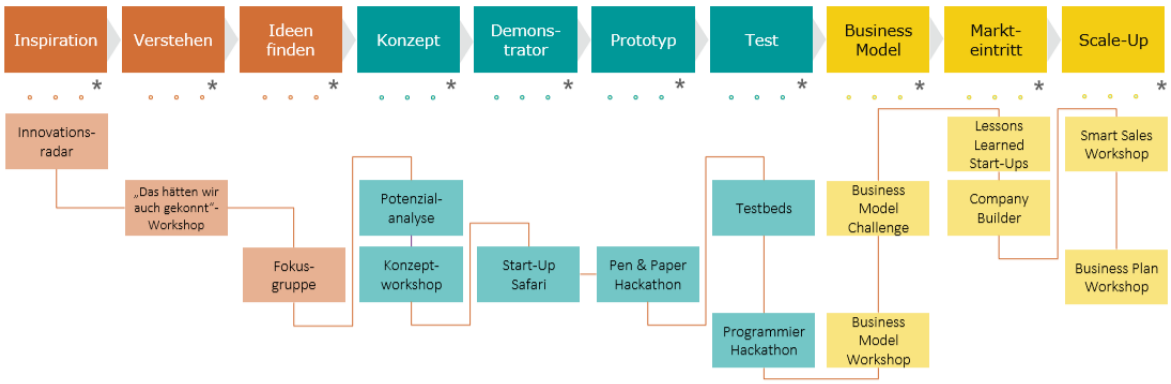
Central in successful DIH activities is analysing each company's needs and its ICT readiness or digitalisation status. The approaches include everything from simple online self-assessments to long-term in-depth analysis. The *regional Industry 4.0 platform - Tuscany* ranges the entire span, with three levels of assessment; in the 1st level assessment, the companies do it themselves online, 2nd level is a more detailed questionnaire and 3rd level is a more in-depth audit. The VDTC DIH does this as a service. They sell an in-depth audit, which they call the Industry 4.0 check-up. In this they dedicate staff for a 3-4 week profound analysis of the company, its products, services, production processes and business models. After this they categorize the company according to a system that helps them provide suggestions for how the SME can move on and raise their ICT levels. This has been so successful that they have exported the concept out of Germany to Spain and Thailand.

Adequate service portfolio and operating procedure

At the same time as there is a need for flexibility in meeting companies and their demand, to build trust in the DIH and its services, it is convincing to communicate that there is a set of services provided and that the DIH has developed an operating procedure.

As an example, *Digital.Hub Logistics Dortmund* has a procedure that consists of 15 steps, see Figure 1, where they stepwise analyse the SME and its needs and then develop the concept, the company and connect them to their community. They go from ideation, to prototyping, experimentation, and then business model development, to market entry and scale up.

Figure 1: Digital.Hub Logistics Dortmund – step wise support model



BioSense DIH for advanced Technologies in Sustainable Agriculture and Food Security from Serbia has developed their own support model. It is based on the established models lean start-up and a Multi-actor approach, where they try to combine business, technology and users, and stepwise develop solutions. With the involvement of various stakeholders, they increase the quality of the developments and increase the likelihood of adoption.

The Slovenian *DIH DIGITECH SI-EAST* uses a standard solution as a main operating procedure for the most normal cases, but when specific issues arise they bring in additional competence centres.

Smart Systems Hub Dresden has something they call the TRAIL concept, with 10 different trails to follow. They refer to it as a mean to go through a jungle, or a structured way to face the unknown, where they offer a varied range of test beds for the companies interested in Internet of Things depending on their needs and status.

The services that DIHs offer typically include access to testing facilities (the Dutch DIH *PhotonDelta* helps SMEs access testing facilities and relevant knowledge, e.g. the Anonlab), experimentation and piloting, business model development, skills access (*PhotonDelta* helps SMEs access relevant staff) and training (the Spanish *IAM 3D HUB* provide education), access to knowledge, access to experts, workshops, events, connect to financing, pool interested parties to team up for projects (DIGITECH SI-EAST), internationalisation and assistance on how to manage intellectual property rights (the Portuguese DIH *Produtech* offers this from a competence centre in their network; PhotonDelta support SMEs with this as they perceive they cannot afford it, yet they see patents loosing relevance), some also support start-ups (Smart Systems Hub Dresden).

PhotonDelta helps shorten the time to market for SMEs. Product life cycles in high-tech have decreased, previously it could be around 20 years and presently it is 3-5 years. Therefore, product development is now reduced to 18 months in general. They have established the PhotonDelta Cooperative, a EU-wide initiative to build trusted networks between research and industry. By giving SME's early access to IP within a trusted network (protected by NDA's), they can reduce the time to market for member companies.

The DIHs vary in how many of these services they provide, some focus on a limited number, whereas others have a broader range, like the Paris' ICT cluster and DIH - Cap Digital. Cap Digital is one of Europe´s largest ICT clusters, they have more than 800 companies among their 1000+ members. They have companies working in a wide range of sectors. Likewise, they

provide many types of services to meet the differentiated range of services needed, they provide training, education, business development services, business coaching; fast track, special support to fast growing companies; scale-up and internationalisation programme.

Communication approaches

As Silvia Castelli, from the Spanish *DIH i2CAT* put it "*the challenge is to get impact, to reach the SMEs and engage with them, however many SMEs have everyday problems and don´t take part in these types of innovation processes*". Many of the DIHs at the meeting witnessed this, they have good processes and support facilities and services, but struggle to reach the target group.

At the workshop, several approaches were suggested on how to communicate the services offered and motivate SMEs and other interested parties to get involved in activities with the DIHS.

Work with the willing

First and foremost, PhotonDelta, advocated to begin *working with the willing* and fast track their needs. A DIH should not spend too much time to try to convince the ones hardest to reach. It is important to get out success stories and this will market the hub. By working with the willing, the DIH get these stories that they can showcase, to inspire other companies to digitalise and to get involved with the DIH.

Language and communication style

DIHs are most often networked organisations with many partners, from different sectors and a variety of services. To a company which is less used to this environment, it can be perceived as very messy and unclear. Therefore, the hub needs to think about what language it uses and how it communicates with clients and potential ones. EDITA DIH (Croatia) has spent quite some time to create a common language with partners and users. Both to understand the different roles in the hub, but also to more clearly define language and communicate and explain what they do. As an example, they don't talk about ICT, but digital. In this they explain to SMEs that they need digital transformation and not ICT per se, to stay competitive and survive.

Figure 2: EDITA DIH illustration of DIH communication challenges

Communication resources

Some DIHs have their own in-house media organisation (e.g. PhotonDelta), others have it in the network. However, a DIH needs to communicate its offer, encourage engagement and raise awareness about itself, using both online and offline strategies.

Online marketing includes having a web-page, social media channels (Facebook, LinkedIn, Twitter), newsletters (e.g. IAM 3D HUB sends briefings that they call tech flashes to their community). The regional Industry 4.0 platform - Tuscany has a section in its web that is a catalogue of infrastructures and relevant experts, a type of yellow pages that can help SMEs find structured and relevant information on who to engage with.

A useful practise recommended by IAM 3D HUB was to put online pitches for services as videos explaining services, but also use cases and other types of good practices. For this they use early adopters and strategic partners.

PhotonDelta has made an early example of the type of format of video they find useful: https://youtu.be/nPYF9vtJNEM . They also see the Small Empires series produced in New York by Alexis Ohanian as a good example, for instance this one they made on the Dutch company Shapeways. https://youtu.be/NV38DXv7RW0 .

Offline marketing includes printing presentation material (e.g. IAM 3D HUB) of the hubs, their services and use cases. Other go to trade shows and conferences to present themselves. Many DIH organise dedicated events to make potential customers familiar with the hub and what it can offer. As an example, the Lithuanian Robotics Association organise both more broad-based High-Level events and demo events, where they invite technology providers to show technology solutions. These events also attract politicians and mass media that diffuse the knowledge further and enhance awareness about the DIH.

Cap Digital organises the FUTUR.E.S in Paris festival every year in June, to raise awareness of new trends, offer experiences to understand the implications of our technological choices, appropriate the meaning of innovations and to co-construct the future with companies and innovators. Cap Digital organises a call for participants to which SMEs and start-ups apply to present their projects. The 150 most innovative ideas are selected and tested with a panel of 22 000 people. Like this the idea can be validated, improved, and it gains visibility.

Another approach is to organise joint company visits to go and study specific technology solutions, with a supplier, in a running environment or in a lab. A version of this are the tech audits: where a company allows suppliers and other interested parties to enter one's facilities and suggest solutions for improvement. This provides opportunities both for suppliers and users. This is something that has been done by the Lithuanian Robotics Association. This approach both diffuses knowledge, but also supports network building between the actors. Also, the Lithuanian Robotics Association DIH points to that for some SMEs a joint visit to a supplier can be less intimidating than having single sales meetings.

To document and diffuse good practices and use cases can be done both as videos and text, printed and online. The KDH Crafts work quite a lot systematising experiences to be transferred to other companies. This can make them aware of new opportunities and prepare them to engage with the DIH.

Use cases and inspiration can be powerful, also for the DIHs themselves. As an example, the Lithuanian Robotics Association looked at the Belgian iMinds for inspiration on how to

organise themselves, especially on how to depart from company needs and on how to use a network to connect relevant competences to address the needs.

Watify is an awareness-raising campaign funded by the European Commission to support EU efforts to stimulate the modernization of Europe's industry. They organise awareness events and participate in events to diffuse best practises and make companies and regions aware of opportunities of digital transformation. For this they have collected over 100 stories of successful digital transformation.

Others use their networks, such as clusters and chambers of commerce, both to find potential users of DIH services, but also as communication channels to reach out.

DIH business model

The DIHS work according to different business models.

Some DIHs were charging the full costs for services (VDTC DIH, charge the cost of their 1-3 researchers coming in for 3-4 weeks) or access to facilities, other only partially. Some have a yearly fee that gives access to support (e.g. Digital.Hub Logistics Dortmund charges companies a yearly fee for support depending on their size and turnover, there are three levels: 100 000 – 200 000 – 300 000 euro for one year of service).

Many DIHs also receive public subsidies (national funds, regional funds, European Structural and Investment Funds - ESIF) to support Digital transformation as it is in the public interest to support this transformation. These subsidies go both to facilities, running expenses, but also to carry out certain services.

However, many of the workshop participants were arguing for charging the presumptive clients for the services, at least partially. The reason being that the SMEs also need to commit to the processes, and as the services delivered should raise future profits and hence be valuable for the companies they should be able to afford it. *The Northern Netherlands Region of Smart Factories Fieldlab*) who work with business development argue that it should be 100% business approach to succeed in getting SMEs on-board, the business model need to be clear.

Funding

The Digital.Hub Logistics Dortmund has analysed their eco system of digital transformation, and found that they are not sufficiently strong in giving advice about access to finance and they are currently working to develop solutions to overcome this.

Many DIHs are keeping track of relevant funding sources and calls, both to finance activities demanded by the companies, but also to mobilise actors to respond to calls, and then some also manage funds that are provided in calls, such as the regional Industry 4.0 platform – Tuscany.

There is a common recognition that many companies struggle with applying for funds and managing the administration of it, therefore some DIHs also specifically mentioned that they help with these activities to take that burden away from the company (e.g. *the VDI Technologiezentrum´s DIH Industry 4.0 test environment for SMEs (I4KMU.DE*).

Several DIHs mentioned that they used cascade funding, which they found very SME friendly approach (e.g. BioSense, Lithuanian Robotics Association, etc.) to develop solutions that can be commercialised.

4. Lessons learned – towards a digital ecosystem and partnering approach

During the presentations of lessons learned four main topics relevant to digital ecosystems and partnering emerged with relation to i) DIHs having focus in different dimensions, but this is a rationale for collaboration, ii) different approaches on how to connect competences locally and strengthening the regional innovation eco system; iii) how to connect to external competences; and iv) the DIHs should connect to the regional Smart Specialisation strategy (RIS3).

Different dimensions – rationale for collaboration

The DIHs presenting at the event had in common that they support services for digital transformation to established industry actors. However, their business models, target sectors, services provided and geographical scopes vary and what kind of focus that defines the DIH. There were hubs with narrower technological focus, such as Broadband. Others are supporting digital transformation based on a broad range of technologies like Cap Digital. Some are focusing on a specific application area, like the BioSense in agriculture, and others that address a wide variety of application areas, like the Handicraft DIH. Related to this is also target audiences, some focus on SMEs, others on all types of companies, some do not help start-up activities others do this. There are differences in the extent to which the hubs have in-house resources (some are defined around a specific test facility or lab) or focus on an intermediary role and collaborate with local and non-local competence centres and other types of service providers. Some may have their definition and focus in their region, where as others are focused along their lab or service and support actors on a national or European scale.

In fact, no region can have all resources necessary for all types of digital transformation and being relevant for all sectors. Therefore, there will always be specialisations of activities for DIHs. However, this can imply that the DIH may not have the relevant services and competences for some potential clients. On the other hand, this could be overcome by seeking partners external to the hub and the region where it is located. This type of collaboration is also something DG CONNECT aims at supporting.

Linking competencies locally

Most DIHs build on resources in a network, of which a majority of partnering organisations are from the local network, e.g. the regional Industry 4.0 platform – Tuscany is a network that connects several competence centres, research institutes, higher education, vocational training and technical training on several Industry 4.0 topics like Industrial Internet, Cloud, Additive manufacturing, Cyber security, Big Data, Augmented reality and advanced manufacturing solutions. Another example is VDTC that is a regional initiative to raise awareness for digitalization and needs identification among companies, and to provide new knowledge and create a partner pool for cooperation; they have 35% of research revenue from partners in a radius of 100km and 45% in 200km radius.

What many of the DIHs at the workshop argued was that it is hard for a hub to have all relevant resources for digital transformation in-house, as the SME needs range from new technological competencies, business model development, IPR knowledge, which is too broad for a DIH to have in-house.

Many have a strong connection to a local cluster (e.g. Produtech is a cluster that hosts two DIHs, the Produtech DIH and the iMan Norte Hub). Some DIHs have grown out as an additional activity of an existing organisation or cluster (Cap Digital and EDITA whose origins are as

clusters). Whereas others have been set-up with a specific purpose to support digital transformation (i2CAT).

Partners with relevant knowledge

In general, DIHs point to having partners for technology knowledge input like Research Centres, Universities, Technical Universities, training providers, vocational training, special competence centres (e.g. VDTC that works with federal competence centres like the Mittelstand for construction industries), large companies (to embark on Flagship providers) and technology suppliers. Then they connect with innovation support organisations for IPR and business model activities. These can also be used to communicate to possible clients about DIH services. Here also cluster organisations, networks and Chambers of Commerce are important.

IAM 3D HUB works though the regional eco-system, not only with tech companies, but also other players, public administration, clusters, schools. Both to supply relevant services and skills; but also, to bring them in as users to innovation processes. In general, many DIHs work in a type of triple helix setting, involving companies, research and public sector, i2CAT sees this one of their key success factors.

Before the set-up of the regional Industry 4.0 platform - Tuscany there was a regional competence network that has been essential in engaging with SMEs and making them aware of the platforms services. These addresses seven technology fields that connect to existing local infrastructures and technology domains in which they provide technology assistance to companies. These also relate to the national plan for industrialisation. Connected to the platform are also two clusters one on Advanced Manufacturing and one on materials.

The EDITA DIH has an important partner in the local ICT association. From this they have an infrastructure to test things, both ICT companies and mature industry interested in digital transformation. As a hub, they are serving the interest of both groups of actors.

One-stop shop and no door is wrong policy

DIGITECH SI-EAST, is grouping several regional innovation support initiatives, and this is also something that DIHs come back to. To facilitate for SMEs to find their way to help by innovation support actors, it is useful to develop approaches of "no-door is wrong" policy and/or one stop shops. In that some actor like the DIH can help a SME in getting access to relevant support, which they draw upon from the network. But also, that these support facilities will forward companies who are interested in support to the DIH or the relevant actors. So, it is important to make Eco-system actors knowledgeable about how the system works.

Matchmaking

Another common function is matchmaking, this is something that DIHs and clusters do, but also the EU initiative of *Watify*. PhotonDelta argued that this was one of their main activities and that their clients saw direct matchmaking as more important than organising conferences and public events of more general character. PhotonDelta focuses on the key enabling technology Photonics that has reached a stage where outreach to other sectors is needed for companies to make accurate product-market fit. The Photonics industry can benefit in particular from working with semiconductors actors. PhotonDelta offers SME's practical help in building trusted knowledge partnerships with larger research institutions and enterprises, so they can work with them on innovative solutions. The success of this lies in building an informal network of relevant expertise, which are more agile than more formal relations. They

also note that SME's with hardware solutions have longer development times than software/app development companies.

The regional Industry 4.0 platform - Tuscany is both organising direct match making events, but also try to support this through their online catalogue of useful infrastructures and professors and other types of experts.

Show rooms and test facilities

Another useful function of DIHs are show rooms that provide good examples of useful technologies. As an example, the KDH hub has five show-rooms (ICT within the enterprise, Digital Business Models, Digitalization of the production processes, Digitalization of business processes, and Digital Construction) that provides examples for different areas of digitalisation and sectors.

Another dimension to this is to make available test facilities, where companies can come and experiment in relevant tech environment, these can be research labs, or live infrastructures, e.g. in Barcelona i2CAT have established the industrial ring, which in the beginning allowed for testing around broadband technologies, over time it has evolved to testing of Internet of Things solutions and other types of applications. They also have a platform for Industry 4.0.

BioSense has been running a living lab for precision agriculture and are now in the development of a demonstration farm that will serve as a test-bed for prototypes in an operational environment. It will be a way to engage and encourage collaboration between start-ups, established companies and various end-users in the ecosystem.

Supplier network and joint production facilities

The Lithuanian Robotics Association is also developing a supplier network, that fosters collaboration between Robotics companies to start sharing client portfolios. It is something that the companies are worried about as they sometimes compete, but is also perceived as an opportunity to support bigger clients and projects jointly, and take orders that could have not been done independently. They see that this works better when there are more complementary companies. In this they are also trying to involve companies from outside Lithuania.

Another example of joint functions is joint production facilities. In the Northern Netherlands, the Region of Smart Factories Fieldlab is a joint facility for a group of SMEs, that help each other with a shared production facility. They have bought a production facility from Philips, in which they both test new ideas, but also produce commercial products. It is also open to other SMEs and from different sectors. Being a shared facility, it is also a way of reducing production costs for these companies.

Open Innovation, societal challenges and connecting users and suppliers

Several DIHs work with open innovation approaches, i.e. trying to connect companies with other companies, users and suppliers, companies and research, e.g. DIGITECH SI-EAST has their open innovation space. The DIHs have different approaches to this, but they are often connected to events and workshops. Some set up events on a specific theme, where they invite actors to discuss what can be delivered in this area. Sometimes this is based on a societal challenge, where some public-sector actors or large companies come and describe challenges that needs solutions, and then companies and research facilities discuss solutions that could address this. As an example, Cap Digital has an open Innovation programme, the PoC&Go Digital Challenge in cooperation with IMT. In this programme, they connect public sector and

large companies that normally do not work with SMEs, with advanced start-ups that develop prototypes and proof of concept to solve the issues. This provides new ideas to established companies and opportunities for start-ups to find relevant clients and set-off for products. In a similar fashion, the Smart Factories Fieldlab has worked with Philips. The beneficial thing is that if the SMEs comes up with a solution Philips can buy the solutions. i2CAT organises workshops to challenge larger companies and public services like health care, and asks them how they work with societal challenges and then bring in suppliers to develop solutions.

Produtech has an elaborate format they call Produtech Open days. In this they ask large companies from different sectors to present to suppliers and R&D organisations what are their needs and constraints in their business processes. Afterwards they go to the shop floor, to identify further intervention opportunities. Then they go back to a meeting room where the suppliers can propose different kind of existing solutions for how the companies can digitally transform their processes. The benefits are that the companies are being presented with sharp possibilities for digital transformation, but it has also been leading to the establishment of consortia that jointly provide solutions for the companies. It has also in some cases led to groups that co-develop new solutions.

PhotonDelta has good experiences with their Clinics approach. It is a bespoke consultancy which yields practical results by trying out new ideas within a clear and realistic deadline. Most of the work can be achieved in 5 days, though these are usually not consecutive.

- Phase one: defining the challenge. This is a confidential needs assessment, listening in depth to challenges the industry player is facing. Unless the company endorses that change is needed, the process does not proceed.. Phase two: prototyping and team selection. This is done online, by forming an ad-hoc discussion network. It starts with a presentation of what the clinic is about, the way it works, how it's organized and the rules of engagement. The introduction explains what participants can expect – and what will not happen. The first presentation ends with a call to action. Candidates for the clinic are invited to build an online profile and to explain their preferred future, with the next steps. PhotonDelta with the SME select up to 5 target customers willing to collaborate on developing prototypes. The process involves journalistic due-diligence assessing whether company X can be trusted, if their IP is in order, and whether they can explain their solution to customers.
- Phase three: the business sprint itself. Once the dates and location of the sprint have been decided, PhotonDelta assembles a small team of practitioners who join the teams during the 5-day clinic (most on the first day). Each practitioner is a specialist in his/her own field. and brings a relevant case study or business intelligence which will assist the team in building working prototypes. The final day is spent sharing what has been achieved, discussing and agreeing next steps and video documentation so progress is not easily forgotten.
- Phase four: 100 days later- evaluation and capturing lessons learned. The lessons learned from the pilot and progress are evaluated. A simple webcam or camera is used to capture interviews of the lessons learned, the preferred futures and what needs to happen next. All this material is used as input into the resources portal for use in future clinics.

Linking competencies externally

Quite a few of the DIHs also referred to connecting to external actors to bring in relevant competences to solve their development needs. The Lithuanian Robotics Association has done this systematically. They try to find research competencies wherever they can find them. They depend on international collaboration to resolve their issues, but they also try to connect SMEs from outside of their country to solutions they may have.

Innomine located in Hungary, argued strongly that their key to success was to be flexible, running experiments to meet SME needs and to bring in other actors with relevant knowledge to the process. They had benefitted much from working with Fraunhofer from Germany.

The Basque DIH works with International experts. They have state of the art facilities and work with three tech-oriented nodes, but this they connect to other facilities. Innomine is also using an extensive partner network mainly in Central and Eastern Europe (such as ICT associations, clusters and chambers of commerce), but also have offices in Hungary, Silicon Valley and Brussels.

Many hubs praised different EU programmes to support this linking. BioSense DIH is built on a teaming project, Innomine carries out experiments which draws upon I4MS. DIGITECH SI-EAST are part of the EU project HORSE, where they work with partners from France and the Netherlands), due to the LENS project they have partners from Denmark, South Africa and India.

Connect to RIS3

Not that many of the DIHs mentioned their connection to the regional strategies for Smart Specialisation (RIS3), yet quite many of them are most likely connected to it. A Smart Specialisation strategy should be place based and develop regional assets and possibilities for innovation. A DIH needs to be using regional assets and addressing regional needs as well.

One region and DIH that pointed this out at the workshop was the Basque DIH. There the DIH is an integrated activity in their RIS3. In their RIS3, they have identified a need among regional SMEs for digital transformation and provide SMEs with new technological capabilities. Their DIH connects several test facilities and R&I centres relevant for Industry 4.0 activities and links them to SMEs. Another DIH mentioning the connection to their regional RIS3 strategies were the regional Industry 4.0 platform – Tuscany and i2CAT of the Catalan RIS3.

In Northern Portugal, the DIH/cluster Produtech is both receiving funding from the RIS3 and is part of implementing the strategy, but they have also been an important partner in design the strategy, by bringing in an industry perspective. They are also taking a multi-level role, where they are sometimes a regional centre on some issues, in other contexts they are a national leader.

5. Break-out sessions

During the day meeting participants could fill out notes on themes they wanted to discuss further with the other participants. This was used to break down the attendants into four smaller groups. The objective was for participants to learn from each other on how to improve the "demand" side for the services of their DIH and to stimulate a community of practitioners that can lead to future collaboration. The four groups of discussion were: i) SME engagement, ii) Eco-system networking, iii) Partnering and iv) Industry 4.0 in relation to other sectors.

5.1 SME engagement[18]

This group discussed the topic "how to engage SMEs in DIHs". They identified six key lessons to bring with them from the activities of the day.

First, for successful SME engagement, DIHs need to build trust and try to engage in a long-term relationship with SMEs. The DIH should engage in identifying what are SME true needs and create a common, realistic understanding of what DIHs can deliver . Then the DIH need to deliver relevant expertise and quality services that solve the real issues of the SMEs.

Secondly, the DIH need to focus on motivated SMEs rather than hard to reach/convince SMEs, hopefully over time good outcomes with the willing will provide examples that can motivate more reluctant to digitalise.

Thirdly, to lower thresholds preventing SMEs to engage in these processes, DIH can create incentives for joint project work, e.g. via offering free trials and variable payment in relation to the realized gains.

Fourthly, DIH should offer a consistent process, where SMEs are guided along different stages of involvement (from information until application; see the proposed process-based portfolio/approach of the Digital.Hub Logistics Dortmund). This provides stability and confidence in processes.

Fifthly, DIHs should connect to and stimulate the build-up of an ecosystem of further partners helping to address SMEs in a broader sense and connecting the SMEs to these actors (i.e. consulting institutions, industrial chambers, industry associations, workers unions, …) to help solve the SMEs needs, and to get access to competencies needed for this, which is not held within the hub.

Sixthly, by engaging in networks, clusters and other types of consortia DIHs can help in bringing different SMEs and other partners together. It is also a way of reaching out to SMEs, and make them aware of the existence of the DIH.

5.2 Eco system – networking[19]

The discussion in this group came from the experiences of the participants from Cyprus, Slovenia, Portugal, Finland, France and others.

They first made a distinction between different kinds of networking: within the eco-system of the DIH itself, between DIH-s in the same region and international networking. This last form was the focus of the discussion in their group. In general, for all forms of collaboration to succeed, there is a need to establish trust between the partners.

Second, it appeared that there are differences among the hubs regarding the dynamics in establishing the DIHs, and their needs for European networking. In the Cyprus case, the DIH is a one-stop shop established (with a business angle) at a national level, with a connection to the technology centres (a more centralised approach). In Slovenia, it is a bottom-up collaborative platform (a flat organisation), gradually extending to different sectors, that acquired national support. However, all have in common that they see the key to success of

[18] Rapporteur from this break out group was Simon Schumacher, Research Fellow at Fraunhofer Institute for Manufacturing Engineering and Automation IPA, DigITools for Manufacturing

[19] Rapporteur from this break out group was Jan Larosse, independent advisor, Vanguard Initiatives

such DIHs depend on the involvement of business associations, clusters and companies, and to respond to the digitisation needs and to economic structure of the regions.

Still, some standardised suggestion can be given for services and activities, such as how to look outside your own region, and how to open-up research infrastructures. There was a reference made to the 'cluster certification', e.g. in using good project management.

They suggested that the European DIH Catalogue could be the reference point for further work: to collect best practices in networking; and to identify/connect to partners for matchmaking. The Catalogue could become the repository of relevant information, but with some quality control. Such a deposit could be useful for newer hubs that could get a steep learning curve.

The Catalogue could evolve to a market place for services or for sourcing experts (training). But it was felt that it would not be used much directly by SMEs themselves, but by the managers of DIHs or clusters (that are considered to be DIHs by the French). The EC can play a role to create a basis of trust for digital innovation networks, provide guidance, set-up pilots (in particular for business models for cooperation). The funding is a key issue.

At present, there is practically no experience with inter-European cooperation between clusters or DIHs in this group (only through the cascade funding in France).

In the discussion, the distinction was made between more horizontal 'enabling' services (to companies in all sectors) and services within 'verticals' of more sectoral and technological nature with dedicated approach. In Finland, these verticals cooperate and in France there is matrix approach to connect technologies with applications. This will impact the cooperation needs: on horizontal services, this will be more generic mutual learning or pooling resources, on verticals this will be more on dedicated matchmaking in dedicated roadmaps.

So, regarding networking between DIHs/clusters, two important conditions came up: establishing trust and establishing a business model to support such cross-EU cooperation.

An important challenge is that regions have a political preference to keep as much as possible services in the hands of their own players, also when these are not of the best quality for their companies. This is not consistent with smart specialisation strategy and cooperation based on identified needs and gaps.

Another (related) barrier is that cluster or DIH managers are not incentivised to use the DIH catalogue and send their companies to service providers abroad, if there is no compensation or balance (= trust in a mutual benefit). The model of the Steinbeis Foundation (providing a fee for the sender from the receiver) was advanced as a possible solution, but often the causality of contributions to some result is difficult to establish.

The participants agreed that the question on the adequate business model for exchanging services/companies is a good starting point for discussion in next meeting on financing.

5.3 Partnering and funding calls[20]

In the break-out group on partnering and funding, the participants began to create a community interested in partnering on calls and funding opportunities. To this end they created a table of interested parties and areas of collaboration sought, see Table 1.

The group´s proposal to the Commission was to extend the DIH Catalogue and enable DIHs to easily communicate their interest on a specific call on the web to find partners. The web could also support partnering on specific technology topics among DIH and their users (SMEs). They argued that as innovations consist of many components and not all are highly innovative, it would be useful to ease search for specific technology knowledge or expertise that is already in production or development, as well. The web could also contain material on good practices, for example videos of useful solutions and different forms of guidelines, as well as workshops for skills development.

Some innovations create new markets or disrupt existing ones, in this work standards can be a barrier, either standards are too low or non-existent, which allows for low level competition of poor quality products or there are standards exist, but they prevent new innovative solutions to enter the market. Partnering could ease that effort for SMEs. A DIH-network could possibly also be a partner in creating the right level of standards for EU companies.

Table 1: Potential partners for funding and calls.[21]

Name & email	Organization	MS	Interest area	Upcoming calls
Emil Perić eperic@hgk.hr	Croatian Chamber of Economy	HR	Industry 4.0 Space technologies Logistics	Robotics Smart Anything Everywhere
Evelina Kutkaityte Evelina.kutkaityte@ssmtp.lt	Sunrise valley science and technology park	LT	Industry 4, establishing DIHs, start-up support, business acceleration	Smart Anything Everywhere Interreg Europe (May 2018)
Gabor Vicze gabor.vicze@innomine.com	Innomine DIH	HU	Industry40 (incl. digitization of manufacturing, robotics, HPCs, IoT), acceleration, biz dev	Robotics SAE HPC
Marc Lemmer Marc.lemmer@uni.lu	SnT – University of Luxembourg	LU	Collaborative research in Fintech, Regtech, Space communication, Industry 4.0, Autonomous vehicles, Blockchain, Cryptography	
Sander van der Molin Sander.vandermolen@civitta.lt	Civitta Lithuania	LT (and offices in EE, LV, PO, RS, RO, MD, UA, BY)	Blockchain, robotics, Fintech, Industry 4.0	Robotics, next generation internet, AltFintech, DIH
Tereza Samanova samanova@czechinno.cz	CzechInno	CZ	Digital innovations – scouting, Industry 4.0 and its non-technological consequences, building DIHs	SAE
Galina Nachkova galina.nachkova@icb.bg	Microsoft Innovation Center Bulgaria	BG	Industry 4.0	SAE DIH
Manuella Portier	Cap Digital	FR	eHealth, education, connected	DIH CSA,

[20] Rapporteur for this break out group was Emil Perić, Croatian Chamber of Economy, EDITA digital innovation hub

[21] An online version of this table can be found here:

Manuella.portier@capdigital.com			environment (smart cities, retail, tourism), data, VR/AR, artificial intelligence, creative industries, media, industry & services (robotics, fintech…)	TRANSFORMATIONS-05-2018, ICT-28 (social media), ICT-13 (data economy), ICT-29 (multilingual), ICT-24 (NGI), INNOSUP
Aziz ZENASNI aziz.zenasni@list.lu	Luxembourg Institute of science and technology	LU	Mobility and logistics Smart agriculture Smart finance Smart cities Water resources management and security Smart construction Space technologies	HPC and big data large scale test beds and applications (ICT 11) DIH
Ger van den Kerkhof ger.vandenkerkhof@flandersmake.be	Flanders Make (RTO) Strategic Research Centre of Flanders	BE	Mobility, factory of the future, smart products and smart processes, IoT, collaborative robotics, automated and electric driving	DIH on robotics, Smart Anything Everywhere, smart manufacturing
Ionut Tata Ionut.tata@iceberg.ro	Cluster for Innovation and Technology	RO	Mobility, Logistics, Blockchain, robotics, Fintech, Industry 4.0 Smart agriculture, Smart cities, AI, Acceleration, Startups	Robotics SAE HPC AltFintech DIH HPC and big data
Josep L. Larriba-Pey larri@ac.upc.edu	DAMA-UPC. TETRAMAX.EU, CIT-UPC	ES	Smart Mobility, Graph Management Technologies, Mobile Apps, Technology Transfer	Smart Cities, Logistics, Open Data for Mobility
Anna Nikiel Anna@photondelta.eu	PhotonDelta Digital Innovation Hub.	NL	Core knowledge on Photonics (KET) and related applications using light-enabled technologies. This includes aerospace, space sensing, agri-tech, life sciences and LIDAR (autonomous vehicles).	Smart Cities, Energy transitions within datacentres, Medical Robotics.

5.4 DIH / Industrial modernisation application to other thematic fields.[22]

This group discussed the topic "the role of DIH in support of the European industrial modernisation". The group identified five key lessons:

First, the group acknowledged the relevance of the DIH initiative to boost industrial modernisation and transformation in many sectors that are currently lagging the digitalisation trend. DIHs should offer expertise to increase the uptake of Internet of Things (IoT) technologies into the market. Furthermore, DIHs should give access to innovative technologies based on standards.

Second, DIHs should circumscribe their services focussing on specific industrial areas. The group agreed that, among the presentations that were given during the workshop, the most successful stories came from those DIHs which focussed their work on specific areas (such as agriculture). Focussing of specific industrial areas allows DIHs to offer high-quality services and helps potentially interested companies in identifying specialised DIHs that might better respond to their needs.

[22] Rapporteur from this break out group was Guido Sabatini, project manager at The European DIGITAL SME Alliance

Third, the group discussed on other potential industrial areas that might benefit from DIHs to move towards sectoral modernisation. In particular that DIHs could play for the digitalisation of the European construction industry. The European construction sector is mostly made of micro-enterprises which are currently facing challenges related to the digitalisation of their activities (e.g. Building Information Modelling, IoT, etc.). DIHs should attract these companies and respond to their needs by coupling them with so-called "digital enablers", i.e. digital industry companies which are currently ready to offer the necessary services for the European industrial modernisation.

Fourth, DIHs should act as focal points to connect digital SMEs and foster their ad-hoc cooperation on specific projects and offer more complex packages of services. By doing so, SMEs operating in different sectors would have concrete possibilities to meet the requirements to respond to large public and private tenders and further contribute to the European industrial modernisation.

Fifth, the group agreed on the need to have DIHs well integrated in the framework of national programmes (e.g. national instruments in support of Industry 4.0). The different level of preparation of European countries and the wide spectrum of difficulties that they face was acknowledged. For this reason, DIHs should not be established based on a one-size-fits-all approach but respond to the specific industrial needs of the countries in which they are established.

6. Next steps

In the final session Anne-Marie Sassen, presented the topics for the upcoming working group meetings. There are tentative topics for the rest of the meetings that will take place once per month. Other topics suggested included Skills development, Networking of DIHs and on the role of MS and regions for the development of DIHs.

However, this can be modified upon request by the DIH community.

The next session will be on the 21st of February and it will address financing of DIHs and financing of the digital transformation of SMEs. It will take place in connection to the Industry days. The room will be smaller, but it will be live streamed and DIHs can pose questions through Sli.do. Also, DIHs that want to share their experiences can send it to Anne-Marie Sassen and her team, before the event.

The feedback from the participants of the workshop was very favourable to the organisation of these meetings. However, some raised the concern that they were too frequent. The response though was that at this point it is better with this frequency as it allows more DIHs to join the meetings, also accepting that DIHs can´t go to all meetings, but at least some. Another suggestion was to have even more participatory parts or more parts for questions as there were many presentations, but little time for interaction.

In this session, there was a sneak preview before the next session on Funding, in that the EIB presented work they carry out on funding of DIHs. They presented a study on challenges regarding funding of digital transformation of SMEs. They have observed that the digitalization of companies in Europe varies significantly by geography, sector and type and size of company. While 54% of large companies are highly digitalized, only 17% of SMEs have successfully integrated digital technologies into their businesses. There is a lack of private investment going to SMEs in traditional sectors (i.e. retail) that aim to digitise their companies. Furthermore, SMEs often lack the awareness about the benefits of digitisation and the

knowledge about how to adopt digital technologies into their businesses. Then there is not any financial instrument at the EU-level that is specifically dedicated to the digitisation of SMEs. Their observation is that successful digitisation programs focus on providing an integrated set of products and services to SMEs including: (i) awareness raising activities; (ii) digital literacy programs; (iii) knowledge transfer; (iv) advisory services and (v) investments in digital technologies. To promote the digitisation of SMEs it is required to support both the supply and demand side ("Push and Pull approach").

Along these lines, in November 2017, EIB announced a EUR 150MM loan to Spanish BBVA to finance SME investments related to Innovation and Digitisation. This is an operation entirely dedicated to promoting and financing innovation and digitisation in SMEs, including funding for initiatives that enable them to digitise their operations

They are also carrying out a study on access-to-Finance for digitisation of SMEs. The objective of the Study is to provide an overview about the current access-to-finance conditions, trends and challenges related to the financing of programs supporting the Digitisation of SMEs in key sectors of the European economy. It will analyse access-to finance conditions for the financing of Digitisation programs, especially SMEs and the development of DIHs. It will identify principle national and European programs that support the Digitisation of SMEs in Europe and provide recommendations on how European programs can complement and strengthen existing national programs. Based on this it will provide a set of policy relevant inputs and recommendations on how to set up financial instruments (such as digitisation fund) at EU level with possible co-financing with national or regional schemes/contributors (the concept of EFSI platforms. Furthermore, it will explore if there are collaborative funding models (involving public and private investors) that can improve financing conditions of DIHs. The study is being carried out in close collaboration with EC (DG Connect and DGRTD).

APPENDIX A: Agenda

09.15-10.00: Welcome coffee and registration

10.00-10.30: Setting the scene: the Digital Innovation Hubs initiative – objectives & expectations

Max Lemke & Anne-Marie Sassen, European Commission (20' and 10' Q&A)

10.30-10.45: The H2020 open calls mechanism & engaging SMEs in European DIHs

Mayte Carracedo, H2020 Coordination and Support Action I4MS-Go under the Innovation for Manufacturing SMEs initiative (I4MS) &

Rainer Günzler, H2020 Coordination and Support Action Smart4Europe under the Smart Anything Everywhere initiative (SAE) (10' and 5' Q&A)

10.45-12.00: Session 1 – Reaching out to the SMEs

(individual presentations of 5' and 25' discussion)

innomine (Cloudifacturing project) (HU), *Gábor Vicze*

The digitalisation challenges the manufacturing SMEs face and how to motivate them towards embracing digital transformation.

BioSense DIH (RS), *Grigoris Chatzikostas*

The Lean Multi-Actor approach, a demand-driven methodology to digitalisation.

IAM 3D HUB (ES), *Aintzane Arbide* & WATIFY (BE) *Gabriela Cinkova*

Raising awareness to the SMEs and a region's industrial community though technical innovation days, events and other dissemination activities (techflashes, social media, tradeshows).

Lithuanian DIH on Robotics (LT), *Sander van der Molen*

Technology demonstration events for the SMEs and raising awareness on digitalisation opportunities.

KDH (Kompetenzzentrum Digitales Handwerk) (DE), *Alexander Barthel* & VDI Technologiezentrum GmbH (DE), *Anette Braun*

The "SME 4.0-Centres of Excellence" and ways to engage the manufacturing SMEs in digital transformation.

VDTC Saxony-Anhalt DIH (DE), *Christian Blobner*

Digitalisation coaches and Industry 4.0 check-up.

CEA Léti-Health DIH (FR), *Patrick Boisseau*

The Showroom, a catalyst for business innovation.

Cap Digital (FR), *Manuella Portier*

The Poc & Go testing program and other best practices that support the SMEs with their digital transformation (business support, coaching etc.)

Digital Innovation Hub Dortmund (DE), *Thorsten Huelsmann*

Supporting start-ins and providing dedicated co-working places for the SMEs to test digital innovations and improve their production processes.

12.00-13.00: Networking lunch

13.00-14.15: Session 2 – Towards a digital ecosystem and partnering approach

(individual presentations of 5' and 25' discussion)

Cantieri 4.0, the Industry 4.0 platform of Tuscany region (IT), *Francesca D'Angelo* & PRODUTECH DIH (PT), *Pedro Rocha*

A regional ecosystem approach towards engaging all actors in the digital transformation process and best practices.

i2CAT (ES), *Silvia Castellvi*

Best practices and challenges on managing the regional digital ecosystem and engaging the SMEs in digital transformation.

EDITA DIH (HR), *Emil Ilija Perić*

DIH network management and ways to determine the maturity level of a region's economy.

PhotonDelta DIH (NL), *Anna Nikiel*

Building trusted networks between research and industry.

Fieldlabs (NL), *Hans Praat*

Region of Smart Factories.

Basque DIH (ES), *Cristina Oyon*

The role of a Steering group as a public private collaboration space, in a region's digital transformation.

Eurecat (ES), *Julia Palma* & DIGITECH SI-EAST (SI), *Brane Semolič*

The PIME entry point for the Catalan SMEs on supporting the innovation processes to increase SMEs competitiveness (technological prospecting, SME management training courses etc.), and access to finance for SMEs in Slovenia.

Smart Systems Hub Dresden (DE), *Frank Bösenberg*

The TRAILS strategy: networking the technology value chain and addressing the business needs of the SMEs within a region and beyond.

14.15-14.45: Coffee break

14.45-16.45: Session 3 – Break out in smaller groups to discuss topics of common interest

During the day all participants will be able to fill in post-its with themes they would like to discuss further with the other participants. In this session we will break out in smaller groups that discuss these topics. The objective will be that the participants learn from each other and everyone can go home with one or two ideas on how to improve the "demand" side for the services of their digital innovation hub.

16.45-17.00: Reporting back from the break-out groups of Session 3 & Closing

APPENDIX B: Links to Presentations and web stream

Link to presentations: https://ec.europa.eu/futurium/en/implementing-digitising-european-industry-actions/digital-innovation-hubs-1st-working-group-meeting

Link to web stream: https://webcast.ec.europa.eu/digital-innovation-hubs-workshop#