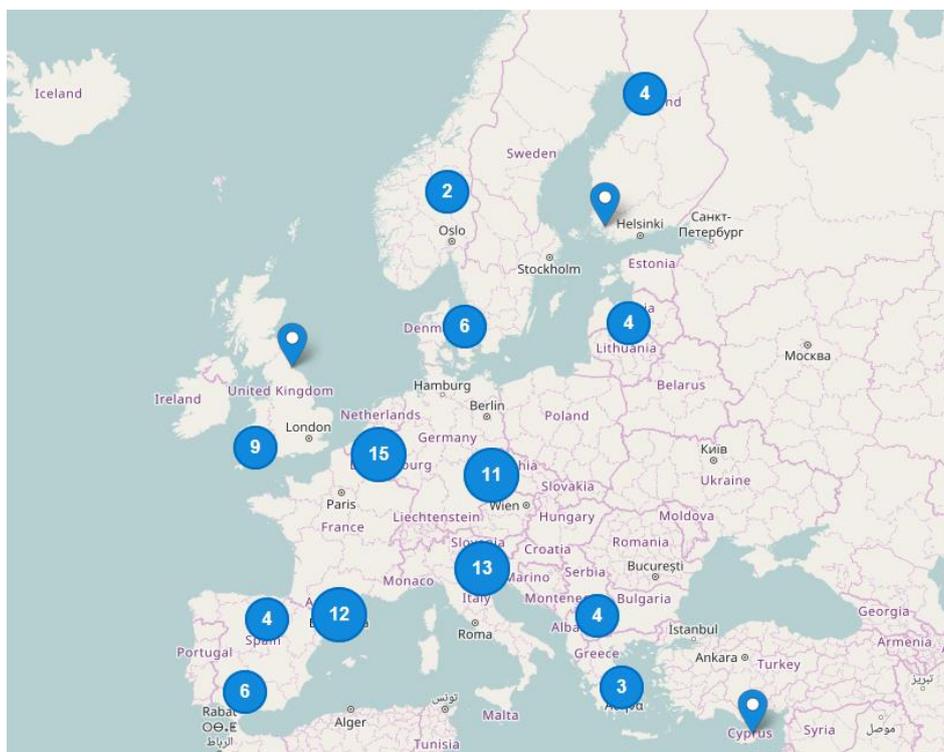# Digital Innovation Hubs contribution to digital transformation in Transport sector

DIHs in MS and regions are contributing to the digital transformation of enterprises in many sectors. When it comes to <u>Transport</u> (and selecting "Transport, Storage & Communication" in the online DIH catalogue of the S3P[1]) 96 fully operational DIHs declare offering digitisation services to companies and contributing to the digital transformation process in this sector[2].

Figure 1: Geographical distribution of DIHs in Transport (Fully Operational)

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

[2] **Disclaimer**: The DIH Catalogue website is a "yellow pages" of Digital Innovation Hubs. The information provided about each entry is based on self-declaration. The European Commission cannot take any responsibility for the provided information. Currently all the entries in the catalogue are being verified (based on the provided information) if they comply to the following 4 criteria:

1. Be part of a regional, national or European policy initiative to digitise the industry;
2. Be a non-profit organisation;
3. 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
4. Have at least 3 examples of how the DIH has helped a company with their digital transformation, referring to publicly available information, identifying for each:
    o   Client profile
    o   Client need
    o   Provided solution to meet the needs

The purpose of the catalogue is to support networking of Digital Innovation Hubs and to provide an overview of the landscape of Digital Innovation Hubs in Europe, supported by Regional, National and European initiatives for the digitalisation of industry. There is no relation between being present in the catalogue and being able to receive funding of the European Commission.

Country distribution of Fully Operational DIHs in Transport

The country distribution of the above mentioned 96 DIHs that provide digitalisation services in the Transport sector are distributed per country as following:
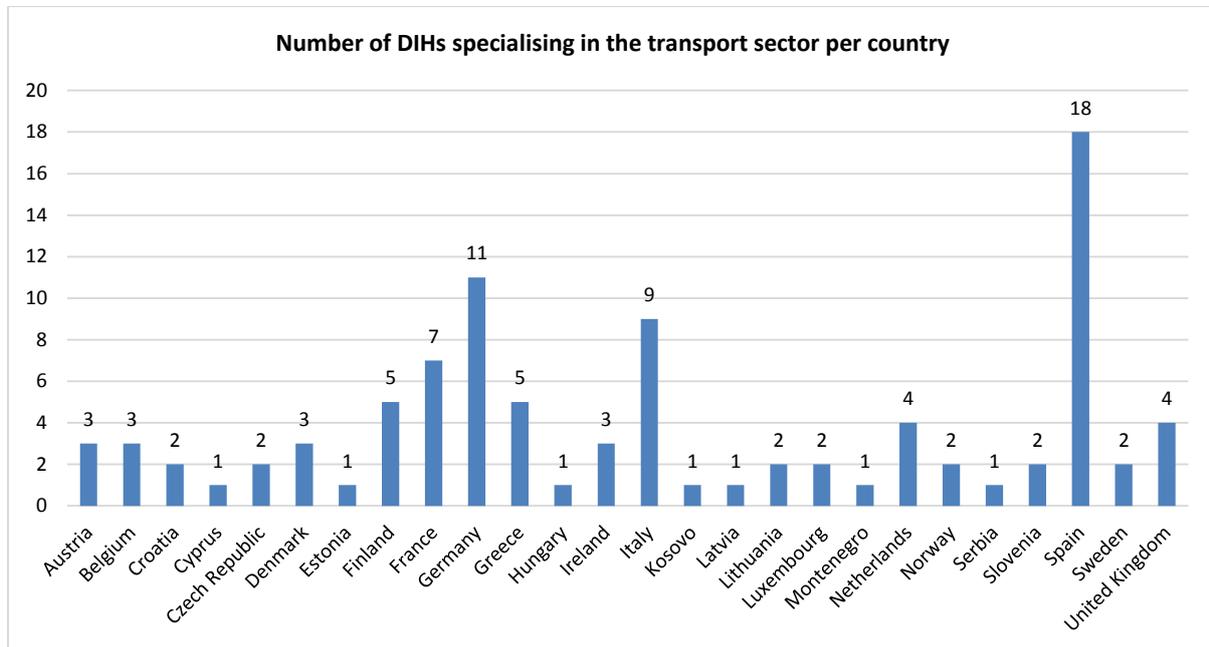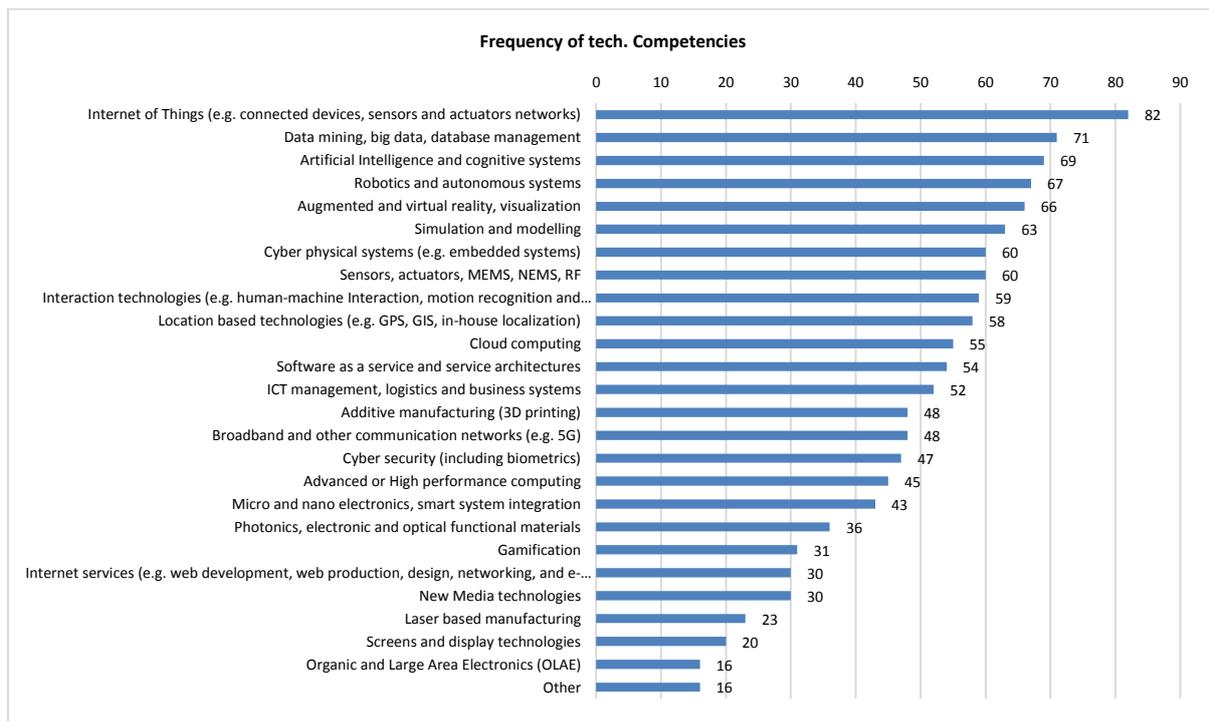

Figure 2: Number of DIHs specialising in the transport sector per country

The identified DIHs possess a number of technical competences and offer a range of services to businesses in the Transport sector. Following is some information on the frequency of technical competences and the range of services provided.

Frequency of technical competences of Fully Operational DIHs in Transport ("Transport, Storage & Communication")

- Internet of Things (e.g. connected devices, sensors and actuators networks)
- Data mining, big data, database management
- Artificial Intelligence and cognitive systems
- Robotics and autonomous systems
- Augmented and virtual reality, visualization
- Simulation and modelling
- Cyber physical systems (e.g. embedded systems)
- Sensors, actuators, MEMS, NEMS, RF
- Interaction technologies (e.g. human-machine Interaction, motion recognition and language technologies)
- Location based technologies (e.g. GPS, GIS, in-house localization)
- Cloud computing
- Software as a service and service architectures
- ICT management, logistics and business systems
- Additive manufacturing (3D printing)
- Broadband and other communication networks (e.g. 5G)
- Cyber security (including biometrics)
- Advanced or High performance computing

- Micro and nano electronics, smart system integration
- Photonics, electronic and optical functional materials
- Gamification
- Internet services (e.g. web development, web production, design, networking, and e-commerce)
- New Media technologies
- Laser based manufacturing
- Screens and display technologies
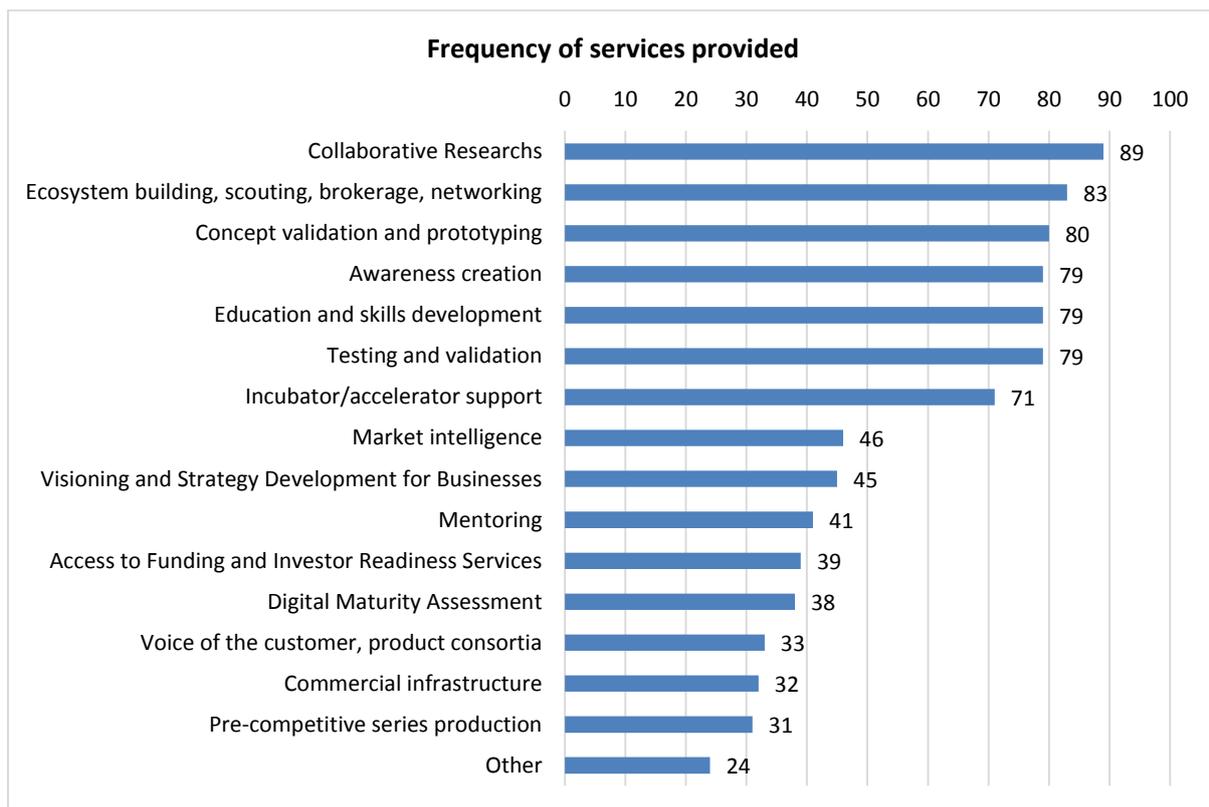- Organic and Large Area Electronics (OLAE)
- Other

Figure 3: Frequency of technical competencies of DIHs specialising in the transport sector

Most common services offered by Fully Operational DIHs in Transport ("Transport, Storage & Communication")

There is a broad range of services provided by DIHs depending on their capacities and also on the level of maturity of SMEs in their process of digital transformation. The types of services most commonly mentioned by DIHs that provide support to the Transport sector SMEs are the following:

- Collaborative Research
- Ecosystem building, scouting, brokerage, networking
- Concept validation and prototyping
- Awareness creation
- Education and skills development
- Testing and validation
- Incubator/accelerator support
- Market intelligence

- Visioning and Strategy Development for Businesses
- Mentoring
- Access to Funding and Investor Readiness Services
- Digital Maturity Assessment
- Voice of the customer, product consortia
- Commercial infrastructure
- Pre-competitive series production
- Other

Frequency of services provided

Service	Frequency
Collaborative Researchs	89
Ecosystem building, scouting, brokerage, networking	83
Concept validation and prototyping	80
Awareness creation	79
Education and skills development	79
Testing and validation	79
Incubator/accelerator support	71
Market intelligence	46
Visioning and Strategy Development for Businesses	45
Mentoring	41
Access to Funding and Investor Readiness Services	39
Digital Maturity Assessment	38
Voice of the customer, product consortia	33
Commercial infrastructure	32
Pre-competitive series production	31
Other	24

Figure 4: Frequency of services provided by DIHs specialising in the transport sector

➢ **Examples of digitalisation services in Transport:**

DIHs are already contributing in the digital transformation of businesses in the Transport sector in Europe and in the future their role will be increasingly important. Following are some examples of different digitisation services provided by DIHs in different countries to beneficiaries related to the Transport, Storage & Communication sector:

i) IT4Innovations National Supercomputing Center, Czech Republic
(http://s3platform.jrc.ec.europa.eu/digital-innovation-hubs-tool/-/dih/1436/view)
Service example
Virtual Prototyping
Borcad.cz (http://www.borcad.cz) is a company designing and manufacturing passenger seats for railways. To penetrate British market their products has to fulfil very rigid safety criteria including safety certificate which could be obtained only after seat passes physical crash tests. Those crash tests are not only expensive but also time consuming because prototype has to be built and tested. This makes traditional approach trial and error very ineffective.

Numerical modelling and simulation of above-mentioned crash tests is one of the most practical and widely used solutions. During this collaboration, team of researchers and engineers from BORCAD and IT4Innovations was created. Existing design cycle was modified in such a way that all design and their changes are first virtually tested and only when it passes it will undergo physical crash test at certification laboratory. This collaboration was recognized by HiPEAC as an example of the technology transfer and as such was awarded by HiPEAC Tech Transfer Award in 2016 (https://www.hipeac.net/press/6801/hipeac-tech-transfer-awards-announced/„Improved passive safety and comfort of passengers in railway traffic")

ii) Centre for Applied Data Analytics and Machine Intelligence, CeADAR, Ireland
(http://s3platform.jrc.ec.europa.eu/digital-innovation-hubs-tool/-/dih/1109/view)
Service example
Aurora
Client profile: A collaboration between Boeing Research & Technology Europe SLU headquartered in Spain; CeADAR, in Ireland; CRIDA (CENTRO DE REFERENCIA INVESTIGACION DESARROLLO E INNOVACION ATM, A.I.E.), in Spain; and, Flightradar24 AB.
Client needs: Assessed the operational efficiency of the Air Traffic Management (ATM) system. The new metrics were developed with the aim of encapsulating the airspace users' operational objectives, considering fuel consumption, schedule adherence and cost efficiency of the flights. A new stream-based data model was created and tested for ATM decision-making based on real-time performance monitoring of user-centric efficiency indicators, where the airspace users could take an active role.
Provided solution to meet the needs: This project created advanced metrics to assess the operational efficiency of the ATM system. These new metrics were developed with the aim of encapsulating the airspace users' operational objectives, considering fuel consumption, schedule adherence and cost efficiency of the flights. User-preferred trajectories were defined as references for performance analysis purposes. AURORA also proposed metrics to measure how fairly the inefficiencies in the system are distributed among the different airspace users.
The other main research area consisted of exploring and testing techniques borrowed from the data science and information management fields for the collection and aggregation of data. These techniques allowed AURORA to propose a new framework for ATM decision-making based on real-time performance monitoring of user-centric efficiency indicators, where the airspace users could take an active role.
AURORA validated all these advanced user-centric efficiency metrics (and the methods to obtain them) at European and local level by comparing them with current Flight Efficiency indicator used by the Performance Review Commission. AURORA also assessed the benefits for the performance-oriented operational concepts (e.g. SESAR) of using the real-time ATM performance monitoring framework to identify opportunities to improve system efficiency and better cater for the users' operational needs.
The innovative method to assess the metrics were based on defining a generic advanced trajectory-based airline cost model that captured, to the extent required for air traffic efficiency assessment, the impact of different aspects of the trajectory (e.g. fuel burn or departure and arrival times) on the airlines' operational costs. The model was characterized by not requiring sensitive information from the airspace users and by the fact that it was applicable to both recorded and streaming data.
More details: https://cordis.europa.eu/project/rcn/200861_en.html
iii) Urban ICT Arena, Sweden
(http://s3platform.jrc.ec.europa.eu/digital-innovation-hubs-tool/-/dih/1504/view)

Service example
Promote Urban ICT Arena
• By developing a 5G connected bike – the #NotBoring5GBike – through the method #NotBoring and developing it together with Ericsson and Kista Mentorspace we also managed to produce and contribute with an infrastructure in the testbed.
• A startup developed a security service for bicyclists with the NotBoring5GBik using GPS through the 5G research net in Kista provided by Ericsson.
• Petra Dalunde, COO, petra.dalunde@kista.com