ACTIVITY 2.1

D.T2.1.3

TRANSNATIONAL ACTION PLAN OF THE INTERVENTIONS INCLUDING A DESK RESEARCH OF THE AVAILABLE KNOW HOW

Transnational Action Plan

FINAL VERSION
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DEX Innovation Centre – PP5 – Czech Republic

Project Number	CE1492
Project Name	Towards the application of Industry 4.0 in SMEs
Project Acronym	4STEPS
Work package	WPT2-From catalogue to action: local implementation of and intervention plan
Activity	Activity 2.1.Transnational action Plan
Deliverable	**Deliverable D.T2.1.3** – Transnational Action Plan of the interventions including a desk research of the available know how
WP responsible partner	DEX Innovation Centre
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Contributors	All partners

Introduction of the 4STEPS project

4STEPS project is addressing the main challenge of Industry 4.0 (I4.0) as a tool towards a new, digital industrial revolution holding the promise of increased flexibility in manufacturing, mass customisation, increased speed, better quality and improved productivity and its development is supporting the RIS3 in the target regions in the different sectors. SMEs in the target regions are lagging behind in the adoption of innovative tools and solutions proposed by I4.0 revolution and need to increase transnational collaboration in facing this challenge.

The main project objective is to support the successful RIS3 implementation applying the I4.0 to all the industrial sectors identified by each region. The innovative elements of 4STEPS will be the methodology applied based on the involvement of all the actors of the quadruple helix, thanks to a bottom up approach.

Transnational Action Plan

4STEPs Transnational Action Plan follows up on the List of possible actions (D.T2.1.2) which has defined territorial instruments to be applied to territorial SMEs by each 4STEPs partner based on the learnings from WP T1 results and deliverables.

The goal of the 4STEPs Transnational Action Plan is to leverage the territorial know-how, expertise and planned instruments by each partner and draft a transnational value for the whole network of territorial partners in order to reach complementarity, focus and open up further transnational opportunities for the territorial Digital Innovation Hubs and its transnational network, which is going to be set up later in A.T2.3

Methodology

The Methodology of creation of this Transnational Action Plan follows several underlying critical process points:
- Defining specialization of each partner which the partner directly covers itself or with cooperating partners and which can be intermediated transnationally
- Creating knowledge clusters within the network of partners
- Comparing the specialisation with RIS3
- Comparing the specialisation with demand of the SME's, focusing on sectors having both potential of growth and existing demand
- Positioning of the network among other DIHs and EDIHs
- Proposing proper actions for increasing of competency (networking, best practice, excursion, seminars, workshops)
– Defining Communication strategy including target group definition, communication channels definition and message definition

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1. Digital Innovation Hubs (DIH) in Europe

1.1 Aims of DIHs

DIHs aim to help companies improve their processes, products and services through the use of digital technologies, in particular supporting them in the following areas:

- In which technologies to invest?
- How to secure financing for digital transformation?
- Access to technical expertise and experimentation for companies to test before investing
- Development of skills needed for digital transformation
- Innovation ecosystem networking - acting as broker and matchmaker
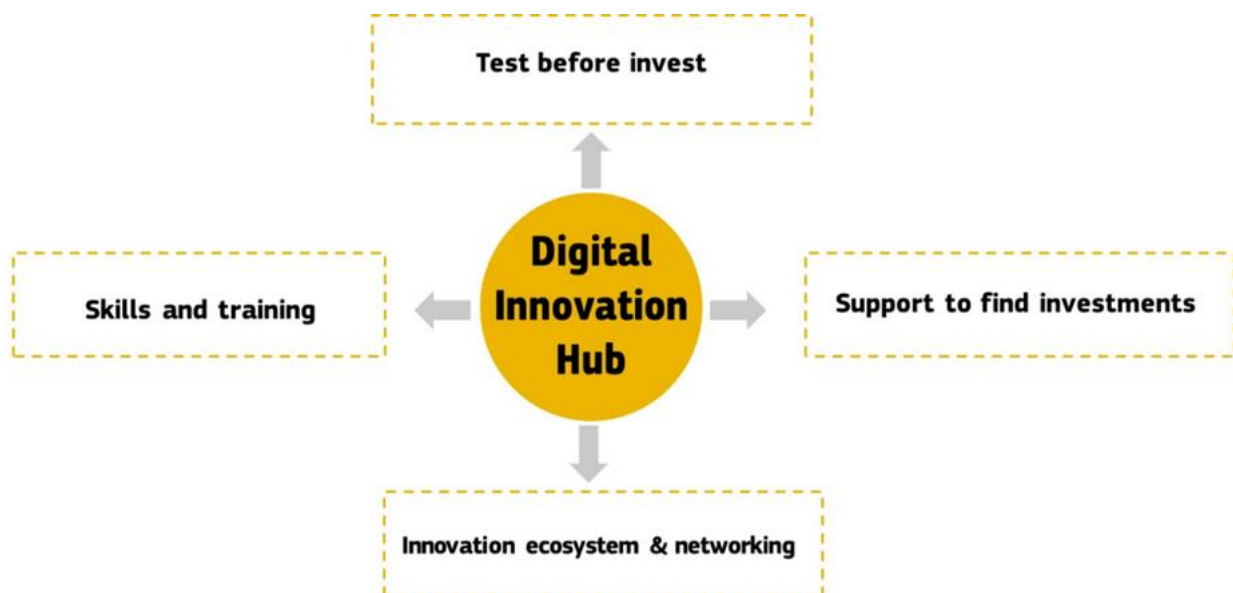
Source: https://ec.europa.eu/digital-single-market/en/digital-innovation-hubs-dihs-europe

1.2 Levels of DIHs

Self-declared DIHs: organizations that carry out the functions of a DIH, the so-called self-declared DIHs, could be listed in the Catalogue of Digital Innovation Hubs and join the conversations on the DIHNET site. Some of these DIHs might have been set up through various Horizon 2020 calls between 2016-2020, through national digitization strategies, Interreg Europe regional programmes or own initiatives.

European DIHs (EDIHs): need to be selected via a 2-step process starting with Member States designating potential EDIHs and these being successfully selected in a restricted call from the Commision.

- Single organization or a coordinated group of organizations with complementary expertise and a not-for-profit objective supporting companies (especially SMEs and mid-caps) and public sector in digital transformation
- They will play both local and European functions as will be also supported by Member States. Selected EDIHs could start their operation in late 2021.
- EU will support 1 DIH per region as a proxy
- Focused on high-performing computing (HPC), artificial intelligence (AI), cybersecurity, advanced digital skills and digital solutions for the public sector
- Core of EDIH is usually formed by a research and technology organization (RTO) or university lab offering technology services and the core cooperates with partners with expertise in business development / innovation / training
- EDIHs do not need to create a dedicated legal entity
- Minimum 1 EDIH per country will be established, minimums and maximums of hubs per country are estimated based on population and European Parliament seats per country
- Foreseen to fund 100-200 EDIHs in the EU
- In 2022-2023 further calls for EDIHs might be launched, although these will be thematically and geographically limited

Source: https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=70324

1.3 Current status of 4STEPs partners under the DIH / EDIH status

The grey highlighted partners currently have highest current status and ambitions related to EDIHs.

Country - 4STEPs Partner	DIH by purpose (not self-declared on the EU catalogue)	Self-declared DIH (yes/no), if yes - details of name/specialization	Currently applying for EDIH (yes/no), if yes - details of name and partnership
Italy - CNA Emilia Romagna		CNA Emilia Romagna - CNA HUB 4.0 - logistics - internet service	BI-REX++ "High Performance Computing & Big Data processing for Industry" - photonics and imaging technologies - Communication networks - Cyber physical systems - Robotics - Internet of things - Artificial intelligence - Mobility & Location based technologies - Interaction technologies - Cyber security - Advanced, or high performance computing - Big data, data analytics, data handling - Virtual, augmented and extended

			reality - Simulation, modelling and digital twins - Software as a service and service architectures - Cloud computing - Additive manufacturing - Laser based manufacturing - Logistics - Internet services - Industrial biotechnology - Quantum Computing
Italy - RE:Lab	X	No	No
Poland - Regional Development Agency Bielsko-Biala	X	iLaBB 43300 Digital Innovation Hub in Bielsko-Biała; - 3D printing - IoT - Automation & robotics	Silesia Smart Systems (EDIH-SILESIA) - automation and robotics (Computer Integrated Manufacturing) - cybersecurity (Digital Europe Program) - additive technologies and new materials for 3D printing - One-stop-shop, i.e. horizontal activities, including soft activities, training and consulting, which prepare companies for the digital transformation process
Austria - Vorarlberg University of Applied Science		Digital Innovation Hub on "Business Intelligence & Innovation" providing the following services: - Artificial Intelligence - Resilience Engineering - System/Eco-System Collaboration - Innovation Management - Methods & Tools	DIH West: Coordinated by University of Innsbruck; participating organizations from the Western part of Austria) - manufacturing companies, tourism companies as well as trade and commerce companies. - information and consulting, training, networking between SME and research institutions in the form of themed work groups and the transfer of research results into standardized products like guidelines, tool kits, etc. - individual coaching and support - access to relevant research infrastructure. DIH Assist4SMEs: Coordinated by Profactor GmbH; participating organizations from Austria - Sustainable Production using AI enabled Assistive Technologies and Robotics & Production (Automotive, Machinery, Aerospace,

			- Collaborative Research: Services to create common research and development projects (funded, bilateral) - Concept validation and prototyping using the Labs of the partners and installation new ones, Testing and validation by technologies of the network, - Voice of the customer to outside (government, funding agencies) - Access to financing and investor readiness services by using BIZ UP services and extend them, - Mentoring, - Services for project development and management, - Regional and urban development, - Design of knowledge transfer and support during implementation, - Innovation management and RTD activities & - Advice on financing options
Czech Republic - DEX Innovation Centre	X	No	No
Hungary - Pannon Business Network Association		AM-LAB Technologies: 3D Technologies: - Product development and prototyping - Business Animation Creation - 3D Scanning and reverse engineering Extended reality: - Real-time display of manufacturing data series on the shopfloor - AR gamification application development - AR applications supporting machine maintenance and component visualization - AR content applications for printed	In the current round we were applying to an EDIH with a consortium, but the Hungarian government has chosen another consortium as applicant for EDIH from Hungary.

		materials Data Science: - web store traffic analysis - analysis of production data of manufacturing companies - large amount of free text processing Robotics: - design and manufacture tailor-made grippers and accessories to collaborative robot workflows using 3D technology - integration of various branded robots into a single operational management platform - industrial, collaborative and mobile robot coordination and complex task development - support in application of robots into conventional production lines Entrepreneurial trainings - Interactive training modules include industry 4.0 related technologies and smart devices	
Slovenia - Chamber of Commerce of Slovenia	X	No	No
Germany - Virtual Dimension Center	X	No	No

2. Transnational networks´ value and operations´ best practices

Research into current DIH networks shows the following value examples of the network itself:

- Regional DIH networks working as a cross sectoral and multi-technology one-stop-shops for SMEs in given regions
- International DIH networks removing constraints linked to regional capacities facilitating cross-border collaboration
- Value offered:
    - transfer of technical knowledge
    - sharing of best practices
    - enhancing the delivery of innovations through cooperation
    - connecting businesses and stakeholders, community building
    - standardization
    - performing tests and experiments of new applications
    - access to latest knowledge, expertise, market and technology,
    - innovation scouting
    - access to funding
    - Trainings
    - benchmarking
    - information exchange
    - collaborative research
    - access to specialist leading edge expertise, technology and infrastructure
    - awareness creation
    - digital strategy
    - pan-EU value chains
    - cross-border synergies in technology and knowledge development
    - contract research
    - incubator/accelerator support,
- Specialization across whole EU needed around specific industry / technology domain expertise
- Network partners are of multiple profiles: universities, R&D centres, businesses

Source:

https://dihnet.eu/

https://dih-hero.eu/

https://dih4cps.eu/dih-network/

http://www.dih-squared.eu/

https://midih.eu/dih_network.php

https://digitbrain.eu/digital-innovation-hubs/

https://trinityrobotics.eu/about/

https://eufordigital.eu/wp-content/uploads/2021/04/Digital-Innovation-Hubs-Network-DIHNET.EU-and-DIHNET-online-community.pdf

3. Selected WP T1 results

3.1 Core identified needs of territorial SMEs from Country Mapping Reports (D.T1.2.1) = TECHNOLOGY DEMAND

Top elements across countries towards near future usage highlighted in grey. These include mainly simulation, cybersecurity, horizontal and vertical systems integration, additive manufacturing, cloud technologies, industrial IoT, big data and analytics.

The interest of companies in individual technologies in the near future	CZE - Good extent + very intense use NOW (%)	CZE - Good extent + very intense use IN FUTURE (%)	AUT - Good extent + very intense use NOW (%)	AUT - Good extent + very intense use IN FUTURE (%)	DEU - Good extent + very intense use NOW (%)	DEU - Good extent + very intense use IN FUTURE (%)	HUN - Good extent + very intense use NOW (%)	HUN - Good extent + very intense use IN FUTURE (%)	ITA - Good extent + very intense use NOW (%)	ITA - Good extent + very intense use IN FUTURE (%)	POL - Good extent + very intense use NOW (%)	POL - Good extent + very intense use IN FUTURE (%)	SVN - Good extent + very intense use NOW (%)	SVN - Good extent + very intense use IN FUTURE (%)
autonomous robots	13	22	19	39	10	5	2	11	11	8	8	6	25	53
simulation	33	33	29	52	30	50	0	18	7	12	13	13	25	58

cybersecurity	36	39	36	68	50	55	4	13	5	4	19	17	39	58
horizontal and vertical systems integration	31	26	29	55	40	55	2	11	14	24	6	6	20	42
augmented reality	6	8	3	19	5	25	0	0	0	4	0	0	3	22
additive manufacturing	17	28	16	32	10	20	2	13	24	30	2	6	3	22
cloud technologies	20	22	45	55	45	40	4	4	3	5	8	13	20	47
industrial IOT	25	25	23	49	30	45	7	7	5	8	8	13	22	64
big data and analytics	11	17	26	52	25	35	2	2	1	3	8	13	14	42

3.2 Core identified needs of territorial SMEs from Transnational Clustering (D.T1.2.2) = TARGET GROUP

The analysis of 350 SMEs showed that when comparing on the basis of technological competence and demand, it was possible to observe a limited difference between the companies. Therefore, a cluster analysis was performed to identify potential homogeneous groups and finally 5 typological profiles (clusters) of companies involved from the 4STEPS project were compiled.

1st cluster (147 SMEs)	refusal of digital technologies usage and no interest
2nd cluster (81 SMEs)	less negative, yet limited interest
3rd cluster (4 SMEs)	innovative mid caps, large R&D and technical office
4th cluster (61 SMEs)	ones that did not respond but active in EU projects

5th cluster (61 SMEs)	motivated and few current usage of digital technology

2 main strategic profiles with a total of 65 SMEs were defined – as highlighted in grey - companies with a medium market capitalization with a large technical and research and development office (cluster no. 3) and companies with small knowledge at present, yet with a motivation to improve (cluster no. 5).

4. Instruments defined for territories including the pilot actions presented in WP T3 (see D.T2.1.2) = SPECIALIZATION SUPPLY

4.1 Instruments, complementarities and similarities planned

Most similar, complementary instruments planned by hubs highlighted below in grey.

1.1 Identification of innovation path (for process improvement) to design new services/products using the I4.0 principles through a business innovation Lab giving the chance to test by using simulation tools and methods (ITA)	Potential similarity / complementarity with POL instrument 2.5 Potential similarity / complementarity with AUT instrument 3.3 and 3.5 Potential similarity / complementarity with CZE instrument 4.1 Potential similarity / complementarity with HUN instrument 5.2 and 5.3
1.2 Development of an innovation model designed on SMEs through a workshop based on an open innovation and creative structured approach interpreting the priorities of the new programming period of the Structural Funds and their application on small sized organizations (ITA)	Potential collaboration with AUT instrument 3.4 and 3.6 Potential similarity / complementarity with instrument SVN 6.1 Potential similarity to instrument DEU 7.2
1.3 Residential (2 days) training for the DIHs managers on innovative financing tools (ITA)	Potential similarity / complementarity with instrument SVN 6.5
1.4 Exchange of good practices (ITA)	Potential similarity / complementarity with instrument SVN 6.3
1.5 A series of webinars on Industry 4.0 technologies, addressed to SMEs, with a	Potential similarity / complementarity with POL 2.2

special attention on the impacts of the technologies on Human Factors (ITA)	Potential similarity / complementarity with CZE 4.4 and 4.5
2.1 Access to a creative space, innovative 3D scanning, 3D printing, reverse engineering and robotics technology and related technological events through FabLab (POL)	Similarity to CZE instrument 4.2 4.1, 4.2, 4.3 (CZ) - similarity and potential of collaboration and good practice exchange in terms of unlocking the capacity of FabLab in terms of usage of a creative space, providing services companies Complementarity to ITA instruments on the field of best practices, tools and methods Complementarity to HUN instrument 5.1
2.2 Webinars and events (physical if possible) to raise awareness about digitalisation - both for the community and tailored for specific industrial sectors (POL)	Complementarity to ITA instruments on webinars and events Similarity to CZE instruments Potential collaboration with AUT instrument 3.4 and 3.6 Potential similarity / complementarity with instrument SVN 6.3
2.3 3D printing, additive manufacturing and 3D scanning, reverse engineering - services for companies and for makers (POL)	Complementarity to ITA instruments on services – in collaboration with the Competence Centre Bi-Rex Potential similarity to CZE instrument 4.3
2.4 Showroom with robotic arms (POL)	Potential collaboration with AUT instrument 3.2 Complementarity to HUN instrument 5.1
2.5 Case study tour – presentation of Industry 4.0 implementation in practice (POL)	Complementarity to ITA instruments on the field of best practices, tools and methods Potential similarity / complementarity with instrument SVN 6.3
3.1 Artificial Intelligence – the hub on Business Intelligence & Innovation proactively conducts scientific and	Potential collaboration with instruments 5.3, 5.4 and 7.5

industrial projects for manufacturing SMEs, stakeholders and associations within the area of artificial intelligence. Investigations captures, for example, modeling, simulation and optimization. Services include, for example, basic research, industrial research, development and engineering, prototyping. (AUT)	Complementarity to HUN instruments 5.3, 5.4 and 5.5
3.2 System Collaboration & Ecosystem Collaboration – the hub on Business Intelligence & Innovation provides tailored and targeted research and knowledge services for stakeholders to break down system borders. It enables the stakeholders to increase their service interaction and value co-creation and to discard organizational island mentality. (AUT)	Potential collaboration with instruments 2.4 and 4.2
3.3 Resilience Engineering – the hub on Business Intelligence & Innovation provides services for design and engineering of enhanced levels of organizational robustness and resilience. This includes the development of a dynamic field of system change and renewal as well as the increase of organizational flexibility and agility. Focus is on the engineering of system resources and design and development of capabilities for system innovation and evolution. (AUT)	Complementarity to ITA instruments on services Complementarity to HUN instrument 5.5
3.4 Innovation Research & Disruptive Innovation - the hub on Business Intelligence & Innovation supports stakeholders to shift from static systems towards dynamic system. It support to implement a culture of dynamic innovation: adoption, change and renewal. (AUT)	Potential collaboration with instruments 1.2, 2.2, 4.5, 6.2, 6.3 and 7.4 Potential similarity / complementarity with instrument SVN 6.2
3.5 Methods & Tools – the hub on Business Intelligence & Innovation investigates and provides meaningful methods and tools for the organization and conduction of events for service innovation, innovation engineering, etc. The target groups and stakeholders get educated and trained to	Complementarity to ITA instruments on the field of best practices, tools and methods Potential similarity / complementarity with instrument SVN 6.1

proactively work on system change, innovation and strategy. (AUT)	
3.6 Co-Creators - the hub on Business Intelligence & Innovation is composed of active stakeholders out of the region of Vorarlberg, its neighbouring regions and Austria; in doing so, the hub provides the platform for networking and the co-creation of value as well as the dissemination of knowledge and expertise. (AUT)	Potential collaboration with instruments 1.2, 2.2, 4.5, 6.2, 6.3 and 7.4
4.1 FabLab workshops for SMEs demonstrating exploitation of rapid prototyping using advanced manufacturing (Pilot) (CZE)	Similar to POL instrument 2.2 Potential collaboration with POL instrument 2.1
4.2 Provision of FabLab space for SMEs and startups for own rapid prototyping (CZE)	Similarity to POL instrument 2.1 and 2.3 Potential collaboration with POL instrument 2.1 Potential collaboration with AUT instrument 3.2
4.3 Expert technical consultation and support with using the 3D print, PCB, IOT and robotics equipment (CZE)	Potential similarity to POL instrument 2.3 Potential collaboration with POL instrument 2.1
4.4 Talent scouting and match-making events organization such as hackathons, workshops and thematic events (CZE)	Complementarity to ITA instruments on webinars and events
4.5 Educational workshops for managers of SMEs on transformation towards Industry 4.0. (Pilot) (CZE)	Complementarity to ITA instruments on webinars and events Potential collaboration with AUT instrument 3.4 and 3.6 Potential similarity / complementarity with instrument SVN 6.3
5.1 Technical development of autonomous warehouse store for a regional company with the help of indoor (semi)-autonomous drone (HUN)	Complementary to POL instrument 2.1 - The common topic would be robotics technology. In Poland robotics technology would be a topic to be accessed through their FabLab. In our 5.1 Action our DIH is

	applying drone technology in a warehouse. This good practice, lessons learnt – which we are developing in this field- might be shared with Polish Partners.
	Autonomous warehouse - complementary in terms of additional technology to be used by the company to become autonomous; possibility of mutual learning (with 2.1, 2.4 POL)
5.2 Usage of Augmented Reality application for sales purpose (demonstrate product features in a non-conventional way. (HUN)	Complementarity to ITA instruments on the field of best practices, tools and methods Complementarity to DEU instrument 7.3 - The common element in both planned action is AR. In the Hungarian plan (5.2) the AR application was used for sales purpose which might be utilized by German partner. On the other hand, the testing and comparison of VR/AR hardwares, by German partner might be also beneficial for PBN as well. Complementarity from DEU side: Usage of Augmented Reality application for sales purpose (demonstrate product features in a non-conventional way) Potential similarity / complementarity with instrument SVN 6.2
5.3 Real time data visualisation of the production line of a local manufacturing SME (HUN)	Complementarity to ITA instruments on the field of best practices, tools and methods Potential collaboration with AUT instrument 3.1 Complementary to AUT instrument 3.1 - FHV, in their detailed action was referring to research and knowledge transfer (dissemination) within the fields of Artificial Intelligence, especially in modeling, simulation, optimization as well as Machine Learning, Evolutionary Algorithm design and robots. Our mentioned actions (5.3-5.5) also include AI applications in the field of data analytics. The knowledge gained by the Austrian

	partner in the mentioned AI areas might be exchanged with us, and vice versa.
5.4 Data Science: Utilisation of real-time operational data in the agricultural field (HUN)	Potential collaboration with AUT instrument 3.1 Complementary to AUT instrument 3.1 - FHV, in their detailed action was referring to research and knowledge transfer (dissemination) within the fields of Artificial Intelligence, especially in modeling, simulation, optimization as well as Machine Learning, Evolutionary Algorithm design and robots. Our mentioned actions (5.3-5.5) also include AI applications in the field of data analytics. The knowledge gained by the Austrian partner in the mentioned AI areas might be exchanged with us, and vice versa.
5.5 Requested PILOT of PBN: A detailed data analysis of companies (including the ones already involved in WPT1) how they reacted to crisis- how resilient they were- based on a national database (sophisticated analytical methods. E.g.: segmentation, classification shall be carried out for the properly elaborated conclusions. (HUN) (waiting for approval)	Complementary to AUT instrument 3.1 - FHV, in their detailed action was referring to research and knowledge transfer (dissemination) within the fields of Artificial Intelligence, especially in modeling, simulation, optimization as well as Machine Learning, Evolutionary Algorithm design and robots. Our mentioned actions (5.3-5.5) also include AI applications in the field of data analytics. The knowledge gained by the Austrian partner in the mentioned AI areas might be exchanged with us, and vice versa. Complementary to AUT instrument 3.3 - The key element in both actions is resilence. As FHV points out in their detailed action, they are planning to carry out Research into and conceptualization of measures for preparedness- which includes the preparation response and cope with risk and organisational crisis. In our requested pilot action (5.5) we shall be focusing on resilience of the companies as well. In our pilot a detailed analysis of companies shall be conducted on a national level, which will demonstrate how they

	reacted to crisis. Complementarity to DEU instrument 7.5 - In our requested pilot action we are planning to analyse big amount of company data based on a national database, and a qualitative and quantitative analysis is foreseen where we are planning to analyse how companies reacted to crisis- how resilient they were-. During the analysis sophisticated analytical methods shall be used for the properly elaborated conclusions. This activity might be connected to Big Data Technology Screening planned by VDC. Complementarity from DEU side: A detailed data analysis of companies (including the ones already involved in WPT1) how they reacted to crisis- how resilient they were- based on a national database (sophisticated analytical methods. E.g.: segmentation, classification shall be carried out for the properly elaborated conclusions. (HUN) (waiting for approval)
6.1 Analytical assessment and individual coaching of SMEs on the topic of sustainable value chain reporting (SVN)	Complementarity to ITA instruments on services Potential similarity / complementarity with instruments ITA 1.2 and AUT 3.5
6.2 Series of workshops for manufacturing SMEs on understanding the importance of customer experience (SVN)	Potential collaboration with AUT instrument 3.4 and 3.6 Potential similarity / complementarity with instruments AUT 3.4 and HUN 5.2
6.3 Series of Workshops on Best practice exchange between companies and diving deep into key I4.0 concepts (SVN)	Potential collaboration with AUT instrument 3.4 and 3.6 Potential similarity / complementarity with instruments ITA 1.4, POL 2.2 and 2.5, and CZE 4.5 Best practice sharing among companies - similar to the idea of case study tour (with 2.5 POL)

6.4 Pilot platform for the e-life cycle of products (SVN)	
6.5 Access to finance – DIH will raise awareness of SMEs on the topic of get co-financing possibilities for digitalization activities (SVN)	Potential similarity / complementarity with instrument ITA 1.3
7.1 Operator 4.0 approach: evaluate and demonstrate wearable devices to be used in industrial context (Pilot) (DEU)	
7.2 Innovation application events (Pilot) (DEU)	Potential collaboration with ITA instrument 1.2
7.3 VR/AR Hardware Assessment (DEU)	Complementarity to HUN instrument 5.2 - Complementarity: Usage of Augmented Reality application for sales purpose (demonstrate product features in a non-conventional way)
7.4 Marketplace and matchmaking for XR (extended reality) (DEU)	Potential collaboration with AUT instrument 3.4 and 3.6
7.5 Working Group: Big Data Technology Screening (DEU)	Potential collaboration with AUT instrument 3.1

Complementarity to HUN instrument 5.5 - Complementarity: Requested PILOT of PBN: A detailed data analysis of companies (including the ones already involved in WPT1) how they reacted to crisis- how resilient they were- based on a national database (sophisticated analytical methods. E.g.: segmentation, classification   shall be carried out for the properly elaborated conclusions. (HUN) (waiting for approval) |

4.2 Specializations sought by the hubs based on current expertise and planned instruments:

Aimed specialization of the hub	TECHNOLOGY	INDUSTRY
Italy - CNA Emilia Romagna	N/A	Manufacturing industry, Small and Medium sized Enterprise, Creative companies (Artcraft, Fashion, Design), Agrifood, Building, Health Sector, Big Data (ICT)
Italy - RE:Lab	Prototyping Human-Machine Interface IoT and connectivity technologies Simulation HW and SW development	Automotive, ICT, manufacturing industry, transport and logistics, agriculture, healthcare, entertainment, culture, education
Poland - Regional Development Agency Bielsko-Biala	3D printing Rapid prototyping Automation of production and processes Robotics	Automotive, ICT, manufacturing industry SMEs, education sector
Austria - Vorarlberg University of Applied Science	In the field of AI: modelling, simulation, optimization and evolutionary algorithm design; In the field of resilience engineering: resource- and capability development; In the field of methods & tools: scientific methodologies to perform innovation projects;	Manufacturing industry, Organizations within Transport Logistics and Supply Chain, Small and Medium sized Enterprises
Czech Republic - DEX Innovation Centre	Rapid prototyping in 3D, PCB and IOT	Micro and small enterprises

Hungary - Pannon Business Network Association	3D technologies Extended reality Data science Robotics Digital twinning smart city application and health-, social-care	Manufacturing industry: SMEs, mid-caps, large companies, universities Healthcare industry: Hospitals, health service sector, social care educational institutes, social care organisations
Slovenia - Chamber of Commerce of Slovenia		Manufacturing, especially the electronic and electrical industry.
Germany - Virtual Dimension Center	Virtual Engineering 3D simulation 3D visualization Virtual Reality (VR) VR hardware Assessment (including Lab and test equipment) AR Hardware Assessment Wearable and smart devices	SMEs, small and medium sized companies, large companies, universities, research institutions, technology suppliers, service providers, users and multipliers

5. Competitive landscape of DIHs = COMPETITION

The following table provides an overview of currently registered DIHs in EU based on industry, technology and geographical scope.

Industry	Technology	Geo. Scope	DIH URLs
HealthCare	Robotics	EU	https://miroinnovationlab.de/
		Nat. - DEU	https://www.ukaachen.de/kliniken-institute/robotics-in-healthcare/robotics-in-healthcare/
			https://pamb.ipa.fraunhofer.de/en.html
		Nat. - POL	https://medycyna.lublin.eu/

	Digital tech.	EU	https://www.upol.cz/en/
		Nat. - SVN	https://www.tp-lj.si/sl
	I4.0	EU	https://www.bioindustrypark.eu/
		Reg. - DEU	https://www.unitransferklinik.de/
	Bio/NanoTech	International	https://www.bnn.at/
		Nat. - POL	https://bioinfo.imdik.pan.pl/
Environment	R&D	Reg. - DEU	https://fokos.de/
Manufacturing	I4.0	International	https://www.addedvalueinstitution.com/?page_id=178
			https://acdp.at/de/
			https://www.tu-chemnitz.de/mb/FabrPlan/edf.php.en
			https://www.iff.fraunhofer.de/en.html/
			https://smartfactory.de/
			http://toolscluster.net/
			https://www.fs.uni-lj.si/en/
			https://en.werk150.de/
			http://www.cantieri40.it/i40/index.php
		EU	http://www.camt.pl/index.php/en/home-en/
			https://www.confapi.org/it/digital-innovation-hub-confapi.html
			https://www.smile-dih.eu/

				https://www.made-cc.eu/?lang=en
				https://www.galileovisionarydistrict.it/galileo-digital-innovation-hub/
				https://www.phoxlab.eu/
			Nat. - HUN	https://www.i40platform.hu/en
			Nat. - ITA	https://www.art-er.it/
				https://bi-rex.it/
				https://www.unipd.it/
				https://www.cineca.it/
				http://www.dihv.it/int/
			Nat. - DEU	https://www.hs-aalen.de/
				https://www.ipa.fraunhofer.de/en/cooperation/industry-on-campus/application-center-industrie-40.html
				https://www.dik.tu-darmstadt.de/
				https://futureworklab.de/
				https://www.ptw.tu-darmstadt.de/
			Nat. - CZE	https://www.ciirc.cvut.cz/
			Reg. - DEU	https://www.b-tu.de/fg-automatisierungstechnik/
				https://kompetenzzentrum-hamburg.digital/
				https://betrieb-machen.de/
			Reg. - CZE	https://www.dih-digimat.cz/

		Reg. - POL	https://sckp40.pl/
		Reg. - HUN	https://www.am-lab.hu/hu/index.php
		Reg. - ITA	https://www.afil.it/
			https://www.thesparkcreative.it/
			http://www.digitalinnovationhub.bz.it/en/
			https://www.t2i.it/dih/
			http://dih.confindustria.umbria.it/
			https://www.unindustria.na.it/
			http://www.medisdih.it/wp/en/services-2/
			https://www.dihlazio.it/
			https://www.cnaemiliaromagna.it/en/cna-hub-4-0/
			https://www.bergamosviluppo.it/sito/sviluppo-e-innovazione/pid-punto-impresa-digitale.html
			https://www.confindustria.abruzzo.it/
			https://www.leanexperiencefactory.it/en/lean-experience-factory-4-0/
			http://www.confindustria.basilicata.it/
			https://www.confindustria.bl.it/
			https://cerr.eu/
			http://www.dihliguria.it/it/
			https://confindustria.lombardia.it/

			https://www.confindustria.piemonte.it/
			https://www.confindustriasardegna.it/
			https://www.confindustria.toscana.it/digital-innovation-hub-toscana/
			https://dih-taa.eu/digital-innovation-hub-trentino/
			https://digitalinnovationhubvicenza.it/
			https://www.dihcalabria.it/
			http://confindustria.marche.it/sp/home-it.3sp
			http://www.dihsicilia.it/
			http://www.confindustria.ud.it/
			https://www.ediconfcommercio.it/
	Robotics	International	http://www.lamafvg.it/
		EU	https://www.ipa.fraunhofer.de/robotsystems
		Nat. - ITA	http://www.pecciolirif.com/
		Reg. - DEU	https://robot.bayern/
	Mechatronics	Nat, - ITA	http://www.intermech.unimore.it/site/home.html
		Reg. - AUT	https://www.lcm.at/en/virtual-development/
	HPC	EU	https://www.arctur.si/
			https://www.it4i.cz/
		Nat. - POL	https://www.psnc.pl/

	AI	International	https://www.dfki.de/en/web/research/research-departments-and-groups/innovative-factory-systems/
		EU	https://www.profactor.at/open-labs/cognitive-robotics-and-factory-hub/
			https://www.l3s.de/en/innovation/hub
		Nat. - AUT	https://www.know-center.tugraz.at/
		Reg. - DEU	https://www.appliedai.eu/
	IPS	EU	http://www.biba.uni-bremen.de/
		Nat. ITA	https://www.fabbricaintelligente.it/
	Manufacturing process innovation	EU	https://www.iwu.fraunhofer.de/
		Reg. - HUN	https://iqkecskemet.hu/dih-kecskemet
New Tech Development	VR	International	https://www.vrvis.at/
		EU	https://www.v2c2.at/
	Cybersecurity/ Cyberspace	International	https://ivesk.hs-offenburg.de/
		Nat. - POL	https://cybersechub.eu/
			https://eng.nask.pl/
		Nat. - CZE	https://nc3.cz/
	Smart Data	EU	https://www.sdil.de/en
		Reg. - DEU	https://www.sdsc-bw.de/
	Financial	International	https://www.frankfurt-school.de/en/home/research/centres/blockchain

		Reg. - POL	http://fintechpoland.com/
Microelectronics /Microsystems	R&D	International	https://dih.eet.bme.hu/
			https://www.hahn-schickard.de/
		EU	https://www.smart-systems-integration.org/
		Nat. - POL	http://www.ite.waw.pl/en/digital-innovation-hub/
Electromagnetics	R&D	EU	https://www.create.unina.it/
N/A	Interconnecting	EU	https://bowi-network.eu/
		Reg. - ITA	https://noi.bz.it/en
		Reg. - DEU	https://techquartier.com/
	SME support	International	http://p-tech.si/
			https://www.spinlab.co/
			https://www.trentinoinnovation.eu/en/governance/
			https://www.an.cna.it/
		EU	https://www.comonext.it/
			https://www.steinbeis-europa.de/en/
			https://www.eitdigital.eu/our-community/contact-us/
			http://www.parsec-hub.eu/en/services-2/
		Nat. AUT	https://en.campus02.at/rd/
		Nat. -	https://gemeinsam-digital.de/

		DEU	https://www.kompetenzzentrum-ilmenau.digital/
		Nat. - SVN	https://dihslovenia.si/
		Nat. - HUN	https://innomine.com/digital-innovation-hub
		Reg. - DEU	https://www.zd-bb.de/
			https://lagarde1.de/
			https://www.uni-siegen.de/smi/
			https://www.digital-in-nrw.de/de/
			https://www.bmwi.de/Navigation/DE/Home/home.html
			https://www.wfb-bremen.de/de/page/startseite
			https://kompetenzzentrum-darmstadt.digital/
			https://digitales-kompetenzzentrum-stuttgart.de/
		Reg. - AUT	https://www.uibk.ac.at/
			https://www.ecoplus.at/
		Reg. - POL	https://www.kpt.krakow.pl/en/
		Reg. - CZE	https://www.tchk.cz/sluzby/inovace/digital-innovation-hub/
		Reg. - ITA	https://www.confartigianatoimprese.net/
			https://www.innexhub.it/
	Agriculture	Nat. - SVN	https://itc-cluster.com/
		Reg. - DEU	https://www.simulplus.sachsen.de/innovationhub-27349.html

	IoT	Nat. - POL	http://www.lpnt.pl/
		Reg. - POL	https://iotnorthpoland.com/en/iot-north-hub-poland-en/
		Reg. - DEU	https://smart-systems-hub.de/
	SW Development	Reg. - DEU	https://software-cluster.org/en/
	Digitalisation/IT	International	https://www.cybermate.org/
			https://www.silicon-europe.eu/home/
			https://www.spectronet.de/
			https://digitalhublogistics.com/
			https://www.mth-potsdam.de/en/frontpage/
			https://fiwareinnova.org/
		EU	https://www.zcu.cz/en/index.html
			https://www.tetramax.eu/
		Nat. - ITA	https://www.fondazionespeedhub.it/
		Nat. - POL	http://www.hub.piap.pl/
		Nat. - AUT	https://datamarket.at/
		Nat. - CZE	https://czechinno.cz/
		Nat. - SVN	https://www.um.si/en/research/DIH%20UM/
			http://4pdih.com/en/intro-page/
		Reg. -	https://zentrum-digitalisierung.bayern/

		DEU	https://www.berlin-partner.de/en/
		Reg. - CZE	http://www.jvtp.cz/en.html
		Reg. - AUT	https://dih-ost.at/
			https://www.fh-kufstein.ac.at/Forschen/i.ku-Innovationsplattform-Kufstein
		Reg. - ITA	https://www.ecipa.eu/
	Research Support / Cooperation	International	https://www.demola.net/
			https://smartlabcarinthia.at/
			https://www.unibo.it/it
			https://www.trentinoinnovation.eu/en/governance/
		EU	https://www.lufthansa-industry-solutions.com/de-en/
		Reg. - DEU	https://www.digitalhub.de/
		Nat. - ITA	https://www.salernoconfartigianato.it/
	Non-destructive Testing	International	https://www.recendt.at/en/
	Research Center	International	https://www.polimi.it/
		EU	https://www.cvut.cz/en
		Nat. - ITA	https://www.areasciencepark.it/
			https://www.iit.it/
		Nat. - SVN	http://tehnologije.ijs.si/

Source: https://s3platform.jrc.ec.europa.eu/digital-innovation-hubs-tool

6. Current strengths and opportunities of 4STEPs DIH network = SUMMARY

Current DIHs and future EDIHs	CNA Hub 4.0 (ITA) • DIH - logistics + internet services • EDIH - HPC + big data DIH at Vorarlberg University of Applied Science (AUT) • DIH - business intelligence and innovation • EDIH - sustainable production using AI enabled assistive technologies and robotics and production AM-LAB Technologies (HUN) • DIH - 3D technologies, extended reality, data science, robotics, entrepreneurial trainings iLaBB 43300 Digital Innovation Hub in Bielsko-Biała (POL) • DIH - 3D printing, IOT, automation and robotics • EDIH – automation, robotics, cybersecurity, additive technologies and new materials
Technology demand	• simulation • cybersecurity • horizontal and vertical systems integration • additive manufacturing • cloud technologies • industrial IoT • big data and analytics
Target group	• Innovative mid caps SMEs (medium market capitalization) with large R&D and technical office • motivated SMEs with few current usage of digital technology • micro companies
Specialization supply	CURRENT 4 DIHs + FUTURE EDIHs • Identification of innovation path (for process improvement) to design new services/products using the I4.0 principles through a business innovation Lab giving the chance to test by using simulation tools and methods (ITA) + POL + AUT + CZE + HUN • Development of an innovation model designed on SMEs through a workshop based on an open innovation and creative structured approach interpreting the priorities of the new programming period of the Structural Funds and their application on small sized organizations (ITA) + AUT + SVN + DEU

- Resilience Engineering - the hub on Business Intelligence & Innovation provides services for design and engineering of enhanced levels of organizational robustness and resilience. This includes the development of a dynamic field of system change and renewal as well as the increase of organizational flexibility and agility. Focus is on the engineering of system resources and design and development of capabilities for system innovation and evolution. (AUT) + ITA + HUN
- Methods & Tools - the hub on Business Intelligence & Innovation investigates and provides meaningful methods and tools for the organization and conduction of events for service innovation, innovation engineering, etc. The target groups and stakeholders get educated and trained to proactively work on system change, innovation and strategy. (AUT) + ITA + SVN
- Usage of Augmented Reality application for sales purpose (demonstrate product features in a non-conventional way. (HUN) + ITA + DEU + SVN
- A detailed data analysis of companies (including the ones already involved in WPT1) how they reacted to crisis- how resilient they were- based on a national database (sophisticated analytical methods. E.g.: segmentation, classification shall be carried out for the properly elaborated conclusions (HUN) + AUT + AUT + DEU
- Access to a creative space, innovative 3D scanning, 3D printing, reverse engineering and robotics technology and related technological events through FabLab (POL) + CZE + ITA + HUN
- Webinars and events (physical if possible) to raise awareness about digitalisation - both for the community and tailored for specific industrial sectors (POL) + ITA + AUT + SVN
- 3D printing, additive manufacturing and 3D scanning, reverse engineering - services for companies and for makers (POL) + ITA + CZE
- Case study tour - presentation of Industry 4.0 implementation in practice (POL) + ITA + SVN

FURTHER 4 PARTNERS
- Provision of FabLab space for SMEs and startups for own rapid prototyping (CZE) + POL + AUT
- Educational workshops for managers of SMEs on transformation towards Industry 4.0. (Pilot) (CZE) + ITA + AUT + SVN
- Series of workshops for manufacturing SMEs on understanding the importance of customer experience

	(SVN) + AUT + HUN
- Series of Workshops on Best practice exchange between companies and diving deep into key I4.0 concepts (SVN) + AUT + ITA + POL + CZE
- Working Group: Big Data Technology Screening (DEU) + AUT + HUN

7. Transnational Digital Innovation Hub network = ACTION PLAN

The table below shows steps of an agreed 4STEPs Transnational Action Plan, that will enable to finalize the process of creating the 4STEPs DIH network value, positioning and strategic cooperation.

STEP	POINTS SOLVED + TO BE SOLVED	TIMELINE
Strategic positioning of the 4STEPs DIH network	• Q: What is our general ambition? To stay only with 4STEPs DIH network unofficial or official DIH recognized label movements? A: we shall check the possible ways of formalizing it and ask partners of Italian partners on suggestions as have multiple experience • Q: Only based in and focused on Central Europe OR with pan-EU ambition A: we shall focus on Central European level and act as central european one stop shop for providing linkages to other countries and partners for complementary services • Q: Specialized for technology and/or industry under I4.0? A: we are not in a stage to be specialized per technology and/or industry, but offer complementary different services across the territory by its members, AUT partner also focuses on methodology rather than specific technology or industry • Q: Ambitions to bring in further players into network? / How will we extend DIH network? A: extension of network is strongly recommended by JS, we still need to	- Kick-started as questions (Q) and answers (A) during internal virtual workshop as part of finalization of this Transnational Action Plan - To be further followed up and finalized during next 1-2 internal virtual workshops to be organized in June/July + September 2021

	agree together how, most probably will happen after project end, from round table participated (organized by JS) we can check if somebody would be interesting for us, some local contacts can sign letter of intent even now and we can open it up on project website for any potential applicants • Q: Will 4STEPS DIHs target both SMEs and big companies? A: SMEs and micro companies as defined above for target groups • Q: Will 4STEPS DIHs have a focus only on technological innovation or also on organizational change necessary for sustainable investments? A: organizational change also • Q: In which future project calls (CE, Horizon..) can the 4STEPS DIHs submit proposals, and which further EU DIHs can be part of the future partnerships? A: Maybe we as consortium should apply in the next Interreg Central Europe call for a "Interreg CE Cross-Border Hub, PO1 (i), PO1 (iv), SO 1.1 Strengthening innovation capacities in central Europe, SO 1.2 Developing skills for smart specialisation, industrial transition and entrepreneurship in central Europe, SO 2.3. Taking circular economy forward in central Europe + maybe: SO.4.1 Strengthening governance for integrated territorial development in central Europe + we shall also check Digital Europe (although could be only for SMEs?)	
Harmony of positioning with the RIS3 strategy	• Cross check of positioning with all relevant RIS3 territorial strategies	- September 2021
Finalization of the DIH network specific value proposition in transnational context	• Selection of unique knowhow that is easily applicable in other territories • Access to specialists needed • Based primarily on chapters 2 and 6 of this document and details in other chapters	- October - December 2021

Operations and processes	• Which operations and processes will we need to set up? • Who will be involved from each DIH • How will 4STEP DIH members communicate regarding services for our members?	- October 2021 - January 2022
Planned actions	• Connection to the EU networks • Connection to the EDIH network by getting in the DIH catalogue • Formalization of the network • New services as part of D.T2.3.1	- January - March 2022

Training of all relevant members	• Train all relevant and needed territorial members of DIH network on:
	    • Transnational DIH in general (D.T2.3.3)
	    • Strategic positioning of the network
	    • All members + their available services
	    • Operations and processes
	    • Planned actions
		- March 2022