DIGILOGIC

D3.2 DOP on EU-AU best practices for inclusive digital entrepreneurship capacity building

Peer learning between EU-AU DIHs

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Abstract	In 2021, DIGILOGIC used a Design Options Paper (DOP) to document and extract DIH existing best practices which were discussed during four Peer Learning workshops and bilateral twinning sessions. The DOP aims to inform future DIGILOGIC actors (i.e. Inclusive digital & entrepreneurship capacity building programmes) and develop recommendations for further DIH collaboration endeavours between Europe and Africa on inclusive digital entrepreneurship and smart logistics.
Keywords	Digital Innovation Hub (DIH); Peer exchange; Twinning+; digital entrepreneurship; smart logistics

Document Revision History

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* R: Document, report (excluding the periodic and final reports)
DEM: Demonstrator, pilot, prototype, plan designs
DEC: Websites, patents filing, press & media actions, videos, etc.
OTHER: Software, technical diagram, etc.

EXECUTIVE SUMMARY

This Design Options Paper (DOP) results from a peer-review process focusing on the following topic: how can DIGILOGIC support innovators to overcome main obstacles across sectors and in particular the transport and logistics sector at the critical mile. A special emphasis is also given to empowering youth and women to be part of the entrepreneurial and innovation ecosystem.

The document has been developed through the Twinning Advanced Methodology (Twinning+)[1]. The Twinning Advanced Methodology is an extension of the original INNO Partnering Forum (IPF) twinning method. This methodology has the potential of bringing many benefits to the participants by giving them the opportunity to share problems, exchange knowledge and understand different viewpoints.

In this way, the DOP identifies and documents the existing support options, guidelines and implementation alternatives that DIGILOGIC European and African DIHs have experienced in different environmental conditions and would recommend to other organizations interested in implementing the proposed best practices.

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[1] https://ec.europa.eu/research/participants/data/ref/h2020/wp/2018-2020/main/h2020-wp1820-sme_en.pdf

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ABBREVIATIONS

AU	African Union
B-Hive	Bongo-Hive
DHM	Digital Hub Management
DIH	Digital Innovation Hub
DOP	Design Option Paper
EiT	Entrepreneur in Training
EU	European Union
FINN	Friuli Innovazione
GTAI	Germany Trade & Invest
ICT	Information and Communication Technology
IP	Intellectual Property
IP4FVG	Industry Platform for the Friuli Venezia Giulia region
IPF	INNO Partnering Forum
MEST	Meltwater Entrepreneurial School of Technology
MVP	Minimum Viable Product
MOOC	Massive Open Online Course
QR	Quick Response
RRI	Responsible Research and Innovation
RTO	Research and Technology Organization
STEM	Science, Technology, Engineering and Mat
UI/UX	User Interface / User Experience
USSD	Unstructured Supplementary Service Data
VTT	Technical Research Centre of Finland

GLOSSARY

Critical mile covers a product's journey from a warehouse to a customer's doorstep. This is more than just transport and includes everything in between from matching, tracking and addressing to environmentally friendly vehicles

A Digital Innovation Hub (DIH) is a one-stop-shop that helps companies and entrepreneurs to become more competitive with regard to their business/production processes, products or services using digital technologies

Youth refers to every person between the ages of 15 and 35 years

1 INTRODUCTION

DIGILOGIC aims to reinforce the development and establishment of Pan-African networks of Digital Innovation/Tech Hubs through strengthening local digital innovation and start-up ecosystems thereby contributing to the European Commission´s call H2020-ICT-58-2020 with the topic "International partnership building between European and African innovation hubs".

To improve their offerings and strengthen collaboration, the members of the DIGILOGIC consortium have exchanged their common challenges and experiences. They have used the peer learning approach "Twinning Advanced" to exchange know-how on how DIHs can support innovators to overcome main obstacles with a specific spotlight on logistics at the critical mile[2].

From the peer-learning methodology and cross-continent exchange, DIHs are expected to mutually learn from best practices to enhance skills and capabilities in the domains of digital and entrepreneurship empowerment. DIHs will therefore be able to improve their offers by adapting the lessons learnt to the local context and by including them in their daily work.

The peer learning has resulted in this Design Option Paper (DOP) which presents options, guidelines and implementation alternatives that five DIGILOGIC DIHs, two African DIHs (MEST and B-Hive) and three European DIHs (DHM, FINN and VTT) would recommend to other innovation support service agencies.

The first part of the DOP contains the background and description of the challenge addressed by the DOP. It outlines the rationale for addressing the topics and challenges at stake and gives contextual information on the DIHs involved. The second part provides a description, evaluation and analysis of good practices and their applicability in different European and African contexts. The DOP concludes with lessons learned to foster collaboration between European and African Digital Innovation Hubs, as well as recommendations for upcoming DIGILOGIC activities.

The peer learning process aims to share experiences and to optimize know-how in the field of entrepreneurial support in different cultural environments. This is particularly relevant in the context of the DIGILOGIC project as DIH consortium members operate in different countries between Europe and Africa. Therefore, to establish and/or consolidate strategic linkages among African and European DIHs, adequate peer learning methodologies were implemented. Comparing, combining and extracting the most effective good practices of DIHs and their current gaps, offers information for future DIGILOGIC activities' successful deployment and valuable options for integration into new projects by any DIH involved. Additionally, the peer learning process was aimed to strengthen the relationships between the different DIH consortium members.

1.1 METHODOLOGY

The DIGILOGIC peer learning process was implemented over the course of six months through two methodological approaches including five peer-learning workshops (the first workshop was an introduction session) with all consortium members and ten twinning sessions matching two DIHs each. Due to the global pandemic, the peer learning workshops and twinning sessions took place online. The process was led by Friuli Innovazione (FINN) with the support of Endeva and implemented by the DIGILOGIC peer learning group, made up of representatives and stakeholder experts from the five DIHs members of the consortium: MEST, B-Hive, DHM, VTT, FINN.

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[2] The critical mile covers a product's journey from a warehouse to a customer's doorstep. This is more than just transport and includes everything in between from matching, tracking and addressing to environmentally friendly vehicles.

a) Peer learning workshops

The peer learning workshop methodology should foster exchange, gathering of experiences and collective brainstorming. Each workshop took place online and was facilitated by an external expert using the virtual whiteboard MURAL as a digital collaborative tool. As DIH members partaking in the peer learning workshops got to know each other better, the exchange became more fruitful, and the methodology evolved accordingly. The structure of each peer learning session also evolved to best match the topic at stake and included in some cases testimonials from start-ups. Overall, each session consisted of the following structure:

1. Topic presentation

2. Exchange of experiences and best practices with regards to the set topic

3. Discussion of target groups' needs and requirements and prioritization with regard to DIHs and final beneficiaries through voting

4. Solutions to be co-created to answer the most important identified needs

TABLE 1: PEER LEARNING WORKSHOP PARTICIPANTS

	Workshop 1	**Workshop 2**	**Workshop 3**	**Workshop 4**
Date	21/09/2021	15/10/2021	04/11/2021	30/11/ 2021
Duration	3 hours			
B-HIVE	Maumo Mubila Peter Nawa Simunza Muyangana	Maumo Mubila Simunza Muyangana Nomsa Ngoma		Maumo Mubila Silumesii Maboshe Simunza Muyangana
DHM	Kamar Aden Omar Maria Beck	Darja Kramer	Darja Kramer Markus Witthaut	Charlotte Edzard Lisa Guggenmos Kamar Aden Omar
Endeva	Claudia Knoblock Paola Zisman	Claudia Knoblock, Paola Zisman	Paola Zisman	Claudia Knoblock
FINN	Claudia Baracchini Elena Piccinato Elide Hravtin Francesca Pozzar	Claudia Baracchini Elena Piccinato Elide Hrvatin Francesca Pozzar	Claudia Baracchini Elide Hrvatin Francesca Pozzar Tommaso Bernardini	Claudia Baracchini Elide Hrvatin Francesca Pozzar Saverio D'Eredità
MEST	Bhavik Doshi Femi Adewumi Gerhard Mallah Prasanth Kumar Toyin Dania	Bhavik Doshi Daniel Delali Femi Adewumi Gerhard Mallah Toyin Dania	Bhavik Doshi Isreal Agbeti Toyin Dania	Isreal Agbeti Toyin Dania
VTT	Stephen Fox	Stephen Fox	Stephen Fox	Stephen Fox
External	Kirsten Tangemann (Social Business Hub Styria)	Kirsten Tangemann (Social Business Hub Styria)	Kirsten Tangemann (Social Business Hub Styria) Sofia Montresor (SpeedHub Verona)	Kirsten Tangemann (Social Business Hub Styria)
Total	18	16	13	15

b) Twinning+ methodology

In line with the Twinning+ methodology, the workshops were followed by bilateral twinning sessions. The Twinning Advanced Methodology (Twinning+)[3] is an extension of the original INNO Partnering Forum (IPF) twinning method, by combining elements of traditional peer reviews and twinning in small learning groups of interested innovation support agencies. The traditional peer exchange and review element of the methodology has the potential of bringing many benefits to its participants by giving them the opportunity to share common problems, exchange knowledge and examine the potential of best practices and prevailing gaps. While the online bilateral twinnings meetings allow the DIHs to dive deeper into the topics and challenges discussed in the peer learning workshops. Each twinning pair could discuss more in depth the transferability potential of their respective best practices and hand over recommendation, as well as the area of improvement to consider. The bilateral sessions allowed therefore to build further relationship between DIHs and to explore opportunities for leveraging the counterpart's expertise and resources. In this DOP, the twinnings' results are featured as highlight boxes to illustrate the key outputs from the peer learning journey.

TABLE 2: TWINNINGS OVERVIEW

Twinning	Date	Participants	Twinning	Date	Participants
1	12.11.2021	MEST - VTT	**6**	08.12.2021	BHIVE - VTT
2	17.11.2021	DHM - FINN	**7**	10.12.2021	BHIVE - MEST
3	23.11.2021	DHM - VTT	**8**	13.12.2021	BHIVE - DHM
4	03.12.2021	FINN - VTT	**9**	15.12.2021	FINN - MEST
5	08.12.2021	DHM - MEST	**10**	16.12.2021	BHIVE - FINN

c) DOP

The DOP aims to document the peer learning process and extract the most promising findings in terms of existing and new good practices for DIH to foster greater transparency, collaboration, innovative business models and digital upskilling in their innovation ecosystems. By using the DIHs collective experience and knowledge, the identified gaps and challenges can be addressed in better ways by conceptualizing and developing new good practices. The DOP identifies and documents guidelines and implementation alternatives that the partners have experienced and would recommend to other agencies interested in implementing the proposed good practices. Good practices mentioned during the peer learning workshops and twinnings consist of practices which at the level of one or multiple DIH efficiently and effectively improved the relevance of support services provided to beneficiaries and hold the potential to be replicated in another context. This methodology facilitates the establishment of project-based cooperation not only for sharing experience, but for developing better approaches, addressing all support elements for innovators across sectors and in some instance at the critical mile in logistics.

Thus, the DOP is intended as a guide for innovation agencies or similar entrepreneurship support organisations to include new ideas and best practices in their innovation support activity. It identifies and explores options to address the specific challenges and shows which options have been precluded in the design phase. The DOP should as well serve as a source of inspiration for other agencies that later become interested in the topic and did not participate in the peer learning process.

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[3] https://ec.europa.eu/research/participants/data/ref/h2020/wp/2018-2020/main/h2020-wp1820-sme_en.pdf

1.2 TARGET GROUPS

The peer learning process and exchange has two target groups, entrepreneurs and innovators served by DIHs, and the DIHs themselves. The peer learning process focused on bringing up and addressing the specific ambitions and needs of these two respective groups.

- The **entrepreneurs and innovators served by DIHs are the first target group** of the peer learning process, as the solutions are collaboratively designed based on their needs and should thus benefit them down the line. The perspective of entrepreneurs was mainly brought in through the experiences of the DIHs. However, for the third peer learning session on innovative business models in smart logistics, entrepreneurs shared their experience directly and took part in the session (i.e Chekkit[4], a Nigerian start-up that provides product authentication technology solutions).

- The **DIHs serving and supporting entrepreneurs represent the second target group**. It is key to look at the DIHs as a separate target group, as their own needs, strategies and available resources heavily influence how they can support entrepreneurs and innovation processes in their regions. Through the peer learning workshops, we looked at the current good practices and initiatives that DIHs are running and the gaps in their support schemes.

1.3 TOPICS

During its inception phase, the DIGILOGIC project investigated and mapped the critical mile logistics as a relevant system to understand the larger systems of smart logistics and innovation[5]. This process uncovered the following four topics relevant for innovation support in smart logistics: transparency, collaboration, innovative business models and digital upskilling[6].

However, the peer learning process was designed sector agnostic. The sector of logistics served as an example to provide more tangible understanding of the four topics covered.

The system thinking deep-dive helped gain insights into how the logistics and transport system in African countries works, its enabling and inhibiting driving forces and from there, the levers for change to unlock significant impact. Digital solutions help to optimise the transport and logistics sector - from matching platforms and smart warehousing to digital addresses. Nevertheless, many challenges remain, and too few solutions are scaling. Optimising parts of the logistics sector is not enough. The critical mile in Africa continues to suffer from weak support structures, limited collaboration, duplication and fragmentation. This leads to inefficiencies and increased costs. For the system to start operating differently, DIGILOGIC and its engaged stakeholders collaboratively identified levers for change. **DIHs can play a significant role in activating the identified levers for change. For that reason, the levers for change were translated into focus areas for the DIH Peer learning process**. Each of the four topics was dealt with on two levels, from the general (multisectoral) exchange perspective and at the level of logistics specific discussions. The four topics are described below through the lens of the critical mile logistics sector, as an exemplary sector focus:

Transparency: Across the board, the critical last mile ecosystem (just as many other sectors) remains relatively opaque, preventing players from being aware of each other. Transparency and access to readily available information for all parties would allow regulators to better overview actors operating in their jurisdiction. Similarly, easily accessible information could provide start-ups with a better overview of their peers and other relevant players providing similar or complementary services, as well as giving entrepreneurs a better awareness

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[4] https://chekkitapp.com/
[5] https://digilogic.africa/wp-content/uploads/2021/05/DIGILOGIC_D1.1._Vision-and-stakeholder-list-1.pdf
[6] https://digilogic.africa/wp-content/uploads/2021/05/DIGILOGIC_D1.2_D2_Ecosystem-map_P_V1.0.pdf

of the regulations affecting them. Lastly, financing partners such as investors could benefit from a better overview of promising trends and potential investees to support. The peer learning aims to answer how to provide effectively up to date and accessible information on funding, digital upskilling, training, networking, etc.

Collaboration: Once key stakeholders in critical mile logistics or other sectors have become aware of their mutual existence and scope of actions, motivation for collaborations might be stronger. Such collaboration could take place through the intermediary of a third-party operated platform to overcome symptomatic trust issues. An existing example of such a collaborative platform includes the National Australian Telematics Framework, run by the government, allowing actors to anonymously share their data and grant them access to specific roads and other logistical benefits. In Sub-Saharan Africa, DIHs could play such a facilitating role, connecting stakeholders and fostering trust regardless of the players' size.

Stronger use cases and business models: Bridging the gaps between actors along the smart and physical critical mile logistics (or other value chains) allows showcasing stronger use cases and business models developed through collaboration. With all the segments and actors structured and collaborating, the smart logistics narrative becomes one where the benefits of collaboration outweigh the risks and costs of partnerships. Greater incentive to foster the ecosystem could be created around local assembly and repair for the hardware that supports the smart logistics solutions (sensors, e-vehicles, cold chain casing, etc.). This approach would localise and empower the smart logistics ecosystem.

Digital upskilling and reskilling: To be able to harness the new opportunities brought by innovation in logistics and more broadly across sectors, there is a need to develop new skills with regard to digital technologies. Existing workforce and businesses need to reskill and open up to the new processes, products and services offered by innovation. Human capital must be supported to develop software and hardware solutions, as well as to be able to apply them and adapt them to different relevant use cases.

DIHs represent key structures to act in these four areas and address some of the current challenges to support innovation across sectors and in the logistics of the critical last mile.

The four topics selected also echo the main functions a DIH should fulfil according to the European Commission.

FIGURE 1: MAIN FUNCTIONS OF EUROPEAN DIGITAL INNOVATION HUBS[7]
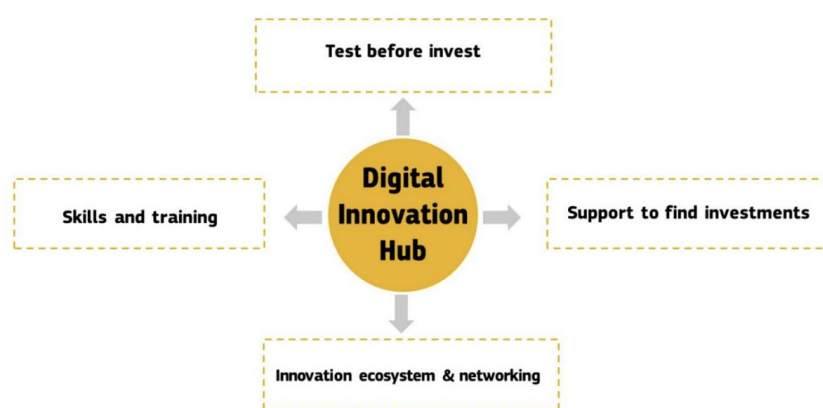
The function of "support to find investments" is addressed in the first topic of transparency, as DIHs support entrepreneurs in navigating the often untransparent landscape of funding opportunities available to them. DIHs can educate start-ups on what kind of capital they should go for at what stage. By receiving the support and seal of a DIH an entrepreneur also increases its chances to receive credible visibility towards potential investors and

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[7] https://www.horizontevropa.cz/files_public/elfinder/1023/digital_innovation_hubs_in_digital_europe_programme_ 25-01-2021_v23_C35B39CC-C9A7-25BE-09DFD0C05A10616F_70324.pdf

funders. The function of "Innovation ecosystem & Networking" is included in the collaboration topic where a hub works as a broker and matchmaker between the different innovation ecosystem players to best support and answer the needs of its beneficiaries. The "Test before invest" function is addressed in the third topic on how DIHs support innovative business models in logistics. Indeed, this topic mentions the support DIHs offer to entrepreneurs in market-proofing their ideas and adapting it to ensure successful uptake. The fourth topic on upskilling and reskilling covers the provision of skills and training mentioned by the European Commission.

1.4 ORGANIZATIONS

DIGILOGIC's partner DIH organizations are strongly committed to the development of a Pan EU-AU digital innovation collaboration and networking ecosystem. Each of them has a qualified role as innovation stakeholder within their own local entrepreneurial ecosystem. As such, they bring the uniqueness and great value of their direct experience, knowledge, and competence to a cross-continental level. This section introduces the five DIGILOGIC partners involved in the peer learning process. The section shows their respective expertise and strengths in supporting innovation across sectors and for some in smart logistics.

1.4.1   Friuli Innovazione (FINN)

Friuli Innovazione (FINN) is a member of the DIH Udine "Data analytics & Artificial intelligence", founded in 2018 (one of the 22 Italian DIHs) and adheres to the regional platform IP4FVG (Industry Platform for the Friuli Venezia Giulia region) dedicated to manufacturers' digitization processes. FINN is one of the main key players of the innovation ecosystem in the Friuli Venezia Giulia Region which is a major innovation player in the cross-border region between Italy, Slovenia, Austria and Croatia with extensive expertise in cooperation projects among business support organizations and innovation agencies. FINN developed several international service schemes to enable an attractive environment for start-ups from outside of the EU willing to enter the EU market.
A constellation of partners offers soft-landing, mentoring and networking services to help third country national newcomers to experience simultaneously the three main business cultures of Europe: Latin, Anglo-Saxon and Slavonic. Technology transfer, incubation and acceleration of tech start-ups, talent activation and business financing for R&D&I are the main areas of intervention of FINN.
Fostering transparency: FINN informs, educates, and supports enterprises and researchers to identify the most appropriate financial instruments and key operating stages, searches for partners and verifies the eligibility of their innovation projects for European or Italian funds.
Fostering collaboration: FINN's management board has representatives from the whole territory (the city of Udine, the Region, banks and foundations, research centres, the economic actors like the chamber of commerce and the industry association). Furthermore, FINN promotes collaboration between enterprises and the scientific and technological research network.
Digital upskilling: FINN provides different upskilling offers to established SMEs in the Region. In addition, it raises awareness on the potential of innovation to specific target groups such as youth and women.
Innovative business model support (in logistics): FINN works toward supporting and assisting the creation of high-tech enterprises by means of its certified incubator. In the past, transport and logistics have not been an area of expertise for FINN. To enhance and grow its offering into this growing sector, FINN is developing partnerships (i.e SpeedHub Verona) and projects like DIGILOGIC.

1.4.2   Digital Hub Logistics Dortmund (DHM)

The Digital Hub Management GmbH (DHM) takes on the management of large industry driven innovation projects in the context of digitalization. DHM supports the transfer of research results and innovative technologies into the economy and takes care of the creation of communities on various initiatives. In close cooperation with Fraunhofer Institute of Material Flow and Logistics (IML) and the Technical University of Dortmund (TU), DHM operates the head offices of the Industrial Data Space Association, the EffizienzCluster LogistikRuhr, and the SME Enabling Center for Digitization "Mittelstand-Digital Zentrum Ruhr-OWL". Additionally, DHM manages internal and external communication and stakeholder engagement activities of the German National Competence Center for Logistics and IT (Leistungszentrum Logistik und IT). Since 2017, DHM facilitates the Digital Hub Logistics Dortmund and offers a unique threefold service portfolio with a focus on supporting and facilitating innovation teams of SMEs (Start-ins) with customized innovation modules. Beside this process,

companies benefit from the digital ecosystem and the well-developed community spanning from research institutions over corporates, SMEs and start-ups to the education sector. Finally, participating companies can use the co-working space and work in an innovative environment.

Fostering transparency: DHM is the orchestrator of an ecosystem including the three competence centres Fraunhofer Institute for material flow and logistics (IML), Fraunhofer Institute for Software and Systems Technology (ISST) and the Technical University of Dortmund (TU). Through such a function, DHM can share information and opportunities and raise awareness for key topics within the context of digitalization, innovation and logistics.

Fostering collaboration: DHM is characterized by the transfer of knowledge, the management of innovations and the establishment of communities, three activities conducive to collaboration. With DHM's areas of expertise in logistics that include goods, data, transport, corporate and financial logistics, it strengthens the dynamic ecosystem of digital logistics in the German Ruhr region and complements it with its offers consisting of Enterprise Labs, SME-Enablers, test beds, smart talent start-up support and research projects. Thus, the Digital Hub Logistics creates an environment for companies that want to bring new high-potential digital products to market. Based on an initiative of the digital association Bitkom, the Digital Hub Logistics is part of the Federal Ministry for Economic Affairs and Energy's (BMWi) Digital Hub Initiative with a total of 12 hubs in Germany. An umbrella brand (de:hub) and a Hub Agency facilitate networking and the exchange of know-how.

Digital upskilling: DHM supports SMEs in their digital transformation journey. This includes train-the-digital-trainer processes, digital product development and process optimization.

Innovative business model support (in logistics): Within the Start-In Factory companies are supported with a customized process in developing digital products and/or business models for Industry 4.0 or Logistics 4.0.

1.4.3   Technical Research Centre of Finland (VTT)

VTT Technical Research Centre of Finland Ltd is a state owned and controlled non-profit limited liability company established by law and operating under the ownership steering of the Finnish Ministry of Employment and the Economy. VTT is a Research and Technology Organization (RTO) whose activities are focused on three areas: knowledge intensive products and services, smart industry and energy systems, and solutions for natural resources and environment. VTT is impact-driven and takes advantage of its wide multi-technological knowledge base. VTT can combine different technologies, produce information, upgrade technology knowledge, and create business intelligence and value added for its stakeholders. Over the years, VTT has gained vast experience from participation and coordination of numerous European projects including R&D Framework Programme projects and other thematic frameworks and programmes. VTT is ranked among the leading European RTOs. In December 2017, VTT has been recognised with the "HR Excellence in Research" award by the European Commission.

Fostering transparency: VTT is fully owned by the Finnish state and operates under the ownership steering of the Ministry of Economic Affairs and Employment. Such a position in the Finnish landscape bestows VTT a high level of credibility and insurance as well as allows VTT to share information and raise awareness of key topics for innovation support

Fostering collaboration: VTT is an active member of a number of international innovation ecosystems. VTT engages in cooperative projects that are co-financed by business partners and research funding agencies, such as Business Finland and the EU.

Digital upskilling: The LaunchPad is a deep-tech incubator where VTT creates science-driven companies that build on cutting-edge research. VTT LaunchPad brings VTT researchers and technology together with the best business minds and investors out there to renew industries.

Innovative business model support (in logistics): From climate action to artificial intelligence, VTT's research expertise tackles the biggest challenges of our time and turns them into opportunities for businesses' growth. VTT has led and conducted a wide range of logistics research project across the globe. On the topic of open, consumer-centric last-mile ecosystem, VTT has drafted a roadmap report for anyone operating in the last-mile space: retailers, transportation companies, warehouse operators, logistics researchers, and technology developers.

1.4.4   Meltwater Entrepreneurial School of Technology (MEST)

MEST is an Africa-wide Digital Innovation Hub entrepreneur training program, internal seed fund, and network of hubs offering incubation for technology start-ups in Africa. Founded in Ghana in 2008, MEST provides critical

skills training, funding, and support in software development, business, and communications to Africa's tech entrepreneurs. MEST's Hubs are located in Accra, Lagos, Cape Town, and Nairobi.

Fostering transparency: MEST was launched by The Meltwater Foundation, head-quartered in the Silicon Valley and has therefore substantial connections to the US, giving it visibility and credibility. MEST has also built its reputation in Ghana, Nigeria, South Africa and Kenya, maintaining close relations with local government and companies as well as with bilateral organization (GIZ), foundations (MasterCard) and international organization (UNICEF). This central positioning in the ecosystem allows MEST to share information and opportunities and raise awareness of key topics for innovation support.

Fostering collaboration: MEST's tech community of leading entrepreneurs, investors, corporate partners and ecosystem players spans across the African continent. Members of MEST have access to MEST's network, and to one another, as they grow their companies. The expanding MEST network provides entrepreneurs looking to grow their market across the African continent with resources and connections in several major African cities. To date, MEST has invested in over 60 start-ups across industries from software as a service (SaaS) and consumer internet, to eCommerce, Digital Media, Agritech, Fintech and Healthcare IT.

Digital upskilling: With its different training programs MEST caters to the needs of aspiring and established entrepreneurs who have a strong interest in technology solutions and entrepreneurship from across Africa to global markets.

Innovative business model support (in logistics): In the past, transport and logistics have not been an area of expertise for MEST. To enhance and grow MEST's offering into this growing sector, MEST developed partnerships and projects like DIGILOGIC and the Smart Cities Innovation Program[8]. This experience will enable MEST to support its clients more comprehensively in this dynamic sector.

1.4.5 BongoHive (B-Hive)

Established in 2011 to answer the growing needs of the local technology industry, BongoHive (B-Hive) was Zambia's first technology and innovation hub. B-Hive is now assisting scalable start-ups of various backgrounds through skill-enhancement, growth acceleration, network building, investment readiness and collaborations. B-Hive maintains close ties with the Zambian government as well as other local and international government and non-government organisations and corporates. For this last stakeholder group, B-Hive offers corporate consulting in innovation and digital transformation.

Besides running start-up programs, B-Hive organises a wide range of seminars on different technology topics. A key hallmark of B-Hive's support to building the capacity of local technology and entrepreneurship ecosystem is the fostering of a vibrant 'community of start-ups and technology enthusiasts' through which international development agencies and corporates can source innovative solutions. B-Hives takes deliberate steps to not only foster this community but encourage collaboration and discourse by hosting community events and facilitating market connection with larger organizations. In addition to their experience in designing and implementing start-up support initiatives, B-Hive also contributes technical knowledge in developing custom digital solutions.

Fostering transparency: B-Hive maintains close ties with the Zambian government as well as other local and international government and non-government organisations and corporates. This central positioning in the ecosystem allows B-Hive to share information and opportunities and raise awareness of key topics for innovation support in Zambia.

Fostering collaboration: Partnership readiness is a core element of the incubation and acceleration programs that B-Hive runs for entrepreneurs and start-ups. Furthermore, through hackathons and thematic events, B-Hive connects different ecosystem stakeholders and lays the foundation for potential partnerships.

Digital upskilling: Digital skill enhancement is an area where B-Hive assists and supports start-ups.

Innovative business model support (logistics): B-Hive offers a range of programmes, workshops and events that support the start-up journey from idea to investment stage. In the past, transport and logistics have not been an area of expertise for B-HIVE. To enhance and grow its offering into this growing sector, B-HIVE developed

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[8] https://www.scipafrica.com/

partnerships and projects like DIGILOGIC and drone hackathons during Zambia 2020 drone week[9]. This experience will enable B-HIVE to support its clients more comprehensively in this dynamic sector.

TABLE 3: OVERVIEW OF STRENGTHS AND RESOURCES WITHIN THE PEER LEARNING DIH MEMBERS

	FINN	DHM	VTT	MEST	B-HIVE
Category of offering					
Incubator	X		X	X	X
Accelerator	X	X		X	X
Science & Technology Park	X	X	X		
Start-up competition	X	X		X	X
Co-working spaces	X	X		X	X
Business support and development agency		X		X	X
Access to					
Networks	X	X	X	X	X
Private funding	X	X		X	X
Public funding	X	X	X	X	X
Industry sector	X	X	X	X	X
Market research	X	X	X		
Infrastructure		X	X	X	X
Logistics specific expertise		X	X		

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[9] https://www.globalairdroneacademy.org/zambiadroneweek

2 OVERVIEW AND ANALYSIS OF CURRENT INNOVATION SUPPORT INITIATIVES

This DOP chapter presents good practices implemented by the DIHs and shared within the four peer learning topics: transparency, collaboration, last mile disruption and digital upskilling/reskilling. The good practices described will be considered within their respective contextual framework to emphasize their replicability potential in different environments. By evaluating the innovation support practices and their relevance, each section will highlight successful DIH endeavors and the current areas of further improvement. This analysis will also provide inspiration for future co-creation endeavors and the tailoring of other DIGILOGIC activities.

TABLE 4: PEER LEARNING TOPICS

Peer learning topics	TRANSPARENCY	COLLABORATION	LAST MILE DISRUPTION	DIGITAL UPSKILLING
Topic details	Communication, access and reach of support services offered by DIHs	Support services aimed to foster collaboration and networking	Business models for smart logistics solutions at the critical mile	Digital upskilling and reskilling for entrepreneurship and innovation
Guiding question	How to provide effectively up to date accessible information on funding opportunities, entrepreneurial programs and other support offers?	How to create and promote collaboration among corporates, entrepreneurs, public entities and other innovation ecosystem stakeholders?	How to promote and support innovative business models for smart logistics at the critical mile?	How to leverage current DIHs digital upskilling and reskilling activities?

2.1 TRANSPARENCY

The lack of transparency was identified as one of the major obstacles to improve the logistics of the last mile in Africa. Transparency is a multifaceted topic. It can be increased by intensifying transfer of information and reaching efficiently different target groups. And it can be tackled with regard to its content and the type of information to be made transparent for beneficiaries.

The focus of the peer learning workshop on transparency was set on DIH support services on inclusive entrepreneurship (women, youth) and innovative business (smart logistics start-ups, enterprises). The guiding question was how to provide effective, up-to-date, accessible information to the target groups. During the peer-learning workshop the guiding question was discussed, and existing good practices implemented by the 5 DIHs were collected.

The four clusters of existing good pratices which DIHs implement to create and support transparency in their innovative ecosystem were the following:

- Ensure and communicate the quality of DIH services
- Develop effective information communication mechanism
- Ensure the quality of mentoring services
- Reach more vulnerable beneficiaries and answer their specific needs (women and youth)

TABLE 5 : OVERVIEW OF GOOD PRACTICES TO FOSTER TRANSPARENCY

Need identified	Good practice	Country	DIH	Resource
Ensure and communicate the quality of DIH services	Public certification of business incubators	Italy	FINN	https://www.studiolegalecoscia.it/wp-content/uploads/2021/04/Elenco-incubatori-certificati-al-12.04.2021.pdf
Develop effective information communication mechanism	Leverage other regional innovative support providers	Germany	DHM	https://www.de-hub.de/en/
		Italy	FINN	https://friulinnovazione.it/en/friuli-innovazione-en/soci-en/
Develop effective information communication mechanism	Detailed map of regional DIHs	EU	EU	https://s3platform.jrc.ec.europa.eu/digital-innovation-hubs-tool
		AU	Afrilabs	https://afrilabs.com/hub/
Ensure the quality of mentoring services	Mentoring the mentors (bootcamp, continuous learnings, handbooks)	Ghana, Nigeria, Kenya, South Africa, Zambia	MEST and B-Hive	
	Recruit successful entrepreneurs who have themselves been mentored in the past by the DIH	Italy	FINN	https://friulinnovazione.it/media/documents/Avviso_costituzione_lista_consulenti_e_mentori.pdf
Reach more vulnerable beneficiaries (women and youth) and answer their specific needs	Work with specialized hubs already engaging more vulnerable beneficiaries	Zambia	B-Hive	http://www.kupesnetwork.com/ https://weaczambia.org/
		Italy	FINN	https://friulinnovazione.it/it/consulenza-e-supporto/imprese/progetti-conclusi/enterprise-academy-fvg-2-201617/

	Develop dedicated programs tailored to answer the specific entrepreneurial demographic's needs	Ghana, Nigeria, Kenya	MEST	https://mestafrica.medium.com/mest-and-make-it-in-africa-announce-2020-cohort-of-tech-by-her-accelerator-program-5dab03863d8a
		Zambia	B-Hive	https://scwomenintech.co.zm/
	Develop dedicated ethical framework and RRI (Responsible Research and Innovation) processes	Finland	VTT	https://cris.vtt.fi/en/publications/responsible-research-in-industry-rri

2.1.1 Ensuring and communicating the quality of DIH's innovation support offering to build trust

Entrepreneurs and innovators lack transparency when they try to identify and find the most suited DIH offering to match their needs efficiently. Currently a lot of sector agnostic, very similar support services and programs exist in Africa and Europe. **This plethora of DIH support varies in quality**. **Signalling, or conveying the credibility and quality of a DIH, is therefore key as well as adequately communicating the value-added** by the support services and the fit with the beneficiaries needs.

To increase the transparency regarding the availability and quality of incubation services certain good practices exist among the DIGILOGIC DIHs consortium and connected networks.

In Italy, FINN is labelled as an officially certified business incubator, a label system launched by the Ministry of Economy in 2014. Such a public track-record process gives credibility and trust to incubation entities and allows entrepreneurs to assess the quality of the available offerings. To obtain certification, these service providers must meet certain requirements such as having adequate buildings and equipment, and a technical and management structure of recognized competence. The incubators must be engaged in collaborative relationships with universities, research centres, public institutions, and financial partners. Certified incubators must also have a proven experience in successfully supporting innovative start-ups: this is quantified through the numbers of start-ups supported/hosted and a minimum number of innovative business ideas collected. The certification is checked and renewed every 6 months. The list of certified incubators is managed and made public by the Italian Chamber of Commerce, giving it considerable credibility[10]. Such a DIH trusted certification also allows FINN to identify other trusted DIHs to collaboratively run projects together in their region. Standardization and certification of DIHs can only happen if certain framework conditions are in place, like a third party overseeing the processes. Furthermore, it is also necessary to have strong M&E processes in place at the DIH level to account for number of start-ups supported and to demonstrate how a DIH played a part in their success and growth.

2.1.2 Effective information flow and communication

Reaching different demographic groups can be costly. However, leveraging social media and online presence channels allows DIHs in a cost-effective manner to reach larger audiences. Leveraging local partners can also be an effective information communication mechanism.

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[10] https://www.studiolegalecoscia.it/wp-content/uploads/2021/04/Elenco-incubatori-certificati-al-12.04.2021.pdf

For example, FINN shares information with other innovation support providers in their region on topics such as: pilot actions which are implementation-related activities dedicated to testing a new approach, joined start-up calls, information on their organization. Similarly, in Germany DHM belongs with 11 other DIHs to one national digital ecosystem, the Digital Hub Initiative Germany[11], from which they can pull resources and expertise or through which they can share information and knowledge.

At a more continental level, the EU has a DIH catalogue in the form of a digital map which provides a comprehensive picture of DIHs in the EU across varying competences, structures and service offerings (see FIGURE 2). Furthermore, DIHs can benefit from the experience and knowledge of other DIHs by participating in other EU-projects that foster the collaboration between DIHs (e.g. DIH World, DIH² etc.).

FIGURE 2: EU Digital Innovation Hub catalogue[12]
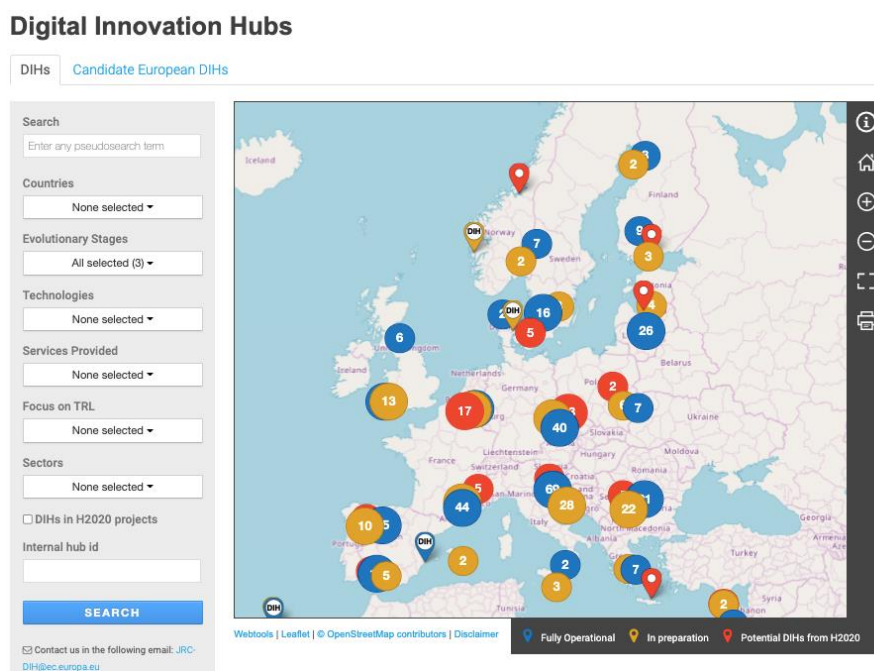
On the African continent, the Afrilabs' community database also offers an overview of the 320 accelerators, incubators, co-creation hubs and co-working spaces across 51 countries[13].

2.1.3 Ensuring the quality of mentoring services

In Ghana and Zambia, before starting their mentorship, mentors from MEST and B-HIVE follow a thorough training program. B-Hive Mentorship bootcamp is designed to run for a full day in person or over four sessions online. These sessions cover key topics such as "mentor driven capital", "thinking like an angel investor", "how to prepare mentees for corporate partnerships". In addition, mentors receive a handbook with suggested guiding questions for their sessions. Another best practice to ensure the quality of coaches and mentors comes from FINN who recruit successful entrepreneurs who have themselves been mentored in the past.

DIHs can also be key players to support start-ups and entrepreneurs to navigate tumultuous processes to access funding. Often information to access financial support is not accessible in one single platform but rather dispersed. As part of their Launch Accelerator programme and their Investor Readiness Program, B-Hive educates start-ups on what kind of capital they should go for at what stage.

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[11] https://www.de-hub.de/en/
[12] https://s3platform.jrc.ec.europa.eu/digital-innovation-hubs-tool
[13] https://afrilabs.com/hub/

> **Highlight Box 1: Certified and trusted DIHs can manage EU funds and funnel those to support start-ups**
>
> Along with three certified DIHs in its region (Area Science Park, BIC Incubatori FVG and Polo Tecnologico di Pordenone), FINN was appointed to manage an EU fund to support start-ups in the creative industries. Having certified DIHs as fund managers, increases the chance of start-ups to access funding, by keeping at bay the stigma of insolvency which prevails especially for younger entrepreneurs who lack access to larger collateral. DIHs through their visible trust, act as guarantor for start-ups. Additionally, having DIHs as fund managers also takes away the administrative burden of start-ups to deal with the processes normally involved in fund processing.

2.1.4   Reaching more vulnerable groups and answering their specific needs

For DIHs to be able to reach out to more vulnerable groups, such as women and youth, specific approaches and formats are required. Indeed, women and youth might have different needs than older male innovators, and often have access to fewer resources. This topic is even more relevant for the logistics sector as women are under-represented in the logistics, transport and traffic industries both in Europe and Africa.

To date, many DIHs have designed programs with targeted support specifically for women: from B-Hive's Women in tech Incubator[14], to MEST's Tech By Her accelerator program[15] for female entrepreneurs in Ghana, Nigeria, and Kenya. In each of these programs, they not only address the challenges women face when it comes to business ownership, but also recognizes and maximizes the exceptional strengths that are unique to the female entrepreneurs. To match the needs and specific challenges of female entrepreneurs, B-Hive will include more female mentors and tailor their programs' schedule consciously due to some women's household tasks.

MEST and B-Hive also highlight the importance to partner with hubs and organizations with a focus on female entrepreneurship and tech innovation. Such partnerships allow sector agnostic DIHs to reach women entrepreneurs. In Zambia for example, B-Hive works with local women's organizations such as the Kupe's Young Women Network[16] and with university student business associations to best reach young entrepreneurs.

Similarly, with the entrepreneurial education program, "Impresa in azione" and the "Enterprise Academy" FINN partners with regional schools to reach young people < 18 and promotes entrepreneurial literacy and learning-by-doing enterprise development[17]. FINN, with the support of the Junior Achievement (JA), Italy, helps prepare young people for the real world by showing them how to create jobs which make their communities more robust, and how to apply entrepreneurial thinking to the workplace. Students put these lessons into action and learn the value of contributing to their communities during a competition between schools. Municipalities are also involved to power and concretise the calls for ideas.

To spearhead and provide overall guidance on how to reach and effectively engage vulnerable groups in society, VTT has developed a dedicated ethical framework and RRI (Responsible Research and Innovation) processes for project preparation, implementation, and evaluation stages. RRI is an inclusive approach to ensure that societal actors work together during the whole research and innovation (R&I) process, to better align both the process and outcomes of R&I with the values, needs and expectations of European society[18]. In practice, this means that for each project it runs as a DIH and a RTO, VTT appoints an expert within the organization to act as Ethics Manager, who will monitor ethical issues related to the project, attend project meetings when necessary and be

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[14] https://scwomenintech.co.zm/

[15] https://mestafrica.medium.com/mest-and-make-it-in-africa-announce-2020-cohort-of-tech-by-her-accelerator-program-5dab03863d8a

[16] http://www.kupesnetwork.com/

[17] https://friulinnovazione.it/it/consulenza-e-supporto/imprese/progetti-conclusi/enterprise-academy-fvg-2-201617/

[18] https://cris.vtt.fi/en/publications/responsible-research-in-industry-rri

consulted on all ethical issues. This role ensures the representation and needs of vulnerable groups, such as women and youth, are taken into consideration and addressed throughout every stage of projects.

Overall, to best perform and support innovation in their ecosystem, DIHs must firstly clearly communicate the quality of their different offerings to become trusted orchestrators. With this seal of approval acquired, DIHs can then actively work on best providing information and transparency across the different players in their ecosystem.

2.2 COLLABORATION

Collaboration among ecosystem actors is key to foster innovation, from knowledge sharing, to pooling resources and co-creating innovative ideas. However, for this collaboration to be sparked and maintained trust and clear incentives need to be built. For example, the critical mile logistics ecosystem in Sub-Saharan Africa is weak and prevents efficient collaboration among players, leading to a fragmented landscape rigged by duplications. DIHs can bridge some of these collaboration gaps, by making actors partnership ready, by bringing them together acting as a neutral broker and creating the right conditions to ensure successful co-creation endeavours. Collaboration among DIHs is also key to better support beneficiaries, SMEs and public sector actors by tapping into the experience and know-how of other hubs.

The table below summarizes the good practices which were brought up during the peer learning session by the different DIHs. The four categories of existing good practices which DIHs implement to create and support collaboration in their innovative ecosystem were the following:

- Raise awareness and onboard large companies in partnership with smaller innovative players
- Develop and share knowledge, tools and methodologies for partnership
- Structuring public entities engagement and support of start-ups
- Partnerships to harness complementarity of DIHs in a region

TABLE 6: OVERVIEW OF GOOD PRACTICE TO FOSTER COLLABORATION

NEED IDENTIFIED	GOOD PRACTICE	COUNTRY	DIH	RESOURCE
Raise awareness and onboard large companies in partnership with smaller innovative players	Involve senior managers from established companies in DIH programs as mentors, advisors and jury members	Italy	FINN	https://www.ita-slo.eu/CAB
	Organize match-making opportunities between start-ups and companies during events	Germany	DHM	https://digitalhublogistics.de/mittelstand-meets-start-up-die-blockchain-braucht-mehr-use-cases/
	Facilitate co-creation endeavours between start-ups and corporate as a first partnership step	Zambia	B-Hive	https://bongohivefintech.co.zm/
		Italy	FINN	https://open.electrolux.com/
		South Africa	MEST	https://www.merckgroup.com/en/research/innovation-center/news/all-news/pure-healthcare-innovation-the-first-ever-hackathon-in-south-africa.html

		Ghana	MEST	https://disrupt-africa.com/2015/01/28/mest-partners-vodafone-ghana-hackathon/
Develop and share knowledge, products and methodologies for partnership	Toolkits	UK & Ghana	MEST	https://media.nesta.org.uk/documents/Partnership-Toolkit-Feb-2019.pdf
	Gamified approach	Germany	DHM	Match-Machine board game
	Programmes fostering knowledge exchange of entrepreneurial experiences (EYE)	Europe	FINN	https://www.erasmus-entrepreneurs.eu/
Structuring public entities engagement and support of start-ups	Dedicated public entity	Finland	VTT	https://www.businessfinland.fi/en/for-finnish-customers/services/startup-companies/startup-companies
	Co-created start-up promotion policy	Ghana	MEST	https://ghanastartupact.org/
	Innovative public procurement	Netherlands		https://www.pianoo.nl/en/sustainable-public-procurement/spp-themes/public-procurement-innovation-ppi
	DIH acting as official relationship broker	Germany	DHM	DHM applies for the tenders of the German Business Development Agency and can pass along these opportunities to their respective ecosystem
Partnerships to harness complementarity of DIH in a region	Engage hubs in their specialized expertise	Ghana	MEST	https://www.zenovieinformationdesk.com/call-for-applications/pre-mest-startup-creation-cohort-for-people-living-in-ghana/

2.2.1 Raising awareness and connecting large companies with smaller innovative players

In the innovation ecosystem, larger existing companies can play a role in providing cloud resources, customers or financing opportunities to smaller players such as start-ups. However, for these corporates to become active contributors to their innovation ecosystem they need to become aware of the potential and be introduced to smaller players which may not yet be on their radar.

As a strategy for corporate engagement, B-Hive involves senior managers from established companies as mentors, advisors and jury members in programs as much as possible. Similarly, FINN for its CAB (Cross-border

Acceleration Bridge) acceleration programme identified mentors from corporates operating in Italy and Slovenia[19].

DIHs orchestrate match-making opportunities between start-ups and companies during events, such as DHM Corporate meet Start-ups (Mittelstand meets start-ups[20]) series. Each meet-up event covers a thematic topic, the latest to date was blockchain. Through their pitches, blockchain start-ups demonstrated to SMEs and corporates how tangible and relevant this technology can be for businesses. This interaction allows larger companies to become aware of new relevant innovations and start-ups to potentially partner with. Start-ups can meet potential clients and test the business relevance of their technological innovation.

Beyond facilitating get-to-together and first-encounter opportunities, DIH facilitates co-creation endeavours between start-ups and corporates as a first partnership step. B-Hive currently runs a FinTech collaborative challenge, where start-ups worked with established insurers in Zambia to identify, develop and launch a market-ready fintech prototype[21]. Similarly, FINN uses the Electrolux Open Innovation[22] to facilitate corporate open innovation. Through DHM, logistics corporates can make "Direct Problem Requests" to be solved by start-ups.

MEST organizes hackathons in partnership with established companies such as Merck South Africa[23] or Vodafone Ghana to respectively address challenges being faced by healthcare experts or in the second case to make mobile money more inclusive in Africa[24].

DIHs can also support start-ups with encountering corporates across borders. FINN acts as such a connector in their multi-border region by connecting the start-ups to foreign ecosystem actors, such as the Science and Technology parks in Austria which have corporates in their networks.

Highlight Box 2: Safeguarding the collaboration between start-ups and corporates

Once DIHs have facilitated the introduction of start-ups to larger corporates as brokers, their role becomes one of guarantors during the initial partnership phase to safeguard the rights of the smaller players. Some DIHs connect to have internal legal support entities: FINN offers an information desk from local affiliated law experts and MEST has a dedicated legal entity to guide young start-ups in making the right decision when it comes to legal contractual activities.

2.2.2 Develop and share knowledge products and methodology for partnerships

DIHs promote and develop numerous resources to foster collaboration and partnerships between actors in innovative ecosystems. Often, they have specialised parts to develop the tools and methodologies.

MEST leverages partnerships fostering methodologies and toolkit from the global innovation foundation NESTA, to define partnerships and get to implementation[25]. It provides practical steps, checklists, assessment methodologies and resources for successful collaboration.

In partnership with the Digital Hub Logistics Hamburg, DHM developed a Match-Machine board game to jump start and foster collaboration in a playful and insightful way.

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[19] https://www.ita-slo.eu/CAB
[20] https://digitalhublogistics.de/mittelstand-meets-start-up-die-blockchain-braucht-mehr-use-cases/
[21] https://bongohivefintech.co.zm/
[22] https://open.electrolux.com/
[23] https://www.merckgroup.com/en/research/innovation-center/news/all-news/pure-healthcare-innovation-the-first-ever-hackathon-in-south-africa.html
[24] https://disrupt-africa.com/2015/01/28/mest-partners-vodafone-ghana-hackathon/
[25] https://media.nesta.org.uk/documents/Partnership-Toolkit-Feb-2019.pdf

DIHs can act as intermediaries to start-up collaboration within a local region but also across borders. FINN facilitates cross-border exchange of entrepreneurial and management experience through the Erasmus for Young Entrepreneurs (EYE) programme[26] supported by the European Commission. In this programme, a newly established or potential entrepreneur shadows an experienced entrepreneur running a small or medium-sized enterprise (SME) in another EU country for a period of up to six months.

2.2.3   Structuring public entities engagement and support of start-ups

DIHs can play a key role in building and strengthening relations between the innovation ecosystem and public entities, who's support is critical for start-ups from nurturing policy frameworks to procurement opportunities.

Although public administrations are bound to public procurement rules, there are ways to facilitate public-private engagement like market dialogues with local companies, organisation of hackathons, pre-commercial procurement, etc.. These formats create a relationship between companies and the public administration in view of the procurement of a specific solution. In Finland, BusinessFinland[27], the Finnish government organization for innovation funding and trade, travel and investment promotion, has dedicated services for start-ups and SMEs. Similarly, the Netherlands have a dedicated Innovation Public Procurement policy[28]. German public buyers can encourage innovation among established market players, but also provide vital opportunities to SMEs and innovative companies who may have solutions to unmet needs but face difficulties in bringing them to the market.

Nonetheless, these remain rare exceptions. **Historically, relationships have been less straightforward between public actors and start-ups, with limited official collaboration.** Drafts of Start-up Acts have started burgeoning across different African countries to establish supporting legislation required to promote entrepreneurial development. However, to date only Tunisia and Senegal have a fully-fledged framework, for other countries like Ghana it remains a bill with concrete implementation tools to be defined[29].

Therefore, DIHs could be key players to bridge that collaboration gap. For example, DHM cultivates a close relationship with the German economic development agency (Germany Trade & Invest GTAI) and can therefore act as a trusted broker and intermediary, advocating for the interest of innovative players. DHM shares with its ecosystem opportunities and tenders from the German economic development agency and also applies for these tenders and includes in consortia its ecosystem partners.

2.2.4   Partnerships between DIHs

As digitalisation is on the rise in Africa, tech hubs are multiplying exponentially. DIHs play a critical role in supporting start-ups and building ecosystems. However, this **exponential growth has also led to a variety of structures under the DIH definition umbrella**. In Africa, DIHs can include incubators, accelerators, university-based innovation hubs, maker spaces, technology parks, and co-working spaces. As most African DIHs are sector agnostic **this also leads to some duplication of actions, competition for funding (donors or sponsors) and some "blanket" strategies**. This highlights the need to create a collaborative and complementary agenda built on common interests to foster hub consolidation across the continent.

Due to the sector agnostic nature of most African DIHs, it can be very relevant to partner with smaller but more specialized DIHs. For example, to better cater to the needs of female entrepreneurs which are part of its pre-MEST programs, MEST works with Soronko Solutions and Women's Haven Africa - Hubs that are women-focused. These specialized hubs have been running programs for female entrepreneurs and have better expertise in recruiting and training women. MEST learns through that process and applies these learnings to its own work.

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[26] https://www.erasmus-entrepreneurs.eu/
[27] https://www.businessfinland.fi/en/for-finnish-customers/services/startup-companies/startup-companies
[28] https://www.pianoo.nl/en/sustainable-public-procurement/spp-themes/public-procurement-innovation-ppi
[29] https://ghanastartupact.org/

For these specialized hubs, they benefit from MEST's clout and network. MEST also has offices in different countries which helps to inform their different country practices.

Highlight Box 3: Developing DIH expertise based on resources and beneficiaries´ needs

MEST incubation expertise: With their EIT flagship programs, MEST nurtures early-stage entrepreneurs from capacity building (software skills, business management, communication) to team building and seed funding. The program incentivizes entrepreneurs from different African countries and with complementary skills to team up and build foundations of their future business. Each group moves on to a MVP (minimum viable product), to market validation and becoming pitch ready. Furthermore, MEST has many partnerships with bilateral development organizations (i.e GIZ) and donors (i.e MasterCard Foundation), which allows to provide free-of-charge entrepreneurship programs to beneficiaries.

B-HIVE acceleration expertise: With fewer internal investing and funding capacity, B-HIVE developed its expertise on accelerating and growing companies by connecting them to industry experts through mentorship and by collaborating with alternative investment institutions like Village Capital and Prospero. B-HIVE developed a strategic expertise in catering to the needs of startups that are at a growth stage (post-revenue), have demonstrated strong market traction, sound governance and finance strategy and are thus ready for investment opportunities.

Overall, as an orchestrator DIHs have a multifaceted role to play in fostering collaboration across and among the different innovation entities in their ecosystem. From raising awareness and making actors visible to one another, to acting as a trusted partnership broker, DIHs must also leverage other DIHs strengths to best answer the needs of the ecosystems and beneficiaries.

2.3 CRITICAL MILE DISTRIBUTION

Smart logistics at the critical mile is an increasingly trendy topic in Europe and Africa. The constant search for greater efficiency, optimization, speed and delivery integrity are key themes. Much of the innovation in this sector comes from smaller players such as start-ups who disrupt the critical mile. Such players are likely to benefit from and require the support of DIHs. The role of DIHs can be key to enable entrepreneurs to overcome some framework conditions that can hinder their success such as developing strategic knowledge, accessing funding and the ease of doing business.

Framework conditions can be divided into set factors and changeable factors at the level of action of DIHs. Set factors are those that cannot be changed easily by DIHs to improve the business case for disrupting the critical mile in logistics. These may include for example the state of physical and digital infrastructure, which require considerable investment going beyond the realm of a DIH's function. However, **changeable factors are those that can be more easily worked on and impacted by DIHs. These include human and social capital, financing and business environment.**

TABLE 7: OVERVIEW OF GOOD PRACTICES TO SUPPORT INNOVATION IN CRITICAL MILE LOGISTICS

NEED IDENTIFIED	GOOD PRACTICE	COUNTRY	DIH	RESOURCE
Social Capital: Building a team as an entrepreneur	MEST's Entrepreneur in Training Program fosters team building by teaming up entrepreneurs during the duration of the program to create complementary skill sets	Ghana	MEST	https://meltwater.org/mest-africa-training-program/
Human Capital: Identify market gaps and demand-driven	BEAM is a logistics start-up builder that nurtures and invests in start-ups that address business problems highly	Germany	DHM	https://beamberlin.com/

opportunities for innovation	relevant for the logistics company BEUMER Group[30] and its customers			
Human Capital: Identify market gaps and demand-driven opportunities for innovation	VTT carries out technology studies and market studies to assess the potential of new technologies in logistics for companies and government agencies	Finland	VTT	https://www.vttresearch.com/en/ourservices/transport-and-mobility-impact-assessment-and-foresight & https://www.vttresearch.com/en/ourservices/automated-driving-and-smart-mobility-services
Access financing: Making available adequate and multiple funding opportunities	Portfolio and alumni companies of DIHs have a higher chance of accessing additional funding opportunities from ecosystem players such as foundations, other DIHs and corporates	Ghana	MEST	https://meltwater.org/2021/10/14/five-mest-portfolio-and-alumni-companies-receive-investment-from-googles-black-founders-fund/
	Smart Logistics in Africa special award within the Digital Logistics Award of DHM	Germany	DHM	https://digitalhublogistics.com/smart-packaging-experts-win-the-digital-logistics-award-2021/
Business environment: navigating IP challenges for start-ups	Integrating legal consulting in entrepreneurship programs and as a discounted services accessible for portfolio companies of DIHs	Ghana	MEST	https://www.linkedin.com/company/endcodesociety/

2.3.1 The enabling/inhibiting potential of human and social capital for critical mile business models

Due to its relevance, many start-ups are currently being created in the critical mile logistics space in Europe and Africa. This popularity might lead to entrepreneurs simply replicating existing business models without proper problem identification, market and customer knowledge.

DIHs can support aspiring entrepreneurs in nurturing their problem/opportunity identification, building up their business knowledge and accessing the right network and business partners to complement their skill set. MEST provided such support to the logistics enterprise Chekkit[31]. Chekkit is an anti-counterfeiting, asset tracking and consumer feedback analytics tool. It produces tamper-proof unique ID labels, either as QR codes or numeric codes, which can be placed on premium packaged food and beverage products for supply chain and consumer feedback tracking. The start-up was formed in 2018 after co-founders Dare Odumade and Jida Asare met while taking part in the MEST Entrepreneurial in Training (EITs) program. Asare is a pharmacist and software developer who identified supply chain challenges caused by illicit drug traders, while Odumade, an inventor and UI/UX expert, was also interested in creating a supply chain solution to reduce counterfeiting in Africa. Their problem identification was critical to their success, as counterfeit in health is a considerable cause of concern for both manufacturers and consumers. The tailoring and market proof of the solution was also critical. To be as inclusive as possible the solutions were designed to incorporate different tech savviness level of users with USSD codes or QR codes. Such a tailoring was made possible by MEST with the market research and piloting support which is part of their EIT program. During the 18 months incubation program, MEST helped Chekkit develop their MVP to make it market ready and then validate their business model.

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[30] BEUMER is an international leader in the design and manufacture of intralogistics systems for conveying, loading, palletising, packaging, sortation, and distribution https://www.beumergroup.com/
[31] https://chekkitapp.com/

> **Highlight Box 4: Problem identification and mapping for start-ups to be able to answer actual logistics challenges needed by the market, to find clients and to access financing**
>
> Even though logistics is becoming an interesting topic for tech-start-ups, there is still a limited understanding of its potential in terms of innovation beyond food delivery or moto-drivers marketplace. **Many start-ups rely on existing use cases as inspiration which often limits their business models and their potential in the market**. DHM works in Germany with commercial start-up builders, which are the venture capital arm of existing large companies. They are usually aware which specific problems need hands-on innovative solutions. For example, Beam[32] is a logistics company builder from the German conveyor belts producer BEUMER Group[33]. Through their investment strategy, Beam nurtures and invests in start-ups that address business problems highly relevant for BEUMER Group customers. Such a demand driven approach to business model creation ensure greater chances of success, of accessing financing and clients.
>
> **DIHs can facilitate this strategic problem identification by providing entrepreneurs in the making with greater market information and connections to industry experts, companies and their respective challenges. Greater access to strategic information can be key to develop viable business models instead of creating use cases and then testing if there is a market value for it.**

Evaluating the potential and readiness of the market for a new logistics solutions, approach or process also affects established companies and organisations. DIHs as knowledge and expertise providers can support navigating the entry in a new market or the adoption of new logistics technologies and systems. As a research and expertise centre, VTT evaluates and assesses the impact and the foreseen market potential of new technologies or technological systems in logistics for companies and government agencies. The growing but rather still nascent landscape of smart logistics can be hard to navigate for companies when it comes to choosing the right focus and priorities, and to identify business opportunities. VTT can provide such informed guidance by developing scenarios to illustrate alternative service and business models including new technologies or technological systems in logistics[34]. VTT´s value-added lies in human-centred engineering and service design where its Living Lab piloting environments allows clients to test the user-experience of services in real-life scenarios[35]. This includes technologies such as traffic management services and systems, connected and automated driving, drone (UAV) and drone systems (UAS) as well as Intelligent Transport Systems (ITS) and Cooperative Intelligent Transport Systems (C-ITS). Impact assessments are carried out from social, technological and economic perspectives. This holistic perspective is all the more relevant as innovation in logistics brings about potential for greener and more inclusive solutions.

2.3.2   The enabling/inhibiting potential of financing for critical mile business models

The availability of appropriate financing at different business development stages is a critical determinant of success for smart logistics entrepreneurs. In addition to the traditional hardship for African start-ups to access financing, digital businesses are typically characterised as high risk as they tend to lack tangible assets that can be used as collateral to obtain bank loans[36].

Nonetheless, access to financing is improving for start-ups, and especially for the ones operating in logistics, as the topic has gained traction over the last years. In the innovation space via DIHs, many awards with financial prizes have emerged. The Digital Logistics Special Award of DHM for smart logistics in Africa is an example of such a prize. The winner in the category in 2021, which was endowed with 5,000 euros, was the blockchain start-up Chekkit Technologies from Lagos, Nigeria[37]. **The prize money is usually too small to be considered as funding,**

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[32] https://beamberlin.com/
[33] https://www.beumergroup.com/
[34] https://www.vttresearch.com/en/ourservices/transport-and-mobility-impact-assessment-and-foresight
[35] https://www.vttresearch.com/en/ourservices/automated-driving-and-smart-mobility-services
[36] https://www.oecd-ilibrary.org//sites/28e047ba en/index.html?itemId=/content/component/28e047ba-en#
[37] https://digitalhublogistics.com/smart-packaging-experts-win-the-digital-logistics-award-2021/

but getting visibility, and having quality acknowledged through a prize can facilitate getting funding significantly, as described below.

Indeed, portfolio and alumni companies of DIHs have a higher chance of accessing other funding opportunities. Chekkit was recently named among 50 start-ups who will be receiving equity-free funding and support from Google's Black Founders Fund[38]. The program will allocate a non-dilutive $3 million fund across 50 investable start-ups in Africa. The start-ups also receive Google Ad Grants and Cloud credits, as well as support from experienced experts at Google.

DIHs can increase the chances of success of smart logistics businesses, by enabling them to access a greater pool of appropriate funding through DIH direct investments, grant prizes and by unlocking strategic partnerships with corporations who might take on the role of an investor.

2.3.3   The enabling/inhibiting potential of business environment for critical mile business models

A conducive business environment can greatly enhance the chances of success of opportunity-driven entrepreneurs.

Legal frameworks and ease of doing business remain complicated topics for start-ups across sectors. For tech entities the question of Intellectual Property (IP), is an important one, for which many countries do not yet provide comprehensive procedures to safeguard entrepreneurs and their businesses. To best protect the entrepreneurs in their Entrepreneurs in Training (EITs) programs and their portfolio companies, MEST now works with a legal consultancy to help entrepreneurs navigate IP questions and provides sessions on safeguarding, privacy and IP issues at a discounted price[39]. Furthermore, in terms of advocacy, MEST has been a bridge to connect start-ups to new rules, regulations and policies being introduced such as the start-up act or the fintech policies in Ghana.

Overall, it is important to point out that DIHs alone, cannot fully change the status quo and framework conditions around digital entrepreneurship in a holistic fashion. Inevitably a diverse multi-stakeholder ecosystem is needed to support opportunity entrepreneurs and innovative business models across sectors and in smart logistics. Nonetheless, DIHs can support entrepreneurs and help nudge the ecosystem in a more conducive direction to increase the chances of success of smart logistics business models at the critical mile.

2.4 DIGITAL UPSKILLING AND RESKILLING

As mentioned in the previous section, digital human capital is a critical factor for successful digital entrepreneurial endeavours that can be influenced by DIHs.

The digital transformation presents many opportunities across sectors for young entrepreneurs in Europe and Africa. Today, even non-digital entrepreneurs rely on digital processes for their day-to-day business operations (i.e. placing orders, social media marketing and communication, accessing market information). In addition, jobs that did not require digital skills in the past will begin to do so, as seen across the globe and sectors during the COVID-19 pandemic. **Digital upskilling is crucial, but so is reskilling**. The need for training also applies to the out of school population. Opportunities for retraining and upskilling must be made available to the active population to unlock innovation skills needed for entrepreneurship and intrapreneurship to facilitate the transition into new and emerging sectors such as smart logistics.

In addition to the plethora of digital skills to be taught, there is a wide range of delivery methods for these skills, from online programs, massive open online courses (MOOCs), coding bootcamps, internships, apprenticeships,

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[38]https://meltwater.org/2021/10/14/five-mest-portfolio-and-alumni-companies-receive-investment-from-googles-black-founders-fund/
[39] https://www.linkedin.com/company/endcodesociety/

in-person skill development training courses, workshops, conferences and blended learning. **It is key to design the right format which matches the needs and favoured learning style (i.e online vs offline) of beneficiaries**. This might vary based on the beneficiary's demographic, available resources (i.e time, money, human capital) and topic for upskilling.

For example, B-Hive listed the following different profiles of their beneficiaries:

- working entrepreneurs with limited time favouring learning in the evenings or on the weekends
- intrapreneurs with full time jobs: training takes them longer; there are also programs that are two weeks courses for which people would take time off
- graduates with considerable amounts of time might favour in-person intensive format while students would rather make use of off-time during holidays
- vulnerable demographic groups that could benefits from digital skills to improve their businesses or find employment: women and rural youth might require different and tailored formats to accommodate their limited availability of time (employment occupations and gendered domestic responsibilities) and their level of tech-savviness (access to technology and capacity to use technology). Online courses could be learning options as well as in-person training routed in their day-to day schedules (i.e. attached to cooperatives, rural organisations, etc)

The choice of format may vary based on the digital topics at hand, the different target groups as well as the required resources versus the expected impact to be achieved.

TABLE 8: OVERVIEW OF GOOD PRACTICES TO SUPPORT DIGITAL UPSKILLING AND RESKILLING

NEED IDENTIFIED	GOOD PRACTICE	COUNTRY	DIH	RESOURCE
Digital upskilling for busy and curious entrepreneurs	Boost with Facebook is a free webinar series on digital marketing through social media	Zambia	B-HIVE	https://bwfbongohive.splashthat.com
	Meta Developer Circle: Lusaka is a self-organized coding community	Zambia	B-HIVE	https://web.facebook.com/groups/DevCLusaka
Digital upskilling for non-digital SMEs	The Mittelstand-Digital Zentrum Ruhr-OWL supports through events and consulting SMEs with their digitalization potential and uptake	Germany	DHM	https://www.mittelstand-digital-ruhr-owl.de/de/
Digital upskilling for intrapreneurs	Start-In Factory membership for coaching, access to facilities and networking	Germany	DHM	https://startinfactory.de/
Sector specific digital upskilling for companies	Adriatic Cultural Tourism Laboratories (ATLAS) for digital upskilling in the cultural and tourism sector	Italy	FINN	https://friulinnovazione.it/it/consulenza-e-supporto/imprese/atlas-adriatic-cultural-tourism-laboratories/
Sector specific digital upskilling for companies	MTN hackathon on mobile money	B-Hive	Zambia	https://bongohive.co.zm/mtnmomohackathon

Sector specific digital upskilling for companies	Methodology to ensure retention and successful practical uptake	VTT	Finland	See highlight box 6
Technology specific digital upskilling for companies	Up-RE skilling of companies in 3D printing	Italy	FINN	https://friulinnovazione.it/en/consulenza-e-supporto-en/progetti-en/progetti-di-business-innovation-en/additive-fvg/
Technology specific digital upskilling for companies	VTT provides a wide set of services and solutions to support drone (UAV) and drone systems (UAS) development	Finland	VTT	https://www.vttresearch.com/en/ourservices/drones
Youth hands-on focused training for aspiring entrepreneurs and job seekers	SPARK program introduces kids to STEM (science, technology, engineering, and mathematics) and computer programming during school holidays	Zambia	B-HIVE	https://bongohive.co.zm/spark/
	Pre-MEST is an early-stage digital skills training program	Ghana	MEST	https://meltwater.org/pre-mest/
	The Coding Academy, an upskilling coding program connected to job placement opportunities	Zambia	B-HIVE	https://bongohive.co.zm/bongohive-consult-information-session/
Modular and flexible digital upskilling training for women and girls	Asikana Network upskilling program for girls, working women and women entrepreneurs	Zambia	B-Hive	https://www.asikananetwork.org/index.php/about-us/

2.4.1 Sparking digital interest for busy and curious entrepreneurs

The digital transformation presents many opportunities across sectors for entrepreneurs. However, active entrepreneurs might have limited time and resources to invest in upskilling and/or reskilling. It is thus important to develop flexible formats demonstrating the benefits that digital and innovative tools and processes offer. B-Hive developed light online formats for working entrepreneurs to improve or pick up new digital skills such as coding or digital marketing. Boost with Facebook is a free online program to learn about digital marketing using social media, from storytelling to effective advertising and KYC strategies[40]. The 2-hours webinars are organized in the evening and have different levels ranging from beginners, intermediary to advanced level, which allows to best target entrepreneurs digital marketing needs. Similarly, B-Hive is coordinating the Meta Developer Circle: Lusaka, which is an online community for all those who wish to learn and share with peers who have a passion

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[40] https://bwfbongohive.splashthat.com

"for everything tech"[41]. This online community becomes a centralized platform for digital knowledge products, upskilling resources and networking opportunities.

2.4.2   Digital upskilling formats for non-digital SMEs

As digital solutions are growing and penetrating all sectors, it is key for DIHs to offer upskilling options for the active population, existing companies and intrapreneurs in need to familiarize themselves with specific digital skills. To accompany these groups in their upskilling journey, DHM, with their Mittelstand-Digital Zentrum Ruhr-OWL, support SMEs in their digitalization processes through events, lectures, keynotes, workshops, portfolio analysis, prototyping etc[42].

Highlight Box 5: The special upskilling approach for traditional businesses

Digital upskilling in existing SMEs is not solely about acquiring a new technical skill, it also revolves around acquiring a new mindset for conducting processes and offering products and services. During its different upskilling formats, FINN dedicates time on organizational cultural development to accompany these new digital processes and mindsets necessary to implement a new way of thinking. This is all the more important as DHM testified that in their region in Germany many larger successful manufacturing companies with healthy books, did not feel the need to worry about digitalizing their process. Digitalisation in other words was more seen as a last resort when non-digital operations would prove themselves not to be profitable anymore. Therefore, it is important to work on the narrative and mindset that come with digitalisation and innovation. In addition, introducing new digital products and services requires to engage the customer in early stages of development. However, in more traditional businesses, the customer is only presented with the product once it is 100% finalized. Such a different level of customer engagement might also deter traditional businesses from introducing new innovative products or services.

The communication process to successfully reach SMEs and businesses can also require a specific approach. From its experience DHM will rely on German rather than English and uses paper-based documentation such as brochures in addition to physical meetings to convey the value of its digitalization smart logistics services to more traditional players. Similarly, the value of DIHs support offer is better valued when it has a (symbolic) price rather than offered for free.

2.4.3   Digital upskilling formats for intrapreneurs in existing companies

Digital upskilling can also be key for already digital and innovative enterprises, by targeting intrapreneurs. For a more hands-on digital intrapreneurs approach, DHM has developed their Start-In Factory program for intrapreneurs[43]. Via different paid membership options, intrapreneurs receive coaching conducted by experienced partners such as Fraunhofer Institute for Material Flow and Logistics (IML). To complement the theory, intrapreneurs get access to the coworking space, networking, ideation workshop and test labs. Similarly, for more continuous technology transfer, VTT uses action learning of workforce in companies during cooperation projects, whether it be direct commissions with organizations (1 month to several years), or in the course of projects funded by the Academy of Finland (2-3 years), Business Finland (1-3yrs) or longer EU projects (3-4 years).

2.4.4   Sector specific digital upskilling formats for companies

The upskilling can also be sector specific by focusing on the targeted needs of an industry and may be closer to a consultancy format. B-Hive partnered with the mobile phone provider MTN to implement a mobile money

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[41] https://web.facebook.com/groups/DevCLusaka
[42] https://www.mittelstand-digital-ruhr-owl.de/de/
[43] https://startinfactory.de/

hackathon[44]. For 2 months developers and entrepreneurs gathered in Zambia to create innovative financial and transactional applications using the MTN MoMo API platform.

During the global COVID pandemic, the tourism industry was heavily impacted. For the tourism and cultural sectors it is now key to have a virtual and digital presence. With the Adriatic Cultural Tourism Laboratories (ATLAS) project, FINN provides digital upskilling of cultural tourism operators, with insights in digital storytelling, web marketing and social media strategies[45]. For established professionals, a workshop format curated by industry experts was favoured to condense the upskilling learnings.

Highlight Box 6: When introducing a new digital topic, to ensure retention and successful practical uptake, VTT recommends the following methodology

1. <u>Observation of contrasting practical cases</u>: introducing different use cases that vary on a couple of dimensions to illustrate the different facets of the topic

2. <u>Prepare the mind to invent</u>: the audience is asked to think about the potential problem to start activating their engagement with the topic

3. <u>Expert opinion</u>: the audience is told by an expert how to overcome the potential problem and how to engage with the topic

4. <u>Practice</u>: the audience applies what they have learnt in a new scenario

5. <u>Feedback</u>: the expert provides feedback and highlights potential improvement areas

6. <u>Implementation</u>: from the feedback, the audience implements in their respective operations the new learnings

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2.4.5 Technology specific digital upskilling for companies

The reskilling capacity building can also be topic specific and will require blended learning of theory and practice when introducing a new digital topic. With its 18 months Up-RE skilling program, FINN explores with companies the potential of introducing 3D printing and additive manufacturing through a mixed approach combining theoretical input and practical sessions with 3D printing machine producers[46]. Companies receive a certification of competences in 3D printing.

Similarly, VTT provides a wide set of services and solutions to support drone (UAV) and drone systems (UAS) development for companies[47]. VTT evaluates the potential of the drone technology for companies and their respective needs and expectations. New use cases are currently developed for example in areas like smart inspections, surveillance and logistics (e.g. deliver items from web stores directly to customers etc). The decision to use drones is typically motivated by lower emissions, fast delivery, improved security or new tools to collect data. VTT leverages laboratory and simulation environments to test the introduction of drone technology for companies and the impact to be expected. In addition to ensure more comprehensive uptake of the technology, VTT acts as a broker by connecting the client to Finnish, European, international key players in the drone scene and network of industrial partners.

2.4.6 Youth hands-on upskilling training for aspiring entrepreneurs and job seekers

Digital entrepreneurship and digital skills represent a growing opportunity to empower youth and to enhance their chances of finding employment.

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[44] https://bongohive.co.zm/mtnmomohackathon
[45] https://friulinnovazione.it/it/consulenza-e-supporto/imprese/atlas-adriatic-cultural-tourism-laboratories/
[46] https://friulinnovazione.it/en/consulenza-e-supporto-en/progetti-en/progetti-di-business-innovation-en/additive-fvg/
[47] https://www.vttresearch.com/en/ourservices/drones

With the potential that digital technology represents it is crucial to spark and nurture this interest from a young age. SPARK is a B-Hive 2-day project-based program hosted during the school holidays to introduce kids to STEM (Science, Technology, Engineering and Math) and computer programming[48]. By participating in the programme, kids learn fundamental electronics and science concepts, with practical building sessions in which they get to learn how to turn ideas into solutions. The program format makes use of the free holiday time that children have.

To target youth and this specific beneficiary group, MEST developed PRE-MEST in partnership with Young Africa Works and the MasterCard Foundation. This program focuses on getting youth into digitally enabled jobs in Ghana. Thanks to its funding partners, Pre-MEST is a 12-week, full-time, tuition-free early-stage training program designed to help participants acquire skills in software development, digital marketing, and technology entrepreneurship[49]. This hands-on program offers digital skills and entrepreneurship training that matches trainees in Ghana with job opportunities upon graduation. In addition to being tuition free, MEST provides students with stipends to facilitate participation in the class sessions, and work on assignments and projects. To also reach young people outside of the capital, MEST partners with several other tech hubs to bring their DIH offering and services to non-urban areas.

Digital skills can be a valuable means to an end when it comes to increasing the employability of youth. Therefore, DIHs need to keep this overarching employment goal when designing digital upskilling trainings. B-Hive is implementing with the African tech job marketplace Dufuna[50], a Coding Academy for Zambians who are looking to gain skills in Software Engineering, Product Management and Product Design[51]. The 3-month program is supplemented by a job placement support, which has enabled the program to have 50% of its cohort successfully find an employment or to get promoted after graduation.

2.4.7   Modular and flexible digital upskilling training for women and girls

The digital transformation has created the opportunity for the scaling of home industries. The digital entrepreneurship spike has given women an opportunity to engage in online work from home providing safety and flexibility and jobs without discrimination. Thus, access to digital formats opens new learning and working opportunities for girls and women even in more traditional contexts. To provide girls, women and female entrepreneurs with tailored digital upskilling opportunities, B-Hive partners with the Asikana Networks[52]. In partnership these two DIHs support women to develop technology skills and help them find employment in the tech sector. The program is threefold and can target high school pupils, students and young women working or seeking participation in ICT related fields.

To match these new skills requirements, new approaches and teaching methods must be implemented which mirror more closely the future of work. For example, experiential approaches integrate content into real-world applications and inquiry-based learning. Similarly, the current knowledge gap in digital skills is especially present in the experience-based understanding of technology and its application. There is also a need to go beyond training on software, by **placing specific attention on developing a practical understanding and competency in hardware and manufacturing.** DIHs can play a critical role in supporting targeted digital upskilling and reskilling through strategic ecosystem partnerships and by answering the specific needs of their beneficiaries.

Overall, for innovation in the critical mile logistics and across sectors to be harnessed, digital upskilling and reskilling needs to be nurtured through an integrated approach. DIHs can play a role in supplying digitally skilled entrepreneurs, intrapreneurs and work force but they also need to prepare the rest of their ecosystem, and notably corporates to become ready to welcome the potential that digital innovation can offer on the other hand.

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[48] https://bongohive.co.zm/spark/
[49] https://meltwater.org/pre-mest/
[50] https://dufuna.com/
[51] https://bongohive.co.zm/bongohive-consult-information-session/
[52] https://www.asikananetwork.org/index.php/about-us/

3 RECOMMENDATIONS AND CONCLUSION

The peer learning process allowed EU and AU DIHs to share good practices, better understand local issues and define common implementation opportunities during the DIGILOGIC project and beyond. The exchanges in the plenary workshops and the bilateral twinnings yielded some lessons to foster greater and more impactful collaboration among DIHs while informing the partners how DIGILOGIC could tailor its upcoming activities. As the individual consortium of DIHs has run similar activities in the past, they exchanged some inspirational good practices and potential pitfalls to avoid.

This chapter will provide recommendations for each of the four topics investigated. In the highlighted boxes are featured DIGILOGIC upcoming activities to illustrate how the recommendations might be implemented.

3.1 RECOMMENDATIONS TO ENHANCE TRANSPARENCY

Create transparency about activities: In their central position as ecosystem orchestrator, DIHs often operate across different sectors and engage numerous stakeholders. As an outsider, being aware and keeping track of this plethora of activities might be a complicated endeavour. Therefore, there is a need for DIHs to better map and communicate their respective activity streams, expertise, target beneficiaries and respective partners.

Provide transparency on quality of services: Communicating the quality of one´s services is also important. This can be done in numerous ways, through formal certification processes and seals or by embedding thorough mentoring of mentors and quality control of DIHs coaches. Generating credibility and trustworthiness is key to stand out in the crowded landscape of DIHs and innovation support services which are burgeoning across Africa and Europe.

Be transparent about one's positioning: Appearing as a visible and credible player allows DIHs to better leverage players in their ecosystem. This becomes especially relevant for sector and target group agnostic DIHs who might collaborate with local partners better placed to reach specific and hard to reach beneficiaries, such as women and youth.

Once greater transparency is achieved it becomes easier for DIHs to better understand potential synergies and areas for collaboration among themselves and with relevant other ecosystem players.

Illustration Box 4.1: Fostering greater transparency within DIGILOGIC activities

DIGILOGIC creates a knowledge base on logistics value chain and latest digital technologies enabling competitive and sustainable logistics processes to be used to foster digital innovation in Africa through online mentoring. This mentoring applies three different formats. The first consists of a series of talks on innovative logistics technologies and business models. The second format are one-company workshops to develop new approaches for specific issues with respect to logistics and digitalization. Individual coaching sessions are the third format. Through a series of online meetings, a company employee is coached by a DIGILOGIC coach in the implementation of innovative digitalization solutions for logistics.

To ensure the quality and relevance of its online mentoring activities, coaches and experts in digital innovation in logistics notably from the Fraunhofer IML will be themselves coached ahead of time. This will ensure that the coaches are better equipped to target and answer the need of the beneficiaries (African), which might differ from their usual target audience (European). For that purpose, members of DIGILOGIC's

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High Level Advisory Board (HLAB)[53] and Impact and Innovation Board (IIB)[54] who are active in the local African innovation space will also be engaged in coaching activities.

As one of the overall objectives of the DIGILOGIC project is to empower African youth, especially women and vulnerable groups, across all activity channels it is key to partner with specialized organizations to best reach these target groups. Therefore, leveraging the respective African women and youth entrepreneurial networks and local structures known to MEST and B-HIVE will be critical.

3.2 RECOMMENDATIONS TO ENHANCE COLLABORATION

Act as a broker for collaboration in the ecosystem: Once greater transparency has been mapped and communicated, DIHs can better access the respective expertise of their DIH counterparts as well as engage and leverage other actors in their respective ecosystems. Trusted DIHs can act as brokers in their ecosystem by sparking, fostering and safeguarding partnerships between different players such as corporates and start-ups.

Create different formats of collaboration: Due to the wide variety of ecosystem players and their different needs and awareness of each other, DIHs can develop specific collaboration formats to cater to the desired partnership outcomes. From lighter introductory events to pairing and active co-created projects, it is key to offer collaboration formats that can easily accommodate and engage ecosystem stakeholders.

Illustration Box 4.2: Fostering greater collaboration through DIGILOGIC activities

In 2021, DIGILOGIC launched its community platform. The interactive online platform aims at facilitating the meaningful exchange of knowledge, community building, networking and the collaboration efforts of its users, as well as disseminate DIGILOGIC activities[55]. The platform will host DIGILOGIC activities from the innovation challenges to the online mentoring. A centralized place for stakeholders' interactions and exchange increases the chances to know each other, seeing the competences and value added of peers and therefore increasing collaboration even beyond DIGILOGIC activities.

As a result of the Peer Learning exercise, MEST and B-HIVE experts will now be featured on FINN's expert list (for other projects, not just DIGILOGIC). This incentivizes collaboration and gives MEST and B-HIVE's experts more visibility in the European context. Similarly, DHM with their expertise in logistics and FINN with their expertise in creative industry, have the potential to be guest lecturers and partners for entrepreneurial programs of African DIHs such as MEST and B-HIVE.

3.3 RECOMMENDATIONS TO ENHANCE BUSINESS MODELS FOR THE CRITICAL MILE

Ensure market relevance of support offers: A more intense collaboration allows to get a fuller picture of the market and tailor programs and support services following an integrated approach (demand-driven and supply-driven). Too often trainings for beneficiaries tend to be supply driven, resulting in graduates with limited applicable skills and disconnected business models. Collaborating with corporates, or DIHs who have connections to companies and market players, can help inform support services and ensure that they respond to the needs

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[53] https://digilogic.africa/_high_level/
[54] https://digilogic.africa/impact-and-innovation-board/
[55] https://community.digilogic.africa

of the market. These demand-driven approaches ensure that the capacity building provided by DIHs - on transferable demand-driven entrepreneurship and business model development - can be used by entrepreneurs to successfully go to market and grow.

Nurture the market´s readiness for innovation: While ensuring the market relevance of support offer is key for DIHs, it is also important to work on the market itself. Without an innovation savvy corporate sector or government procurement sector that can offer a customer base or job opportunities to a large number of entrepreneurs, support services are unlikely to ensure business development for start-ups. DIHs thus also have a role to play in preparing and raising awareness on the potential of digital innovation in their respective ecosystems.

Illustration Box 4.3: Enhancing business models for critical mile logistics

In 2022, the DIGILOGIC project will launch a call for proposals for teams of innovators in Africa and Europe to address four Challenges related to the improvement of logistics on both continents. Twelve teams will be selected to participate in a one-year programme of mentoring, coaching, and access to specialist facilities. The rational for the DIGILOGIC *Challenges* and the year-long associated mentoring, combines demand and supply driven approaches. The topics of the call for proposals were determined based on an introspective multi-stakeholder deep-dive, to highlight the most promising areas in the logistics sector: warehousing, transportation, point of sale and end consumer. Similarly, the mentoring for the 12 winning teams aims to provide skills needed by the market (i.e. sustainable business design, go-to-market strategies, increasing reliability, resilient value chain, initiating and managing investor relations) and involves actual corporate, potential clients and use cases. Such an engagement allows to build the corporates' openness to welcome digital innovation and collaboration with smaller innovative players. For that reason, the *Challenges* involve government offices interested in start-up initiatives and large companies interested in connecting with start-ups as jury, advisors and mentors.

3.4 RECOMMENDATIONS TO ENHANCE DIGITAL UPSKILLING AND RESKILLING

Based on the discussion of the peer learning workshops and twinnings it appears that for digital upskilling/reskilling capacity programs to be impactful, both the format and the content must be thoroughly considered.

Select suitable formats for capacity building activities: Capacity building programs on digital upskilling need to understand the framework conditions within which beneficiaries operate to select the best fitting format. By keeping in mind certain women and youth-specific time commitments, some learning formats will have to be favoured over others. For example, women face additional constraints resulting from gender-biased social institutions, particularly with regard to high demands on their time deriving from their household and family-related responsibilities. They are often less free than men to travel, which significantly diminishes their employment and education opportunities. Thus, programs that are either online, very flexible or in the evening benefit female participants.

Create a relevant mix of content modules to achieve the intended impact: It is also key to understand and communicate the impact hoped to be achieved with the new digital skills. Digital upskilling/reskilling is a means to allow beneficiaries to better find employment or better run their businesses or better develop their business models. Therefore, it is essential to create a mix of training modules that address digital skills, but also other skills to support entrepreneurship or employability.

> **Illustration Box 4.4: Fostering impactful digital upskilling and reskilling with DIGILOGIC activities**
>
> As part of DIGILOGIC, MEST and B-HIVE will run two entrepreneurial upskilling capacity building programs in the second half of 2022 and in 2023. The format and content of these programs are still to be designed at the time of DOP development.
>
> DIGILOGIC´s upskilling capacity building programs aim to have an impact on unemployed youth and women in Africa. Therefore, the digital and entrepreneurial skills transferred will not only be used for beneficiaries to start a business but also to potentially find employment as employees. In the sector of logistics this could for example mean to work as drivers or operators in a warehouse. The modules of the programs could reflect the needs of these professions nowadays.
>
> Unemployed youth and women represent specific demographic groups with different time availability and digital literacy. To best match these pre-conditions, the capacity building program could use a hybrid mode of delivery applying the DIGILOGIC Community platform as an online format as well as leverage MEST and B-HIVE´s (and their network) facilities for physical trainings. To tailor the best suited format, MEST and B-HIVE can leverage the knowledge of their network partners who work with and reach vulnerable groups like women and unemployed youth.

3.5 CONCLUSION

DIHs, whether in Africa or in Europe, are key innovation players in their ecosystem. During the six months peer learning processes, DIGILOGIC DIHs dived deeper into four pivotal areas to strengthen their support offerings, by exchanging inspirational good practices and potential pitfalls to avoid as well as by exploring potential partnership across the two continents. The four topics investigated, namely transparency, collaboration, innovative business models support, and upskilling/reskilling, build on one another to allow DIHs to best support innovation and sustainably impact their ecosystems.

To best perform and support innovation in their ecosystem, DIHs must first of all clearly communicate the quality of their different offerings to become trusted orchestrators. With this seal of approval acquired, DIHs can then actively work on best providing information and transparency across the different players in their ecosystem.

As a trusted orchestrator, DIHs have a multidimensional role to play in fostering collaboration across and among the different innovation stakeholders in their ecosystem. From raising awareness and making actors relevant to one another, to acting as a trusted partnership broker, DIHs must also leverage other DIHs strengths to best answer the needs of the ecosystems and beneficiaries.

Despite the quality and trust granted to them, DIHs alone cannot altogether change the status quo and framework conditions around digital entrepreneurship in a holistic fashion. Inevitably a diverse multi-stakeholder ecosystem is needed to support opportunity entrepreneurs and innovative business models across sectors and in smart logistics. Nonetheless, DIHs can support entrepreneurs and help nudge the ecosystem in a more conducive direction to increase the chances of success of smart logistics business models at the critical mile.

Finally, for innovation to be harnessed, digital upskilling and reskilling needs to be nurtured through an integrated approach and understood as a means to an end (i.e increasing employability, harnessing a local innovation opportunity, etc.), and not an end in itself. DIHs can play a role in supplying adequately digitally skilled entrepreneurs, intrapreneurs and work force but they also need to prepare the rest of their ecosystem, and notably corporates to become ready to welcome the potential that digital innovation can offer.