Alliance for Internet of Things Innovation

White Paper

Mission and Activities of IoT Digital Innovation Hubs Network

Version 1.0

AIOTI WG02 – IoT Innovation Ecosystems

October 2019

Executive Summary

The network of IoT Digital Innovation Hub (AIOTIDIHN) will play a fundamental role in building the community of developers contributing to IoT adoption in European industry, acting at local level. At the same time, AIOTIDIHN will emphasize on the business development strategies of the several IoT projects ran locally and eventually propose a roadmap for existing sectorial needs' fulfillments and unveiling of emergent ones through local economy's engagement. Thus, the AIOTIDIHN Programme aims at supporting the creation and the operations of IoT DIH nodes EU- and worldwide focusing on the technical capacities but not exclusively.

Business hubs, determined to incubate and encourage new services, play an important role in the global ecosystem that AIOTI is spinning. As in webs, all nodes are essential to build a lasting and strong structure; but, in this case the wider the web, the stronger the structure. To encourage the growth of the digital economy, AIOTIDIHN enables local digital hubs to enrich their services, to spin a network of enabling communities and to further support new internet-based business creation at local level. It is an effort to expand the reach of IOT technologies, so that as many companies or even individual developers as possible can have an easy first contact with IoT along with its leading promotion organization in EU, AIOTI, and take full advantage of it.

Table of Contents

1   Context

The EU supports the collaboration of DIHs to create an EU-wide network, where companies can access competences and facilities not available in the DIH of their region. This network will lead to knowledge transfer between regions and will be the basis for economies of scale and investments in the hubs. For this, the European Commission is investing EUR 100 million per year from 2016 to 2020.

Alliance for Internet of Things Innovation (AIOTI) is covering the IoT domains encompassing verticals which are using IoT technologies.
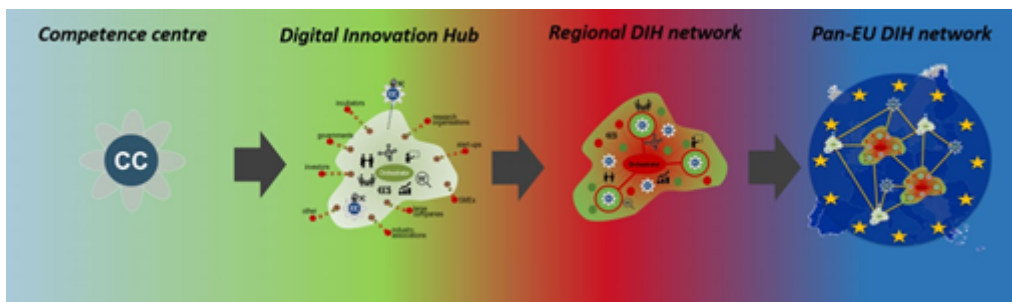
Source : DIHNET.EU project

IoT is one of the key domains for the European industry digitalisation, it is potentially used in many verticals (Smart cities, smart living, smart farming, smart manufacture, smart energy, smart mobility, smart building, …) and DIH are really a good manner to help European organisation to use such technologies in their process and services.

IoT are generating an enormous amount of data that need to be analysed to offer useful services to end users, IoT/data platform are also key to help Industry digitalisation. In that context, DIH will offer access to such platforms in order to develop and experiment innovative services.

For IoT DIH, there are two types of users:

- Companies developing IoT services
- Companies using IoT services

Due to the high number of business cases and heterogeneity of customers' requirements, each DIH can't be able to provide custom solutions to all of them. This is why a network of DIH is established to orchestrate the sharing of IoT devices, nodes and platforms as well as hard and soft competences among IoT DIHs so that they cope effectively with EU's economy digital transformation.

Worth notice that the European Commission has recently launched the DIHnet.eu support action which has the objective to facilitate organisation of DIH networks. It is coordinated by TNO and FundingBox, a collaborative tools is available, one addressing AIOTI initiative has been created (https://spaces.fundingbox.com/spaces/aioti-dih-network) that is available for discussions.

2   Mission and Objectives

The network of IoT Digital Innovation Hub (AIOTIDIHN) will play a fundamental role in building the community of developers adopting and contributing to IoT adoption in European industry, acting at local level. The AIOTIDIHN Programme aims at supporting the creation and the operations of IoT DIH nodes worldwide

Business hubs, determined to incubate and encourage new services, play an important role in the global ecosystem that AIOTI is spinning. As in webs, all nodes are essential to build a lasting and strong structure; but, in this case the wider the web, the stronger the structure. To encourage the growth of the digital economy, AIOTIDIHN enables local digital hubs to enrich their services, to spin a network of enabling communities and to further support new internet-based business creation at local level. It is an effort to expand the reach of IOT technologies, so that as many companies or even individual developers as possible can have an easy first contact with AIOTI and take full advantage of it.

IoT has also to support the growth and consolidation of the IoT community by working locally on disseminating and introducing the technology to interested parties, but also build local communities where the position and role of IoT would be developed, boosted and consolidated.

First and foremost, they should be devoted to instructing and educating, but also to helping and advising the interested parties, AIOTIDIHN should be a collaborative space for the whole IoT community where the cooperative work will boost new projects, The AIOTIDIHN must be able to collect, aggregate and reflect on individual hubs' demands of the local market with the capabilities of the IoT community, strengthening both and boosting the growth of the ecosystem.

3 Services offered by IoT DIHs

This section describes the services that IoT DIH should be able to offer to industries willing to develop/adopt innovative services using IoT technologies.

3.1 Strategy

3.1.1 Community building
- Visits to success stories.
- Events & congress's participation and visibility.
- Workshops for members.
- Best practices with media content.
- Hackathons (optional)

3.1.2 Digital development Strategy
- Diagnosis (Digi Check)
  - Digital Maturity diagnosis
  - Digital maturity level test
  - Free consultancy / first step advice.
  - Deep analysis of the digitalisation status of the company
- Transformation Plan
  - Identify companies transformation needs
  - Detailed Audit on the current digitalisation status
  - Digital transformation plan to step forward

3.1.3 3.1.3 Ecosystem learning
- Demand sector challenges catch up.
- Challenge Pre-materials composition and publication in the platform.
- Open Innovation Day
  - Challenge publication / platform
  - Dynamization of the challenges solution uploads at the platform
- Guidance to innovation process end. Pass to POC

3.1.4 Representation, promotion
- Showrooms (optional)
- Dissemination activities to arise use cases and trends
- Commercial info about the DIH activity
- Roadshows (optional)
- OpenWorkshops/brokerage

3.2 Collaborative R&D (expertise & tech infrastructures) up to industrialisation

3.2.1 Strategy RDI (to rise use cases and PoCs).
- Round tables in Meetups / Congresses
- Vertical / Sector Specialized workshops

3.2.2 R&D and Innovation Projects
- Type of
  - Bilateral project (with or with no funding)
  - Collaborative project (with funding)
- Stages:
  - Identification of demand challenges
  - Challenge solutions reception
  - Tech info structuring
  - Guiding and monitoring of project implementation
  - Access to Research financing
- Geographical scope :
  - Regional project – DG Growth – ESIF
  - National project (optional)
  - International research project creation – H2020 (optional)

3.2.3 Technical support on scale up
Ex : voucher from cascade funding etc. Inform to the ecosystem about cascade funding and opportunities. (optional).

3.2.4 3.2.4 Provision of Technology infrastructure
- Digitalisation platform (see next section 4)
- Data computation, applications and storage platform
- IoT Labs (optionally including devices and/or open data)

3.2.5 3.2.5 Testing & Validation for technology developers.
- Specialized testing activities on IoT performance.
- Strategic support: usability testing, market positioning and/or value proposition.
- Tech support: guidance and support to testing activities.
- Research projects support
- PoC and pilot projects proposals
- Experiment & Scale

3.3 Business

3.3.1 Growth for SMEs
- Business Acceleration programmes/ Business brokerage Meetups
- Business Fairs attendance (optional)
- Providers and demand matchmaking
- MARKETPLACE (Business) - Brokerage events and common market access strategies sharing.
- Project development - Industrialisation (optional)
  - Guiding - first tips
  - Mentoring throughout the digitalisation process
  - Expertise / Consulting for the product development
- Internationalization.
  - Similar ecosystems identification and benchmarking
  - Bilateral international agreements
  - Workshops with other DIHs
  - Cross marketplaces
  - Reception and dynamization of international workshops

3.3.2 Incubator / Accelerator support for startups (optional).
- Coaching and mentoring
- Fundraising strategy
- Networking events
- Offering Housing

3.3.3 Digital marketplace dynamization (optional)
- Services queries information management.
- Info about companies offering review
- % of project conversion vs. KPI data monitoring
- Dynamite and apply corrective measures to the tool.
- Marketplace reports presentation

3.3.4 Helpdesk management
- Admin/tech interlocution with DIH members
- Services documentation support.
- Collaboration agreements templates and samples, guide to documentation handling
- Documentation and guidance to Property and industrial rights handling procedures

3.3.5 One stop shop / single point of attention
- Attention desk for users, being able to give information regarding:
  - DIH services.
  - Contextual first level technological information.
  - Membership conditions and procedures.
  - Access to DIHs infrastructures.
- Single point of digital documentation reception proceeding from members and non-members starting their membership procedure.

- Interlocution to side partners, other entities, companies and final users involved in any kind of process with or within the DIH.
- Link to DIHs Tech Secretary, receiving technological enquiries and transmitting them to the most suitable part of the DIH structure.

3.4 Finance

3.4.1 Innovation vouchers (optional)
- cascade funding projects
- National initiatives
- Pre-commercial procurements (PCPs) projects

3.4.2 3.4.2 Consulting (optional)
- Public or private structures to provide advices & recommendations

3.4.3 3.4.3 Support / Expertise (optional)
- Public or private structures to provide advices & recommendations

3.5 Skills / Talents

3.5.1 Digital campuses
- List of training campuses with topics / domains

3.5.2 Digitalisation and I4.0 training (demand capacitation)
- Specific trainings with tools / platforms available for such a domain

3.5.3 Workshops 'train the trainer' (professional capacitation and training)
- Train the trainers program.
- Support for anchoring skills
  - Human management - engaging the human
  - Impact of digitalisation on humans

3.5.4 Job Offering (optional).
- Public or private structures to match the requests and offers

3.6   Minimum mandatory services offered by an IoT DIH

This section is proposing the minimum list of services that IoT DIH should propose in order to claim to be an AIOTI DIH. This is necessary in order to facilitate communication and exchanges between DIH but also to offer to end users (industry) the possibility to use one or another DIH without any problem.

Some work and discussion need to be done with several DIH prior providing such a list, it will be provided after validation of the sub-sections above.

Task	Description	Sub-task involved
1	Strategy	
1.1	Community Building	• Visit success stories • Events & congresses • Members Workshops • Best practices videos & media
1.2	Digital Development Strategy	• Diagnosis (Digi Check) • Transformation Plan
1.3	Ecosystem learning	• Demand challenges catch • Challenges Pre-materials creation • Open Innovation Day • Guidance to innovation process end. Pass to POC
1.4	Representation, promotion	• Dissemination activities • Commercial info • Open Workshops/Brokerage meetups
2	R&D / Offer / Industrialisation	
2.1	Strategy in RDI	• Round tables in Meetups / Congresses • Vertical / Sector Specialized workshops
2.2	R+D+i projects	• Type of ○ Bilateral project (with or with no funding) ○ Collaborative project (with funding) • Stages: ○ Identification of demand challenges ○ Challenge solutions reception ○ Tech info structuring

			○Guiding and monitoring of project implementation ○Access to Research financiation ●Geographical scope : ○Regional project – DG Growth – ESIF
2.3	Tech support on scale up		
2.4	Provision of technology infrastructure		●Digitalisation platform (see next section 4) ●Data computation, applications and storage platform. ●IoT Labs (optionally including devices and/or open data).
2.5	Testing and validation for developers		●Specialized testing activities on IoT performance. ●Strategic support: usability testing, market positioning and/or value proposition. ●Tech support: guidance and support to testing activities. ●Research projects support ●PoC and pilot projects proposals ●Experiment & Scale
3	Business		
3.1	Growth for SMEs		●Business Acceleration / Business Meeting ●Providers and demand matchmaking ●MARKETPLACE (Business) - Brokerage events and strategies. ●Internationalization.
3.4	Helpdesk Management		●Admin/tech interlocution with DIH members ●Services documentation support. ●Collaboration agreements templates and samples, guide to documentation handling ●Documentation and guidance to Property and industrial rights handling procedures
3.5	One stop shop		●Attention desk for users ●Single point of digital documentation reception proceeding from members and non-members starting their membership procedure. ●Interlocution to side partners, other entities, companies and final users

		involved in any kind of process with or within the DIH. • Link to DIHs Tech Secretary, receiving technological enquiries and transmitting them to the most suitable part of the DIH structure.
4	Finance	
5	Skills & Talents	
5.1	Digital Campuses	• List of training campuses with topics / domains
5.2	Digitalisation and I4.0 Training	• Specific training tools / platforms available for such a domains
5.3	Workshops "train the trainer"	• Train the trainers training • Support for anchoring skills

4   Platforms Sharing

This section is providing an overview of the main IoT platforms used in IoT DIHs with an objective to avoid too much duplication and to identify those which are sharable remotely

Unify-IoT project has recently produced a report on existing IoT platform, the 23 leading IoT platforms could be classified as follow:

Leading IoT platforms					
Commercial					Open Source
Multination corporations				SME platforms	Kaa
Cloud centric	Industry centric	Comms centric	Device centric	ThingSpeak	Nimbits
				Xively	Eclipse IoT
Microsoft Azure IoT	PTC ThingWorx	PTC Axeda	Intel IoT	Carriots	Open Remote
IBM Watson IoT	Bosch SW Inno	CISCO/Jasper	ARM mbed	EvryThng	FIWARE*
Amazon AWS IoT	Suite	Ayala Networks		SensorCloud	OpenIoT*
	GE Predix	Aeris IoT			

Source Unify-IoT project (https://cordis.europa.eu/project/rcn/199180/reporting/en)

4.1   Platforms used by IoT DIHs

Sirris : Azure IoT, AWS IoT

Pôle I&R: FIWARE

I2cat: CRYSTAL o UniversAAL; NB-IoT Vodafone Network; Sigfox Platform

MinaSmart : Microsystems, IoT and Network (including connectivity) , Cybersecurity & Privacy

CITC : SPOT (Objenious), SigFox, The Things Network

DIGIHUB Südbaden: Siemens MindSphere, The Things Network

DIHBU: BackEnd SigFox, LoRaWan, Narrow Band IoT (NB-IoT)

Universidad Politécnica Madrid: AIOTES Platform

FINT: FIWARE

4.2   Platform description

This section gives a short description of the technical IoT platforms used by IoT DIH

Platform Azure IoT

- Description:
  The Azure Internet of Things (IoT) is a collection of Microsoft-managed cloud services that connect, monitor, and control billions of IoT assets. In simpler terms, an IoT solution is made up of one or more IoT devices and one or more back-end services running in the cloud that communicate with each other.
- Remote access: https://azure.microsoft.com/en-us/services/iot-hub/
- Access condition: Commercial
- Location: Worldwide

Platform AWS IoT

- Description:
  AWS IoT makes it easy to use AWS services like Amazon Kinesis, Amazon S3, Amazon DynamoDB, Amazon CloudWatch, and AWS CloudTrail, to build IoT applications that gather, process, analyze and act on data generated by connected devices, without having to manage any infrastructure.

- Remote access: https://aws.amazon.com/iot-core/getting-started/
- Access condition: Commercial
- Location: Worldwide

Platform FIWARE

- Description:
  FIWARE Lab is the non-commercial sandbox environment of the FIWARE Community. It offers, for free, the capability to innovate and experiment with the FIWARE Technologies. Entrepreneurs and individuals can test FIWARE technologies as well as their applications within the FIWARE Lab, with the possibility to exploit Open Data published by cities and other organizations.
- Remote access: https://cloud.lab.fiware.org/auth/login/?next=/
- Access condition: FREE
- Location: France, India, Spain, Italy, Greece, Senegal

Platform SPOT

- Description:
  SPOT is a commercial IoT Platform developed for Objenious Network (LoRaWAN). Objenious is a subsidiary of Bouygues Telecom.
- Remote access: https://objenious.com/starter/
  https://spot.objenious.com/login

- Access condition: Commercial
- Location: France

Platform Sigfox

- Description:
  Sigfox is a LPWAN commercial network with a dedicated IoT Platform. Sigfox delivers the network and the protocols required to allow an object to share its data from anywhere in the world.
- Remote access: https://build.sigfox.com
- Access condition: Commercial
- Location: France, Sigfox presence in 60 countries in 2018

NB-IoT Vodafone Network - Vodafone IoT Platform

- Description:
  NarrowBand-Internet of Things (NB-IoT) is a standards-based low power wide area (LPWA) technology developed to enable a wide range of new IoT devices and services. NB-IoT is an 'industrial grade' LPWA solution – it runs on licenced spectrum which guarantees quality of service and a future-proofed capability

- Remote access: https://www.vodafone.com/business/iot/managed-iot-connectivity/nb-iot#narrowbandiot-applications-and-solutions
  https://www.vodafone.com/business/iot#iot-platform

- Access condition: Commercial. Based on open standards – service is not vendor or operator dependent
- Location: Worldwide

Platform The Things Network

- Description:
  The Things Network provides a set of open tools and a global, open network (LoRaWAN) to build IoT application at low cost, featuring maximum security and ready to scale. Through robust end-to-end encryption, a secure and collaborative Internet of Things network is built that spans across many countries around the globe. Now operating thousands of gateways providing coverage to millions of people.
- Remote access: https://account.thethingsnetwork.org/register
- Access condition: Open Source
- Location: Worldwide

AIOTES Platform: ACTIVAGE IoT Ecosystem Suite (AIoTES)

- Description:
  The ACTIVAGE IoT Ecosystem Suite (AIoTES) consists of a set of techniques, tools and methodologies for interoperability between heterogeneous IoT Platforms and an open framework for providing semantic interoperability of IoT Platforms for AHA, while addressing trustworthiness, privacy, data protection and security. It interconnects FIWARE, IoTvity, OpenIOT, SeniorSome, sensiNact, Sofia 2, and universAAL IoT platforms, new platforms can be added by creating a bridge for syntactic alignment and using the IPSM feature for semantic alignments with the AIOTES Data Model.
- Remote access: http://www.activageproject.eu/
- Access Condition: Open Source (release expected on sept 2019, and in 2020Q1)
- Location: Europe (Spain, Italy, Greece, France, Germany, Finland, UK)

Platform UniversAAL

- Description: universAAL IoT is the open source platform that enables seamless interoperability of devices, services and applications on an unprecedented scale. The community behind this not-for-profit software platform believes that by integrating every available technology, we can finally bring clarity to the Internet of Things (IoT).
- Remote access: https://www.universaal.info/page/explore/
- Access condition: not-for-profit software
- Location: Worldwide

CRYSTAL: CRITICAL SYSTEM ENGINEERING ACCELERATION Reference Technology Platform

- Description: The ARTEMIS Joint Undertaking project CRYSTAL (CRitical sYSTem engineering AcceLeration) takes up the challenge to establish and push forward an Interoperability Specification (IOS) and a Reference Technology Platform (RTP) as a European standard for safety-critical systems.
- Remote access: http://www.crystal-artemis.eu
- Access condition: not-for-profit software
- Location: Europe

Platform Microsystem

- Description: Micro and nano electromechanical systems (MEMS and NEMS) manufacturers are on a constant quest to lower chip energy consumption while keeping the cost of manufacturing key chip components down.

  CEA Tech institute Leti brings 35 years of experience in MEMS R&D, and is one of the world's largest centers for MEMS research. The institute has successfully transferred many of its innovations to manufacturers.

  Leti offers a broad range of services covering the entire MEMS and NEMS development cycle, addressing sensors, switches, RF components, 3D integration, characterization, and reliability testing to partners' specifications.

  The institute's flagship M&NEMS technology makes it possible to integrate nano-objects (piezoresistive nanowires) and MEMS onto a single sensor. This innovation—smaller than traditional MEMS capacitive sensors—marks an advance toward reducing manufacturing costs.

- Remote access: http://www.cea-tech.fr/cea-tech/english/Pages/resources-and-skills/x1x-micro-nano-systems.aspx
- Access condition: CEA Tech conditions
- Location: Grenoble – France

Platform IoT and Network (including connectivity)

- Description: CEA Tech is helping drive widespread IoT (Internet of Things) deployment by addressing three major issues: how communicating objects capture and process information; overall system cost reduction; and data security.
  CEA Tech institute Leti is developing sensors to pick up data and process it locally to extract relevant information and is making advances toward self-powering components by modifying integrated low-power electronics, developing enhanced low-level protocols, and systems capable of harvesting energy from the environment.

  The institute is also developing smart miniaturized antennas and investigating ways to roll out reliable, secure connectivity. Finally, the institute is paving the way for tomorrow's telecommunications networks (5G) for IoT.

- Remote access: http://www.cea-tech.fr/cea-tech/english/Pages/resources-and-skills/x1x-telecommunications-and-communicating-objects.aspx
- Access condition: CEA Tech conditions
- Location: Grenoble - France

Platform Cybersecurity & Privacy

- Description: The integrated circuits found in smartphones, mobile embedded systems, smart cards, and other connected objects are all prime targets for cyber-attacks.
  CEA Tech institute Leti has built up a unique set of resources to simulate physical attacks (fault injection) on these kinds of systems. Leti researchers have also developed characterization tests to evaluate these targets' vulnerability, detect any weaknesses, and come up with innovative solutions to close breaches, thereby mitigating attacks.

  Leti helps its industrial partners make their products more secure and certifies products before release. In France, certification involves official evaluations carried out according to Common Criteria. Leti is one of two centers in France to conduct these official evaluations, right on the CEA Tech campus.

- Remote access: http://www.cea-tech.fr/cea-tech/english/Pages/resources-and-skills/x1x-secure-components.aspx
- Access condition: CEA Tech conditions
- Location: Grenoble - France

5 Collaborative Tools

AIOTI is managing a number of online tools that could be used to facilitate exchanges and communication between DIH. Each DIH belonging to the network should be able to register to access these tools.

- Document Repository : A document management system (DMS) is a system (based on computer programs in the case of the management of digital documents) used to track, manage and store documents and reduce paper. Most are capable of keeping a record of the various versions created and modified by different users (history tracking). The term has some overlap with the concepts of content management systems. It is often viewed as a component of enterprise content management (ECM) systems and related to digital asset management, document imaging, workflow systems and records management systems.
- Mailing list : A mailing list is a collection of names and addresses used by an individual or an organization to send material to multiple recipients. The term is often extended to include the people subscribed to such a list, so the group of subscribers is referred to as "the mailing list", or simply "the list".
- Market place: An online marketplace (or online e-commerce marketplace) is a type of e-commerce site where product or service information is provided by multiple third parties, whereas transactions are processed by the marketplace operator. Online marketplaces are the primary type of multichannel ecommerce and can be a way to streamline the production process. (see MIDIH EIT/KIC or FIA / FIWARE market place http://arena.fiware.eng.it/)
- Platform agendas (book a slot) : An online calendar is a web application that allow one or more users to edit, and optionally share with other users, online access to a calendar.
- Website with services offered and link to each DIH websites
- eLearning platform : training courses
- Challenge platform : request from companies (see EEN platform)

AIOTI is provided a Teamwork project collaborative environment which support the following features:

- Calendars: Track your meetings, holidays, and major deadlines in one place, and easily sync up with your team.
- Status updates: Get real-time status updates on project progress from your team, so everyone can see where work stands at a glance.
- Milestones: Don't lose sight of the bigger picture. Mark your highest priorities as Milestones, and work backwards from important deadlines to make sure you hit those goals.
- Contacts: Keep your team members, collaborators, and clients in the loop. With Projects, you have one central platform where everyone can communicate without losing visibility of each other's work.

6   Services offered by IoT DIH Network

IoT DIH network is planning to offer a number of services to help IoT DIH to operate in good conditions. These services blow is a provisional list that could be completed in the future looking to DIH recommendations.

6.1   Collaborative tools

This service is supported by AIOTI, it covers Document Repository, Mailing list, Market place, Platform agendas (book a slot), Website with services offered and link to each DIH websites, …and IOT DIH catalog.

6.2   Liaison with the European Commission (EC)

This service is dealing with communication with the 2 main DG Connect units that are interested by the initiatives (Unit A2: technologies and systems for Digitising European Industry and Unit E4: Internet of Things). A number of events and workshops are organised each year and obviously anyone is not able to attend all of them. Reporting provided by participants will be shared on the web site

6.3   Workshop, meeting organisation, event planning, Hubs visit (for DIH and SMEs)

In order to build our community, there is a need to meet at least once a year, this service will take in charge the organisation of the workshop and potential meetings that are needed

6.4   News

IoT domain evolves very fast and AIOTI is following closely the actuality, this services will offers to DIH the latest news circulating on IoT such as events, regulations, policy, security, ethics, ...

6.5   Technology watch

The services will provide to DIH a collected information report regarding IoT technologies evolution and also side technologies such as big data, connectivity, AI, security, … All this information will be updated on the website and email push should also be possible on demand.

6.6   Training catalog & session

This service is clearly linked to the Training session, it will propose an online catalog with contacts in order to help DIH staff to train to specific IoT technologies.

This service will also propose to organise online training sessions on specific topics that have an interest for DIH staff but also for DIH "customers". Webinars could also be organised on demand.

6.7   Technical skills

IoT technology is a very wide domain with a number of technologies that are adapted to one or another vertical domains. More than 300 protocols have been identified by AIOTI so it is quite impossible for anyone to be an expert of all these technologies.

This service offers an online contact list that identifies the experts for each technology and these experts should be contacted to get help

6.8   Identification of European projects and funds

(ref to ERDF which are part of the ESIF program)

European research program is very wide with a number of calls and it is not obvious to find the most relevant one. This service will offer a catalog of the most relevant calls for IoT projects.

6.9   A common market place where each companies solutions could be highlighted (technology providers)

A number of innovative services and technologies will be developed through the IoT DIH, this service will offer a marketplace where anyone could advertise a product or a service

6.10   A common success stories repository where real successful operations for industry users can be highlighted

Industries that will use DIH to introduce IoT technologies in their process should be able to communicate on the benefits of a specific solution if it is a success. An online repository will be available for DIH to communicate on their success stories

6.11   Certification of solutions (i.e. European label).

Interoperability should be required in some cases in order to facilitate exchange of data between different technologies. Standardisation institutes have already specified a number of standards and it should be interested to check compliance of products to these standards.

6.12   Best practices Sharing

In DIH daily activities there are a number of problems which rise up and it could be helpful to management a FAQ online tool where people could find support. It could for technical aspects as well as regulatory topics or any useful information.

This service covers also the analysis of a DIH service level in order to help it to reach higher levels.

6.13   Technical IoT open platform list (Description, remote access conditions, shared agenda)

This services is closely linked to the platforms section, it should offer an online agenda where one could look to the availability of a specific platform, the condition of access and can also book a slot online for a spécif usage.

6.14   IPR Management

Customers of DIH should disclose confidential information that need to be saved and kept between authorised stakeholders. For that reason, there will be a need to establish an agreement that will secure the information exchange.

There a number of cooperative agreements which are existing, in order to facilitate cooperation between DIH, it should be interesting to use a common document.

The above models may help to personalise/complete a consortium agreement. Have, however, in mind that they show only examples of possible approaches and do not show all alternatives for a given situation – you may adjust them for the specific needs of your particular consortium to the extent that such modifications are not in conflict with the Grant Agreement or the Horizon 2020 Rules for Participation.

- DESCA Model
- EUCAR Model
- MCARD Model
- LERU Model
- BAK Model

Based on one of these existing models, a specific CA could be proposed by the Network of DIH.

6.15   Access to technology and design services (support in)

This service offers an online contact list that identifies the experts for each technologies and these experts should be contacted to get help. Beside of the expert technical knowledge the service will guide customers to technology providers offering access to technologies proposed by experts to solve the specific problem.

6.16   User communities for pilots and experiments

In order to validate a service, there is often a need to run pilots/experimentation with real users. This service offers a number of users in many European location that could be used to validate a specific service developed in one country. So that, the service provider can check if the service is fitting the needs of other users in other countries

6.17   DIH Services that could be provided at network level

This table is identifying the DIH services that could be offered at Network level because common to all DIH

1. Strategy		
1.1	Community Building	Best practices videos & media
2. R&D / Offer / Industrialisation		
2.1	Strategy in RDI	● Round tables in Meetups / Congresses ● Vertical / Sector Specialized workshops
2.4	Provision of technology infrastructure	Digitalisation platform (see section 4)
3. Business		

3.1	Growth for SMEs	● MARKETPLACE (Business) - Brokerage events & Strategies ● internationalisation
3.4	Helpdesk Management	Admin/tech interlocution with DIH members Services documentation support. Collaboration agreements templates and samples, guide to documentation handling Documentation and guidance to Property and industrial rights handling procedures
4. Finance		
5. Skills & Talents		
5.1	Digital Campuses	● List of training campuses with topics / domains
5.2	Digitalisation and I4.0 Training	● Specific training tools / platforms available for such a domains
5.3	Workshops "train the trainer"	● Train the trainers training ● Support for anchoring skills

7   List of Active and Operational IoT DIHs

The full list of DIH is available at the European Commission's Joint Research Center (JRC) web site catalog (http://s3platform.jrc.ec.europa.eu/digital-innovation-hubs-tool) among them a number of them are active in the AIOTI initiative.

This section should also give information of services offered by each IoT DIH

01- Aarhus

02- CITC-EuraRFID (www.iotcluster.fr)

03- DIHBU

04- DigiHub

05- I2cat

06- Competitivity Cluster Images&Réseaux

07- Institute Electron Technology

08- MinaSmart

09- Sirris

10- Universidad Politécnica Madrid

11- ahedd (http://ahedd.demokritos.gr/)

Description	01	02	03	04	05	06	07	08	09	10	11
1. Strategy											
1.1 Community Building											
• Visit success stories		X				X		X			X
• Events & congresses		X				X		X			X
• Members Workshops		X				X		X			X
• Best practices videos & media		X									
1.2 Digital Development Strategy											
• Diagnosis (Digi Check)		X				X		X			
• Transformation Plan		X						X			
1.3 Ecosystem learning											X
• Demand challenges catch											
• Challenges Pre-materials creation		X				X		X			
• Open Innovation Day		X				X		X			X
• Guidance to innovation process end. Pass to POC											
1.4 Representation, promotion											
• Dissemination activities		X	X			X		X			X
• Commercial info		X						X			X
• Open Workshops/Brokerage meetups		X				X		X			X
2. R&D / Offer / Industrialisation											
2.1 Strategy in RDI											
• Round tables in Meetups / Congresses		X						X			X
• Vertical / Sector Specialized workshops		X				X		X			X
2.2 R+D+i projects			X			X					
• Type of											
○ Bilateral project (with or with no funding)		X						X			X
○ Collaborative project (with funding)		X						X			X
• Stages:											
○ Identification of demand challenges		X						X			X
○ Challenge solutions reception		X						X			X
○ Tech info structuring		X						X			X

○ Guiding and monitoring of project implementation		X					X			
(implementation)							X			X
○ Access to Research financiation		X								
● Geographical scope :		X					X			X
○ Regional project – DG Growth – ESIF		X								X
○ National project (optional)		X								
○ International research project creation – H2020 (optional)		X								
		X								
2.3 Tech support on scale up		X				X	X			
2.4 Provision of technology infrastructure.			X			X				
● Digitalisation platform (see next section 4)		X					X			X
● Data computation, applications and storage platform.										X
● IoT Labs (optionally including devices and/or open data).		X					X			X
		X								
2.5 Testing and validation for developers			x			X				
● Specialized testing activities on IoT performance.		X					X			
● Strategic support: usability testing, market positioning and/or value proposition.		X					X			X
● Tech support: guidance and support to testing activities.		X					X			X
● Research projects support		X					X			
● PoC and pilot projects proposals		X								X
● Experiment & Scale		X					X			X
3. Business										
3.1 Growth for SMEs			X			X				
● Business Acceleration / Business Meeting		X					X			X
● Providers and demand matchmaking		X					X			X
● MARKETPLACE		X					X			
● Internationalization.		X					X			
3.4 Helpdesk Management										
● Admin/tech interlocution with DIH members		X					X			X

	C1	C2	C3	C4	C5	C6	C7	C8	C9
• Services documentation support.	X								X
• Collaboration agreements templates and samples, guide to documentation handling	X					X			X
• Documentation and guidance to Property and industrial rights handling procedures	X					X			X
3.5 One stop shop • Attention desk for users	X					X			
• Single point of digital documentation reception proceeding from members and non-members starting their membership procedure.	X								X
• Interlocution to side partners, other entities, companies and final users involved in any kind of process with or within the DIH.						X			
• Link to DIHs Tech Secretary, receiving technological enquiries and transmitting them to the most suitable part of the DIH structure.	X					X			X
									X

4. Finance

5. Skills & Talents

	C1	C2	C3	C4	C5	C6	C7	C8	C9
5.1 Digital Campuses • List of training campuses with topics / domains	X					X			
5.2 Digitalisation and I4.0 Training • Specific trainings with tools / platforms available for such a domain	X					X			X
5.3 Workshops "train the trainer" • Train the trainers training • Support for anchoring skills	X								

7.1   Enlargement of the IoT DIH network community

In order to begin to build our network, based on this paper, an open call will follow to invite IoT DIH to join this initiative. For that purpose, the 200 IoT DIH declared in the S3 catalog will be contacted and invited to join and to contribute in order to complete this first version of the document with additional services, platforms, ideas, …

The second step will be the next call for proposal DT-ICT-03-2020 (November) which offers the possibility to setup DIH networks (CSA).

The action will support the network of Digital Innovation Hubs and help achieve broad coverage in technological, application, innovation, and geographic terms, and link up with regional/national innovation initiatives, and other Digital Innovation Hubs. The action should build on the previously developed tools and innovation portal and aim to further improve them

for the benefit of new Innovation Actions. The actions should also help in sharing best practices, dissemination, brokering between users and suppliers, leveraging investment and training and organise events. For these support actions, close cooperation is required with the European Factories of the Future Research Association (EFFRA90), and other CSAs funded under the Digital Innovation Hubs part of the Focus Area "Digitising and transforming European industry and services".

8   Conclusions

This paper is a first step of our initiative having the objective to put in place a pan-European network of IoT DIH. It gives some indication of the services that IoT DIH should offer in order to offer to end users (Industry) a comprehensive pan European environment helping them to develop innovative services.

This initiative targeting IoT domain also needs to be aligned with other technical domains and for that reason our cooperation with DIHNET (DIHNET.EU) action has to be effective. The structuration of services developed in the IoT context could be clearly replicated in other technical domain.

Next steps

- Share this paper with DIHNET
- Get comment from all IoT DIH declared in the S3 catalog
- Launch a call for candidature in order to begin to build the network
- Prepared together with the EC unit E4
- Identification of potential funds to support the operation of the network (DT-ICT-01-2019: Smart Anything Everywhere)

KPIs used to evaluate the AIOTI DIH Network

- Critical mass composing the AIOTIDIHN: 8 countries,
- Events: 2 events / year
- New services provided by the Network: 2.
- Shared tools:1
- Network challenges: 1 international network.

Timeline / roll out plan:

Year 1: AIOTIDIHN activities.

- Strategy and sustainability Plan.
- Governance Plan for the network.
- General meeting with the Network members. Strategy and Governance plan approval.
- Collaboration Agreement with DIHNET.
- DIH Catalog with 15 entries.
- 2 dissemination events.
- 1 international challenge.
- Best practices manual.
- Marketplace setting up and activation (call for services & products).

1 training session for DIHs.

DISCLAIMER

About AIOTI

AIOTI is the multi-stakeholder platform for stimulating IoT Innovation in Europe, bringing together small and large companies, start-ups and scale-ups, academia, policy makers and end-users and representatives of society in an end-to-end approach. We work with partners in a global context. We strive to leverage, share and promote best practices in the IoT ecosystems, be a one-stop point of information on all relevant aspects of IoT Innovation to its members while proactively addressing key issues and roadblocks for economic growth, acceptance and adoption of IoT Innovation in society.

AIOTI's contribution goes beyond technology and addresses horizontal elements across application domains, such as matchmaking and stimulating cooperation in IoT ecosystems, creating joint research roadmaps, driving convergence of standards and interoperability and defining policies. We also put them in practice in vertical application domains with societal and economic relevance.

AIOTI is a partner for the European Commission on IoT policies and stimulus programs, helping to identifying and removing obstacles and fast learning, deployment and replication of IoT Innovation in Real Scale Experimentation in Europe from a global perspective.

AIOTI is a member driven organisation with equal rights for all members, striving for a well-balanced representation from all stakeholders in IoT and recognizing the different needs and capabilities. Our members believe that we are the most relevant platform for connecting to the European IoT Innovation ecosystems in general and the best platform to find partners for Real Scale Experimentation.