



Advancing the digital transformation of European industry

The role of standards in accelerating innovation – The case of IoT/IIoT

12 June 2020

Webinar

Co-organised and supported by the Alliance for Internet of Things Innovation (AIOTI)

Workshop Report



1. Introduction

The Webinar, co-organised and supported by the Alliance for Internet of Things Innovation (AIOTI), has taken place on June 12th, 2020 in two sessions of approximately two hours, one in the morning, one in the afternoon.

In the first session, the participants have addressed some of the main challenges that are posed by the recent evolution to the global IoT ecosystem, and more specifically to the on-going work in standardisation and pre-standardisation. In the second session, panellists from a large set of relevant standardisation organisations have outlined areas and methods for re-enforced collaboration between the actors, namely standardisation organisations, EU research projects, industries, academics.

The background for the webinar was the great disruption generated by the COVID-19 and how it has immediate implications and generates new challenges regarding response effectiveness, resilience of healthcare systems as well as privacy for the individuals and citizens. Beyond these immediately perceivable implications, this disruption has also larger consequences across a broad range of sectors by potentially redesigning the business models, the supply chains, etc. These new challenges demand fast readjustments of the associated technical systems – with a key role for the IoT systems - and new innovations to cater for new requirements.

In this context, standards have a key role to play. Standards and sharing of common practices are strong drivers of digital transformation of European industry. Standards are critical tools of innovation, and many innovations that have changed the world (e.g., modern manufacturing and interchangeable parts, agriculture, the Internet, global communication) only succeed because of standardization. The case of IoT/IIoT deployments in the IoT European Large-Scale Pilots Programme has shown the role of standards in accelerating innovation and the benefits of using standard processes, considering common goals, common platforms, shared values and standard Interfaces.

Standardization provides many benefits as part of a business strategy. By ensuring compatibility and consistency through standardization, companies can improve production efficiency. Standardization leads to cost reductions economy of scale and simplification and supports the creation of ecosystems in which technologies and business models become more prevalent, competitiveness increases, and ultimately the stakeholders involved benefit. In addition, the establishment of common rules to meet the environment and standards leads to improvements in safety and security.

This key role of standards in the required transformation of organizations requires even faster responses from the standardisation community which must be able to support and integrate new innovations, accelerate the pace of its response, and strongly promote collaboration between actors in reinforced and development programs are aligned and streamlined.

The webinar was designed for an open attendance and 100 participants have registered with representatives of the European Commission, participants from the LSPs, representatives of SMEs, researchers of other institutions and research projects. More than 50 persons have followed each session where an important part has been devoted to the questions of the participants and supported by on-line question gathering and prioritisation.

The presentations are publicly available at: <https://european-iot-pilots.eu/the-role-of-standards-in-accelerating-innovation-webinar-2020/>.

2. Setting the scene

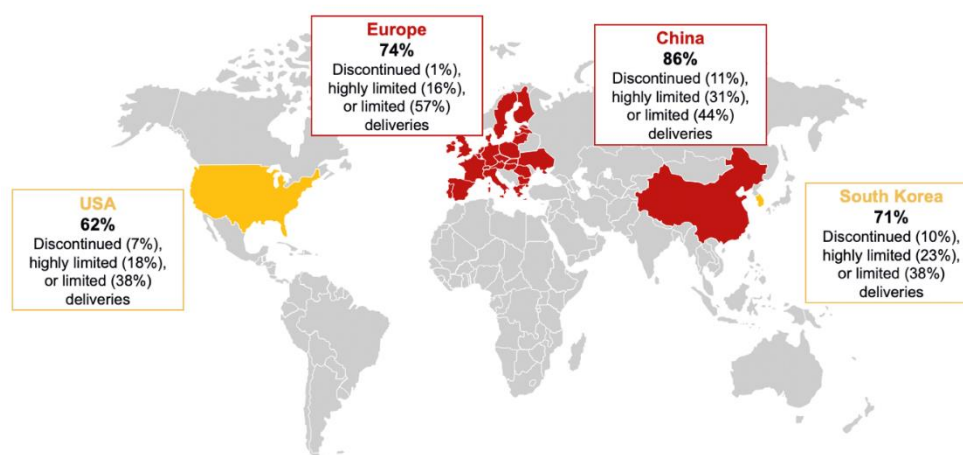
Franck Boissière has introduced the webinar on behalf of the European Commission DG Connect.

The overall large context for in which the EU addresses the challenges is its Long-term Digital Strategy “A Europe Fit for the Digital Age” and the associated mission statements for the New Commission:

- Strengthening Europe’s technological leadership and strategic autonomy (with the support of DG GROW and DG CONNECT);
- Enhancing Europe’s technological sovereignty by investing in the next frontier of technologies, such as blockchain, high-performance computing, algorithms, data-sharing, data-usage tools, 5G standards, ...
- Leading reflections on these issues in key value chains, including in the defense and space sectors, common standards and future trends.

A key aspect of the EC answer to the challenge is the proposal for €750 Billion European Recovery Fund “Next Generation EU”.

A very important element for a recovery strategy is the understanding of the disruptive effect of Covid-19 crisis on Global Supply Chains. From this standpoint, Europe is amongst the areas that have suffered less and shown some form of resilience, as shown in the figure below.



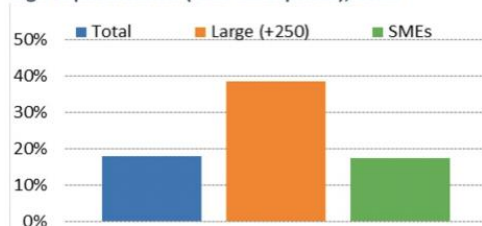
Source: Bitkom Research 2020 | Base: All respondents for whom supplies from the selected country are relevant and which are aware of the disruptions. China (n=229), South Korea (n=87), USA (n=164), Europe (n=208, no data available for Spain and Germany)

A key element of explanation for this relative protection is linked to the connection and on-line interaction for the European citizens and businesses. As pointed out by Margrethe Vestager: “The coronavirus crisis has demonstrated how crucial it is for citizens and businesses to be connected and to be able to interact with each other online. We will continue to work with Member States to identify areas where more investment is needed so that all Europeans can benefit from digital services and innovations.”

Thierry Breton has presented the [2020 Digital Economy and Society Index \(DESI\)](#) with the following

message: “The data we publish today shows that industry is using digital solutions now more than ever. We need to ensure this is also the case for small and medium businesses and that the most advanced digital technologies are deployed throughout the economy.”

Figure 9 Cloud computing services of medium-high sophistication (% of enterprises), 2018

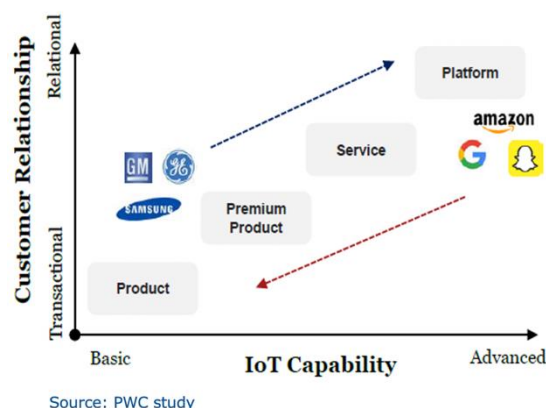


Source: Eurostat, Community Survey on ICT usage and e-commerce in enterprises.

Enterprises are becoming more and more digitised, 38.5% of large companies already rely on advanced cloud services and 32.7% use big data analytics. However, SMEs do not yet use these digital technologies, as only 17% of them use cloud services and only 12% big data analytics.

The exit strategy from COVID-19 crisis will rely on a boost on usage of Digital Platform Services.

- Accelerated adoption of Digital Platforms
- Products and services cutting across sectorial silos.
- Focus on agility of supply chains and localisation of markets
- **IoT + AI as enabler for contactless user experience**
 - IoT use cases have proliferated amid the pandemic
 - IoT and AI enabled applications can help automate processes, track and manage assets



Three important actions are in support of this approach:

- Digital Platforms & Pilots Work Programme 2018-20



- Digital Innovation Hubs: Towards organic Growth
To "Ensure that every business in Europe, whatever its sector of activity, wherever located and whatever its size, can take full advantage of digital innovations and competences" with a role for Member States & Regions to build-up/strengthening of national and regional structures of digital innovation hubs; and for the European Commission to Set up a pan-European network of Digital Innovation Hubs and Support activities such as cross-border experiments, catalogue and assistance in the creation of hubs with a particular attention to SMEs;
- BOOST4.0: Towards a European Industrial Data Space
The biggest European initiative in Big Data for Industry 4.0, Boost 4.0 leads the construction of the European Industrial Data Space to improve the competitiveness of Industry 4.0 and guides the European manufacturing industry in the introduction of Big Data in the factory.



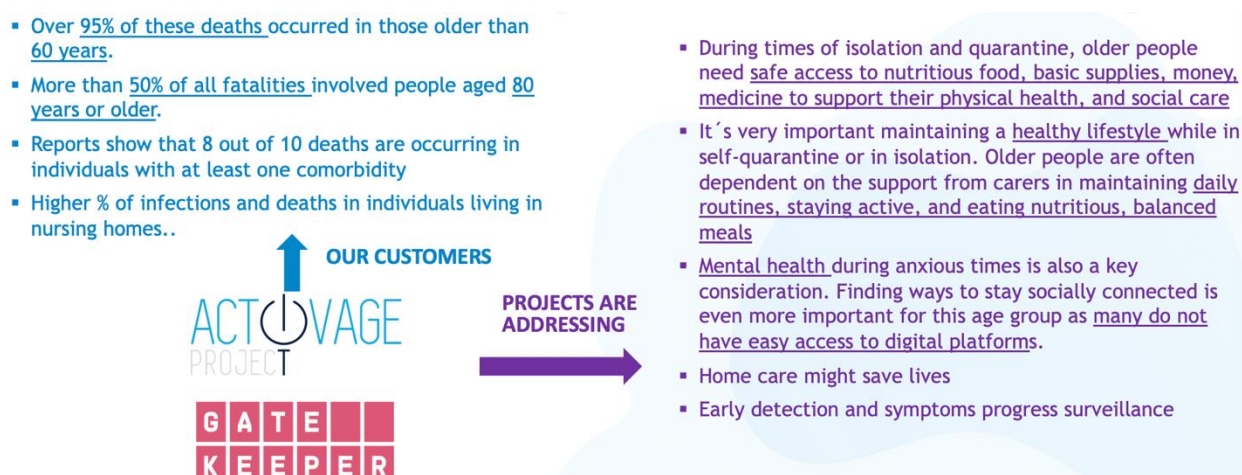
3. Challenges to the IoT ecosystem and to standardisation

The panellists in the first session have addressed what they perceive are the new challenges posed by the recent COVID-19-induced disruption. The objective of their presentations was to evaluate whether these challenges can be addressed as such or not by the recent projects and developments and, if not, outline which kind of new responses can be brought by the new generation of projects dealing with innovation in business sectors, introduction of new technologies, etc.

3.1 New challenges for eHealth and Ageing Well

Sergio Guillen has drawn some lessons from the ACTIVAGE, a Large-Scale Pilot (LSP) project on IoT for Smart living Environments for ageing well, and anticipated on the approach taken by GATEKEEPER, an new LSP project on AI and Big Data for early detection of health risks and intervention for prevention and care on ageing populations.

The COVID-19 pandemic is impacting the global population in drastic ways. Older people are facing the most threats and challenges at this time. The main impacts are shown in the figure below:



The new challenges (technological and others) and the way they will be taken into account by GATEKEEPER and the ACTIVAGE.ORG organization are illustrated in the figure below:

IMPACT OF COVID-19 NEW CHALLENGES

INTEROPERABILITY

- At the edge, lack of interoperability

DATA SPACES

- Align with EU Data Space Framework in the health care sector

GDPR / MDR

- Implementation across IoT levels

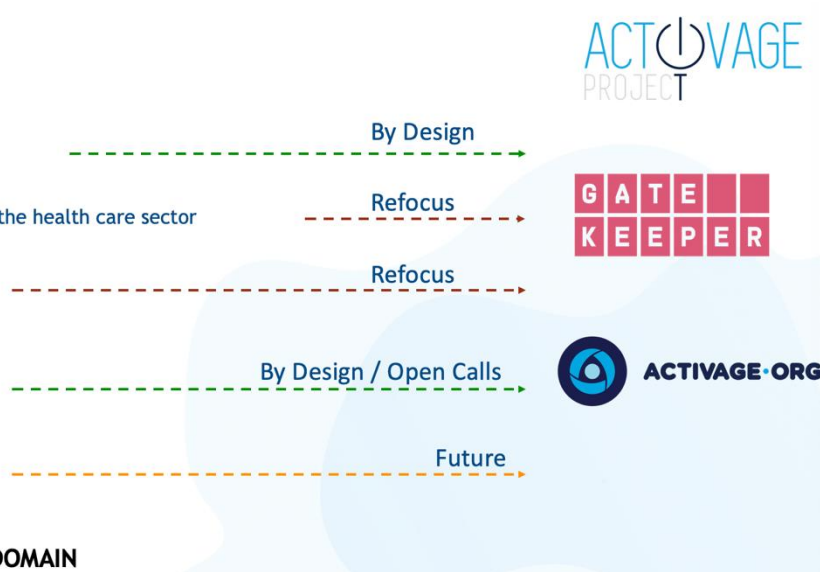
HOME DIGITISING

- Connectivity
- SLE 4.0 - Embedded AI
- Training

RURAL AREAS

- Connectivity
- Services

MANY MORE IN THE HEALTH CARE DOMAIN



3.2 The impact on Agriculture and food supply

George Beers has analysed some of the impacts on standardisation on agriculture on behalf of the IoF2020 Large-Scale Pilot. IoF2020 has launched a COVID-19 Task Force whose main actions are shown in the figure below:



The main challenges identified are:

- Limited information on available stock and projected stock
- Food waste due to long waiting time at borders
- Food safety issues due to expired shelf-life for fresh goods
- Need for tracking food supply on the road
- Missing manual labour for harvesting, seeding etc.
- Missing labour for quality controls and food safety checks
- Missing skills of workers and volunteers to help on farms
- Missing skills of farmers to quickly use digital tools

Some of the solutions foreseen are shown in the figure below:



Two Open Calls for COVID-19 have been launched for Hackathons (31 proposals) and toward SMEs (78 proposals). The responses are under evaluation.

Topics to discuss further in IoF2020 and SmartAgriHubs include:

- Use of standards not an explicit issue related to Covid-19 actions
- Replicability to other sectors is (softly) included
- Proposals could be 'manipulated' before contracting
- Open for suggestions on pushing more standards

3.3 ATLAS Reference Architecture for Data Exchange in Agriculture

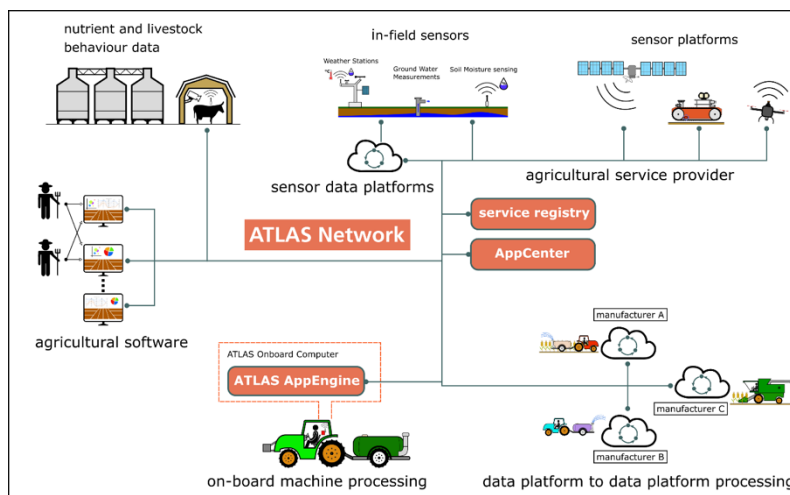
Stefan Rilling has provided a complementary view on the challenges for agriculture with the presentation of the Reference Architecture proposed by the new ATLAS Large-Scale Pilot.

This architecture is meant to address interoperability in digital agriculture, especially from the point of view of data, dealing the very heterogeneous landscape of machines, sensors and data platforms where exchange of data between all entities is a key capability and must ensure the interoperability between Agricultural machines, sensors and data services.

The main principles of the architecture described in the figure below are:

- Rely on trusted and autonomous participants with data sovereignty and full control

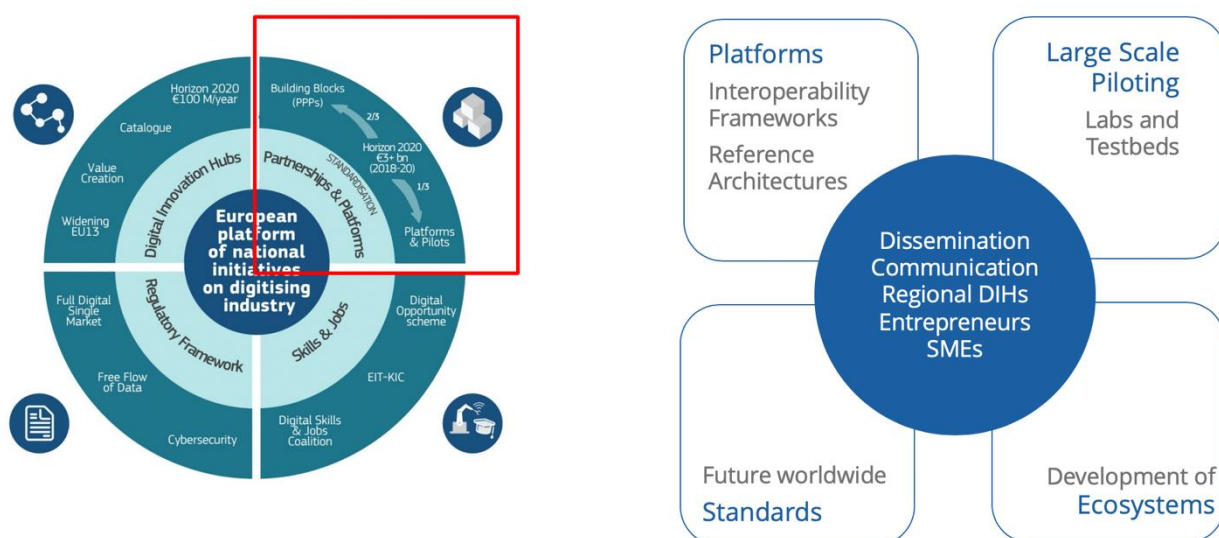
- Offer a minimum of centralized components, hence no data silos, no central data hubs
- Support data exchange through dedicated connectors (Services)



The High-level reference architecture is designed along concrete use-cases through a collaborative development process between industry partners, software developers, agricultural service providers.

3.4 Disruption in the industry value chains

Sergio Gusmeroli has presented the view of the OpenDEI Coordination and Support Action (CSA). OPEN DEI is the CSA for cross-domain Platforms & Pilots as shown in the figure below:



The scope of OPEN DEI is the alignment of Reference Architectures, Open Platforms and Large-Scale Pilots in Digitizing European Industry: the digital transformation strategy of the European Union has a specific priority: the creation of common data platforms based on a unified architecture and an established standards to support the implementation of next generation digital platforms in four basic industrial domains: Manufacturing, Agriculture, Energy and Healthcare.

EU #CORONAVIRUS RESPONSE

2nd call for an Expression of Interest

in behaviour, socioeconomics, cohorts, manufacturing, medical and digital solutions

€122 million

#UnitedAgainstCoronavirus #StrongerTogether #GlobalResponse

European Commission

In order to address the impact of COVID-19, the EU has set up a Coronavirus Response action addressing a large range of issues. Some of the topics addressed are part of the OpenDEI scope.

The topic “Repurposing of manufacturing for vital medical supplies and equipment” is directly related to the main approaches dealt with in OpenDEI.

The re-orientation and repurposing of production capacities to meet urgent needs involves:

- The repurposing, adaptation and ramp-up of production lines to quickly adjust to new and urgent production needs.
- The demonstration of flexibility models for the supply chain for the repurposing of production lines and proper risk management in case of disruption of supply chains.
- The deployment of automation technologies that are less dependent on work force present in factories regarding the certification/ calibration/ accreditation of production lines that have been repurposed or restarted after a shutdown.
- The qualification of operators/technicians for new/repurposed production lines.

The expected impact on the manufacturing industry is amongst other:

- To foster industry's adaptation capacity and resilience in strategic sectors.
- To demonstrate a flexible 48-hour industrial response capability for requalification or release of repurposed production lines.
- To support industry and interested parties, in particular SMEs, by providing services for design, assessment, testing and regulatory issues.
- To deliver results within 3-18 months to end-users at scale with solutions applicable to other industrial sectors.

This is addressed in several pilots that have a standards background and involve several industry actions such as RAMI 4.0 or IDSA (the Industry Data Spaces Association):

- RAMI AAS as basis for Production Digital Twins (addressing Repurposing Production Capacity, Virtual Commissioning and Ramp-up of Production Lines; Automation and Social Distancing);
- IDSA Data Sovereignty for agile Value Chains (addressing Flexibility Models for the Supply Chain; Qualification of Operators; Additive Manufacturing);
- IDSA Data Sovereignty for agile Suppliers' Chain (addressing Flexibility Models for the Supply Chain; Qualification of Operators; Spare Parts Logistics and Operations).
- IDSA Data Sovereignty for agile Manufacturing aaS in Digital Innovation Hubs (addressing Flexibility Models for the Supply Chain; Qualification of Operators; High-Tech SMEs in Regional DIHs).

3.5 Addressing the need for co-design supportive architectures

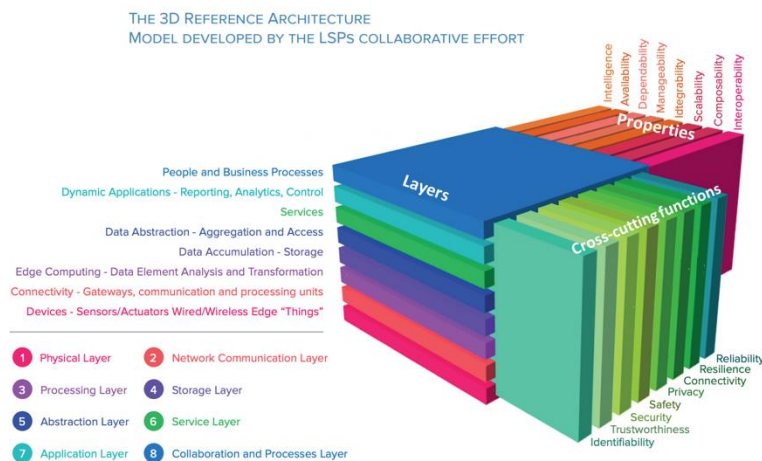
Emmanuel Darmois has presented some of the results of the CREATE-IoT CSA and how they can be applied to support the co-design of IoT systems and applications.

Some perceived impacts of the COVID-19 crisis involve the major boost to the place of digitalized processes in supply chains (e.g., industry, agriculture), eHealth, e-payment, etc.

Less often noted is the key role of citizens involvement in the resilience of society and key systems. In the perspective of the citizens, some areas for strong improvement of access to digitalized systems involve a better support to SMEs (e.g., easy access, simplification), education, cities services, ...

Beyond the boosted digitalization of (IoT-based) streamlined, seamlessly interoperable (from physical to process levels), secure, privacy-supportive systems and services, the main challenges from a citizen's point of view are related to a better involvement of non-traditional actors (SMEs, citizens, small cities, rural communities, ...), more efficient and simple communication between all involved stakeholders.

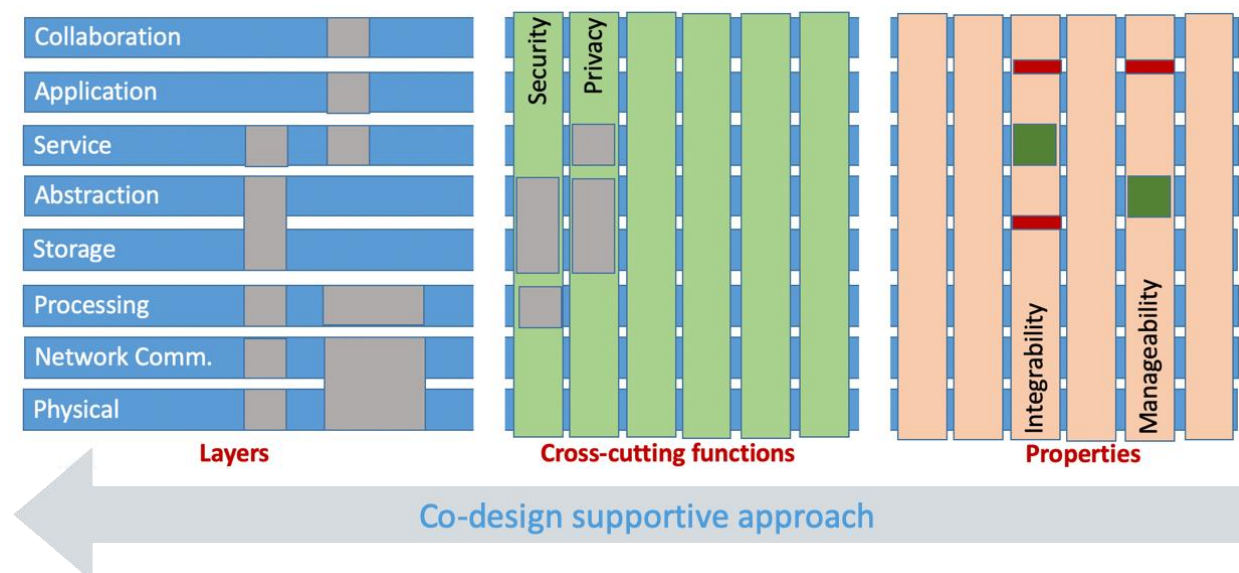
This should go together with a more coordinated involvement of the standardisation community. This is the rationale behind the recommendations of the ETSI STF 561 (Standardization to meet citizen and consumer requirements), in particular its recommendation #12 to standardize the basic elements of citizen-oriented service design, to provide clear and easy-to-use electronic interfaces, and ensure human interface possibilities are always there (in whatever form) as back-up and avoid digital divide issues.



The LSP 3D Architecture Model extends some of the current IoT reference architectures by:

- Ensuring a common view of the different layers of the IoT systems from Physical up to Business.
- Providing additional viewpoints to the different stakeholders (beyond the developers) regarding additional cross systems functions such as security, privacy or safety and the shared analysis of some properties (e.g., integrability).

The 3D model is supporting a co-design approach where the systems are defined jointly by all involved stakeholders. It allows to depart from the usual approach (designers/developers-centric; focused on the functional view; with a limited engagement of specialized experts and a reduced involvement of “other” stakeholders such as end-users) towards a co-design supportive approach with an early involvement of “other” stakeholders in the definition of the expected properties; a key role devoted to the properties view; and the co-engagement of designers/developers and specialized experts, as shown in the figure below:



3.6 Questions and answers, discussion

The questions for this session have been asked by the participants using sli.do, with the possibility to ask their own questions and to promote those asked by others. The highest rated questions have been asked in priority. However, the moderator has also asked several questions on-the-fly.

A summary of the main questions and answers follows:

- On EC Strategy:
 - **Q:** Do you believe there is a possibility for EU platforms to emerge or will we have to use massively the US/China ones in support of our systems
 - **A:** The EC has put forward its proposal on the ground, with the associated support, and think this strategy has the means to be implemented. Of course, this will require also the involvement of all interested parties, such as research projects This goes beyond the scope of the workshop. However, as regards the question of data, standardisation is key. An important issue is whether we have the right reference architectures.
- On IoF2020 and ATLAS:
 - **Q:** can you please explain more about which standards you want to push more?

- **Q:** Is the ATLAS concept presented aligned with all players or are there other concepts of data exchange discussed within ATLAS?
- **Q:** Any possibility to use the Atlas interop reference architecture in other projects, like the use case proposals in IoF2020 about Covid19?
- **Q:** Any indication of most promising ATLAS contributions to standardisation?
- **A:** F. Boissière relates this also to the architecture related to semantic interoperability as defined by ACTIVAGE.
- **A:** G. Beers outlines the role of standards in embedding knowledge that can be useful for the rapid reaction to incidents, and to scale-up. In IoF2020, we have made use of the IoT Catalogue which is not a standards per se but is a very useful tool in view of reusability and replicability.
- **A:** The good point with IoF2020 and ATLAS is the commonality of partners. A comparison of the approaches regarding reference architecture will be useful. S. Rilling recalls that the first work that will be done will be on the analysis of use cases and on launching Open Calls that will support the implementation of the use cases. The ATLAS documents will be available to be used by the public.
- On Reference Architectures:
 - **A:** S. Gusmeroli also highlights the importance of the reference architectures, the work done to synthesize and coordinate/map these architectures with industry-initiated architectures such as IIRA or RAMI. Another key aspect of the investigation of the role of Open Source in the reference implementations. A third element is the work of IDSA on data sharing.
 - **A:** S. Guillen insist on the key issue of managing privacy in the definition of ACTIVAGE, which is also linked to interoperability. The COVID-19 has not required new standards but a proper way to use the existing ones in the implementations.
- On Reference Architecture and co-design:
 - **Q:** Could you elaborate what is for you Co-design supportive approach? Typically, do you mean open source way of development?
 - **A:** One first element is that standards are not the only points to consider in the (co-)design of a system. Other important elements may be guidelines and recommendations, codes of conduct, de facto data models and, of course, open source components. Co-design is about making sure that the actors involved across the entire lifecycle of a system are involved as early and as much as needed: this is the purpose of the 3D Reference Architecture model.
- On national versus international levels for standards development:
 - S. Gusmeroli: in the manufacturing domains, most initiatives have emerged nationally (Industrie 4.0 or IDSA have originated in Germany). There is a trend in having a pan-European dimension (for instance with a joint activity of CEN/CENELEC/ETSI) and more broadly international with global organizations such as the current IDSA and national standards becoming international (e.g., in ISO/IEC).
 - G. Beers looks at the perspective of who is driving standardisation in the agriculture sector. Logistics is deeply shaping the agriculture sector, but standards are not developed for agriculture as such. Big companies are also driving with the need to have global standards. Lastly, there are also a lot of certification organizations that have emerged.
 - S. Rilling agrees with the view of G. Beers and outlines that ATLAS is very much driven by the machinery industry. From this standpoint, some international standards will emerge, but it will take some time but possibly emerge after the end of the ATLAS project.
 - S. Guillen recalls that we have learned a lot about dealing with data (e.g., how to collect it) in the first generation LSPs, ACTIVAGE in particular. The new battlefield is how to share data with the appropriate sharing schemes (e.g., regarding privacy). To deal with the uncertainty of the current pandemic, this is a clear must and will have to be addressed by the 2nd generation LSPs.
 - E. Darmon points out that there is clear agreement amongst the participants in this session that the new battlespace is about data. An example comes post COVID-19 with the possibility of some form of re-localization of the value chains. It is, given the current complexity of those value chains, very unlikely that this will happen at national level. The challenge is to integrate

European national initiatives into larger, worldwide ones and ensure that the role of European standards (in the broad sense) is constantly and consistently promoted. Luckily, we can use some mechanisms that may help in the consolidation of the current European position. Three of them can be noted: the Publicly Available Specifications that will allow to use of the national specifications at regional or worldwide level; the European Harmonized Standards that have the possibility to become de-facto global standards given the place of Europe in the global economy; and lastly regulation that may result from some of the strategies that have been launched. All the projects of LSP 2nd generation will have to deal with this.

4. Challenges to the IoT ecosystem and to standardisation

The session 2 panellists have briefly outlined which priorities regarding the new challenges (identified in session 1 and in the questions from the audience) are addressed by their organisation and, in particular, how they will engage in collaboration with other organisation in order to reduce fragmentation and speed-up the roadmaps. A large part of the session will be dedicated to the reactions, questions and suggestions from the participants.

4.1 Quick introduction from the panellists

- Georgios Karagiannis for AIOTI

The AIOTI WG03 Strategic objectives for 2021-2027 are the following:

- (Cross)-IoT application domain activities, including standardisation, policies, use cases and business models.
- IoT is an important enabler for the success of 5G and vice versa; How existing IoT standards accommodate the use of these converged technologies, such as 5G, IoT/IIoT, Artificial Intelligence (AI), robotics, cloud and edge computing and as well automation, in vertical and cross-vertical applications?
- Data Sovereignty and the role of IoT; How data sovereignty will impact IoT standardisation?
- Industry Digitization and IoT standards; How digital transformation will impact the IoT related standardisation?
- IoT and its impact to UN Sustainable Development Goals (SDGs) and European Green Deal; How IoT and IoT standards be used to support UN Sustainable Development Goals (SDGs) and European Green Deal?
- Focus on Business drivers and business models in each vertical AIOTI WG; How they will impact the IoT standardisation?
- Large Scale Pilots are important to verify the IoT gaps that are identified by AIOTI in IoT standardisation, policy and IoT deployments, and to show how these gaps can be alleviated
- Cooperation with other IoT related initiatives and SDOs are needed to reduce fragmentation and remove all barriers on the deployment of IoT in EU and worldwide.

The AIOTI WG03 is working on reference documents, very often through collaborations:

- IoT Landscape with v2.9 published in October 2019
- IoT relation and impact on 5G with R1 in June 2018, R2 in March 2019, R3 in May 2020
- Gap Analysis and recommendations with 2nd release published in January 2020
- HLA / High Level Architecture with R4 published in June 2018 and R5 ongoing (2020)
- IoT identifiers with 1st release published Feb'18
- Semantic Interoperability with two JWP on semantic interoperability published in October 2019
- IoT Privacy (with WG04)
- IoT Security (with WG04)

- Ashok Ganesh for CEN/CENELEC

Three main focuses for the CEN/CENELEC Operation Plan:

- To engage with researchers and innovators through recognizing contributions from research
- To offer deliverables and processes that meet researchers and innovators needs by a fast – track approach
- To obtain the support and recognition of (national and European) institutions.

A living example of Standardization responding to needs: in response to the coronavirus outbreak, the French Standardization Organization, AFNOR, released a Technical Specification(TS) document for mass production and artisanal making of "face masks". This document was made available to

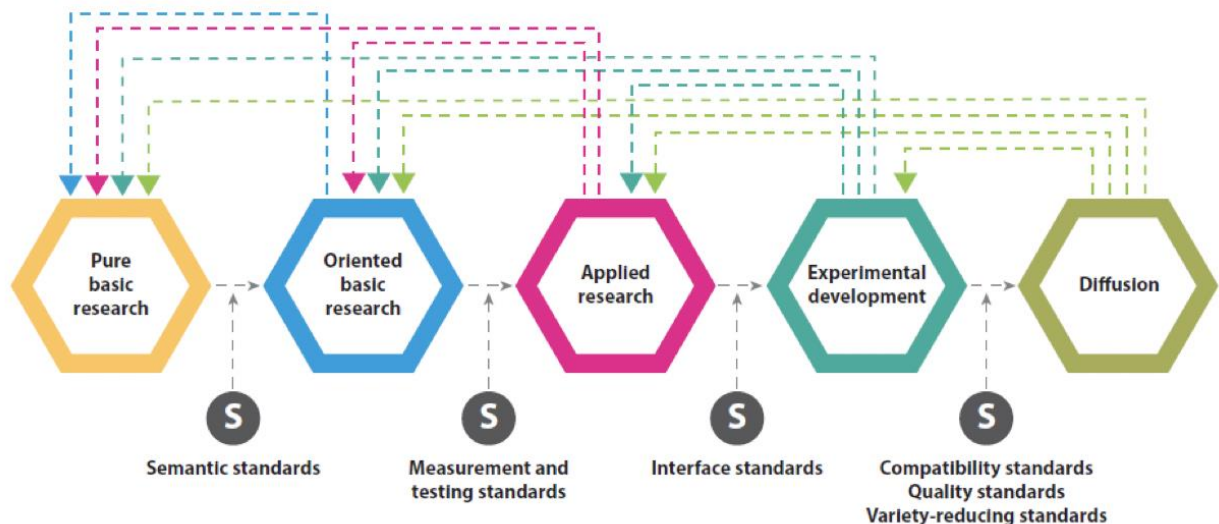
- companies that are candidates for mass production
- any actor who has the appropriate materials and equipment for handcrafting

This TS has been downloaded for a million times.

- David Boswarthick for ETSI

How to Accelerate Innovation through Standards

- Standardization and research are highly interlinked.
- Different standards can play different roles at several stages of the research and innovation process.
- There is currently limited awareness of the benefits of standards and standardization among researchers
- Guidance and Education is required



Some Lessons Learned from recent Pandemic:

- The COVID-19 pandemic had demonstrated the importance of ICT at many levels
 - Simply connecting people and services during confinement (Voice/Telework/Netflix)
 - Providing data and services to Health organizations, Governments and Citizens
- ETSI reacted quickly to the demand to help and to direct requests from ETSI members
 - Build a COVID-19 tracing APP group (ISG E4P), took less than 4 weeks
 - Inject energies into EP eHealth with the publication of a dedicate Whitepaper
 - Dedicated discussion in ETSI Board (and Secretariat) on what more can be done
- Learning and acting now in order to be better prepared for future pandemics
 - Help with the current wave of COVID-19 AND mitigate future waves
 - “Share” and apply lessons learned to future “similar” health challenges

Cooperation, Coordination, Communication. ETSI' recommendations

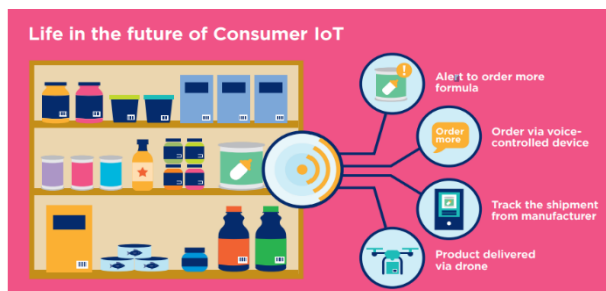
- Improved Cooperation 'early on' between EC research projects and Standards – more reactive and shorter lead times
 - Education and visibility made by Standards bodies on their current work activities and opportunities for synergies with research and policy
 - Education by Standards bodies on how to bring new work into standards as well as the value of standards for research
 - Better Coordination between EC, research bodies, funded projects, LSPs, SDOs and other Standards Partners – Open approach
- Francesca Poggiali for GS1

IoT is driving increased connectivity of “things” – which leads to massive data collection. Data quality is more important than ever and GS1 global and open standards provide the foundation for accurate, sharable, searchable and linkable data, starting with standardised attributes.



GS1 global and open standards for the supply chains connect the physical and digital worlds, laying the foundation for IoT. Unique identification of objects, assets, locations, etc. (things) and automatic data capture, powered by GS1 barcodes and EPC/RFID, enable interoperability and are key requirements for IoT.

In addition to the identification of the Things itself, identification is used for several other purposes. Various identification schemes already exist, are standardized, and deployed. AIOTI WG3 has performed a thorough analysis of the identification needs and related standardization for IoT (available [here](#)).



Today's consumers expect to interact with retailers, brands, and products digitally.

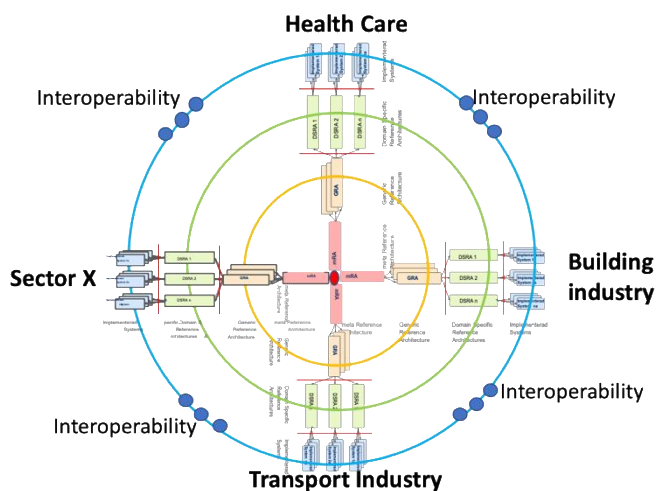
Interactions with smart connected devices are a part of the experience. GS1 open standards enable interactions with consumers and all along the supply chain through GS1 identification barcodes, EPC/RFID tags, watermarks, and sensors of all kind.

Exchanging rich product data using sensors that are built on standardized GS1 data structures, combined with data analytics, can boost innovation, and develop enriched consumers experiences.

- Östen Franberg for ISO/IEC JTC1

Semantic interoperability refers to an information description that is used for negotiation, so that the meaning of data is understood and shared. For IoT, it is achieved by invoking services, and by using specific knowledge and concepts of IoT.

A Meta-reference architecture (such as what is defined in ISO/IEC JTC1 AG 8) can be used in support of interoperability.



The principle is to inherit vocabulary, terms, rules etc. from meta reference architecture to create a generic reference architecture for IoT.

Then create an industry-specific (domain-specific) architecture for the construction industry. Based on DRSA, installation companies develop control system IoT for buildings.

At the same time, the health care business does the same, which means that you get common vocabulary, terms, etc.

- Sébastien Ziegler for ITU-T

IoT is global, with IoT devices in Asia representing more than 2/3 of cellular connected IoT devices.

What Does IoT Need to grow? 1. Research and Development; 2. Interoperability; 3. Economies of Scale. To achieve this, Global Standards are key.

A significant example is ITU-T Study Group 20 on IoT and Smart Cities and Communities:

- A Lead expert group to develop standards & guidelines on:
 - Internet of things (IoT) and its applications
 - Smart cities and communities, including its e-services and smart services
 - Internet of things identification
- More than 120 experts (including Academia, members, and SMEs) within 2017-2019:
 - 63 Recommendations Decided/Determined/Approved (Recommendations ITU-T Y.4200)

- 13 Supplements and informative texts agreed
- Over 40 events organized related to IoT and Smart Cities and Communities

Collaboration with other SDOs and IOs



- 17 new Recommendations approved
- 1 ongoing work item
- 6 Technical Reports agreed



- Organization of World Smart City Forums
- Working team on Smart City Terminology

Joint IEC-ISO-ITU Smart Cities Task Force

- To build synergies on ongoing work in ITU-T, IEC and ISO related to smart cities and communities;
- To maximize efforts in order to identify new areas of cooperation related to smart cities and communities;
- To develop a holistic view on smart cities and communities taking into consideration the scope, areas of work and expertise of ITU-T, IEC and ISO to support smart cities and communities development.



WORLD TRADE
ORGANIZATION

ITU, ISO, IEC are WTO endorsed
= Free Trade Advantage

• Dave Raggett for W3C

Fragmentation is hindering the potential for digital transformation of Industry (e.g., the IoT is fragmented with limited signs of convergence; much of business knowhow is inside people's heads; traditional databases make it hard to adapt quickly; data science is burdened by high data preparation costs).

Collaboration is needed for building shared understanding - across SDOs and industry alliances - of the high-level goals, the major challenges and the ways to address them and how each SDO can complement other SDOs. W3C is actively liaising with ISO, ITU-T, ETSI, AIOI and others.

Simplifying Semantic Technologies is key. The Web of Things solves the fragmentation at the network edge so that developers can then focus on supplying and consuming services via data spaces and open markets free of borders between EU nation states. We need a uniform framework for declarative and procedural knowledge. Two elements are to be considered: 1/ Chunks that simplify semantic technologies for the average developer; 2/ Cognitive AI that draws upon decades of work in the cognitive sciences.

The IoT evolves into the Sentient Web, i.e. digital twins + cognition

- Cognition as combination of graphs, statistics, rules and graph algorithms
- Cognitive Databases take over from earlier database technologies
- IoT protocols are only of interest to engineers at the network edge
- Ontologies are developed through human-machine collaboration
- We mostly communicate with cognitive agents using natural language
- We rely on AI that is strong, empathic and trustworthy!
- Let's embrace change and reap the rewards for European citizens!

4.2 Questions and answers, discussion

As in the morning session, the questions for this session have been asked by the participants using sli.do. The session moderator has also asked a number of questions on-the-fly.

A summary of the main questions and answers follows:

- On Semantic Interoperability (SI):
 - **Q:** Some common position papers have been produced (e.g., identifiers, semantic interoperability). What was their impact? Is the model worth replicating?

- **Q:** Do you believe that interoperability is only Ontology topic?
- **Q:** Is not the most important challenge adoption of interoperability practices?
- **Q:** Semantic interoperability was quite successfully addressed in INTER-IoT and symBiote projects, but since these projects ended, nobody cares to look back...
- **A:** G. Karagiannis considers that a very effective way to simplify the SI landscape is to promote collaboration between the organizations involved. AIOTI has launched a Task Force and published 3 White Papers with involvement of actors in the field (ETSI, IEEE, ISO/IEC JTC1, oneM2M, W3C, ...). The objective is to reduce complexity, for instance by reducing the number of ontologies, based on an analysis of the landscape of those that are used.
- **A:** D. Raggett mentions the AIOTI group of SI which produces material to help those who wish to use SI. There are different requirements behind different ontologies, and we need tools to deal with different vocabularies. If access to SI technologies is simplified for the average developers, the overall market of ontologies will simplify.
- **A:** O. Franberg is also part of the AIOTI work group. There is a need to have a very broad mindshare on this.
- **A:** D. Boswarthick considers that a large part of the problem comes from the lack of information about the outcome of on-going activities that users like smart cities, automotive, etc. might want to use.
- On how we can do better at European level (the issue summarized by F. Boissière):
 - O. Franberg considers that, in Europe, we have a very great knowledge about industrialization that has a long history and a good feedback on what works and is not only relying on recent implementations.
 - G. Karagiannis considers that, to be more effective at global level, it is very important to express clearly the requirements coming from Europe.
 - D. Raggett recalls that we have very successful marketplaces in Europe, but they have been hosted by very large internet companies. If we want to have strong standards, we need to have strong open marketplaces.
 - F. Poggiali sees very interesting perspectives in the recently published data strategy. Europe has a strong potential in the same line that what has been outlined about SI by O. Franberg. There is willingness in Europe of supporting a public usage of data, irrespective of identified usages that have not yet emerged. D. Boswarthick recalls the lesson learned in ETSI to standardize just enough. For data, there might not be the same need of standards than for interoperability protocols. Europe is the foundation of many great technologies. On area where Europe can improve is getting European funded research results coming to European standards and ensure that they are globalized, especially in an accelerated manner.

5. Conclusions

5.1 Accelerating innovation in standardisation

Regarding acceleration, E. Darmois outlines that there is a huge amount of time spent in the IoT community on highly fragmented activities. To revert to more efficiency, collaboration is the name of the game. From this standpoint, it is important to promote actions such as the joint development of White Papers, but also to assess their effectiveness in order to better scope the new initiatives. Another aspect of making European experts effective in standardization is to ensure that they have the possibility to work as long it is needed to see their contributions approved. The StandICT project has been a very good first attempt to provide funding stability to the experts. It is therefore important to assess the project and see if it is making sense to boost it with another order of magnitude.

G. Karagiannis has recalled that, in the MSP (Multi-Stakeholder Platform), the question of fostering collaboration of different stakeholders (including different standards organizations) has been discussed. One outcome is the creation of a networking platform to concretely discuss collaboration initiatives. This approach is seen as a way to improve acceleration of standards development: identification of the gaps on which the collaboration could work and which program to associate.

One associated question is which kind of focus could be given to the European standardisation, as pointed out by Ö. Franberg. In the European context, this will be dealt with organizations that are driven by their members and have limited ability to steer the work program. The role of research, as a major contributor in the upstream part of the standard lifecycle, will be more and more important.

5.2 Closing remarks

F. Boissière has provided some takeaways from the discussions:

- There is a constant to reassess the things that work and those who work less efficiently.
- The EC has several actions on-going that will contribute to addressing this question of accelerating innovation in standardisation starting with the preparation of the Rolling Plan on ICT standardization for 2021 – with the help of the MSP – with the objective to define priorities with the broader industry and economic community.
- In addition, a new communication of the EC on bold actions related to standardisation will be addressing a number of the issues tackled in today's webinar.

On a final note, Ovidiu Vermesan has thanked the panelists, the moderator and catalyst for the meeting, namely F. Boissière, the organizers of the webinar in CREATE-IoT and the participating LSPs. In addition, he suggested that some of questions not answered during the webinar will be circulated to the panelists to get a broader view on a larger set of topics.

6. References and Background Documents

The following documents have been distributed prior to the webinar as background documents:

- [1] [Who is prepared for the new digital age? Evidence from the EIB Investment Survey, European Investment Bank, May 2020](#)
- [2] [Advanced Industries Practice – Coronavirus: Industrial IoT in challenging times, McKinsey & Company, April 2020](#)
- [3] [Digital strategy in a time of crisis. Now is the time for bold learning at scale, McKinsey & Company, April 2020](#)