Alliance for Internet of Things Innovation

AIOTI 2nd Signature Event

IoT - Driving European Technology Leadership

29 September 2020 On-line

Introduction

On 29th of September, we celebrated our 2nd Signature Event, designed to bring together our stakeholders to discuss the new technological advances across multi-domain technological landscape, with a view to positively driving their development and adoption in Europe.

We have come a long way since 2015, when we were conceived as a technology platform to deliver on clear IoT related research priorities for Horizon 2020. Our collective efforts and expertise resulted, among other things, in the delivery of a successful Large-Scale IoT Pilot programme, as well as inputs that have been taken into account for several other European policies. We are now at the start of a new political and policy cycle that saw the election of the new European Commission in November 2019. We have provided practice-based contributions to the design of the new programmes and partnerships, as well providing multi-stakeholder inputs to various strategies (industrial, data, SME).

It is clear that IoT is not a buzzword anymore- it is at the source of many policies that will be discussed at our event today: data, edge, cloud, connectivity. IoT is the underlying common denominator for all, enabling real-world applications and services to be built on top of these basic technologies.

Paradoxically, the true value of any one of these technologies can only be realised through their convergence. This is at the heart of what AIOTI is trying to achieve: a "platform of platforms", exploring technological, societal, economic challenges and opportunities, connecting relevant partners in areas that we find are of interest for our community: agriculture, mobility, energy, health, smart cities and relevant topics such as data spaces and data marketplaces.

Discussions today should help our own IoT community, and guests who have joined to gather greater insights on our approach and how it fits with the general trends in industry, policy and research priorities.

This is at the heart of who we are and what we do. While the enunciation of our mission may evolve and change, the core message does not: **AIOTI exists to enhance on behalf of our members business, policy, research and innovation development in the IoT & Edge Computing and other converging technologies across the Digital Value Chain to support digitization in Europe, and competitiveness of Europe globally.**

Over the course of the event we explored these issues through different lenses:

- Data sovereignty and the role of IoT
- Beyond 5G and applications in cross-vertical industry domains
- Our final IoT/IIoT research priorities in Horizon Europe, sustainability and climate change

Keynote interventions

Europeans must work together to secure Europe's recovery. The current crisis is a chance to push the digital and green transformation of companies. It is a strong impulse for digital sovereignty and for Europe's digital decade. We can also learn from our mistakes.

We are on the threshold of entering European Digital Decade. The new European digital strategy will underpin this, focusing on four areas:

- **Digital Sovereignty** and Competitiveness, looking at, inter alia, how we can store European Data securely, digital identify at device level and European data infrastructure, including the European Cloud Federation (Gaia X), to establish data spaces in strategic sectors;
- **Promoting an Innovative European Platform and Data Economy:** establishing an effective governance framework for digital spaces and access to data, the regulation of digital platforms and ensuring interoperability; in this, we must strive for a balance so that we do not inhibit the international growth of our platforms;
- **Human Centric Digital Transformation**: promoting rules for AI that uphold European values and stimulate innovation;
- **Strengthening EU Cybersecurity** across technological, at device, data and communication levels.

Stakeholders must find their own roles, based on their strengths and adapted to the new context. Everything we do must be in the context of recovery.

The Policy vision of the Commission as communicated by President Von der Leyen is clear:

- **Green deal:** tackling climate change head on; anything we do must have an impact on this;
- **Digital Europe**: securing our Digital Decade, with at least 20% of the recovery funds allocated to digital;

To this end we can see 4 pillars that underpin an effective data strategy:

- A governance framework, regulating data access and use;
- Enablers, high impact projects on cloud federation, with commitment from MS and industry; that can demonstrate the layer that guarantees interoperability
- User empowerment- data literacy and data skills
- Common data spaces, that are rolled out of to enable the development of AI

AIOTI has contributed much to Large Scale Pilot experimentation and standardisation, with significant impact but much more to do. To this end AIOTI must re-examine its role, in particular relating to connectivity, data, computing, bringing real impact to the following areas:

- Joint undertaking on smart networks and services - IoT actors need to be at the same footing as the communications infrastructure (10-year cycle)
- On key digital technologies
- Next generation IoT actors
- New strategic contributions in data, AI, robotics- value chain.

There is also a paradigm shift to be considered: The move from cloud to edge means that the action moves to where the data is. The emphasis moves away from the consumer to meeting the needs of businesses. The work with SMEs must also continue.

Next Generation IoT

- Digital and IoT platforms play an important role in data sovereignty, since they are able to provide access to products, services, digital content, information, and data for everybody. At the same time, data sovereignty developments will have a big impact on the deployment of IoT/IIoT applications and use cases, data sharing and exchange.
- AIOTI was instrumental in implementing the IoT strategy in Horizon 2020, bringing the use cases which was used to feed back into common frameworks and demand side engagement.
- Digital enabling technologies strategies are now converging with a clear need for holistic approaches to Data Processing, Connectivity and Intelligence as Cognitive Cyber-Physical Systems underpin the Next Generation of the Smart Internet of Things.
- There is a paradigm shift as the 80% processing in the cloud, 20% edge processing is reversed over the next 5 years. This move to the edge is particularly important in sectors such as healthcare, agriculture and energy. This will have an impact on hardware and microelectronics, as devices once again become important. The closer to the edge, the more specific the applications must be; devices must be customized.
- This move, closer to the application layer, plays to Europe's strengths.
- A key concept for the future is centered on the "Computing continuum", linking IoT/Edge (Meta-level), operating systems and digital industrial platforms. The power to harness "intelligence" to perform is enhanced. Data is not just sent or transmitted but fused from different devices in a given neighborhood and/or federated from far edge resources.
- Europe's strengths lie in industrial applications, sensors, CPS and has an opportunity to regain global leadership and market shares for EU actors. To achieve technological autonomy, it is crucial to master the full value chains in key sectors. This requires expertise in microelectronics, photonics, IoT, SW and systems, data analytics/fusion, 5G and beyond, operating systems, platforms, Large Scale Piloting and Partnerships. The key is speed as the competition is not standing still.
- There are multiple dimensions to digitisation but the integration of different digital applications through platforms and dataspaces is still missing. The next Generation IoT Solution Space includes decentralisation, intelligence at the far edge and interoperability.
- In conclusion, edge computing, can drive decentralisation and decarbonisation and tethers control/automation systems and the cloud. EU actors must apply a platform approach to speed up innovation at the edge. The Horizon Europe cluster also reflect the need to act across multiple areas, with no unique and exclusive relationships between actors or domains.

European Cloud Federation and Gaia X project

- Gaia-X is a European industry led initiative, with 22 founding members (11 French and 11 German), established to bring European rules and values to the cloud: openness, transparency, data security, privacy. Gaia X has over 500 participants from around. 300 companies and organisations, with 3 out of 4 organisations are private companies and about half of which are SMEs, from different industries (Mobility, Energy, Manufacturing, Finance etc.).

- 80% of requirements are common across domains, Gaia X, does not want to substitute any existing infrastructure but build on existing solutions, domains match the data spaces. The goal is to activate the demand side in order to:

    - Analyse and evaluate the requirements of use cases from different domains to develop
    - Identify suitable use cases – from both a qualitative and a quantitative perspective
    - Define and validate cross-domain requirements
    - Initiate further measures for the development of Gaia-X
    - Define and validate domain-specific requirements
    - Enhance data exchange across domains

- The whole approach is evolutionary rather than revolutionary – meet the users where they are today. To date there are 8 domains and 42 use cases, matching the data spaces outlined in the European Data Strategy.

- User requirements are at the core of the development of Gaia-X. Common architectures are needed to facilitate value creation based on digital services and mechanisms across domains. Gaia-X allows the emergence of Advanced Smart Services such as AI, Analytics or Big Data and fosters innovation in the whole ecosystem, offers ontologies for interoperability and API within and across sector specific data spaces according to the EU data strategy, promotes the opportunity to collaborate in data-driven horizontal and vertical value chains. As a result, it encourages the emergence of sustainable business and innovation ecosystems for the next generation of digital infrastructure.

- Gaia-X will also be organized regionally, through Gaia-X hubs that sign an MoU. The will represent the demand side. Gaia-X expects from the European Commission to coordinate those hubs, as it needs to be disseminated to the SMEs and regions.

- Adherence to Gaia-X rules is mandatory for any organization wishing to join, either through a declaration of honour or third-party certification depending on agreement within the Gaia-X governance. Existing tools (e.g. Codes of Conduct, ISO Standards, etc.) may be used to demonstrate effectiveness of compliance.

Beyond 5G and applications in cross-vertical industry domains

With consumer and personal communication commercial 5G networks rolling out in ever-more countries, the next wave of 5G expansion will allow organizations to digitalize with greater mobility, flexibility, reliability and security than ever before.

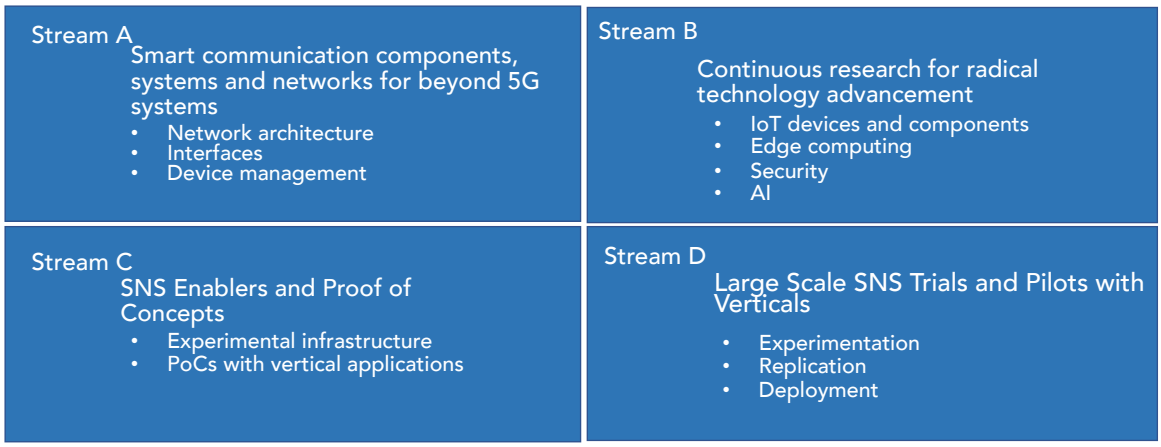
- The digitalization of the economy is leading to an ever more connected world, from industry and factory floor, through smart grids to the smart home and buildings, to mobility and health.
- In this context, cross-company interoperability for OT devices (such as through Concept of „I4.0 Component with AAS") must be enabled. This platform enables the interconnection of machinery through asset administration.
- On the IT side, data should be used to inform decisions at the point at which those decisions are taken. But data without analytics has no value. The availability of Industrial data will grow five-fold. Currently, 80% of industrial data is not collected and therefore not analysed.
- But even if there are gaps in data availability, organizations should still start to process and analyse as there is a feedback loop in inherent in any data initiative. Find fast, fail fast and move on using lessons learned.

5G: Unlocking the Potential of Industrial IoT

- 5G deployment is accelerating: 1.5 years after launch 80+ operators commercially deployed networks, 300+ in preparation, making %G commercialization moving into mainstream.
- 5G is the unifying connectivity fabric for a hyper connected future, rapidly evolving to meet diverse IoT requirements. Through system innovations, 5G is leading to enriched user experiences, new use case, new verticals, enabling ubiquitous intelligent connectivity. There is a strong industry collaboration around 5G Industrial IoT that started with 5G for Industrial IoT with 10+ live ecosystem demonstrations at Hannover Messe 2019 based on 5G Release15 specifications.
- Dedicated and reliable networks, optimized for local services and capabilities for new use cases (e.g., wireless industrial ethernet) will bring the mobile ecosystem to new industries: Connected healthcare, Digitized education, Construction and mining, Precision agriculture, Smart manufacturing, Intelligent retail, smart city.
- Expanding 5G Industrial IoT to make the factory of the future a reality includes: 5G time-sensitive networking (TSN) (Live OTA demonstration from an production line with industrial devices, 5G TSN: Tight time synchronization over 5G, eURLLC: Ultra-high reliability with CoMP 5G precise indoor positioning, live OTA demo of a new feature in Rel-16+, s Sub-meter 3D positioning utilizing multi-TRP) and 5G IIoT research collaborations (joint live proof-of-concept demos with industry leaders on key IIoT use cases using TSN over 5G).

Smart Networks and Services partnership

- A key goal of the Partnership submitted in June by with 5G IA, with AIOTI, NetWorld2020, CISPE and Nessi is to define and implement the research, innovation and deployment roadmaps that will enable Europe to lead in the creation of the next generation of smart network technologies and services. These will be designed and implemented in such a way that European values like security and privacy are safeguarded and European technological sovereignty is further strengthened.
- IoT in the workstreams of the SNS Partnership is reflected as follows:



Opportunities and challenges ahead are related to collaborative research, Green deal targets and human-centricity and SDGs commitments.

Green Deal and Digital

- It has been widely recognized that "intelligent connectivity" is essential to achieve the United Nations Broadband Commission agenda for 17 Sustainable Development Goals (SDGs). Deployment targets have been set for 2025, underlining the importance of communication systems and networks in addressing economic growth, multiple social challenges, and other critical issues around climate change and sustainability.

- The twin pillars of green deal and digital are synergistic, essential mitigators for climate change and achieving the ambitious targets. The 1st is about protecting the people, planet and nature. There is no "planet B".

- In order to reduce greenhouse emissions 50% by 2030, the Commission will launch numerous initiatives: a European Digital Strategy, a European Strategy on Data and the Circular Economy Action Plan including regulatory measures for mobiles, tablets, laptops, printers and consumables chargers, 'right to repair', including a right to update obsolete software and EU-wide take back scheme to return or sell back old mobile phones, tablets, chargers.

- There is positive relationship between the SDGs and technologies. 11 SDGs have positive link with digital, examples of SDGs with strongest positive links: SDG 9 - Infrastructure, industry and innovation, SDG 8 - Decent work and economic growth, SDG 3 - Health and well-being, less so in others (in some, there may a negative relationship). ICT has significant environmental impacts: E-waste = material inefficiency, non-circularity of devices: strongest negative link.

- Progress is needed on energy and material efficiency (durability, reparability, recyclability). Data from satellites can be used to improve our carbon footprint by modifying our behaviour. The digital divide will also have an impact on the SDG take up.

- Some of the digital related work items across various policy initiatives that will be supported through funding are:

    - **Supplying clean affordable and secure energy** – Digitisation of decarbonised (smart) grids;
    - **Mobilizing industry for clean and circular economy** - ICT sector needs to improve energy and material;
    - **Building and renovating** – ICT can improve energy, efficiency of buildings by 15-25%;
    - **Accelerating the shift to sustainable and smart mobility** – digitally enabled Mobility as a Service, shared mobility;

    - From 'Farm to Fork' – Precision agriculture can lead to 25% savings in Fuel, 15% reduction in seeds and fertilisers.

- On the Green Deal impact on Digital Networks and Services, from an IoT point of view, the impact is on connectivity, hardware and devices and use of data. AIOTI has actively contributed through various partnerships (in particular Smart Networks and Services and Big Data/AI) to contribute in achieving Green Deal targets.

- In Europe the level of urbanization is above 75% and is expected to increase to approximately 83.7% in 2050, with cities consuming over 70% of energy and emitting as much of greenhouse gases. As city populations grow, the demand for services, on the one side, and the pressure on resources, on the other side, increases.

- Buildings are an important element to this growing trend, as the World Health Organisation estimates that people spend approximately 90 % of their time indoors in residential and non-residential buildings. Buildings are the single largest energy consumer in Europe, absorbing 40% of final energy and producing about 36% of all greenhouse emissions. There is an urgent need to tackle this issue, as across Europe, 75% of buildings are considered energy inefficient, and, depending on the Member State, only 0.4-1.2% of the stock is renovated each year. But if Europe is to fulfil its 2050 climate and energy goals, this rate will need at least to double to reach 3 % per year.

- In December 2019, the Renovation Wave was announced as a key European initiative to support the European Green Deal.

- AIOTI strongly supports the call for scaling up renovation rates across Europe. With 97% of EU buildings in need of renovation, we believe that the upcoming Renovation Wave Initiative represents a unique opportunity to not only ensure the energy efficiency of buildings but also to address the wellbeing, health and comfort of occupants through a better indoor environmental quality.

- The foundation for an effective and ambitious Renovation Wave must be based in the following three principles:

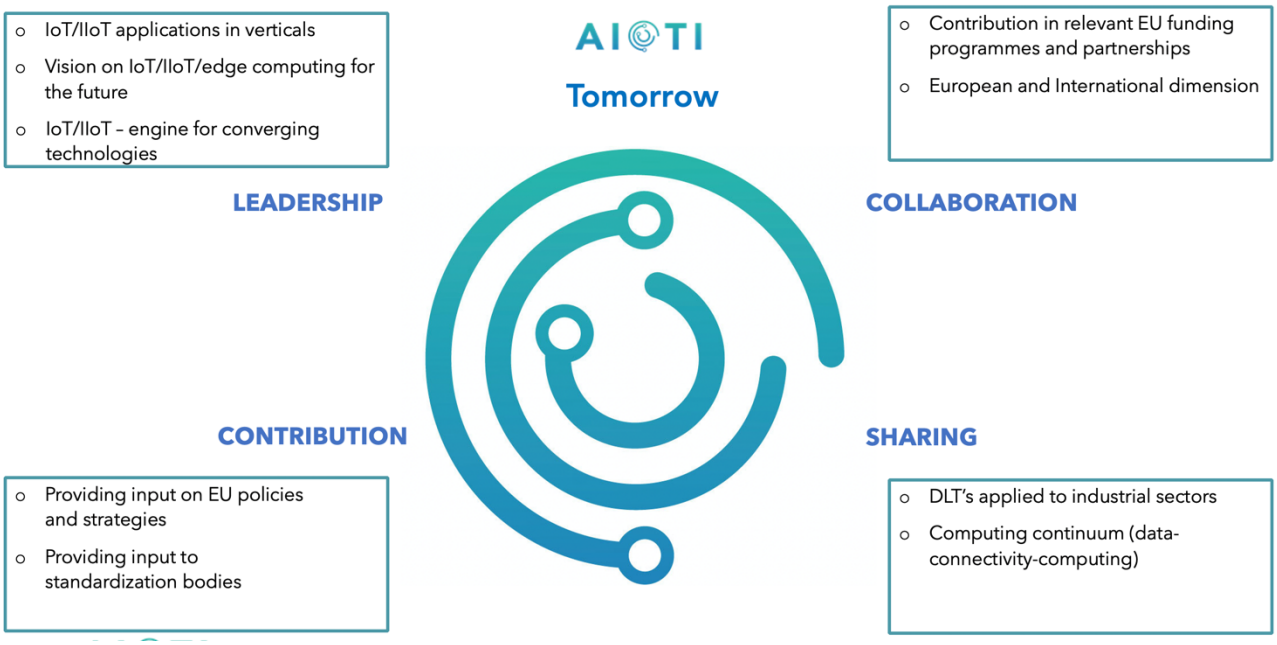
    - Integrated building renovations:
    - Energy Efficiency and Renewables
    - Dedicated financial flows

- Public conditionality for public finance should not neglect improving a building's smartness. Ignoring the potential for connectivity/use energy savings could lead to long-term lock-in-effects, postponing the digitalisation of the building stock for decades. Accurate and reliable data is imperative before proposing legislation to ensure measures are also adapted to the geography, climatic zone etc.

- The Energy Performance of Buildings Directive (EPBD), work should be undertaken in the future to improve the Smart Readiness Indicator (SRI) and ensure that it is implemented widely across the Member States. In addition, there needs to be a focus on non-residential buildings (public and commercial buildings), as already set out in the Energy Performance of Buildings Directive with public buildings, leading by example.

Final words

A few final words: AIOTI is not just about technologies, systems of systems or platforms of platforms. We are about people, individuals who are experts in technologies, data, industries, behavioural economics and societal adoption and adaptation. Based on discussions heard at the event, and on our updated mission and vision of AIOTI, we can already point to some of the areas on which we will focus in the coming period:



As is our way, this will be subject to further discussion and is evolving, living thinking.