



Alliance for
Internet of Things
Innovation

European IoT challenges and opportunities 2019-2024

AN IOT
ENABLED
FUTURE

Through the IoT lens

From now to the IoT-enabled future

'Digitisation' has been at the root of the most impactful transformations of the past decades. It has its roots in technology and technical applications but affects all aspects of the way we work, live, study and spend our free time. It has a significant impact on our welfare, well-being and our independence as European citizens. The Internet of Things (IoT) facilitates and supports this digital transformation.

Digitisation can be seen through many perspectives. It is not constrained to a single 'technology box'. It requires a multi-layered technology approach that is holistic and integrative, an approach that is traditionally not well served by a single organisation. This challenge, identified by the European Commission (EC) some time ago, was the basis for the establishment of the Alliance for Internet of Things Innovation (AIOTI) with the aim to open up and break down existing silos in technology and application domains and drive IoT innovation through real-world implementation.

It is clear that the IoT plays a critical role in the current digital economy, enabling of billions of connected devices to exchange data and powering artificial intelligence systems in many fields. It will be instrumental in solving societal challenges such as climate change, energy and water management, mobility, food, security and safety, liveable cities, healthcare and the aging society. Indeed, some of these themes are at the core of several Horizon Europe missions that are currently under definition.

To understand the challenges related to the many aspects of digitisation and IoT, we take the simplified view of the different platform layers in IoT value chain, reflecting a component level, connectivity and communications levels, a general data analytics level and an application level in a value chain. While further discrimination can be applied to identified many more detailed platform layers, the overall view remains unchanged.

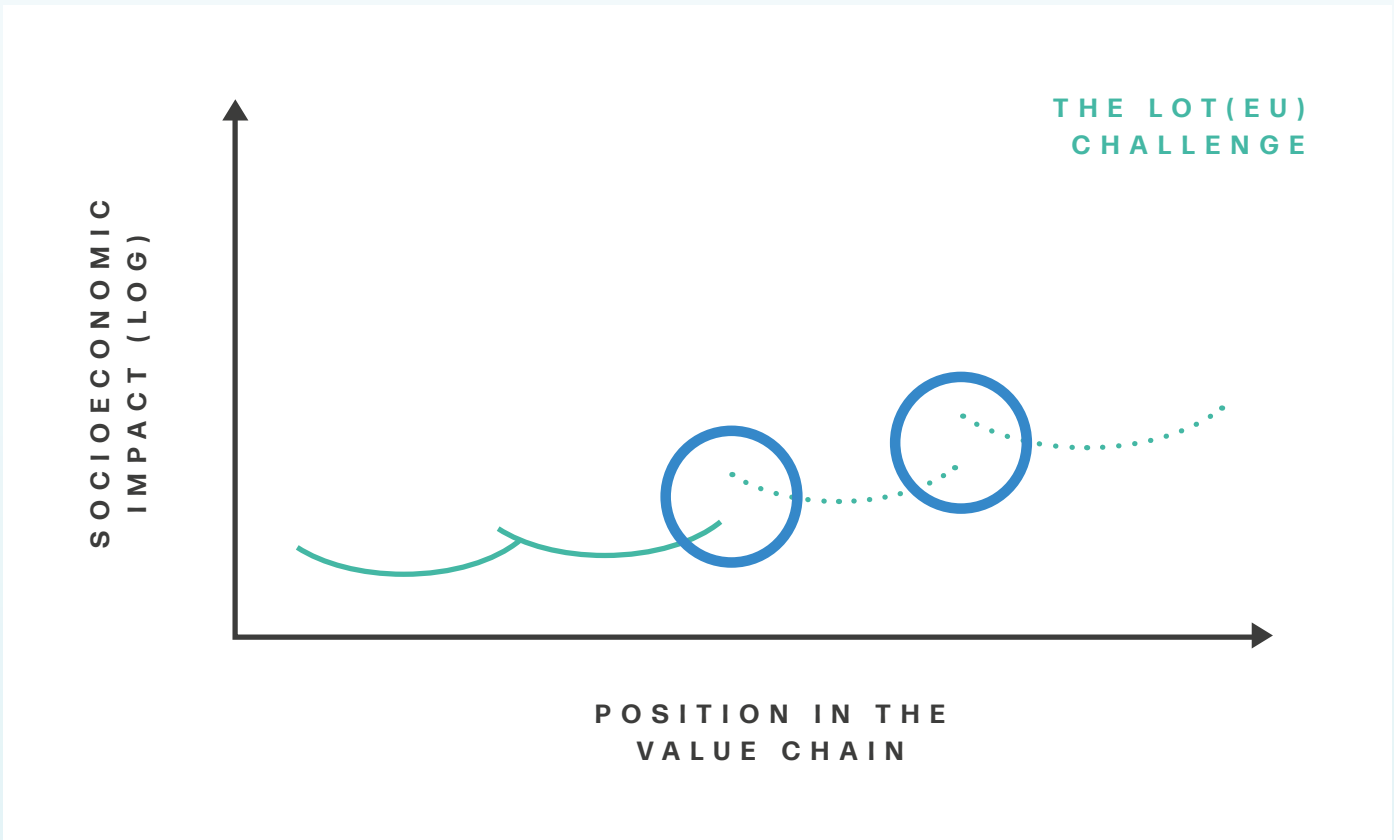


In general terms, the further up in the value chain, the higher the integral economic value and diversity of IoT applications. Typically, the economic value of applications (with tens of thousands of companies active in this area) is an order of magnitude larger than the economic value of the lowest layer, which typically has few players serving global markets. Nevertheless, all higher layers are building on platforms provided by the lower layers, multiplying their initial economic impact.

Outside Europe, influential companies with economic drives or governments with political drive are orchestrating the establishment of global platforms.

Europe, capitalising on its diversity in active markets across countries, culture and industry needs to secure its value chain and value creation based on European values.

The below figure illustrates the challenges that result from a broken integral value chain in Europe. The smiling curves depict the positions in the value chain where companies are focusing on providing a technology platform (e.g. microelectronics foundry, IC design house, general application software, communication networks) where link between application domains and technology providers becomes of critical importance to drive the integrated value chain.



There are many analyses and predictions regarding the size and impact of IoT, including the following:

- According to Gartner, there will be over 14 billion connected devices by the end of 2019, and over 25 billion by the end of 2021. [\(Source: Gartner\)](#)
- The global IoT market was worth over \$150 billion in 2018 and is expected to exceed \$1.5 trillion by 2025. [\(Source: IOT Analytics\)](#)
- By 2020, there will be 4 internet connected devices for every human on the planet. [\(Source: Gartner\)](#)
- By 2020, the lack of data science specialists will prevent 75% of all businesses from maximizing their IoT goals. [\(Source: Gartner\)](#)
- The number of smart home devices purchased is expected to exceed 1.94 billion by 2023, with device sales exceeding \$78 billion by that time as well. [\(Source: Strategy Analytics\)](#)
- Smart cities are a major and emerging market for IoT. Over one-fifth of all publicly announced IoT projects involve IoT-driven smart cities of some kind, with most of these smart cities (45 percent) located in Europe. [\(Source: IoT Analytics\)](#)
- Over 25% of all cyber attacks against businesses will be IoT-based by 2025. [\(Source: Gartner\)](#)

But the challenge of creating competitive value is also an opportunity for the EU.

The broad reach of digitisation and the Internet of Things come with the need to secure privacy, security, resilience and trust. This need requires a differentiated approach from that proffered by the traditional technology push. Customer acceptance, co-creation and shared added value are key for establishing a common way forward.

A collaborative EU approach with the involvement of end-users can grow into a trusted IoT paradigm, provided that we put the efforts in supporting the creation of enabling ecosystems.

An example of a thriving ecosystem that AIOTI is currently building involves IoT-enabled Data Marketplaces. The transformative journey from building infrastructure to the local enablement to cross-domain marketplaces is underway across many domains and geographies. The ecosystem is fundamental for unlocking cross-domain data marketplaces and provides the context and specific recommendations to guide the next steps across Europe.

The four stages of IoT Marketplaces identified below link the related technologies and challenges. Their relevance and resonance provides a mandate for AIOTI to focus on this ongoing cross-working group efforts and delve further into each of the topics.



TOWARDS IOT MARKETPLACES

TECHNOLOGY

CHALLENGES



EU partnerships and establishing collaboration platforms

AIOTI aims to play a decisive role as match-maker and integrator.

Leveraging the transversality of technologies within cross-domain reach, AIOTI extends its capabilities to address and solve societal challenges such as energy transition, reaching climate neutrality, transforming smart cities transition towards healthier and more efficient environments, improved governance and citizens participation, and many more aspects of rapidly changing European landscape.

Infrastructure plays an essential role during this transformative phase. Applications, facilitated by new architectures that are scalable across EU regions, hold the promise of a broad reach of solutions and significant capacity for further development. Similarly, a synchronised interplay between safe and secure bottom up solutions and the application of an intelligent edge approach and cloud solutions will continue to evolve over the next few years.

AIOTI will be an advocate for a system of systems approach, that takes all of the above matters into consideration to create greater value for all. Jointly, we can achieve this faster, more efficiently and with greater impact within IoT data-driven marketplaces that are enabled by:

- Vertical application domains for cross learning and integral solutions, e.g. mobility, energy, water and food coming together in a smart city
- Networks linking with multiple application domains, securing interoperability
- The application of common legal frameworks that determine liability across multiple domains.

This link is of critical importance for Europe's success in IoT, driving the speed of adoption, learning, acceptance and providing the backdrop for economies of scale. To put things into practice, AIOTI and the 5G Infrastructure Association (5G IA) are preparing a joint approach to the EC's Future Networks and Services programme.

But more is required. And that is why AIOTI wishes to stress through this communication that offering excellence in the deployment of individual technology building blocks is no longer a guarantee for socio-economic success. Stimulating measures must be much more application-driven and acknowledge the critical research and innovation role for integration skills, both to achieve excellence in technological and socio-economic terms.



Our Visions and Recommendations

We believe that future EU policies, and in particular those that are within the work programme of the next European Commission, should be built around:



The definition and support of a human-centric approach ensuring safety, security, privacy and trust, as the basis of the identity of “Made in Europe” IoT technologies and applications, ensuring a non-discriminatory presence in the European market and participation in R&D&I programs.



Leveraging IoT data, enabling cross-sectoral “data marketplaces”, providing true interoperability, lowering regulation barriers, etc. to unlock the full potential of innovation IoT-based applications.



Progress in the digitisation of European industries according to market and societal needs, with special attention paid to closing a digital divide between EU regions and the Member States.



This includes establishing a cybersecurity strategy for safeguarding IoT technology and applications, whilst ensuring privacy by design. Advancing in the convergence of IoT with other enabling technologies such as next-generation connectivity, AI, edge computing, to sustain and extend European leadership in the digital innovation space.



This includes developing new IoT-enabled technologies addressing societal challenges like energy efficiency, climate-change, carbon-neutral smart cities, security of food supply and healthy water, which are currently at the core of the Horizon Europe missions.



Dialogue with industry representatives, such as AIOTI, to build a bridge between the European Commission and EU Member States to disseminate IoT knowledge and in particular to:

- Share and streamline information on IoT related policy, regulation, research, innovation and standardization areas that are led by the European Commission and/or those led by EU Member States and shorten the decision making process at EU and the Member States level on IoT related issues.

That means that existing successful initiatives, including the Digitising European Industries and Digital Innovation Hubs, should continue to be supported within the new context and with new impetus to accelerate testing and adoption of IoT-enabled applications.

Within the framework research programme, European partnerships that include Smart Networks, Intelligent Connectivity, IoT Applications and Services should be developed and adequately financed. Through a public-private partnership model, AIOTI can lead and make significant contributions in this field, bringing our expertise and membership breadth and reach.

In addition, to pursue successful IoT public policies, the EU should further promote access to data to deliver public interest solutions, enable the development of new commercial business models, build European data lakes and ensure the security, safety and privacy of data.

The value that IoT can provide is determined by interoperability of systems across domains, creating a network effect. Specifically on IoT standardisation, where AIOTI has a demonstrable track record, the work performed to date can be used to further promote the implementation of standards and protocols across industries. Guidelines can be produced for the future proponents of project proposals associated with IoT related calls financed by the EC. The aim will be to build on existing standards, while identifying gaps and continuing to contribute to relevant standardisation activities.

Finally, AIOTI can deliver on a number of actions that are directed at improving the visibility, relations and synergies with other political stakeholders. These would include:



Maintain the database for research and innovation projects that are funded by the European Commission and/or EU Member states related to IoT



Develop and provide a roadmap with conclusions of significant IoT related projects, e.g., IoT LSPs, that are funded by the European Commission and that could enable further deployment, research, innovation and standardization in Europe



Develop an active information loop with Digital Innovation Hubs



Design, develop and structure regional workshops to disseminate the national and EU level IoT related initiatives, bridging all related research and innovation IoT related initiatives while leveraging the best practices of successful IoT related initiatives



Support the Member States and the European Commission in fostering dialogue on the IoT related themes as outlined above as well as addressing Horizon Europe priorities



Actively propose intraregional or intra Member State regulatory sand boxes related to IoT.

In order to enable such enhanced exchange and collaboration, AIOTI proposes the creation and operation of the European IoT Hub, that can be (co)-financed by the European Commission to achieve the objectives listed above.



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.