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# IoT EU Strategy, State of Play and Future Perspectives

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## 1.1 Introduction

Two years have passed since the publication of our Digitising European Industry (DEI) strategy, whose overall objective is to ensure that any industry in Europe, big or small, wherever situated and in any sector can fully benefit from digital innovations to upgrade its products, improve its processes and adapt its business models to the digital transformation. The underlying scenario is represented by the European platform of national initiatives on DEI, including digital innovation hubs, regulatory framework, skills and jobs, partnership and platforms (Figure 1.1).

IoT is at the heart of the digitisation process of the economy and society and it is an essential building block of the DEI strategy and the Digital Single Market strategy. Therefore, the overall goal is for Europe to be at the forefront of supplying innovative IoT solutions and to become the world's leading market for IoT products and services. As part of the DEI strategy, the goal for developing IoT leadership encompasses several building blocks funded under Horizon 2020:

- The IoT-European Platforms Initiative (IoT-EPI), addressing interoperability of IoT platforms, creating the ecosystem, using architectures, and integrating systems and networks for a multiplicity of novel applications;
- The Focus Area on IoT under Crosscutting Activities in the Horizon 2020 Work Programme 2016–2017, on experimentation with real-life solutions, tested at large scale with users; and

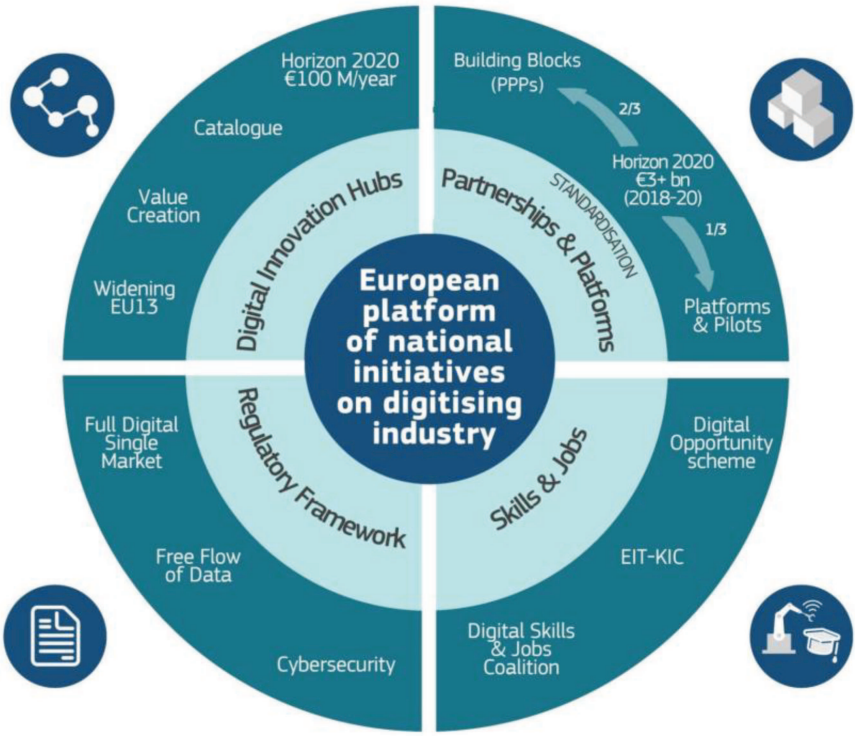


**Figure 1.1** DEI 4 main actions.

- The Focus Area on Digitising and transforming European industry and services under the Horizon 2020 Work Programme 2018–2020, which supports the DEI strategy on digitization of industrial sectors, integrating digital technologies and innovation across societal challenges (Figure 1.2).

These building blocks are further elaborated below to provide with an overview of the state of play of the EU initiatives and activities.

## 1.2 Research and Innovation under Horizon 2020

The IoT-European Platforms Initiative (IoT-EPI) was formed to build a vibrant and sustainable IoT-ecosystem in Europe, maximising the opportunities for open platform development, interoperability and information sharing. At the core of the programme there are seven research and innovation

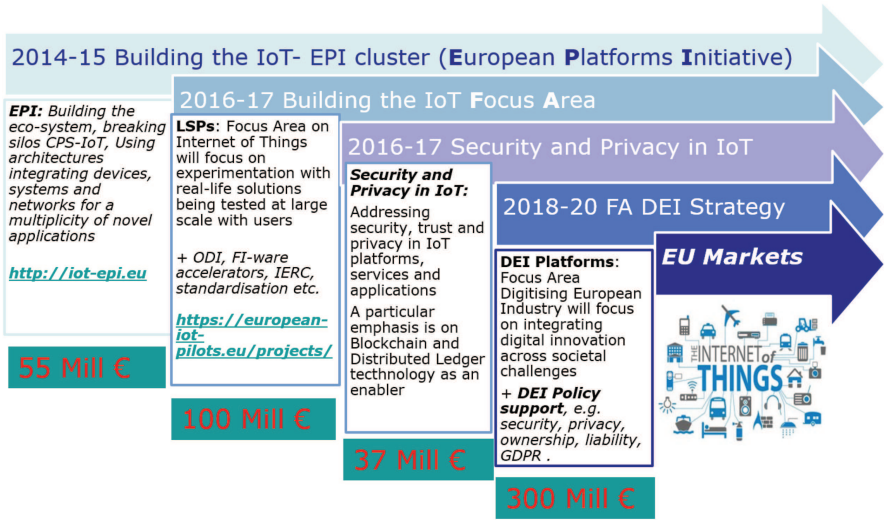


**Figure 1.2** Overall EU IoT strategy.

projects and two coordination and support actions: Inter-IoT, BIG IoT, AGILE, SymbIoTe, TagItSmart, Vicinity, bIoTope, Be-IoT and UNIFY-IoT. With a total funding of EUR 50 million and a partner network of 120 organizations, these projects develop innovative solutions focusing on IoT architectures and semantic interoperability. Furthermore, they also foster technology adoption through the development of use cases in several industrial sectors, and community and business building activities. All projects ran within the time-frame of 2016–2018 – with one (Vicinity) extending until 2019.

The IoT-EPI projects are cooperating to define the research and innovation mechanisms and to identify opportunities for collaboration in IoT ecosystems to maximise the opportunities for common approaches to platform development, interoperability and information sharing. The common activities are organised under six task forces that are conceived and developed under IoT-EPI (Figure 1.3).

Each of the six Task Forces have produced major results in terms of research, but also in terms of policy, which has created a real impact on the European IoT market [1]. Some of the key results include:

- The analysis of IoT platforms showing a market growing rapidly, but still fragmented, with hundreds of different and incompatible platforms.

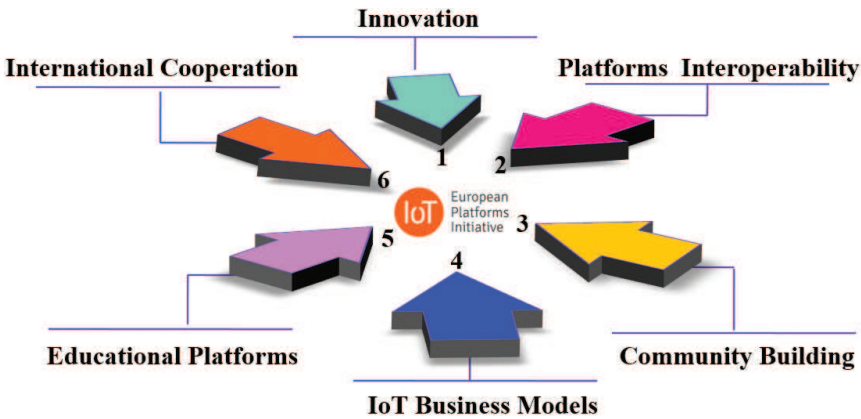


**Figure 1.3** IoT-EPI Task Forces.

This report on IoT landscape has been further developed and published by the Alliance for Internet of Things Innovation (AIOTI) [2];

- The publication of a white paper on IoT platform interoperability, compiling the lessons learnt and results from the seven projects [4];
- The development of an open architecture and open IoT business model framework that has set the foundation of cooperation with the developers and entrepreneurs community, and that has mobilised SMEs and start-ups to join the ecosystem. In eleven open calls, with more than 100 external IoT-teams, the IoT-EPI has planned an investment of more than EUR 5.5 million until December 2018 to nurture an IoT ecosystem around the seven core projects;
- The development of policy recommendations for the uptake of IoT in Europe; and
- The set-up of an education platform using the results of the IoT-EPI projects.

Besides the IoT-EPI Task Forces, adequate security, trust and privacy are key issues to be tackled in connection with IoT, and therefore a specific cluster of project addressing these issues has been launched under Horizon 2020 in 2017. Seven projects have been selected with a total EU contribution of EUR 37 million in order to develop and test solutions providing IoT security, trust and privacy (ENACT, IoTCrawler, SecureIoT, BRAIN-IoT, SOFIE, CHARIOT, SEMIoTICS, SerIoT). The projects address the key issues of end-to-end security and trust in open IoT Platforms, as well as advanced concepts for IoT security and prevention of cyber-attacks, including blockchains and

distributed ledger technology, which are tested in a set of ambitious use cases. In addition, the projects deploy open IoT platforms and include a strong contribution to upcoming open standards in IoT security.

## 1.3 Deployment – IoT Focus Area and Focus Area on Digitization

In order to foster the uptake of IoT in Europe and to enable the emergence of IoT ecosystems supported by open technologies, the European Commission launched an IoT Focus Area that supports the IoT European Large-Scale Pilots Programme (IoT-LSPs) on deployment of IoT at large in Europe. These IoT-LSPs started on 1 January 2017 and are funded with a budget of EUR 100 million. The IoT-LSPs cover the following domains:

- Smart living environments for ageing well (ACTIVAGE);
- Smart Farming and Food Security (IoF2020);
- Wearables for smart ecosystems (MONICA);
- Reference zones in EU cities (SYNCHRONICITY); and
- Autonomous vehicles in a connected environment (AUTOPILOT).

With these pilots, the European Commission is supporting the testing and experimentation of new IoT related technologies with the involvement of and result validation by end users. These pilots are expected to accelerate the standards setting across different business sectors, boosting further the IoT technology and provide input to policy developments, such as data protection, privacy and security.

Since January 2017, several successful results have been achieved. Each funded project is applying IoT approaches to specific real-life challenges across use cases, based on European relevance, technology readiness and socio-economic interest in Europe. More than 50 use cases have taken shape and are now fully running. This has also allowed the LSPs to work together in order to define common high-level architecture models. Another example is the well-defined and good cooperation among LSPs, which develop common mechanisms for the publication of open calls to enlarge their consortia with new partners, in particular SMEs. These open calls provide so-called cascading funds as financial support targeted to involve especially SMEs and start-ups to get access to pilot testing in an open and lean way.

In the Horizon 2020 Work Programme 2018–2020, the European Commission aims to use the strong concept of a Focus Area on Digitisation (*Digitising and transforming European industry and services*), accounting for EUR 250 million funding and forming a significant part of ICT calls in the Horizon 2020 Work Programme 2018–2020. Success in implementation of the Focus Area will depend to a large extent on the capacity to work across the digital, societal and industrial topics that are grouped under this Focus Area. The Focus Area requires close cooperation of different services across different DGs, namely CONNECT, GROW, RTD, AGRI and ENER, to ensure coherent policy setting across areas which so far were siloed economic and policy areas, e.g. to support Digitisation under the Energy Union or the Common Agriculture Policy.

Calls will close in November 2018 and resulting from this Focus Area, a further set of pilots will be launched in 2019 across different areas, such as health and care, energy efficiency, agriculture and industry 4.0. These pilots will accelerate standards setting across different business sectors, boosting further the investments and scalable market creation for IoT technology. This focus area will be funded by several parts of the Horizon 2020 programme, mainly by the Leadership in Enabling and Industrial Technologies and Societal Challenges pillars. Pilot activities will be supported in the areas of Smart Farming, Digitisation of Energy, Digital Health and Rural Platforms, as depicted in Figure 1.4.

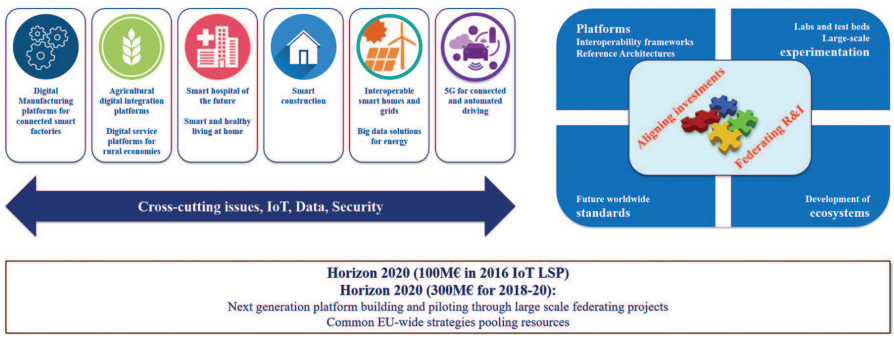


**Figure 1.4** Focus Area on Digitization.

## 1.4 IoT within the Next Generation Internet – Preparing the Next Framework Programme for Research and Innovation

IoT continues to evolve rapidly, in particular in response to the major trends, such as the ever-increasing volumes of data generated and extraction of knowledge through smart data analytics, as well as increasing levels of automation and decision making, made possible by smart sensors, devices and actuators combined with machine learning and artificial intelligence.

In addition, there are new real-time requirements emerging, such as in industrial production and autonomous cars, which must be addressed. The capacity of communication networks is ever increasing with 5G deployment starting and processing power is still increasing exponentially, allowing for new distributed architectures (e.g. cognitive cloud, fog or edge computing) and solutions.

Also, new approaches to reduce or eliminate intermediaries, by building on blockchains and distributed ledgers, and the power to control access to and sharing of data, lead to new value chains and business models, which will open new opportunities for European companies and user communities.

This is all encapsulated in the vision of a Next Generation Internet, which is more human-centric in terms of identity, data protection and privacy, control and opportunity, addressing wider needs (from browsing to interconnection of billions of smart devices with new real-time requirements) and which is more secure and trusted by design as a critical infrastructure for society and business.

## 1.5 Conclusion

The digital revolution has only just started – and it is speeding up. Technology is entering into a critical phase, where connectivity and intelligence will permeate all areas of the physical world, with profound economic and social effects. Europe must maintain a leading position in the digital world and ensure that everyone whether businesses, public sector and citizens, can benefit from it. The European Commission has just published its proposal for the next EU budget for 2021–2027 [5], where there is a substantial

focus on an ambitious investment in digital to make this a reality. This proposal includes a 60% increase in budget for Horizon Europe, the next EU Framework Programme for Research and innovation, as well as a proposed new programme, i.e. the Digital Europe Programme with a EUR 9 billion funding to support the large scale uptake of digital technologies, including digital skills. IoT and its future evolution is central to many of these efforts and Europe can take the lead in realising its potential.

## References

[1] Digital Single Market – The Internet of Things, online at: https://ec.europa.eu/digital-single-market/en/internet-of-things
[2] Alliance for Internet of Things Innovation (AIOTI), online at: https://aioti.eu/
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