JULY 2021

EU Tech Chamber White Paper
IOT Council

10 KEY RECOMMENDATIONS
FOR INTERNET OF THINGS INDUSTRY

European
Technology
Chamber
eutec.org

EXECUTIVE SUMMARY

Why the Internet of Things is so important? When something is connected to the Internet it means that this object can exchange data and information, or it can be remotely controlled.

The IoT has the power to transform every object in a "Smart Object".

Therefore, an IoT ecosystem consists of a set of smart objects connected to the Internet that, using microprocessors, sensors, protocols and transmission technologies, collects, sends and operates on the data acquired from their environments. Data are sent to the cloud for analysis or otherwise analyzed locally through an edge structure. IoT devices can also communicate with each other. Human intervention is not necessary, and IoT devices can work independently; human intervention will be required to manage configurations, give instructions and access data.

In short, we can say that "Internet of Things" means to take all things and objects and connect them to the Internet: An IP Address for every object.
IoT technologies are spreading rapidly, with growth rates estimated at 12% per year. Moreover, we will

have a number of always-connected objects that will already exceed 20 billion in 2021 and result in a turnover of more than several hundred billion dollars in a few years. Therefore, the IoT will increasingly be a set of pervasive technologies, and we will get used to having more and more objects "naturally" connected to the Internet
There is no limit where the IoT can have an application, in this White Paper we are going to explore only small subset of areas where IoT has a transformation or disruptive effect.

We will examine many different realities, from the Healthcare, to the education, going through the industry, mobility, smart cities and e-Government, without forgetting about issues, such as the Cybersecurity, in the Cyberworld we cannot afford to let Cybercriminals to take control of our IoT ecosystems.

European Technology Chamber

With great technology comes great responsibility.

Technology Obliges!

The European Technology Chamber is a registered NGO, which enables European businesses to use their technologies for the benefit of Europe and mankind. The EUTEC Chamber has three major goals and believes that technology is the answer to reach those.

Competitiveness

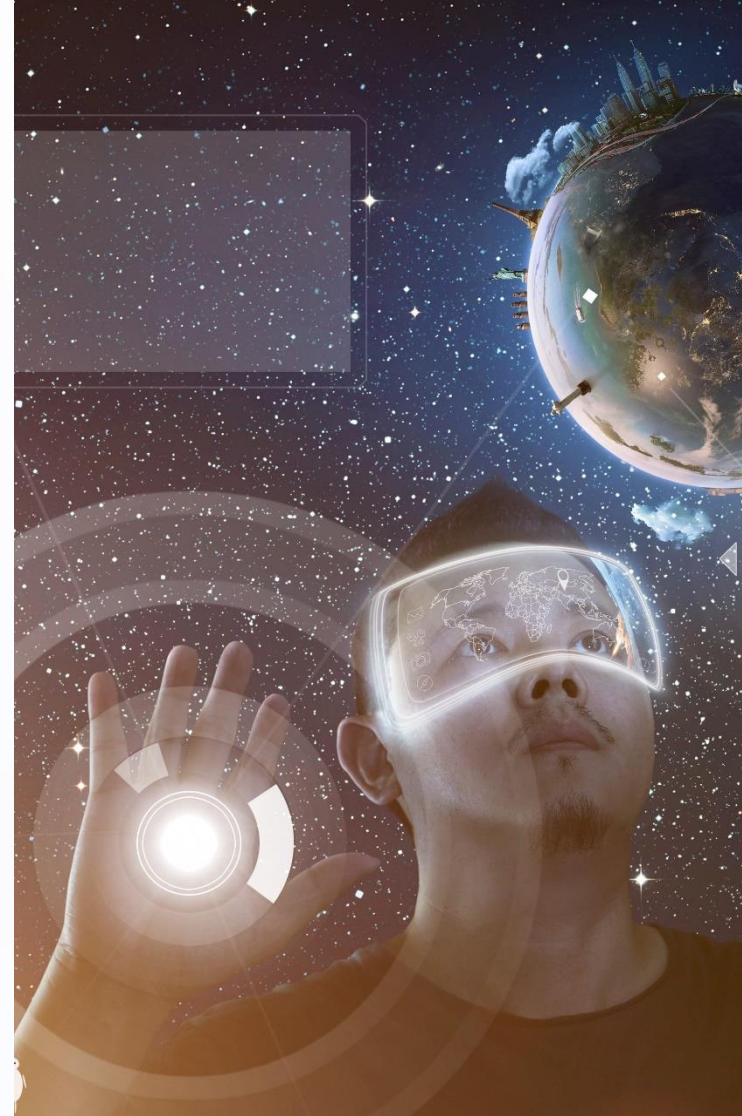Strengthen Europe's competitiveness and transformation capabilities in its Global positioning

Sustainability

Leverage innovation, key technologies and business opportunities to achieve 17 UNSDGs

Growth

Build bridges to international markets and establish partnership for an inclusive growth

About the Internet of Things Council

Designed to foster innovation and business opportunities for European technology.

The IoT Council, an initiative of the EU Tech Chamber, to build up new intelligent solutions based on the Internet of Things. "Things" like smart phones, sensors, wearables etc. in the private and the industrial surrounding step nearer and nearer. Our councils' purpose is to connect the relevant innovators and stakeholders, share concepts and collaborate.

Platform Eco-systems   **Innovation**   **Cyber Security**

METHODOLOGY

EU Tech Chamber White Paper

An EUTEC White Paper serves as an informational document to share knowledge, foster exchange and collaboration, and create value for our advocates and the larger EUTEC community from society to businesses, from industry professionals to technological innovators.

Sharing technology-driven solutions and methods to help solve some of our most challenging questions on how we can improve our lives, providing insights from engineers, experts, and researchers.

A White Paper is carefully curated in collaboration with EUTEC advocates, supporters and contributors who share EUTEC's vision and values and is published by ETUEC Sections for educational and knowledge sharing purposes.

European
Technology
Chamber

With great technology comes great responsibility.
Technology Obliges!

10 RECOMMENDATIONS FOR INTERNET OF THINGS INDUSTRY

European
Technology
Chamber

10 RECOMMENDATIONS

1. **The IoT will bring the next wave of innovation in the Medical profession**: The Health industry is getting ready to the next wave of transformation. The Internet and Technology are supporting doctors to assist patients with telemedicine and the health status of isolated elderly people due to continuous monitoring and alarms assistance.

2. **The IoT and the use of Smart Devices will transform the Education industry**: The Education and Training Industry takes a leadership position, using Smart devices that are changing education methodologies. Additional Smart connected devices will improve the teaching process, empowering the teachers to be more efficient and effective

3. **The IoT technology adoption will enable Smart Cities models**: The widespread adoption of the Internet and associated technologies will support the transition to an efficient, sustainable and secure City management.

4. **Implement IoT solutions to enable a modern and sustainable Manufacturing**: The Industrial IoT (IIoT) alongside the Industry 4.0 is changing modern production techniques. The Industry 4.0 technologies, such as the factories production ecosystem always connected to the MES (Manufacturing Execution Systems) and the ERPs (Enterprise Resource Planning) has increased the production efficiency, flexibility, productivity and reduced costs and waste.

5. **The IoT can disrupt our Mobility ecosystem**: Our Mobility is enhanced and empowered due to the widespread use of internet technologies in several ways: From the car sharing, to the micro mobility devices that are revolutionizing the transport into our cities, all these technologies will transform the way we are going to move in our cities.

European Technology Chamber

10 RECOMMENDATIONS

6. **The IoT and the 4.0 era technologies is transforming the Agriculture sector**: Smart Agriculture is already being enabled by the Internet and Technologies. We are now at the start of a new revolution brought by the digital transformation such as data connectivity, cloud computing/big data analysis, digital platforms, artificial intelligence and machine learning, but also, yield mapping, GPS guidance systems.

7. **Use IoT technologies to enable a sustainable Circular Economy**: The Internet Technology alongside other technologies such as the Blockchain are the enabler of a comprehensive Circular Economy where the Products are traced in their Life Cycle. One of the key factors in the Sustainable Development in the coming years will be the Digital Transformation, consisting in the continuous advances of artificial intelligence, connectivity, information technology, additive manufacturing, virtual reality, machine learning, Blockchain, robotics, quantum computing and synthetic biology

8. **Our homes will be transformed by IoT technologies**: Our home ecosystem is transforming thanks to the ease-of-use and accessibility of technology used across the internet, from the personal wearable devices, connected households' appliances, to voice controlled smart assistants up to personal domestic robots.

9. **Smart building, Smart construction:** Smart buildings use Internet of Things (IoT) devices—sensors, software, online connectivity—to monitor various building characteristics, analyze the data, and generate insights around usage patterns and trends that can be used to optimize the building's environment and operations.

10. **Prevent security vulnerabilities from the Cybercrime**: Exposure to cybercriminal and data security risks is under threat and likely to increase. Millions of objects are already connected to the internet, with several more to come soon, and we need to focus on security issues.

European Technology Chamber

1. The IoT will bring the next wave of innovation in the Medical profession

The Health industry is getting ready to the next wave of transformation. The Internet and Technology are supporting doctors to assist patients with telemedicine and the health status of isolated elderly people due to continuous monitoring and alarms assistance.

The Internet of Things (IoT) is a set of technologies that in the coming years will involve all aspects of our daily life but will also be revolutionary in medicine.

At the base of IoT is the 5G technology, that is, the high-speed over-the-air Internet connection that will allow in the coming years a wide variety of devices to be managed and being pervasively interconnected.
Internet of Things and Medicine: the MIoT (Medical Internet of Things)
The first effect of the deployment of the MIoT is easily predictable: it will be the greater integration of information, which will rewrite the way we manage health data, their flow and processing.

The practical consequence will be a huge

usability of data, a zero-processing time and an extreme efficiency in health management. All this by exploiting Deep Learning techniques and Artificial Intelligence through Neural Networks.

It is conceivable that in this scenario paper documents, biomedical images as they are handled nowadays, the exchange of therapeutic prescriptions and so on will decrease drastically, if not disappear.

The Health Facilities of the future:
It is reasonable to imagine future hospitals equipped with a network of numerous interconnected devices that will allow a real-time exchange of medical parameters and other information available in various ways to all healthcare professionals in order to optimize the overall management of hospital activities.
This will profoundly affect the processes we currently know by making human errors less likely, optimizing intervention times and producing more effective diagnoses and therapies in a shorter time.

We can expect that management costs will be reduced, which is always a hot topic in health care. An important problem that will arise during the development of all these technologies will be the need to standardize the methods of encoding and transmitting the information that will flow into the MIoT.

You will need to have your devices, intranets, and data bases dialogue in a consistent way. This means establishing global standards of communication and writing that do not yet exist.

The Personal medicine:
Coming to the personal information management, if soon our smartphone becomes an MIoT terminal, we can use it to check our health status.
All this will certainly be mediated by increasingly sophisticated wearable devices able to monitor our body parameters. The greatest impact is likely to be in the prevention and management of chronic diseases.

European Technology Chamber

2. The IoT and the use of Smart Devices will transform the Education industry

MEDICAL
APPLICATION

The Education and Training Industry takes a leadership position, using Smart devices that are changing education methodologies. Additional Smart connected devices will improve the teaching process, empowering the teachers to be more efficient and effective.

Innovation in the field of education is linked to the entry of new teaching technologies: this condition has become necessary if young people are to be prepared for an increasingly digital labour market. The most advanced studies tell us that many of the jobs that today's children will do in their future have not yet been created. That is why it is essential for schools to open the doors of innovation to them in order to make them more capable of acting in the world of tomorrow. Let's see what are the main technological trends that will affect education in the world of school.

3D printing:
3D printing in education is spreading fast thanks to the new low-cost devices. This is a very pragmatic method of facilitating students' learning. The power of 3D printing lies in the fact that it not only allows to replicate objects sequentially, but above all, it allows to create new ones, stimulating students' creativity to realize something that does not yet exist. The added value was detected, above all, by the "insights" of engineering students who began to "invent" real prototypes useful for humanity. The result? A community of programmers, engineers, architects, communicators, thinkers who around the new 3D printing technology have created real Makerspaces and FabLabs for an all-evolving sector.

Virtual Reality technology:
Virtual reality is becoming increasingly accessible in schools. Many major companies such as Google, Samsung, HTC, Sony and Facebook have, in fact, allocated millions of their budget for virtual reality innovation. According to these multinationals, such technology could significantly change the learning techniques of students who, once they have experienced the field of virtual reality, could even change the choices of their studies.

European
Technology
Chamber

Educational Robotics:

Educational Robotics is the development and use of robots for educational purposes, for teaching and learning. With robotics, children's education is directed towards the development of transversal skills and the student is placed at the center of the educational process as the builder of their learning. The advantages of educational robotics are to use simple construction and programming kits for educational purposes: students thus become protagonists of learning and creators of their product, instead of simple passive users. There are significant experiences that demonstrate how educational robotics plays an important role in increasing motivation and engagement, in fostering problem-solving skills, creativity, curiosity, and teamwork. Robotics allows the students to observe and experiment with concepts and theories through direct experience and can be considered a kind of game: building or using a robot, in fact, is a way to learn by playing.

The Internet of Things (IoT):

The Internet of Things represents a great opportunity of innovation for schools. In fact, it is defined as a new technological paradigm in which the virtual world of information and communication technologies is closely integrated with the real world of things and is based on the idea of "smart objects", that is, objects with identities, that can be localized, that interact with the surrounding environment and process data. These objects are interconnected so that they can collect, exchange and process information, thanks to the network. The goal of "connected objects" is in general to make our lives easier by automating processes and providing us with information that we did not have before. With the advent of IoT in classrooms, students will increasingly be enabled to the role of digital creator with a collaborative approach between educators and pupils.

Wearable technologies:

Wearable technologies are the flagship of IoT, albeit with a long way to go in the field of education. Wearable devices are electronic and digital objects capable of incorporating computers, programs and advanced electronic technologies and offering practical and innovative interactive, communication and information and operational contextualization features. The wearable tech market is still in its early phase, but it has already demonstrated its ability to grow and spread in various market segments, in particular sports and personal well-being, health and infotainment. Today, wearable technologies offer students to push traditional boundaries and move towards new forms of increasingly symbiotic interaction and intersection between humans and technology.

3. The IoT technology adoption will enable Smart Cities models

The complete and widespread adoption of the Internet and associated technologies will support the transition to an efficient, sustainable and secure City management:

Several Key points: starting from the temperature / humidity control of public places, traffic control, monitoring of streets temperatures, garbage collection, overcrowding control, up to noise and air pollution monitoring.

The design of Smart Cities will take place thanks to the support of the Smart Governance, where the new technologies of IoT, AI and blockchain will constitute strategic levers to favour and increase the process to improve the quality, performance and interactivity of services; reduce costs and resource consumption; optimizing the relationship between citizens and operators.

Smart cities, using a digital infrastructure, will be efficient in reducing energy consumption; optimize waste collection; improving public transport; reducing urban degradation; reduce the impact on the environment and pollution. But not only that: according to European policies, "smart city" is also synonymous with a more interactive and responsive city administration, capable of speeding up bureaucratic procedures; improving city welfare; develop synergies between the various institutional and private actors; ensure safer public spaces and meet the needs of an ageing population

Many technologies are considered enabling for Smart cities can be listed below, such as the Internet of Things (IoT), the Artificial Intelligence (AI), Big data analytics, systems to reduce and manage energy consumption and to ensure energy monitoring, urban planning and decision support models and management at administrative level, IT and communication technologies and infrastructures (e.g. 5G) , sensors, energy production and distribution systems, new materials and new solutions for the sustainable construction, interconnected vehicles, waste cycle management such as collection, treatment and recovery models.

European Technology Chamber

4. Implement IoT solutions to enable a modern and sustainable Manufacturing

The Industrial IoT (IIoT) alongside the Industry 4.0 is changing modern production techniques. The Industry 4.0 technologies, such as the factories production ecosystem always connected to the MES (Manufacturing Execution Systems) and the ERPs (Enterprise Resource Planning) has increased the production efficiency, flexibility, productivity and reduced costs and waste.

What parameters and how could we power intelligent applications to improve the production processes? The importance of knowing which measurement is representative for the process we want to study is linked to the selection of the most efficient method of transferring it to computer systems.

Extending the Internet to the Things (IoT) has been one of the points on which industrial research has worked the most for years. Data collection and management is based on the use of sensors and control units, in the industrial field we think of PLCs or numerical controlled machines, while for transmission and sharing there are various protocols and reference architectures. What parameters and how could we power intelligent applications to improve a production process? To answer these questions, we must start from the awareness that data, today, represents a valuable resource in connected factories.

All these applications are based on the concept of the Internet of Things (IoT), which is the idea of extending connectivity to objects, places, and processes as well. There are therefore three main players in this transformation:

- Sensors, for the detection of quantities from the field;
- Connection protocols, which instead define transmission rules;
- Systems for data storage and management.

European Technology Chamber

Each of these items enjoys a separate chapter in the Dictionary of Industry 4.0, but for a first approach we just need to know that more than anything else, the one that will lead us to choose a type of sensor, rather than a specific protocol or a management platform, will have to be the expected result at the end of all processing. It must be clear at the design stage what the ultimate purpose of the analyses we are going to do, because the data has no use if it is not analyzed and managed. All this requires the introduction of the Cyber Physical Systems (CPS).

Smart and connected factories:
In the industrial field, the concept of the Internet of Things is further strengthened and is called the Industrial Internet of Things (IIoT). The key is always the connection between devices, but in this case, we consider machinery, production orders, tools and everything to do with the production environment.

A practical application of this concept can be found in monitoring systems, which use the data gathered from the machines to analyze and format into more digestible and immediate metrics, represented through dashboards or control panels. Other uses may include design-time contribution, resource management, and planning support.

The intersection of Cyber Physical Systems and IIoT give rise to Industry 4.0 and therefore computing systems, interconnected with each other and with the surrounding physical world, able to exploit shared data access and management services in connected factories.

The data, made available through the IIoT, is used by a final application. This will generate new interactions with the process, such as for example activating a certain subsystem of the machine tool to compensate for a process variation. Or it could develop plant efficiency metrics by comparing the final quality of a product with production hours versus production hours (Overall Equipment Efficiency).We could also push ourselves to imagine a factory system that regulates its production according to the amount of raw and consumable materials available in our warehouses.

European Technology Chamber

5. The IoT can disrupt our Mobility ecosystem

Our Mobility is enhanced and empowered due to the widespread use of internet technologies in several ways: From the car sharing, to the micro mobility devices that are revolutionizing the transport into our cities, all these technologies will transform the way we are going to move in our cities.

When it comes to mobility and connected vehicles, we talk about something that has a much wider impact than IoT.
We are no longer just talking about fleets, we are thinking in broader terms, we look at what our cities will resemble in a few years.

We cannot fail to take account of the changes taking place with regard, for example, to metropolitan areas. For this reason, the definition of the scenarios of the future must take into account a set of aspects that are no longer only connected vehicles.

It means building a future in terms of roads, parking and roads. We can see that some interesting applications already exist, such as intelligent transportation systems that hold the Smart Mobility.

We need to address the theme of the smart city through data analysis of both our control units and integrated vehicles. The analysis of the data reveals very significant insights, which provide decision-making support to municipalities and local authorities regarding the management of traffic flows, intersections, risk routes and all those aspects that generate tasks in terms of road safety.

Data is therefore one of the assets that enables the concept of Smart Cities: not only devices, not only platform, but also and, above all, data.

The world of IoT is made up of a multiplicity of sensors and data generated by these sensors. Ecosystem actors can make their solutions available through the use of shared data. A data marketplace is created, which thus becomes a meeting point and enabler of third-party solutions. This creates an ecosystem of software features and specific devices. In the future of mobility, therefore, the developers of the ecosystem will play the role of enablers of the new mobility. It is important to be and operate within the ecosystem and have a holistic vision with a look that goes towards 5-10 years. This is the strong point that will support the new mobility.

European
Technology
Chamber

6. The IoT and the 4.0 era technologies is transforming the Agriculture sector

Smart Agriculture is already being enabled by the Internet and Technologies. We are now at the start of a new revolution brought by the digital transformation such as data connectivity, cloud computing/big data analysis, digital platforms, artificial intelligence and machine learning, but also, yield mapping, GPS guidance systems

In the age of the digital transformation, which is going through all sectors and all industrial models, the world of Agrifood is looking with interest at the opportunities that the new approach to technologies brings with it.

A systemic approach, from which new ways of engagement with the supply chain, new possibilities for digitization of products and processes, new opportunities to improve the customer and consumer experience, all taking advantage of the scalability and economies of the cloud.

A strategic approach, decisive in an area in which competitiveness is played out on a global scale and in which compliance, quality and safety standards are complex and expensive imperatives to comply with.

Digital transformation, more than ever in the agri-food sector, does not simply mean acquiring and adopting new and more sophisticated technologies, but putting them at the service of a strategy for reviewing processes and operations.

Moreover, the world will be increasingly hungry and digital innovation can make a substantial contribution to feeding it, it is clear that it is not possible to think of responding to this need by increasing the area of cultivated land or increasing livestock farming.

It's time for innovation 4.0, an innovation that is played on processes and products, and that benefits from the implementation of different technologies and above all from an increasingly careful enhancement of the data, in an openly logic 4.0.

In order to remain competitive, companies need to find new ways to achieve operational excellence, working on efficiency, performance and resilience across the supply chain, and consciously addressing many challenges.

European Technology Chamber

For example, food safety brings several issues, starting from all regulatory aspects to arrive at the impacts on the company's reputation.

The entire supply chain must be kept under close control: from design to procurement, from production processes to quality controls, from packaging to transports.

To analyze vulnerabilities and risks throughout the supply chain, agrifood companies need to fully understand which parties are involved in the production, storage, distribution of ingredients and products, technically from "farm to fork".

In addition, a careful control of the supply chain allows to reduce waste related to the poor storage of food and raw materials and to avoid having to bear additional costs related to recalls of damaged consignments.

If traceability functions are combined with control the benefits increase, for example by improving stock management.

The growing demands on food have an increasingly obvious environmental impact. We start from the consumption of irrigated waters to arrive at the phenomenon of overfishing passing through the use of pesticides and fertilizers in agriculture and antibiotics on farms.

Again, technological innovation (e.g. the use of sensors in the fields for irrigation regulation) can support the new necessary attention to sustainability, both environmental and, consequently, business.

Finally, it is essential for companies in the Agrifood sector not only to consolidate the data generated by all the contact points along the supply chain, but, literally, to put the data to work, so that they generate insights and useful information.

European Technology Chamber

7. Use IoT technologies to enable a sustainable Circular Economy

The Internet Technology alongside other technologies such as the Blockchain are the enabler of a comprehensive Circular Economy where the Products are traced in their Life Cycle.

One of the key factors in the Sustainable Development in the coming years will be the Digital Transformation, consisting in the continuous advances of artificial intelligence, connectivity, information technology, additive manufacturing, virtual reality, machine learning, Blockchain, robotics, quantum computing and synthetic biology.

4.0 technologies for the Sustainability are the data collection and processing systems related to production and process (Big Data/Cloud), additive manufacturing, the Internet of Things and the use of intelligent products (RFID, sensors). The adoption of these technologies has facilitated the achievement of the objectives related to the circular business model, improving and monitoring the choice of materials to be used for the realization of products, optimizing their quantities and tracing the supply chain.

The circular economy is an economic paradigm that integrates environmental and social sustainability within the company strategy. It is based on the principle of decoupling economic growth from resource consumption and waste generation, reducing energy waste and unnecessary use of materials, reusing finished products, regenerating components and recycling materials.

In practical terms, it is a question of introducing, within companies and manufacturing supply chains, a whole series of strategies aimed at extending the useful life of finished products, through the provision and enhancement of service, repair and maintenance services; maximise their use, through the provision of advanced services; recovers the value of products, components and materials at the end of life, through the collection for the end of use of finished products, reconditioning, disassembly into individual components and recycling of materials.

European Technology Chamber

Digital transformation and the role that digital technologies play in enabling circular business models. Think of the Internet of Things, which helps ensure product traceability and resource consumption optimization, or the role of end consumers, who are increasingly attentive to sustainability aspects.

The Blockchain:
The ways in which the use of Blockchain technology applied to waste traceability could be achieved are manifold. The blockchain is becoming an opportunity to ensure transparency in a sector, that of waste, characterized by considerable uncertainties.

The use of this technology could, in particular, be applied to the waste traceability system. This is with a view to creating a closed and functional system to the "certification" of all phases from collection to transport and up to the final treatment plant.

The innovation brought by blockchain therefore lies in immutability and data certainty, allowing producers, recyclers and all those involved in the waste supply chain as well as consumers to confidently affirm the legality of the process and the circularity of any products deriving from waste.

European Technology Chamber

8. Our homes will be transformed by IoT technologies

Our home ecosystem is transforming thanks to the ease-of-use and accessibility of technology used across the internet, from the personal wearable devices, connected households' appliances, to voice controlled smart assistants up to personal domestic robots.

Smart home: what it is and how it works
Smart is synonymous with "Connected". What makes a device "Smart" is therefore the possibility that it will become part of a home network, and with the internet it can reach and be reached by the outside world. This allows you to control the connected device, remotely or automatically. Smart devices communicate through several different communication standards such as Wi-Fi, Zigbee, Z-Wave and Bluetooth, the most used ones. The difference between a smart and a non-smart device lies precisely in the fact that the smart one responds to a command, can be programmed according to a routine and, in the case of sensors and detectors, can transmit data or show them on integrated display. The hub with which the smart device communicates with, can be in the same home or perhaps thousands of kilometers away.

The Internet of Things for the home covers many aspects of home life: from safety to comfort and energy saving. The market is developing in various directions. We can make several examples: air conditioning/heating as air conditioners, thermostats or boilers adjustable remotely or via app, appliances remotely switching on/off, dishwashers, washing machines, microwave ovens, lighting on/off or adjusting tone or intensity, security as video surveillance and video intercom systems with the possibility of accessing images remotely and/or from smart TVs, smart locks that send alarms in case of intrusion, smart speakers voice-controlled devices that allow you to receive information – e.g. on weather, traffic – and to give commands – e.g. adjust lights or temperature.

European
Technology
Chamber

How appliances become "smart":

The refrigerator, in all its multiple configurations, is the functional and emotional center of the kitchen: not a day goes by without us opening it several times. Its main task is to preserve fresh food: in this case, connectivity plays a role of reassurance: constant verification of the correct functioning through telemetry monitoring via the cloud, timely notifications to the user's smartphone in case of incorrect behavior (such as a door left open) or breakdowns, up to the evaluation of the actual freshness of the content through dedicated sensors. An element of convenience is also the possibility to consult its content remotely thanks to streaming cameras facing inwards, for example while shopping at the supermarket.

The oven, traditional or microwave, is used less frequently but in a more deliberate way: typically, it is set with operating parameters (program, temperature, duration) to obtain predictable cooking or heating results. Here then the IoT makes possible a series of "shortcuts" and comforts: remote activation of preheating, management of favorites and presets, end-of-cooking notifications to the user's smartphone, recognition of dishes inserted through barcode scanning or visual analysis.

In combination with dedicated contents (for example recipes) it is then possible to create a real assisted cooking, automatically managing the transition to the different stages of the preparation or adjusting the time according to the quantities or the actual state of cooking of the food, in order to obtain a perfect result.

The hob and hood almost always go hand in hand. In combination with cameras or smoke sensors placed in the hood, it is possible to make valuable self-extinguishing systems (connecting simple switches of the electrical circuit or gas) to prevent fires and other damage. In the case of induction hobs, you can then govern with great precision the temperature variation of the dishes through electronic controllers: working in tandem with a connected thermometer you can enable very advanced guided cooking, supporting the less experienced cooks in the preparation of the most complex and delicate dishes.

The "smart" dishwasher allows considerable savings of time, water and energy. In addition to enabling timely end-of-cycle notifications and any malfunctions, connectivity allows you to collect from other smart appliances information about the load volume and type of dirt that the machine will have to expect, and then automatically suggest or select the most suitable program. In addition, by tracking the frequency of use, you can provide cloud-based automatic replenishment systems, which reorder detergent pads from an eCommerce platforms delivered directly to your home.

9. Smart building, Smart construction:

What is a Smart Building?

Smart buildings use Internet of Things (IoT) devices—sensors, software, online connectivity—to monitor various building characteristics, analyze the data, and generate insights around usage patterns and trends that can be used to optimize the building's environment and operations. While smart technology gives you greater control over your building, smart building technology is much more than just advanced "command and control" mechanisms (like your building management system, or BMS).

The Internet of Things (IoT) is transforming the way in which buildings are being managed and operated. There are two things that differentiates smart buildings apart from traditional command and control solutions:
• Granular Data Monitoring
• Advanced Analytics

There are various Analytical Advantages of Smart Building:

1. IoT Sensors in a Smart Building Collect Data for Power-Quality Monitoring, Predictive Maintenance, Occupancy Sensing & Energy Measurement
2. Access the Building's Intelligence through Sensor Driven Data Collection, Visual Insights, Connected Infrastructure, & Predictive Maintenance of Healthy Buildings
3. Remotely Monitor Energy and Environmental Conditions, Indoor Air Quality, Building Occupancy & Equipment Operations through Building Automation Systems.

Smart building systems are an excellent tool to report, inspect, and review performance over the lifetime of a building. IoT sustainable solutions helps maintain 'Green Building Status', assist in Certification (e.g., LEED) and strive to meet Sustainability Goals.

European Technology Chamber

Smart Construction: Smart tools for smart new outcomes

Construction Industry is the least digitized sector in the world. Smart Construction aims to leverage cutting-edge technologies to improve productivity and decision-making. It involves augmentation of construction resources such as machinery, devices, components, and people with digital technologies for transforming the construction industry. Construction companies worldwide are making use of IoT tools, digital and data to enhance their activities. The various areas of application of IoT in modern construction methods are offsite construction, lean construction, smart assembly, prefabricated components and so on. Connected IoT devices can help construction companies with project progress tracking.

In an industry renowned for costly overruns, expensive equipment, skilled labor shortages and increasingly short project schedules, IoT tools can help construction companies leverage real-time data to increase efficiencies. 95% of construction companies have told KPMG that emerging technologies will fundamentally change their industry, while PwC reports 98% of construction companies expect digital tools to increase efficiencies by 12%.

Construction businesses now seek improved value from IT investments, digital skills acquisition, and advanced digital infrastructure. Innovative technologies now dictate how buildings are designed, constructed, and managed. Using IoT-enabled management systems help with keeping track of material deliveries to building sites, helping stay on schedule for deadlines and reducing costs. Smart Construction enables benefits like tracking the movement of materials and assets at a construction site in real-time and monitoring the number of people on-site, giving construction companies the data to optimize logistics, detect thefts, maintain inventory levels, and mitigate safety risk.

Digital twins are a tool that are a boon to construction companies. A digital twin of a building not yet built can help construction companies test out designs, keep plans on track through simulations and fine-tune operational processes before physical construction begins. It's an excellent way to ensure efficiency, keep projects on track and keep costs under control.

It further enables benefits like tracking the movement of materials and assets at a construction site in real-time and monitoring the number of people on-site, giving construction companies the data to optimize logistics, detect thefts, maintain inventory levels, and mitigate safety risk.

European Technology Chamber

10. Prevent security vulnerabilities from the Cybercrime

Exposure to cybercriminal and data security risks is under threat and likely to increase. Millions of objects are already connected to the internet, with several more to come soon, and we need to focus on security issues.

One of the risks of IoT are the Cyberattacks:
Digital transformation is now a process that embraces companies of all sizes and operating in the most diverse markets, posing challenges aimed more and more at reducing time-to-market and improving the user experience. Technologies such as IoT, virtual assistants, mobile and web applications, E-commerce, represent tools through which companies are completely changing the way they realize projects to support their business, an unstoppable and necessary evolution, but not without critical issues to consider and address such as cyberattacks.

The need for a "Security by Design" approach:
Most successful cyberattacks occur at the application level, due to a developing approach that often does not consider integrating security features to prevent vulnerabilities that, when exploited by attackers, can result in consequences related to data loss or data corruption.

This, in addition to direct damage, implies specific responsibilities for the company, according to the various regulations regarding the privacy protection laws.

The reasons why a structured "Security by Design" approach is still often lacking in IoT solution development teams, find answers in generalized shortcomings such as: lack of dedicated budget, test execution methodologies often carried out in the final phase of testing, but above all, the lack of a security culture within the same security development teams.

A new holistic approach to the software development cycle aims to define a modus operandi that integrates security tests from the beginning to the end of the process to create an environment where prevention and remedy of critical issues become one with software development.

Step by step to security in IoT:
An important first step to triggering a convergent approach requires that several teams in an organization work together efficiently, it is a joint process involving those involved in security and audit, software development, business and executive management increasingly supported by infrastructure systems and technological tools able to support security policies.

In addition, the entire application lifecycle must be followed by IT specialists who manage all phases of the project to integrate, develop, add and test security features within applications. In this way, security teams can proactively identify potential risks and, at the same time, prevent not only a certain percentage of residual error with the rapid removal of 'defects', but also the loss due to unauthorized data changes or access.

European Technology Chamber

CONCLUSION

CONCLUSION

In this paper we have examined several IoT applications of very different fields, starting form the technological evolutions of the Medical profession, going through the Smart Cities, Industry, Mobility, Education, E-Government and Cybersecurity.

Several more key areas could be covered, such as for example the Retailer industry, Tourism, HoReCa, Wearable technologies, Indoor locating systems. This is just to say that the Internet of Things is a technology that has the potential to be applied in every area of our life.

Many more applications still have to be found which will benefit from the Internet of Things technologies. The fast pace at which the telecommunication industry is improving the network, will allow services that today have not yet been discovered.

What is the future of the Internet of Things?
The future is not yet set, the future will be the results of all the actions we are deciding and planning today. The IoT

We will continue to connect things to things, Humans to things, Humans to Humans, in order to solve problems, to improve the services of our States, the quality and the usability of our products, the production efficiencies or to improve our health and our standard of living.

CONTRIBUTED BY

Sakshi Hotwani
EUTECH IoT Council Memebr
Strategist | Digital Transformation | Architect |

Jörg Schiller
EUTECH IoT Council Chairman
Digital Transformation and IOT Enthusiast

Thomas Kanzler
EUTECH IoT Council Board Member and
Principal Consultant & Head of Digital Services
at A1 Digital

Alexander Rämisch
EUTECH IoT Council Memebr
Business Development Management for digital
transformation with focus on cyber security

Alessandro Iacoponi
EUTECH IoT Council Director

European
Technology
Chamber

SOURCES

1. Fundamental But Effective IoT Device Security Controls - https://threatpost.com/5-fundamental-iot-device-security-controls/165577/
2. Tech trends that will change schools - https://startupitalia.eu/education/education-scuola/40457-20160206-scuola-5-tendenze-tech-2016
3. Five challenges for Agrifood transformation - https://www.agrifood.tech/agridata/cinque-sfide-per-la-trasformazione-dellagrifood
4. Circular Economy and Digital Transformation for Sustainability - https://www.techeconomy2030.it/2020/02/20/economia-circolare-e-digital-transformation-per-la-sostenibilita/
5. Circular economy, how to rethink business and supply chain - https://www.digital4.biz/executive/digital-transformation/economia-circolare-che-cosa-e-circular-economy-importanza-per-business-e-supply-chain/
6. Instructions for using data in connected factories - https://www.internet4things.it/industry-4-0/iot-istruzioni-per-luso-dei-dati-di-produzione-nelle-fabbriche-connesse/
7. The Internet of Things and the medicine next venture - https://www.cassagaleno.eu/internet-delle-cose/
8. The Internet of Things push into the Smart City development- https://www.internet4things.it/smart-city/la-spinta-dellinternet-of-things-nello-sviluppo-delle-smart-city/
9. IoT technology in the home - https://www.internet4things.it/smart-building/smart-home/la-tecnologia-iot-fra-le-mura-domestiche-ecco-la-smart-kitchen/
10. Smart cities: what technologies they adopt - https://www.internet4things.it/smart-city/smart-city-quali-tecnologie-adottano-la-classifica-delle-migliori/
11. Smart home: what it is, how it works, examples and smart home products - https://www.internet4things.it/smart-building/smart-home/smart-home-come-rendere-la-propria-casa-intelligente/
12. Towards smart mobility between IoT and sharing economy - https://www.internet4things.it/automotive/verso-la-smart-mobility-tra-iot-e-sharing-economy-con-uno-sguardo-al-recovery-fund/
13. Digital agriculture - https://en.wikipedia.org/wiki/Digital_agriculture
14. How technology aligns animal agriculture with sustainability - https://www.agriculture.com/technology/livestock/how-technology-aligns-animal-agriculture-with-sustainability