Internet of Things: the European Commission's policy perspectives

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Nikos ISARIS
Acting Head of Unit, Internet of Things
DG Communications Networks, Content and Technology
European Commission

Internet of Things - 3 pillars

A Single market for IoT

IoT devices and services should be able to connect seamlessly and on a plug-and-play basis anywhere in the European Union

A Thriving IoT ecosystem

Open platforms used across vertical silos will help developer communities to innovate. As a kick-start, IoT deployments in selected lead markets supported

A Human-centred IoT

Respect of European values, empowering people along with machines and businesses, high standards for protection of personal data and security

Industrial Strategy
President-elect Ursula von der Leyen

"We will need to invest in innovation and research, redesign our economy and update our industrial policy"

"I will put forward my plan for a future-ready economy, our new industrial strategy."

"Our economic policy must go hand in hand with social rights, Europe's climate-neutrality objective and a competitive industry."

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Streamlining Digital
Commissioner-designate Thierry Breton

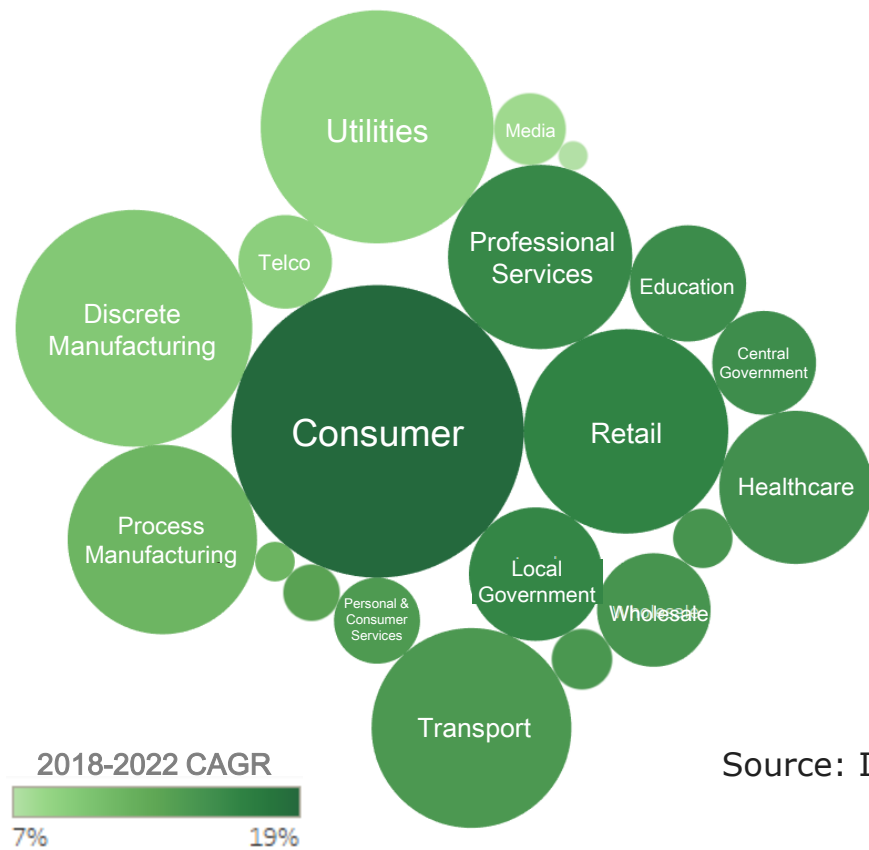*One Commissioner for the Single Market, Industrial policy, Digital and Space & Defence*

✓ *Long-term strategy for Europe's industrial future*

✓ *Enhancing Europe's technological sovereignty*

✓ *Investing in the next frontier of technologies*

✓ *Leading reflections in key value chains including in the defence and space sectors, common standards and future trends*
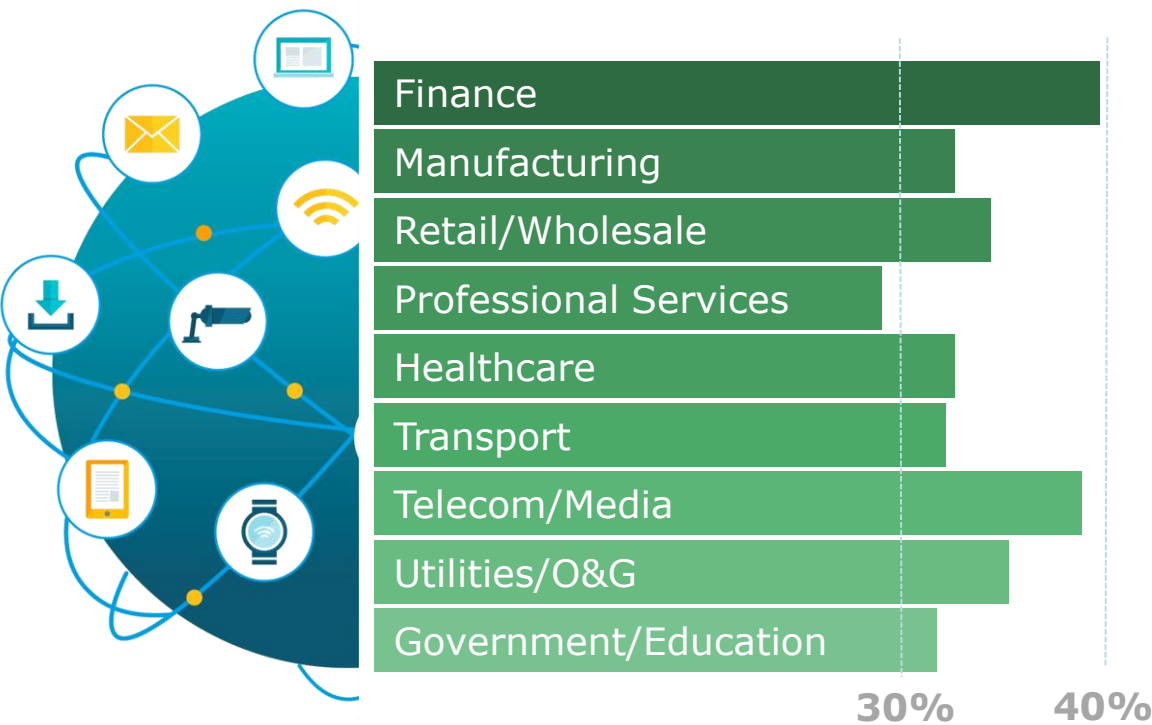
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IoT adoption is maturing in Europe

EUROPEAN IoT SPENDING BY INDUSTRY (2018 Size and 2018-2022 Compound Annual Growth Rate)

Utilities
Media
Telco
Professional Services
Education
Discrete Manufacturing
Consumer
Central Government
Retail
Healthcare
Process Manufacturing
Personal & Consumer Services
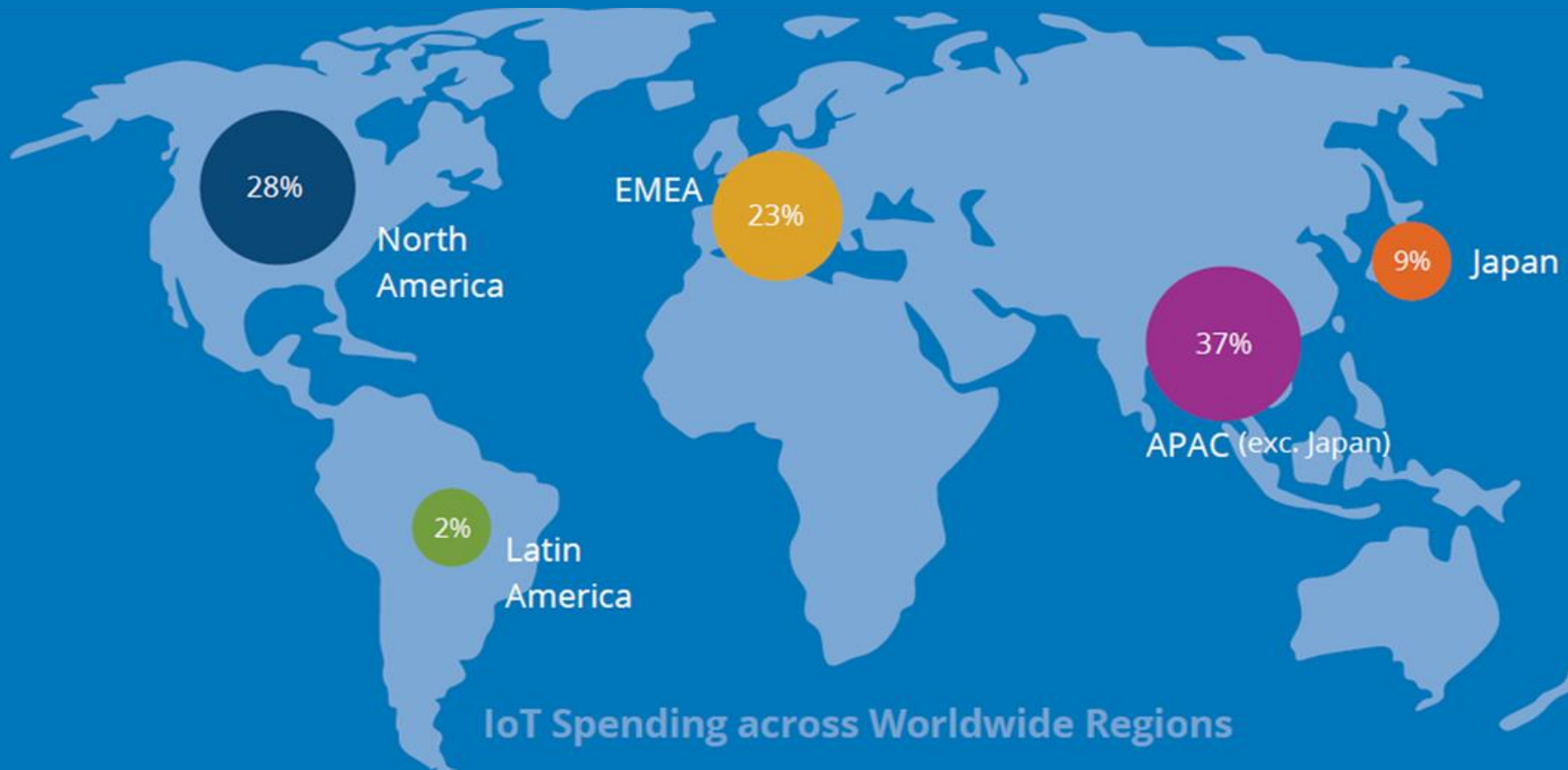Local Government
Wholesale
Transport

2018-2022 CAGR
7%   19%

IoT ADOPTION ACROSS EUROPEAN VERTICALS (% of companies with more than 10 employees adopting at least one IoT solution in 2018)

- Finance
- Manufacturing
- Retail/Wholesale
- Professional Services
- Healthcare
- Transport
- Telecom/Media
- Utilities/O&G
- Government/Education

30%   40%

Source: IDC Worldwide Semiannual Internet of Things Spending Guide, 2019

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IoT spending across the world

28% North America

EMEA 23%

2% Latin America

37% APAC (exc. Japan)

9% Japan

IoT Spending across Worldwide Regions

After years of customers evaluating the case for IoT, now the market is entering a critical phase, with European IoT spending expected to reach € 127 billion in 2019.

Source: IDC Worldwide Semiannual Internet of Things Spending Guide, 2019
Sum of percentages may differ from 100% due to rounding

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Key barriers/concerns for IoT adoption

Figure 1

Security remains the leading barrier for IoT adoption

Percentage of IoT buyer respondents
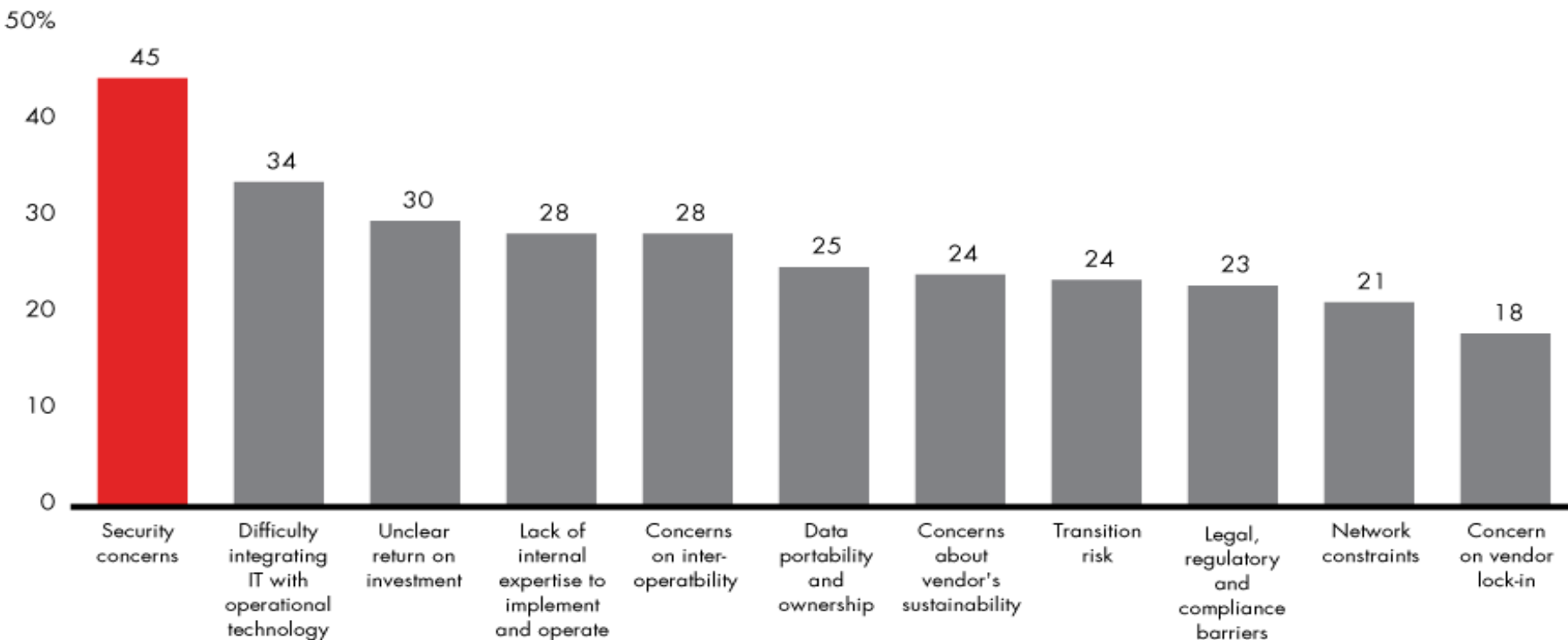
Top barrier for investment in the Internet of Things

Source: Bain 2018 IoT customer survey (n=521)

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Our proposal

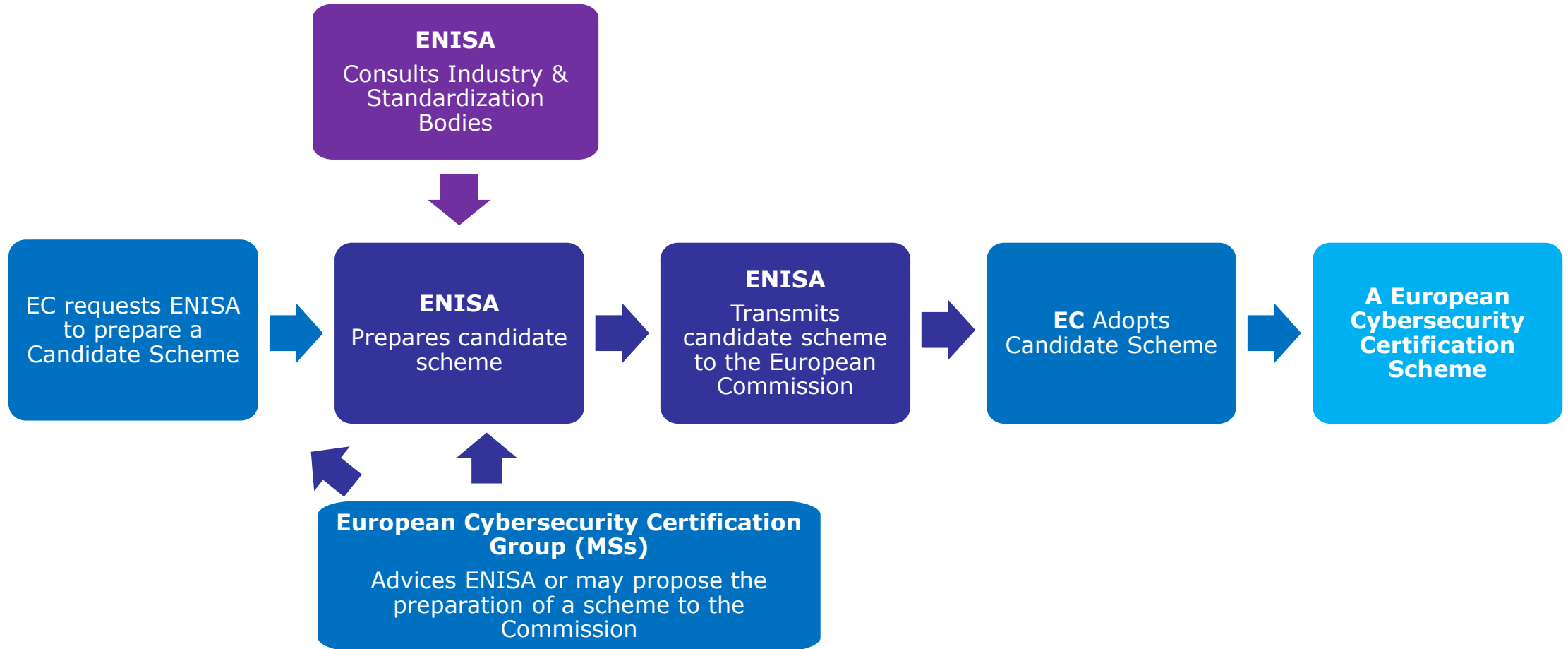A **voluntary European** cybersecurity certification **framework....**

...to enable the creation of individual EU certification **schemes** for ICT products and services...

...that are **valid across the EU**

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How the framework will work in practice

Expected outcomes of certification

Now

Difficult to distinguish between more and less secure products/services

Co-existence of schemes makes comparison difficult…

…end-users refrain from buying certified products/services

In the Future

more information on the security properties of products / services ahead of purchase

Greater incentive for Operators of Essential Services to buy certified products/service

Increased cyber resilience of critical infrastructures

…As end-users of digital solutions, **governments** would rely on an institutional framework to identify and express priority areas needing ICT security certification.

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DEI – Digitising European Industry Strategy
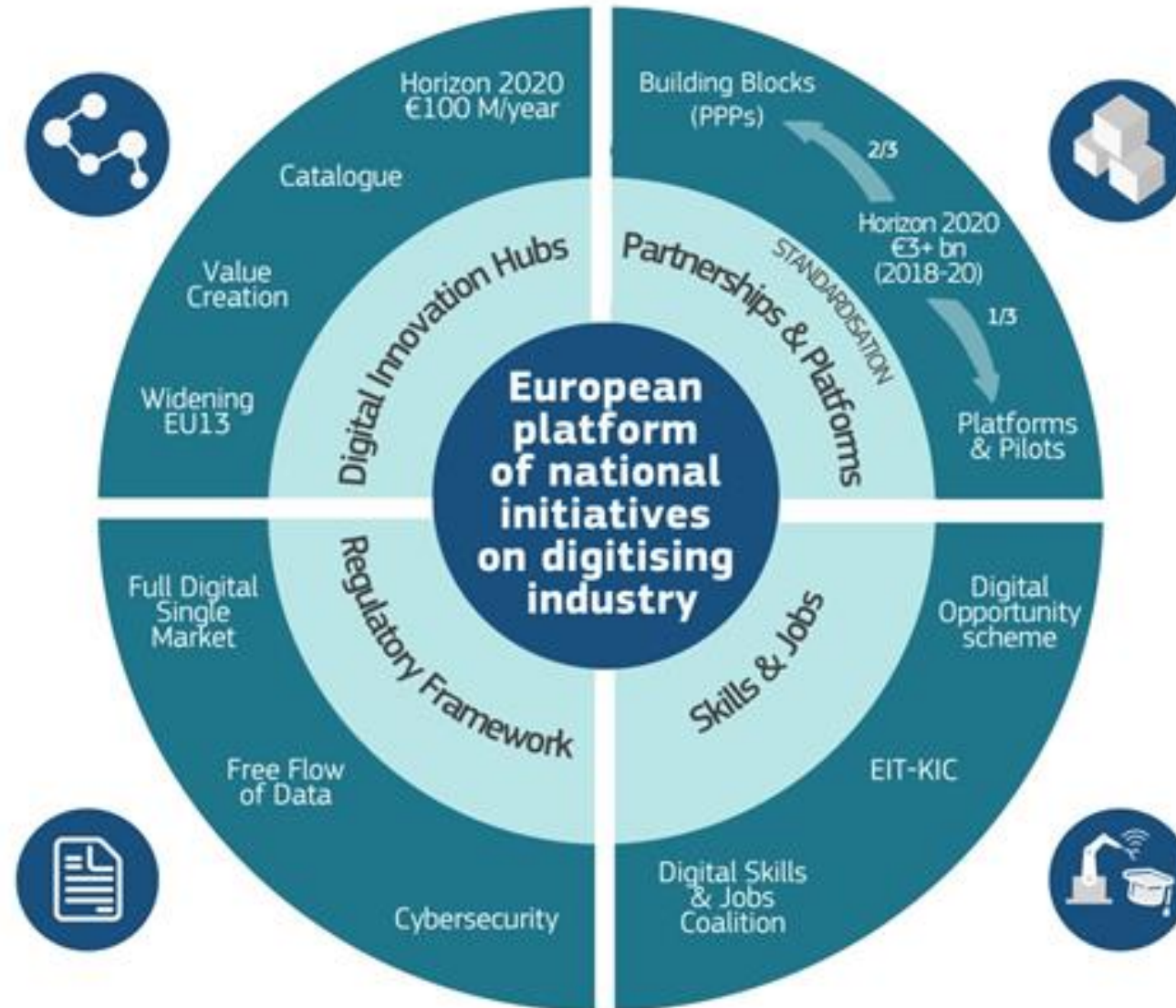
EU IoT Strategy and Actions

Research and Innovation

- Large Scale Pilots
- IoT Security & Privacy
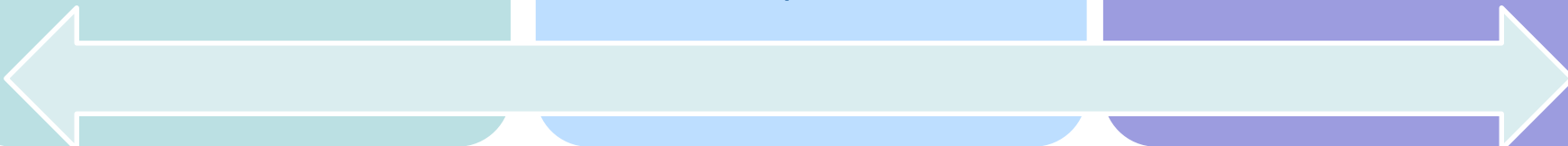- Next Generation Internet

Nearly 500 M€ in H2020

Policy

- DEI
- GDPR
- Cybersecurity Act
- NIS Directive
- Liability SWD

Stakeholder engagement

- ENISA
- AIOTI
- IERC
- Demand side
- Smart Cities
- IoT Week

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IoT Large Scale Pilots 2016-2020

Courtesy: IERC 2015

MONICA - Management Of Networked IoT Wearables – Very Large Scale Demonstration of Cultural Societal: Wearable devices containing sensors and actuators for massive scale applications. Europe (EU contr: 15M€, 28 partners in 9 countries)

IoF2020 - Internet of Food and Farm 2020: Strengthen competiveness of farming and food chains in Europe. Europe (EU contr: 30M€, 70 partners in 16 countries)
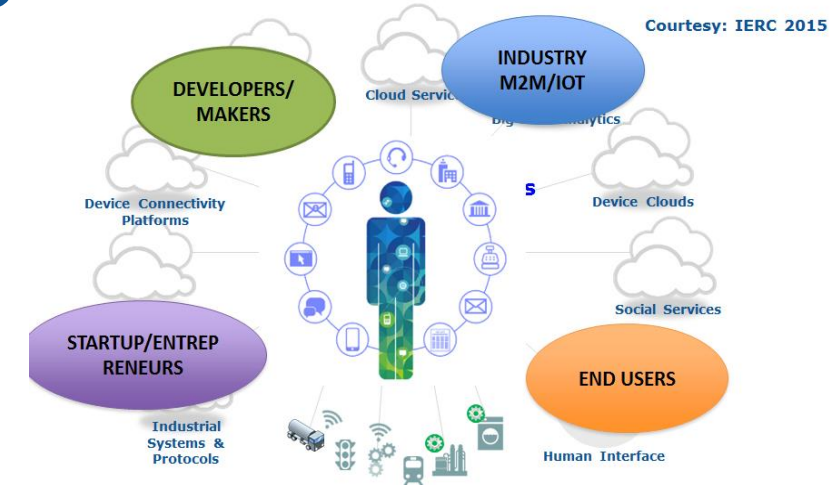
ACTIVAGE PROJECT

ACTIVAGE - ACTivating InnoVative IoT smart living environments for AGEing well: Active and healthy ageing. Europe (EU contr: 20M€, 48 partners in 9 countries)

European Large-Scale Pilots Programme
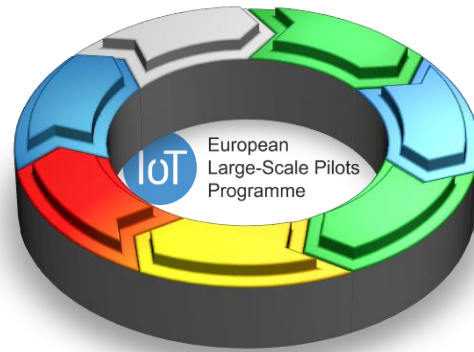
AUTOPILOT

AUTOPILOT - AUTOmated driving Progressed by Internet Of Things: Automated driving and infrastructure. Europe (EU contr: 20M€, 43 partners in 14 countries)

SYNCHRONICITY

SYNCHRONICITY - Delivering an IoT enabled Digital Single Market for Europe and Beyond: Single digital city market for Europe (EU contr: 15M€, 33 partners in 9 countries)

DEVELOPERS/ MAKERS

INDUSTRY M2M/IOT

Cloud Service

Digital Analytics

Device Connectivity Platforms

Device Clouds

STARTUP/ENTREP RENEURS

Social Services

END USERS

Industrial Systems & Protocols

Human Interface

european-iot-pilots.eu

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DEI Large Scale Pilots 2019-2023

OPENDEI

Aligning Reference Architectures, Open Platforms and Large-Scale Pilots in Digitising European Industry

Platform building
Comparing reference architectures and open source reference implementations

Data ecosystem building
Enabling an innovation and collaboration platform, forging a European network of DIHs, contributing to industrial skills catalogue and observatory

Large scale piloting
Contributing to a digital maturity model, creating a set of assessment methods and a migration journey benchmarking tool

Standardisation
Conducting cross-domain surveys, performing promotion and implementation
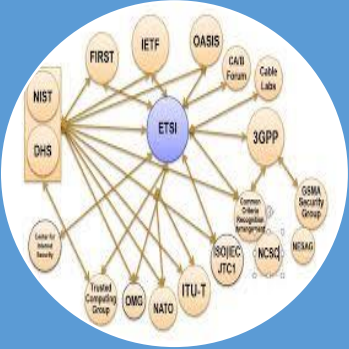
Manufacturing   Agriculture   Energy   Healthcare
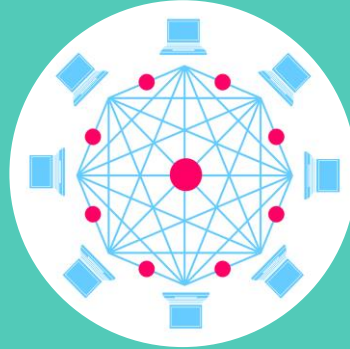
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European large-scale pilots programme

Joint Standardization Efforts

- Specify/Standardize Common Tools for risk assessment and threat analysis
- Explore existing standards in lifecycle management for security and trust

Knowledge & Experience Sharing

- Blockchain & DLT Deployment, Operation and Use
- Joint "Thematic" workshops on Blockchain

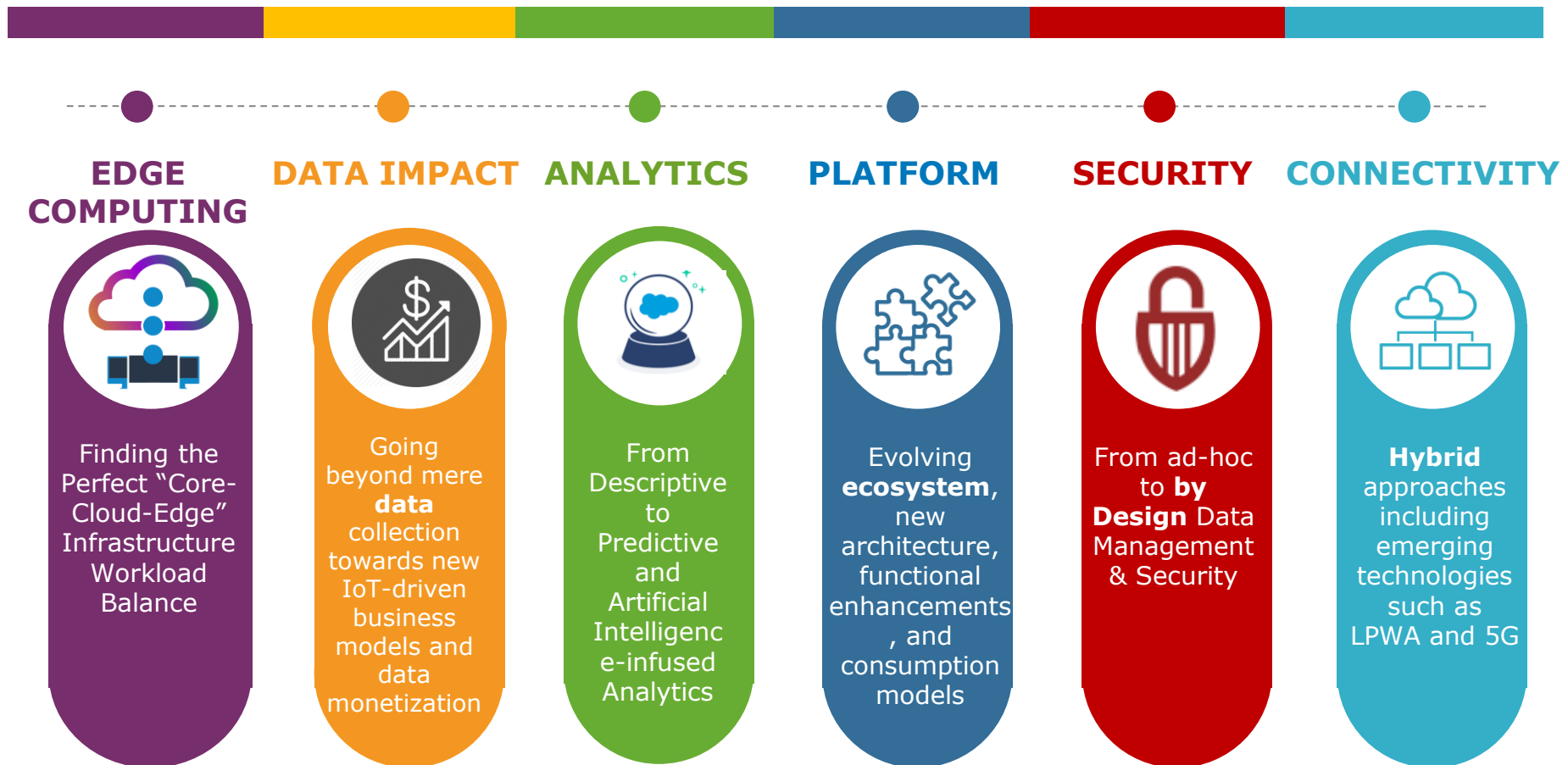**IoT Platforms Interoperability and Integration**

- Emphasis on Data-Driven Security Monitoring
- Streamlining with other EU Efforts (e.g., IoT-EPI)

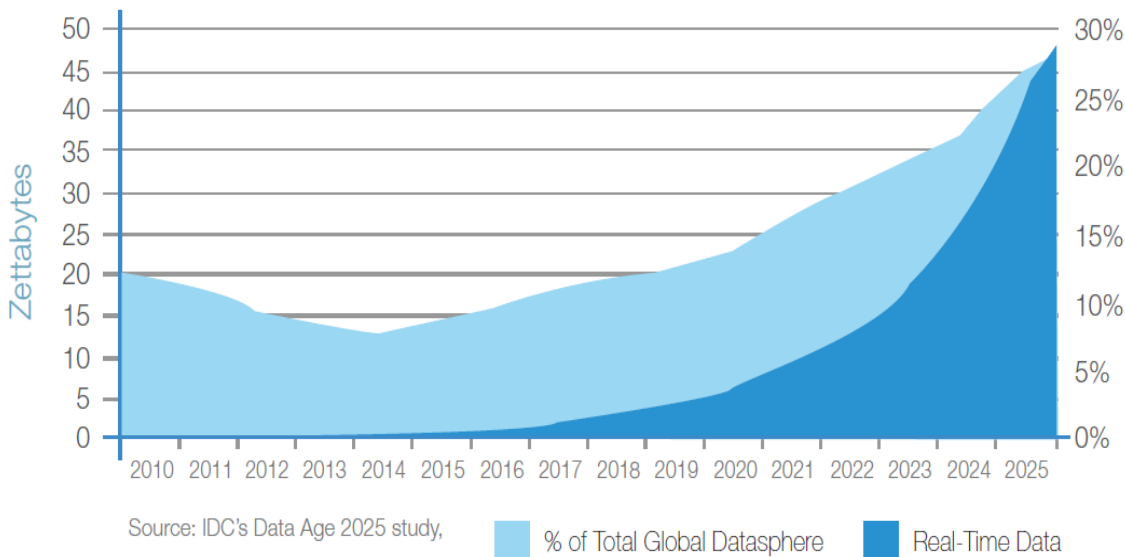**Joint Dissemination and Policy Contributions**

- Common workshops and conferences – Joint participation in exhibitions
- Collaborative contributions to policies (e.g., GDPR compliance, inputs to ECSO)

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Where are we heading?

EDGE COMPUTING

Finding the Perfect "Core-Cloud-Edge" Infrastructure Workload Balance

DATA IMPACT

Going beyond mere **data** collection towards new IoT-driven business models and data monetization

ANALYTICS

From Descriptive to Predictive and Artificial Intelligence-infused Analytics

PLATFORM

Evolving **ecosystem**, new architecture, functional enhancements, and consumption models

SECURITY

From ad-hoc to **by Design** Data Management & Security

CONNECTIVITY

Hybrid approaches including emerging technologies such as LPWA and 5G

Source: IDC European IoT Practice, 2019

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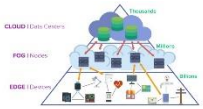# Next Generation Internet: Data-driven change

- Exploding volume
- Increasing real-time requirements
  - Autonomous Driving
  - Industry 4.0
- Needs ultra-fast communication, distributed processing and analytics

Source: IDC's Data Age 2025 study,

Legend: IoT, Other

Source: IDC's Data Age 2025 study,

Legend: % of Total Global Datasphere, Real-Time Data

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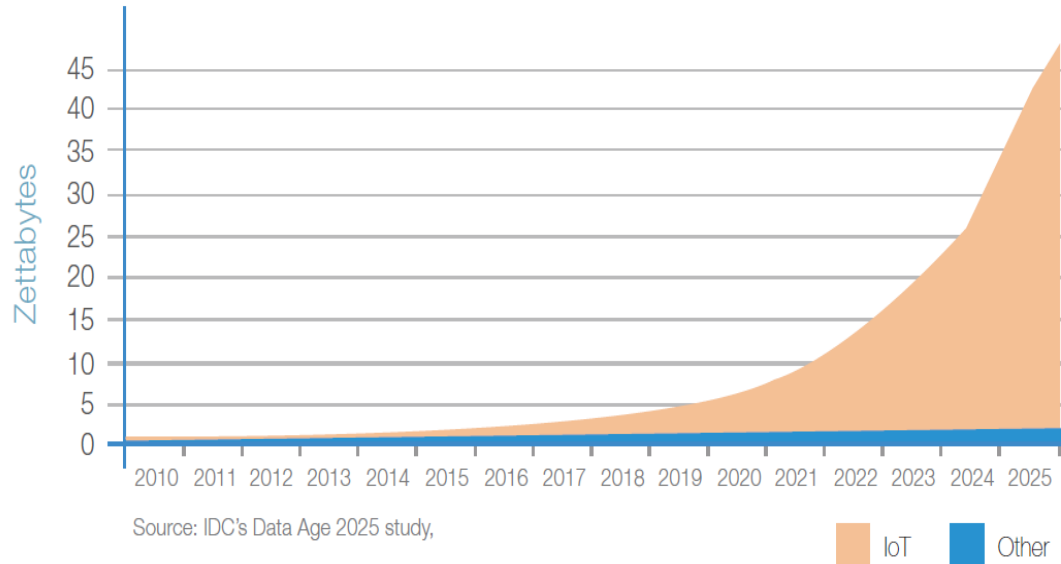
R&D drivers for Next Generation IoT

Real-Time Applications

Data-Centric and Secure Architectures

5G/6G Network infrastructure

Edge Computing

Distributed AI and Analytics

Augmented Reality and Tactile I/F

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Next Generation Internet in Horizon Europe

- Future network and service infrastructures, ensuring availability and control, including beyond 5G, Internet of Things, distributed clouds, blockchain
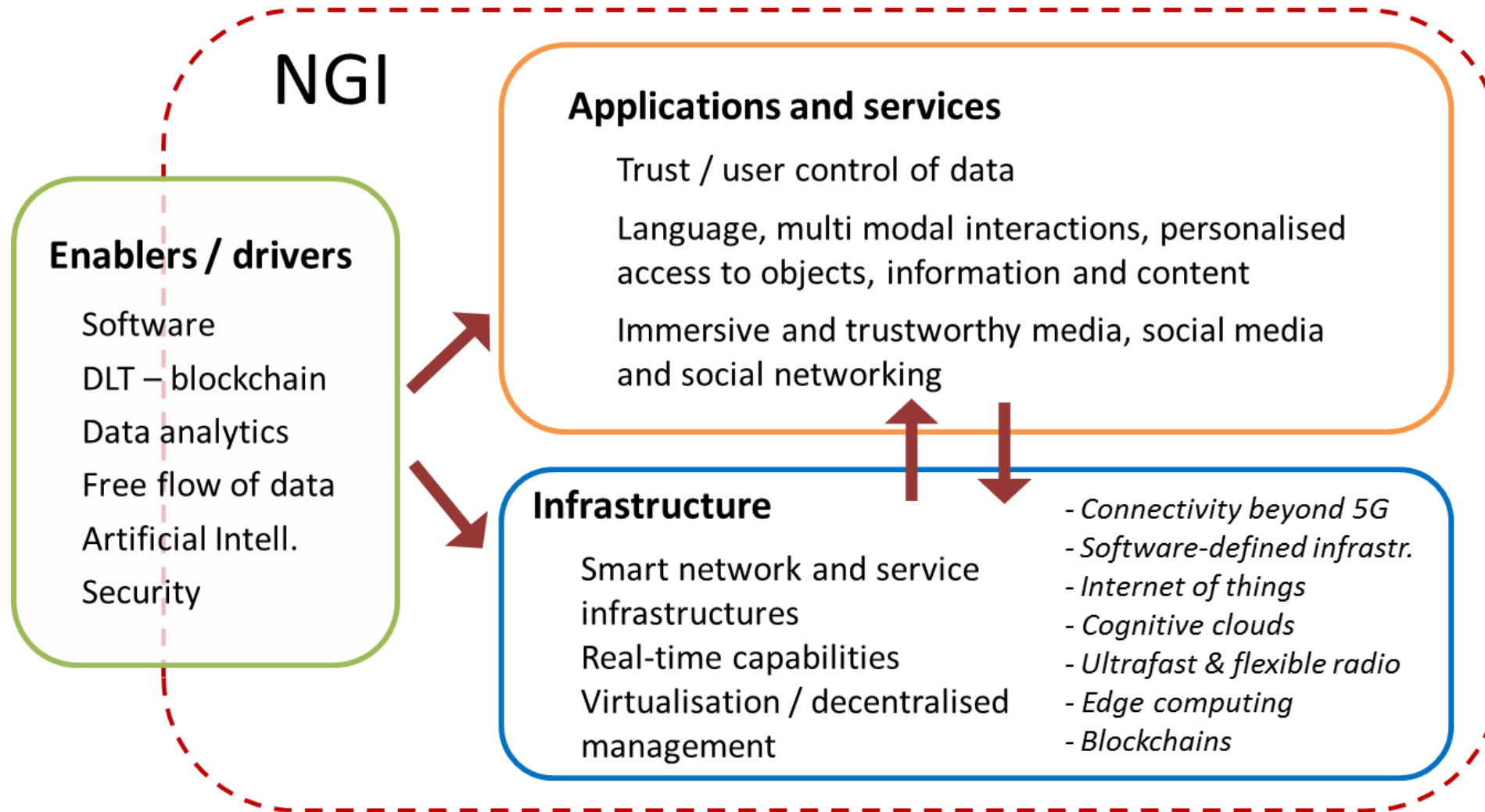
- Human-centric Internet applications, including trust and privacy, inclusive multi-modal interaction concepts, language independency and trustworthy social connectivity and media
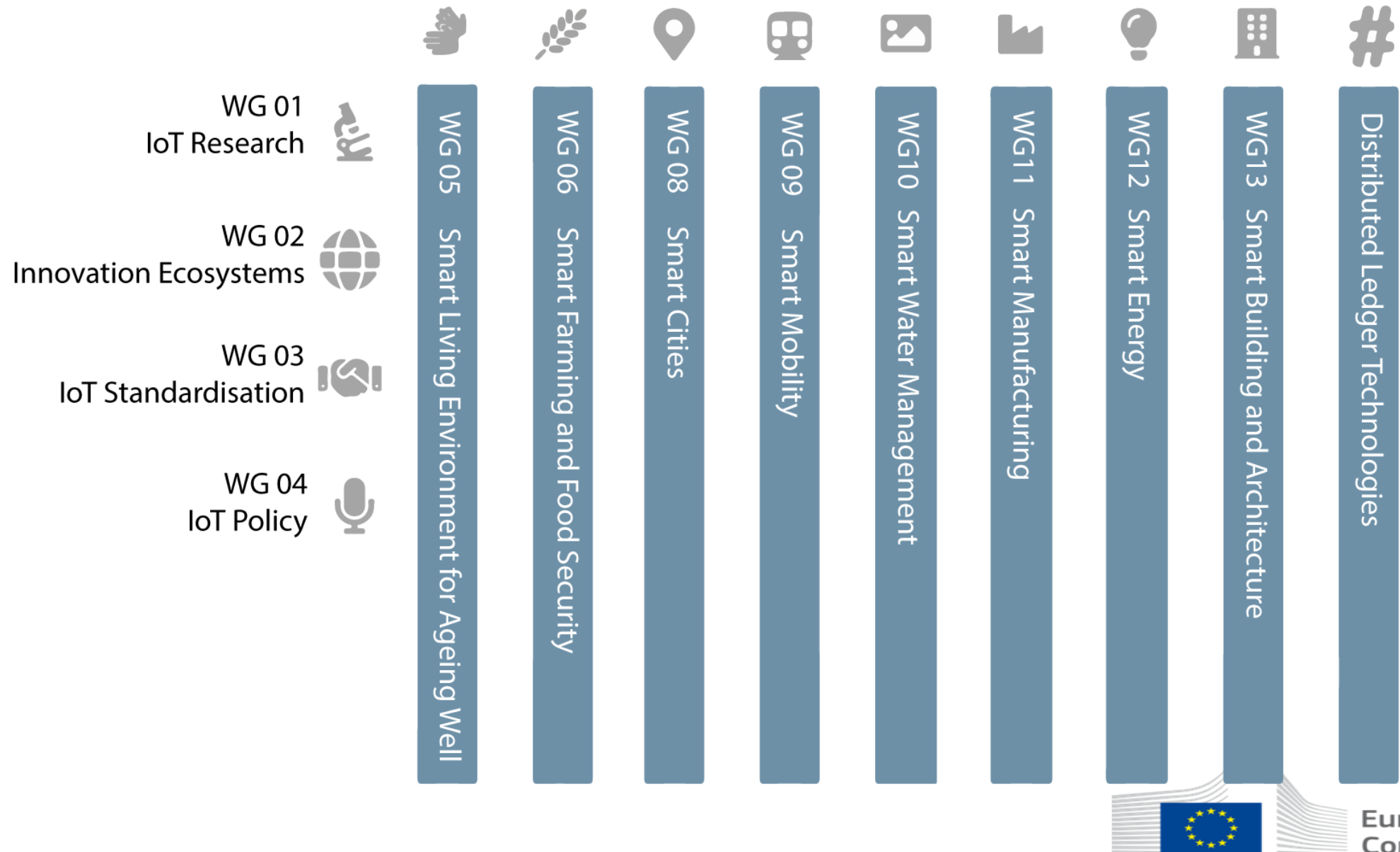
- Distributed processing and data analytics, incl. distributed ledger technologies, embedded Artificial Intelligence
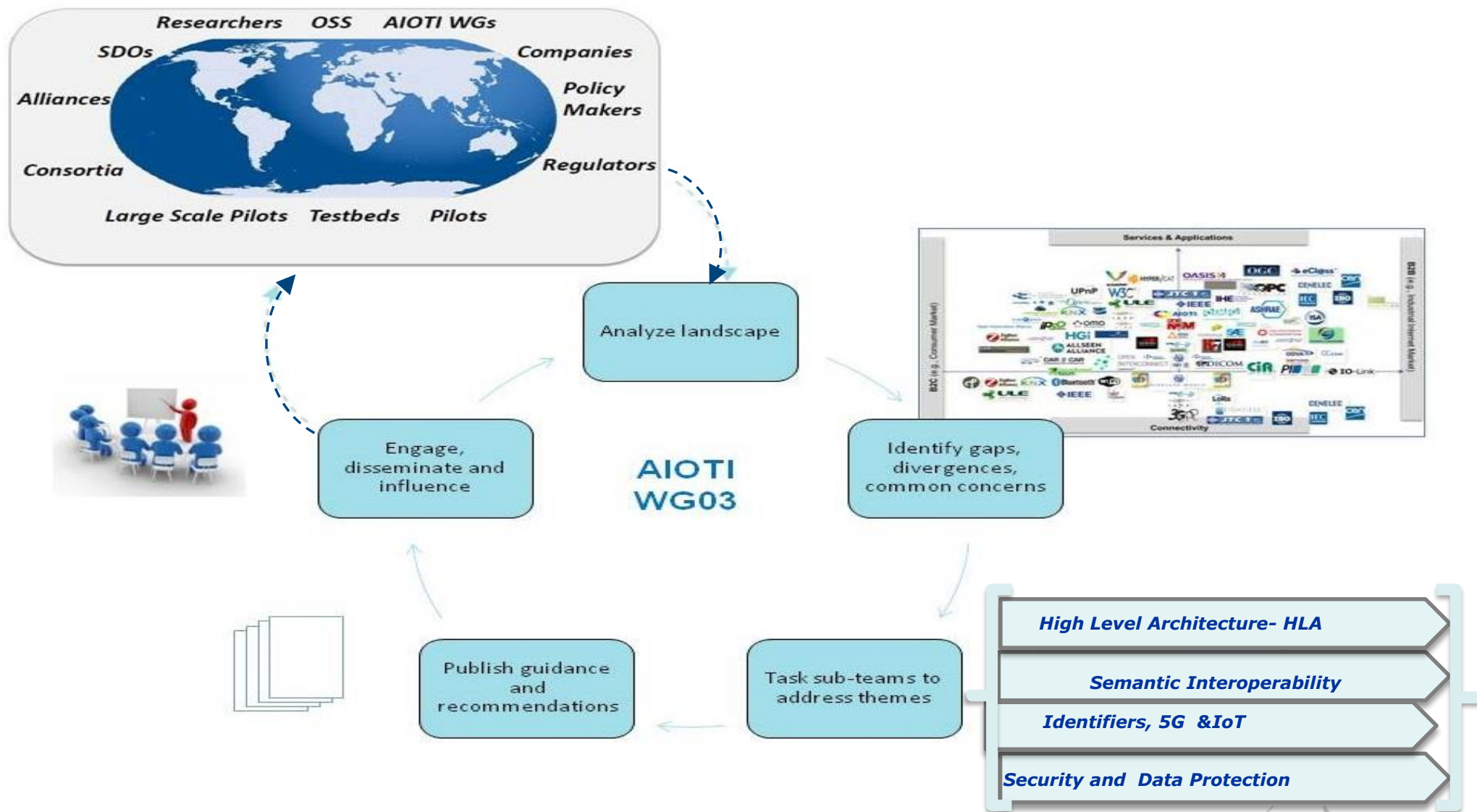
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Next Generation Internet: Proposed structure

NGI

Enablers / drivers

Software

DLT – blockchain

Data analytics

Free flow of data

Artificial Intell.

Security

Applications and services

Trust / user control of data

Language, multi modal interactions, personalised access to objects, information and content

Immersive and trustworthy media, social media and social networking

Infrastructure

Smart network and service infrastructures

Real-time capabilities

Virtualisation / decentralised management

- Connectivity beyond 5G
- Software-defined infrastr.
- Internet of things
- Cognitive clouds
- Ultrafast & flexible radio
- Edge computing
- Blockchains

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Alliance for IoT Innovation (AIOTI)

WG 01
IoT Research

WG 02
Innovation Ecosystems

WG 03
IoT Standardisation

WG 04
IoT Policy

WG 05 Smart Living Environment for Ageing Well

WG 06 Smart Farming and Food Security

WG 08 Smart Cities

WG 09 Smart Mobility

WG10 Smart Water Management

WG11 Smart Manufacturing

WG12 Smart Energy

WG13 Smart Building and Architecture

Distributed Ledger Technologies

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AIOTI Standardisation WG engagement model

The role of global partnerships: the OASC example
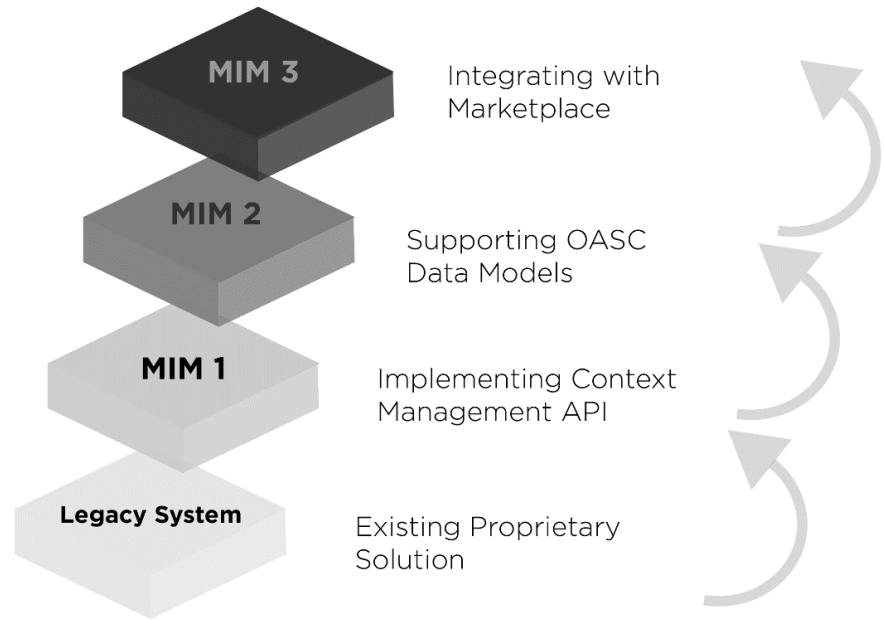

OPEN & AGILE SMART CITIES

140 cities in 30 countries and regions in Europe, Latin America and Asia-Pacific: a global network of Standards-based innovation and procurement across sectors.
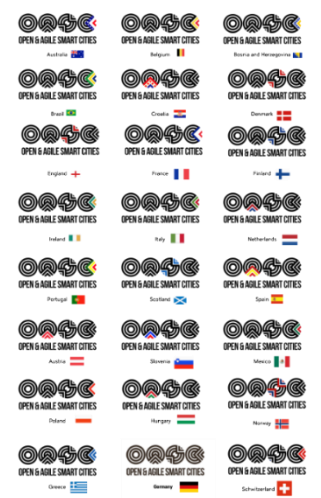
MINIMAL INTEROPERABILITY MECHANISMS (MIMS)

A roadmap based on existing standards and mechanisms, governed by cities, supported by suppliers and infrastructure providers.

MIM 3 — Integrating with Marketplace

MIM 2 — Supporting OASC Data Models

MIM 1 — Implementing Context Management API

Legacy System — Existing Proprietary Solution

SYNCHRONICITY

IoT Large-Scale Pilot on Smart Cities & Communities
Set up to validate and mature the OASC MIMs at scale.
20 cities, 50 services – running on the same common technical ground.
Catalogue of validated services based on standards.

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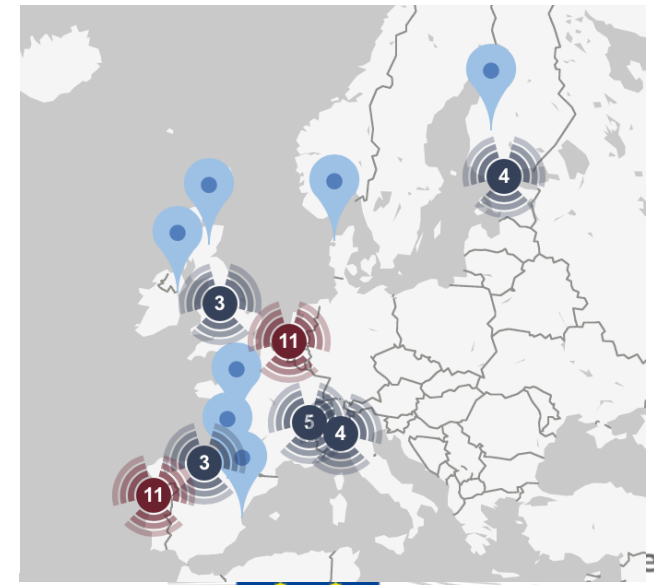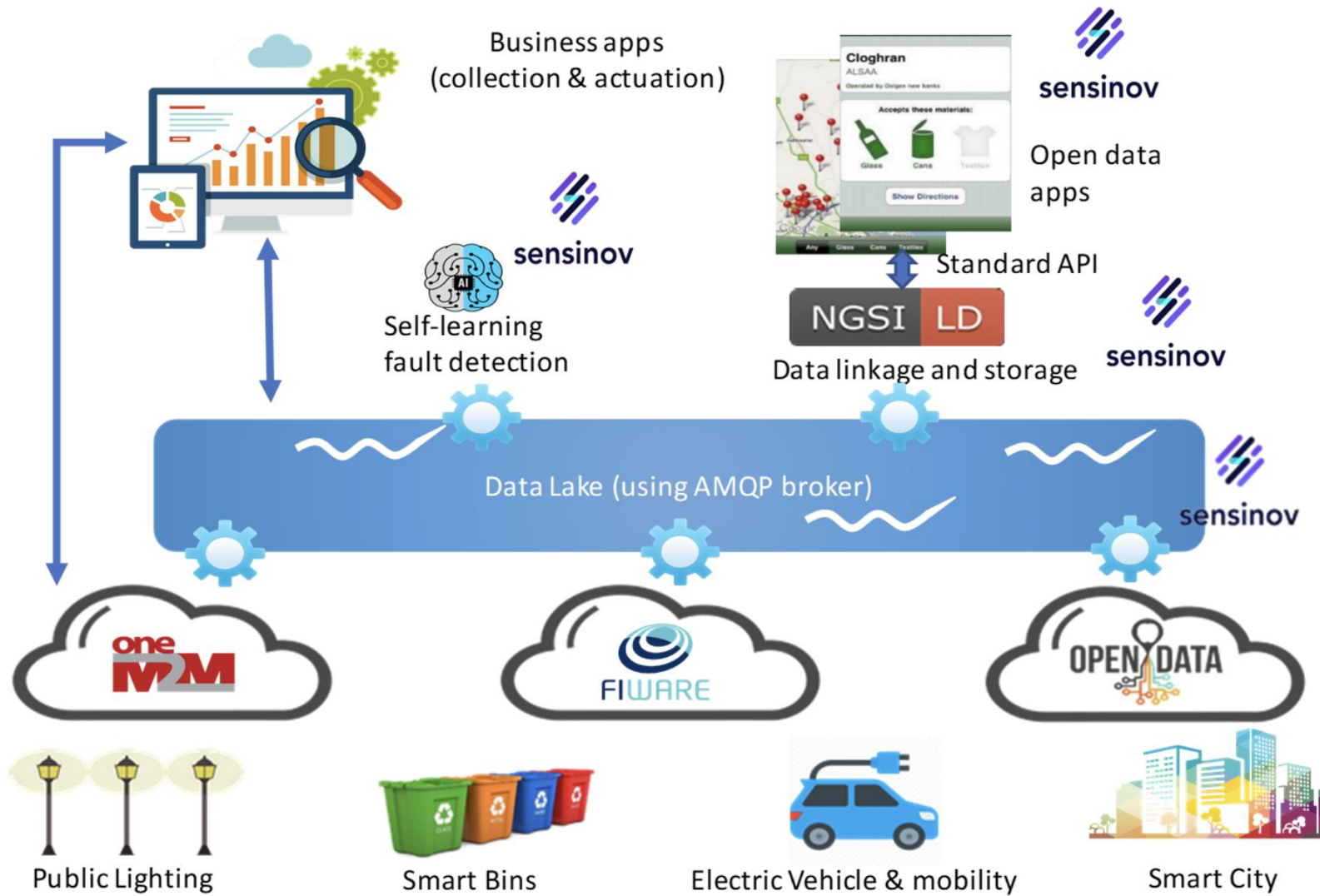
ASAP-VALUE : A STANDARDS-BASED APPROACH TO ENHANCING VALUE FROM CITY DATA LAKE

Thank you !

Internet of Things – European Commission
http://ec.europa.eu/digital-agenda/en/internet-things

Horizon 2020
EU Framework Programme for research & innovation:
http://ec.europa.eu/research/horizon2020/index_en.cfm