NGIOT WHITEPAPER: IOT & EDGE

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NGIoT whitepaper IoT and Edge computing: key messages and recommendations

IoT and Edge Computing

- Supporting EU's competiveness
- Bringing radical change to existing technology paradigms
- Making the digital transformation green
- Enabling technology for an empowered and inclusive society
- Moving from value chain to value network

MARKET ANALYSIS

Francisco Molina – Archimede Solutions

MARKET DIMENSIONS

UPDATED PROJECTIONS FOR EDGE COMPUTING

- Global CAPEX to reach ~100 USD Bn in 2025 with a CAGR of approximately 33%-35% depending on the study
- Operators are leading adoption with cloud providers most likely to provide platform environments in the future
- Europe at 31% of investments by 2028, with multinational network operators in western Europe as largest customers

Global Edge Infrastructure Investments

31.0% Europe
20.2% North America
36.7% Asia Pacific
6.3% Latin America
5.8% Middle East and Africa
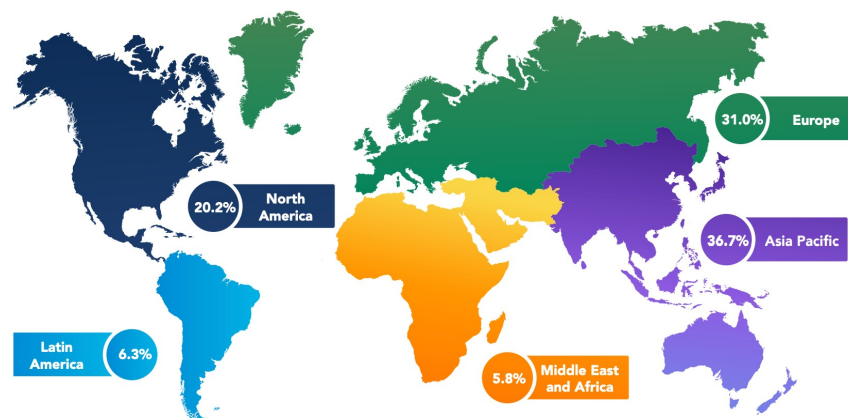
Source: Tolaga Research / State of the Edge

Regional and Domain Potential

bil. USD

Combined

IT equipment on the device edge   IT equipment on the infrastructure edge
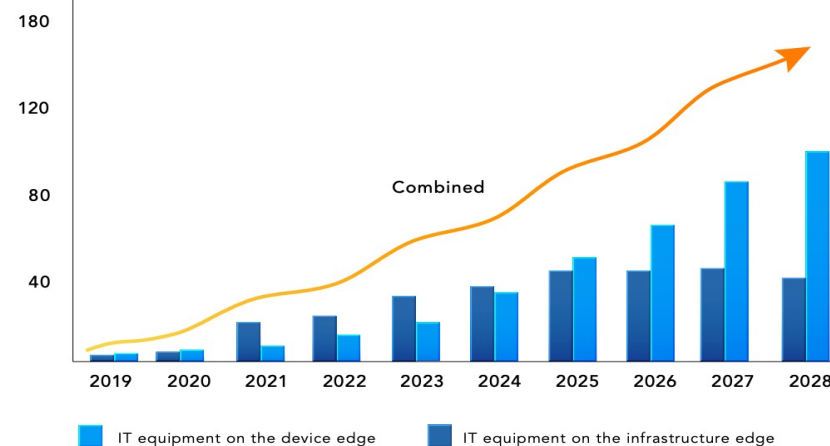
Global annual CAPEX on Edge

[Source: State of the EDGE 2020 - https://www.lfedge.org/wp-content/uploads/2020/04/SOTE2020.pdf]

EUROPEAN LANDSCAPE

We need your input!

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European front runners in Edge-IoT

Application / Services

SIEMENS · TTTech · INTRASOFT · DUNAV NET · BluSpecs · WORLD SENSING · MARTEL Innovate · TECHNOTON ENGINEERING · EdgeInfra Ultra Local

BOSCH · Atos · Xcerion · Spiro · kontron · GERMAN EDGE CLOUD · DISTENCE · Schneider Electric · KINEXON · software AG · SYNELIXIS

Support services

vodafone · ERICSSON · GIG · Cloud / Backend · EUROTECH · NOKIA · WICAST · DFKI · OVHcloud · orl · zynstra

Devices & Premises

SIEMENS · PHOENIX CONTACT · HARTING · Atos · THALES · ST life.augmented · arm · TECHNOTON ENGINEERING · Perinet · NXP

Main Alliances, Fora & Organisations active in Cloud-Edge-IoT

HiPEAC · TNO · BDV · imec · ETSI · IoT-Forum · tmforum · fortiss · SINTEF · CATAPULT Digital · GSMA · LF EDGE · openEDGEcomputing · ARTEMIS Industry Association · ONAP · AGILE · asia cloud computing association · AIOTI · IR6 FORUM · H-CLOUD · Edge Computing Association · IERC · GHI · EPoSS European Technology Platform on Smart Systems Integration · CLOUD NATIVE COMPUTING FOUNDATION · O-RAN ALLIANCE · THREAD GROUP · IoT Acceleration Consortium · IoT WORLD ALLIANCE · openstack · WIRELESS BROADBAND ALLIANCE · council · industrial internet CONSORTIUM · AllJoyn · IGF Internet Governance Forum · IoT Lab · ECLIPSE FOUNDATION · THE LINUX FOUNDATION · INDUSTRIE 4.0 · aim · 工业互联网产业联盟 Alliance of Industrial Internet · SLICES-RI · WiFi ALLIANCE · Bluetooth · Open Infrastructure FOUNDATION · IoT+ · broadband forum · CISCO

- **Network operators** are front-runners in edge computing investments

- Europe has strong players in **hardware and service providers**. With accelerators "champions" like Eurotech, Gemalto, Software AG, SAP, Bosch, Deutsche Telekom, Telit, Schneider Electric, etc.

- Moving **from use cases towards platform-centric** environments leaders are non-european AWS, Microsoft
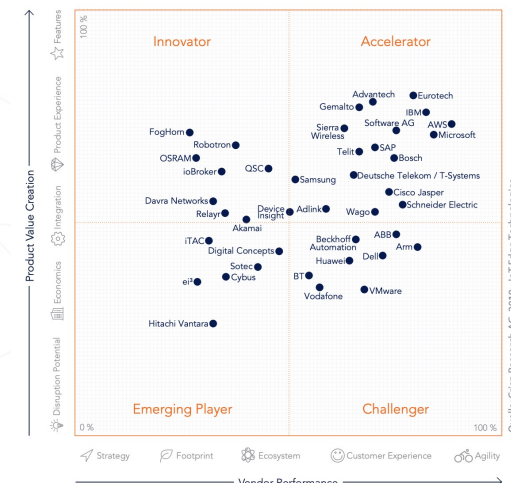
Edge Vendor Quadrants for DACH region

EUROPEAN LANDSCAPE PUBLIC SECTOR

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Public sector as:

- catalyst
- regulator

SCC Global market size:
USD 71.3 billion in 2018, with an annual estimated growth rate of 18.9% between 2019 and 2025 (Grand View Research, 2019).

Move to the Edge

- empowers cities' intelligence:
- real-time response, lower costs
- enables personalised services for citizens
- supports inclusive cities and communities
- avoids vendor lockin
- supports open collaboration

European Key Organisations

- OASC
- EUROCITIES
- ENoLL
- Artemis Industry Association
- EPOMM
- ELTIS

Relevant Movements

- Living-in.eu

Relevant H2020 Projects

- AURORAL
- dRural
- JPI Urban Europe
- CIVITAS
- SmartEnCity
- SMARTER TOGETHER

We need your input!
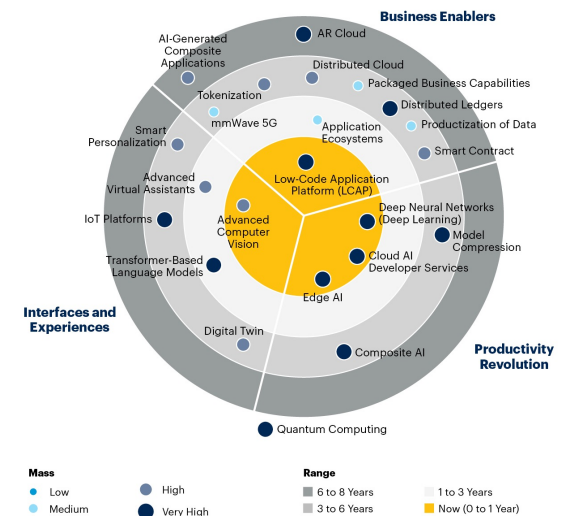
TRENDS & BARRIERS

Adriënne Heijnen – Aarhus University

TRENDS

- From cloud to edge
- From IoT to AIoTI
- From monitoring to intelligence
- From global/central to local/decentralized
- Towards a green transformation
- From Big Data to relevant data
- From IoT value chain to value network

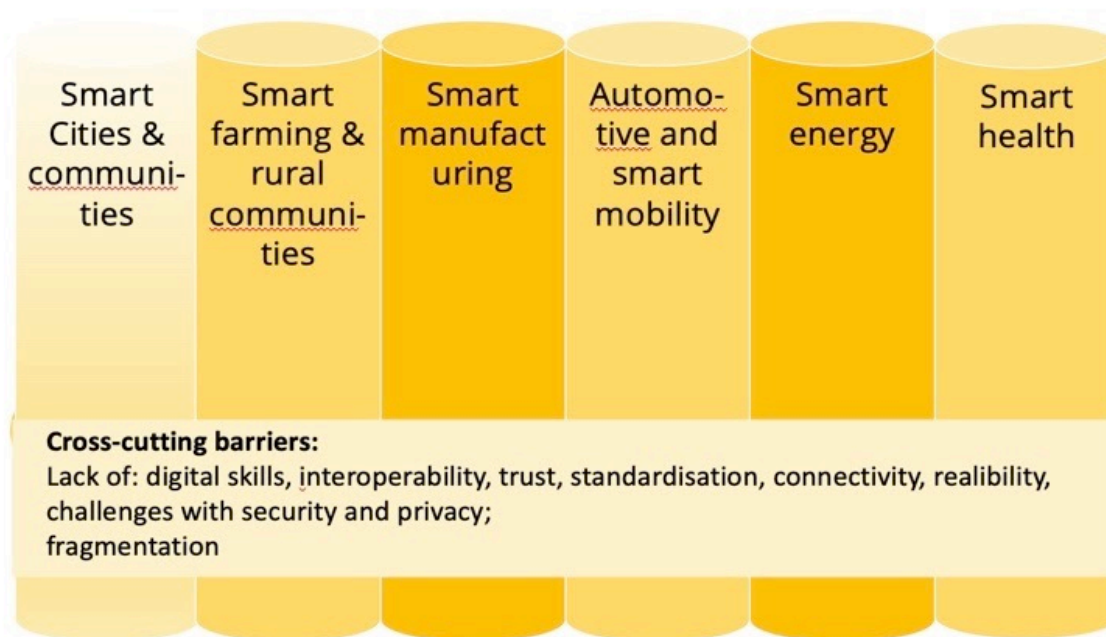

Emerging Technologies and Trends Impact Radar

HORIZONTAL BARRIERS AND CHALLENGES

Barriers across the verticals

Smart Cities & communities	Smart farming & rural communities	Smart manufacturing	Automotive and smart mobility	Smart energy	Smart health

Cross-cutting barriers:
Lack of: digital skills, interoperability, trust, standardisation, connectivity, realibility, challenges with security and privacy; fragmentation

Smart Cities and Communities

- Trust, security and privacy

- Scalability and Interoperability

- Cohesion and Inclusiveness

- Inequality within and between cities

- Sustainable development

ROADMAPPING AND RECOMMENDATIONS

Federico M. Facca – Martel Innovate

EU STRATEGY & MFF 2021-2027

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Technology that works for people

Strategy on Quantum and blockchain

Digital Education plan

White paper on AI

Action Plan on 5G and 6G

5G corridors for connected and automated mobility

EU Governments interoperability strategy

Improve work conditions for platform workers

A fair and

European data strategy

Industrial strategy package

Digital Finance framework

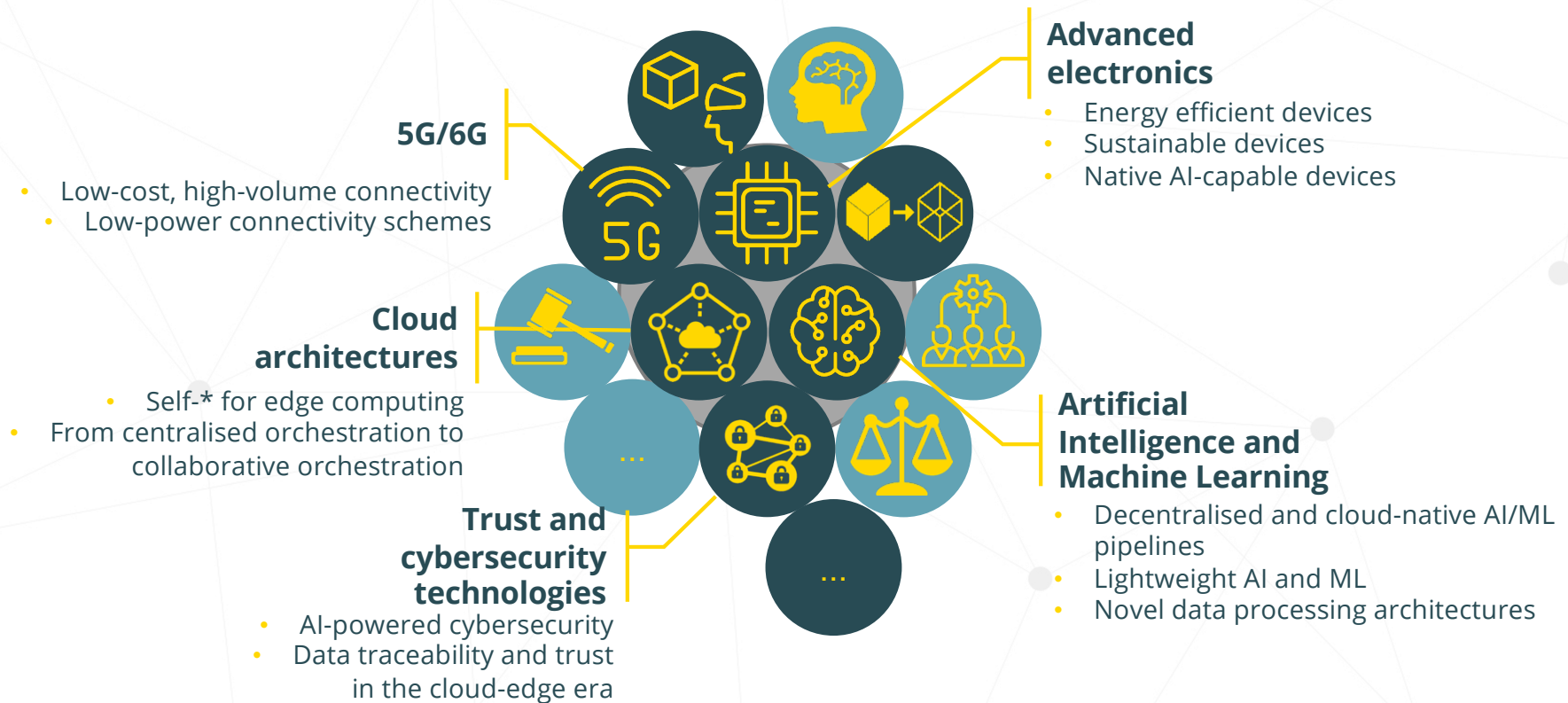**Legislative framework for data governance**

Consumer agenda

An open democ

Revised IDAS

New rules for Digital Market

Media action plan

EU Democracy action plan

Key strategies related to Internet of Things

DATA governance
The European way

#DigitalEU

KEY ENABLING RESEARCH AREAS

5G/6G
- Low-cost, high-volume connectivity
- Low-power connectivity schemes

Advanced electronics
- Energy efficient devices
- Sustainable devices
- Native AI-capable devices

Cloud architectures
- Self-* for edge computing
- From centralised orchestration to collaborative orchestration

Artificial Intelligence and Machine Learning
- Decentralised and cloud-native AI/ML pipelines
- Lightweight AI and ML
- Novel data processing architectures

Trust and cybersecurity technologies
- AI-powered cybersecurity
- Data traceability and trust in the cloud-edge era

KEY RECOMMENDATIONS

- Go beyond "meta" Operating Systems

- Increase emphasis on AI and hardware convergence

- Go beyond state of the art data processing architectures for IoT

- Highlight relevance of IoT in the supporting sustainability goals

- Support large deployments of standard and replicable solutions

- Increase harmonisation of IoT cloud-edge standards

- Invest on experimental infrastructures to support testing and experimentation of cloud-edge solutions

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THANK YOU FOR YOUR ATTENTION