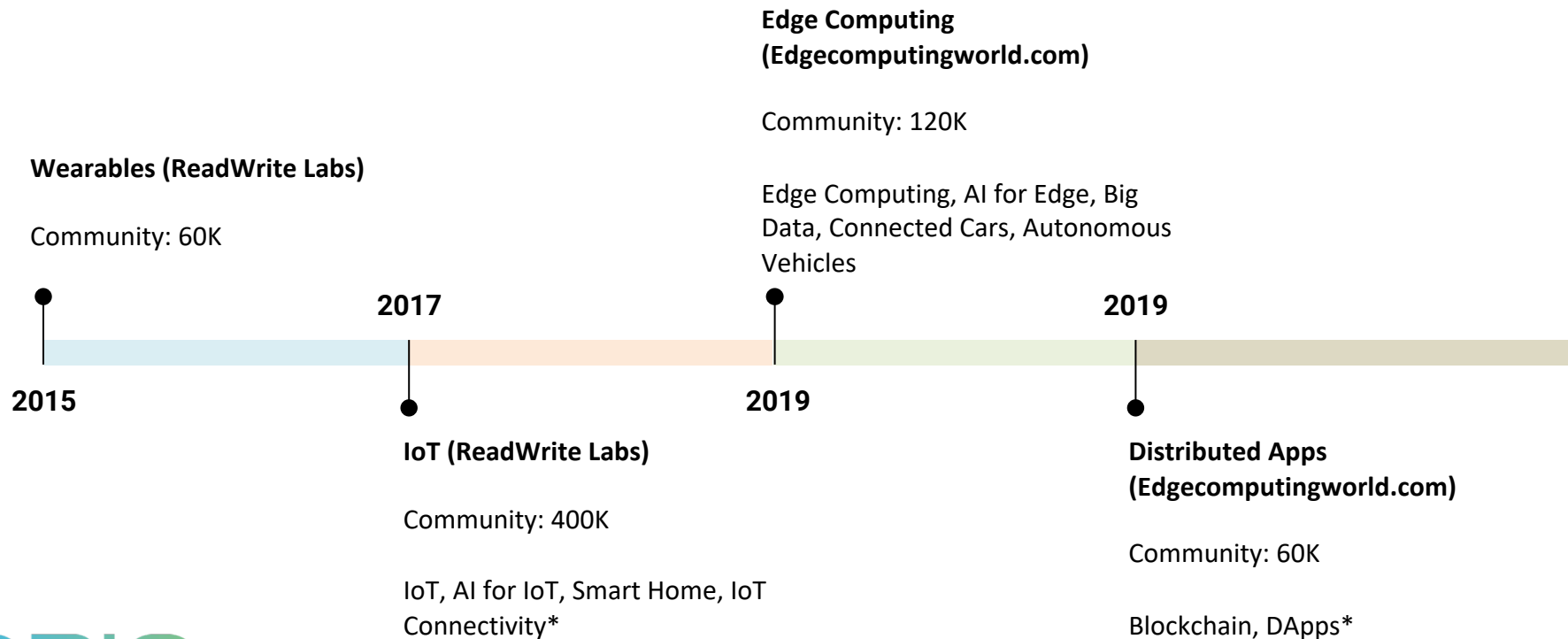


AI at The Edge

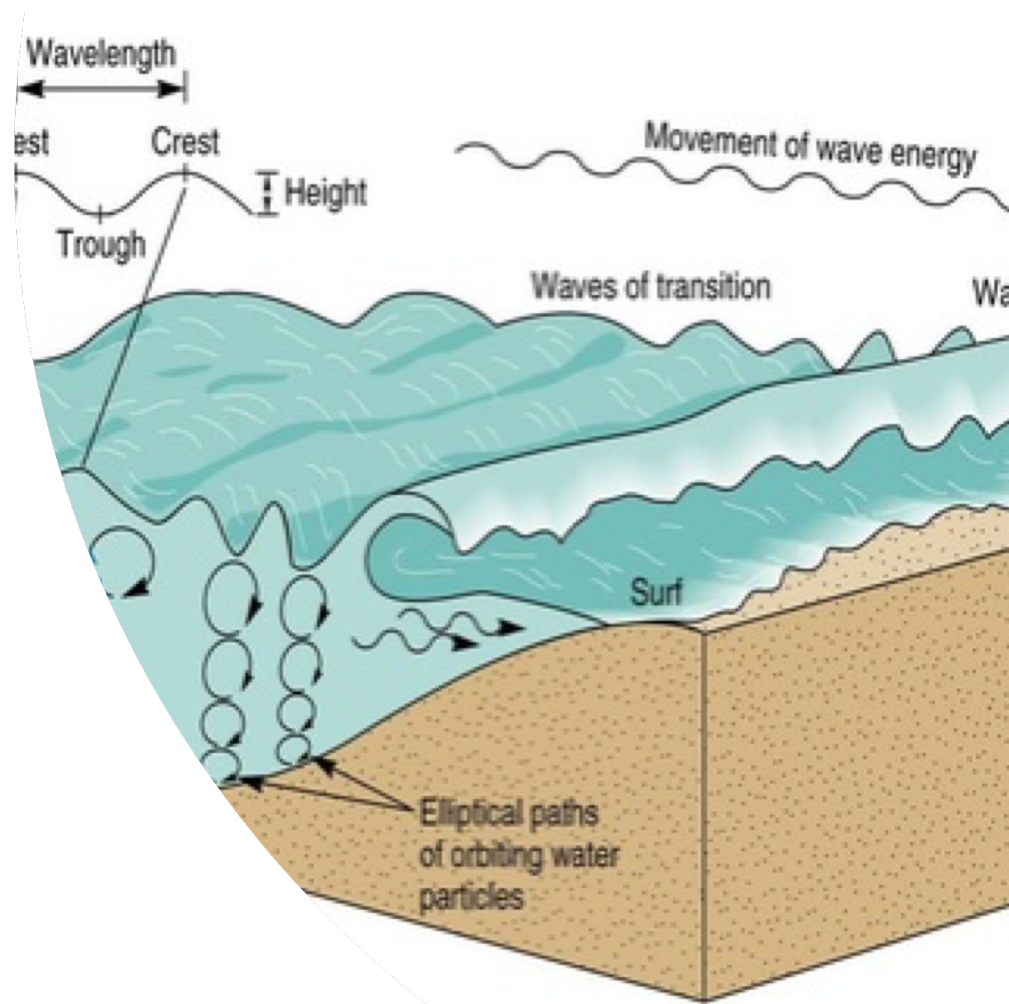
November 13, 2019

Topio Networks Footprint



Mapping the information & connections necessary to profit from emerging trends

- Identify relevant emerging trends
- Map timing, critical touchpoints and opportunities
- Create industry landscapes
- Develop and nurture impacted communities
- Enable companies and expert voices to contribute content





Are you prepared to catch
the next technology wave?

Topio Networks is an industry catalyst.

We accelerate the formation of markets and the development of companies by creating communities around emerging trends and developing the information and connections necessary for the community to effectively position themselves and benefit from these trends

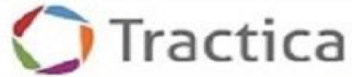
Combining data, events and market voices, Topio Networks is an industry catalyst nurturing the Economy of Things landscapes such as Edge Computing, IOT, and mobility.

Agenda

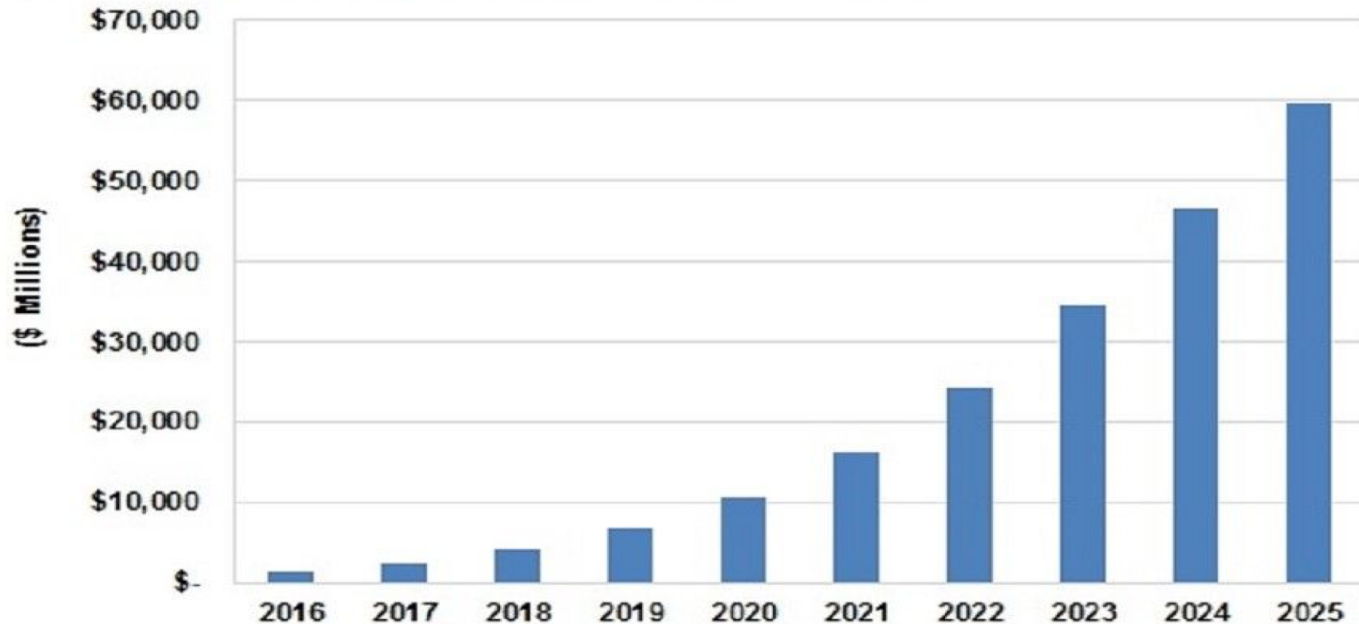
- Quick review of general AI market
- AI for Edge at a glance
- AI moving forward – few observations
- Q&A

2. Quick review of the general AI market

Artificial Intelligence is growing faster than anything we have seen



Artificial Intelligence Revenue, World Markets: 2016-2025



Source: Tractica



- Adoption is being catalysed by companies' **growing conviction in AI's potential**.
- A greater proportion of executives believe **AI will be a 'game changer'** than any other emerging technology – including cloud, mobile, IoT, blockchain or APIs.

AI tops the list of technologies companies perceive as 'game-changing'

2019 CIO Agenda			
Which technology area do you expect will be a game-changer for your organisation.			
	Top performers (n=230)	Typical performers (n=2,329)	Trailing performers (n=276)
AI / Machine Learning	40%	25%	24%
Cloud (including XaaS)	12%	10%	14%
Mobile (incl. 5G)	7%	6%	5%
Internet of Things	6%	10%	11%
Blockchain	5%	4%	5%
ERP	1%	3%	3%

Source: Gartner, 2019 CIO Survey: CIOs Have Awoken to the Importance of AI, figure 1, 3 January 2019.

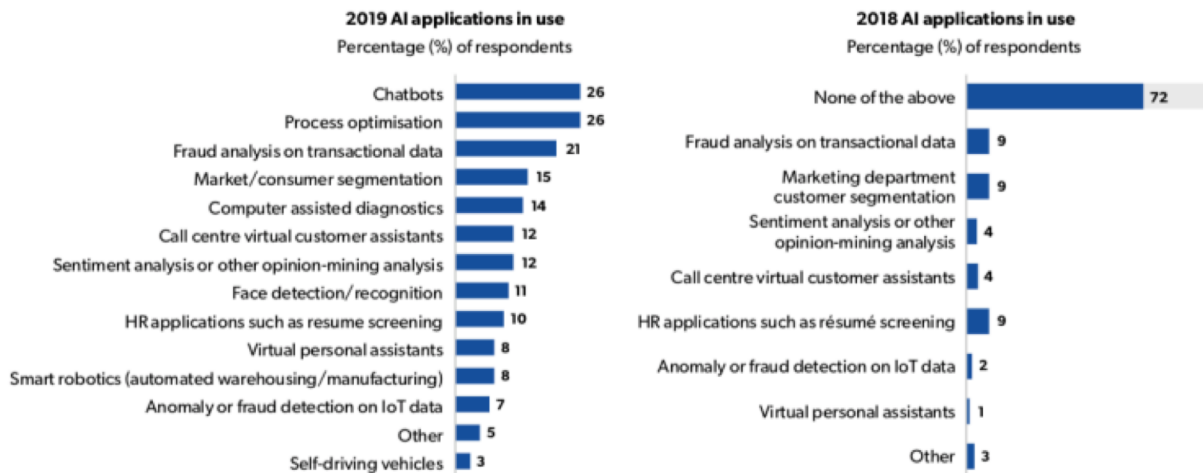




Use of AI applications is advancing across a broad front

- Today's enterprises are using **multiple types** of experiential and analytical AI applications.
- One in ten enterprises now uses **ten or more** AI applications (Gartner).

Chatbots have displaced fraud detection as the top use of AI in 2019



Does your organisation use any of these artificial intelligence (AI) based applications? 2019: n = 2,791; 2018: n = 2,672. Multiple responses allowed.
Source: Gartner, 2019 CIO Survey: CIOs Have Awakened to the Importance of AI, figure 1, 3 January 2019.

3. AI And Edge at a glance

We are still in the early stage of IOT deployment

IOT adoption was expected IOT to be adopted in 2016/2017. Data suggest otherwise as many companies have not rolled out their product yet.

IoT Solution Providers



42%

OEM manufacturers



27%

Device manufacturers



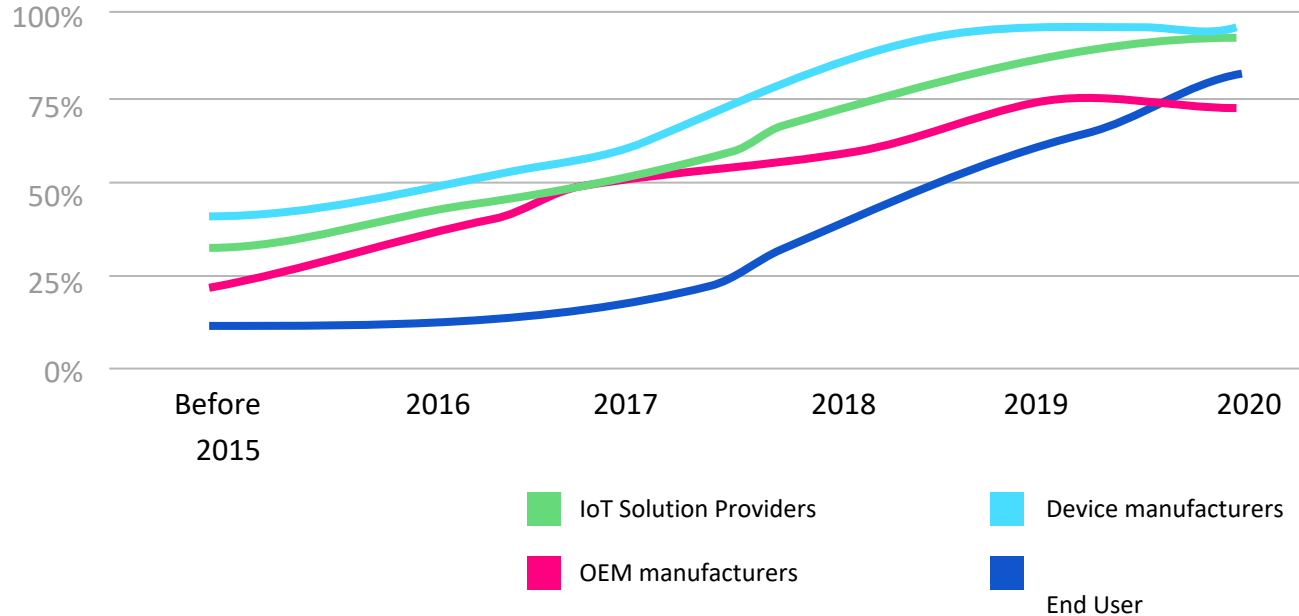
31%

Users of IOT solution



11%

% of Project Started by Year



Mining existing data better and mining new types of data



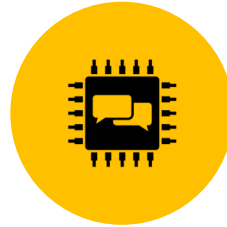
Intelligent Data
Analytics

Data: 66%



Vision Analytics

Video: 33%



NLP

Text: 28%



Audio

Audio: 24%

The 4 types of Analytics



Descriptive analytics

Tracking of materials, goods, and means of transport –
Telematics (logistics)
Foot traffic trends, time at which people travel (Retail,
Travel, Publishers)



Diagnostic

Competitor behaviors (retail)
Audience segmentation



Predictive analytics

Demand forecast,
customer experience,
inventory management



Prescriptive analytics:

Identify investment opportunity (store, cell tower)
Consumer targeting and messaging
Match users and retailers based on location, context,
and discount

The key use cases for processing at the Edge



Access
Management



Telemetry



Autonomous
Vehicles/Robots



Predictive
Maintenance



Remote
Monitoring



Video
Surveillance



Voice
Processing



Behavioral
Analytics



Situational
Awareness



Contextual
Awareness

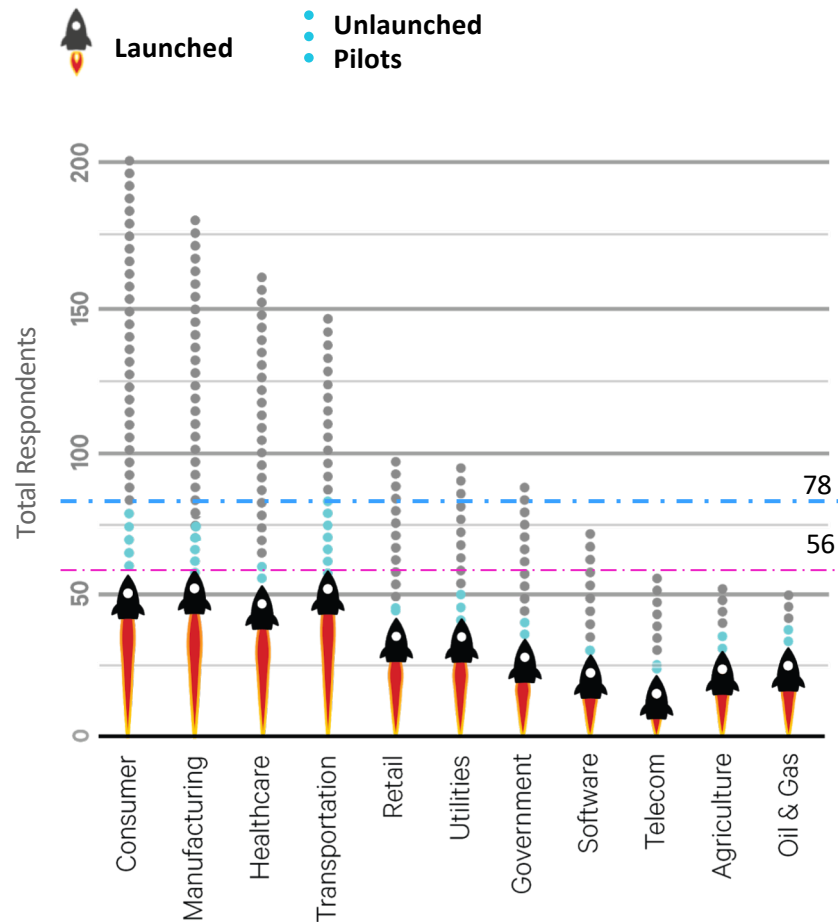
Transportation is leading the way in number of launched projects, ahead of manufacturing & consumer

Not surprisingly, Consumer, Manufacturing, Healthcare and Transportation are the industries with the most projects started and the most project launched.

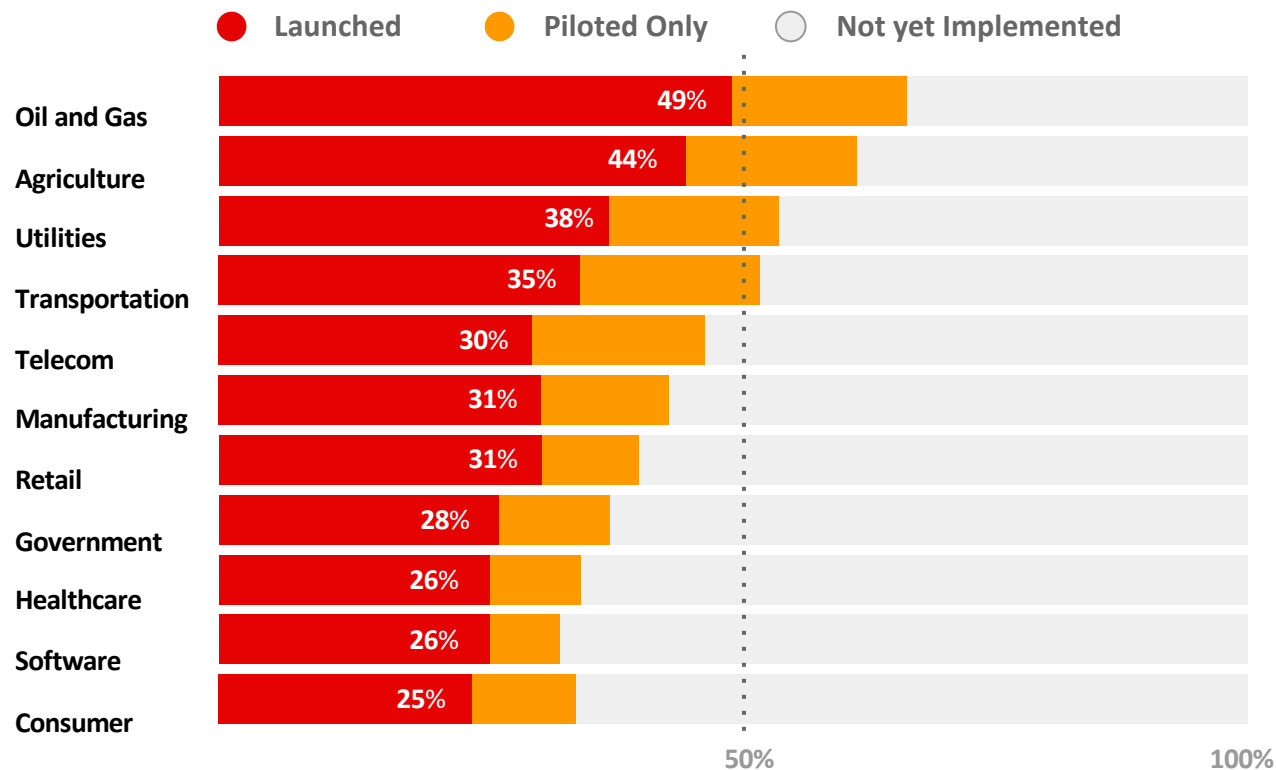
Manufacturing and Transportation are the industries with the with the highest number of live implementations and number of ongoing pilots.

Consumer IoT has the largest number of respondents involved with IoT but their experimentations is still at the very early stage. This is not very surprising given the climate for consumer products in general.

- Max launched implementations: Manufacturing (56)
- - - Max launched implementations + pilots: Transportation (78)



Agriculture, Oil & Gas, and Utilities are smaller industries but more mature in implementing IoT solutions

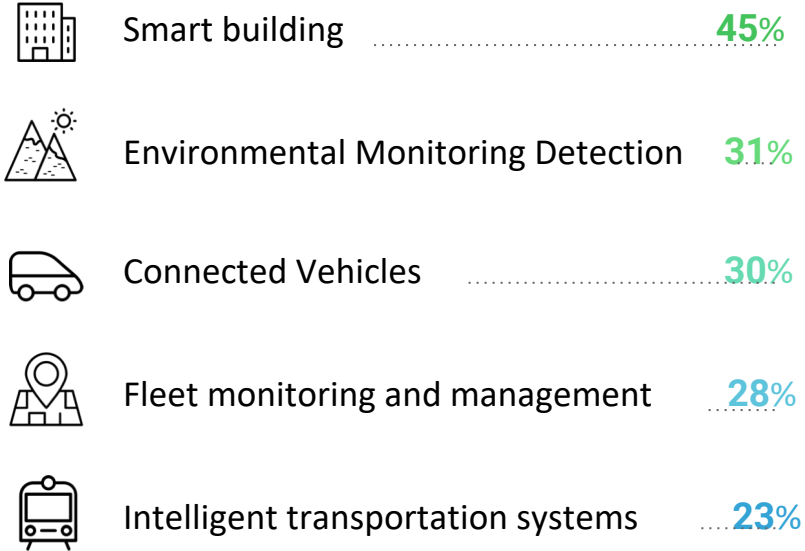


The share of projects launched is a key indicator of the industry's ability to implement IoT from conception to launch.

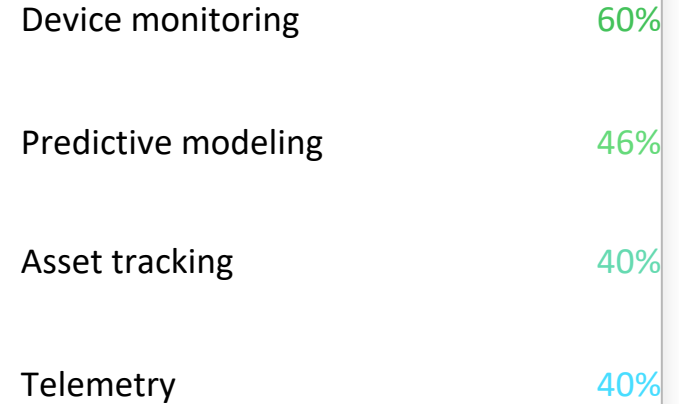
Having launched more projects for an industry means having found the right use cases, having understood how to generate a ROI with IoT and therefore is a close proxy for the IoT maturity of that industry.

Share of respondents that have piloted (orange) or launched (red) a project, by industry

Use Cases (% of projects dealing with use cases)



Types of Use Cases





Moving Forward

The amount of data created at the edge is massive



Cars

4TB /day/ car



Oil Wells

10TB / Day /Well



Weather

5PB/ day



Airlines

2.5 TB / day



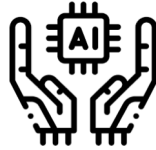
Windfarms

5TB/day

New requirements are emerging



Data Security,
Privacy and
Compliance



Bandwidth
Constraints
(Cost)



Latency

Data flow in the Cloud

Consumer Apps



Insight

Enterprise Apps



Insight

Smart Data

Insight



Smart Clouds

Aggregated
data



Connected and Autonomous Things

Insight



1010

Smart Networks

1010



Data flow in the Cloud

Consumer Apps



Insight

Enterprise Apps



Insight

Smart Data

Insight



Smart Clouds

Aggregated
data



Connected and Autonomous Things

Insight



1010

Smart Networks

1010



Edge World Representation

Application
Deployment

Consumer Apps



Enterprise Apps



Edge/Device/Premise



Edge Infrastructure



Smart Data



Smart Clouds



Edge Infrastructure

From edge sensors to the centralized cloud

The edge computing ecosystem is comprised of four primary areas

Centralized Cloud

Centralized data centers are farthest from the network edge. However, they offer a much greater density of compute, storage, and networking resources.

Edge Infrastructure

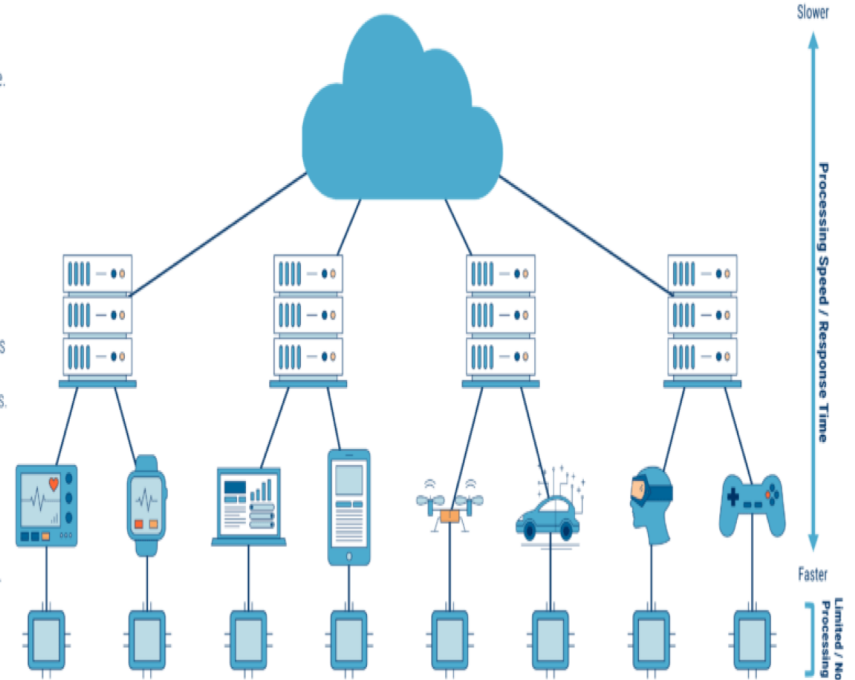
Small, distributed data centers that provide a resource-dense midpoint between edge devices and the centralized cloud. Low roundtrip latencies of 5 – 10ms.

Edge Devices

Real-time data processing within devices based on application needs. Processing limitations present.

Edge Sensors & Chips

Data collection & origination.



- Multi-Access Computing
 - Fog Computing
 - Cloudlets
 - Micro data centers
- (containers inside cloudlet)

.....

Edge Computing World

Dec 10 to 13, 2019

Mountain View, CA

Data flow in the Edge World

Application
Deployment

Consumer Apps

Insight



Enterprise Apps

Insight



Edge/Device/Premise

Insight



Anomaly

Updates

Edge Infrastructure

Insight



Anomaly

Smart Data



Updates

Smart Clouds



Anomaly

Data flow in the Edge world

Application
Deployment

Consumer Apps



Enterprise Apps



Edge/Device/Premise

Insight



Anomaly

Smart Communications

Insight



Anomaly

Smart Data

Updates



Smart Clouds

Insight



Anomaly

Few other considerations



Data Storage



Digital Twin/models



Edge Economics



Cheaper, smaller
and more efficient
hardware

What are some of the Blockers for AI at the Edge?



Access to data



Lack of talent



Infrastructure



Ethics and
principles



Q & A