EVALUESERVE

# Vision 2030 reshaping IoT Landscape in Saudi Arabia

Global IoT market to record 10.4% CAGR in next three years
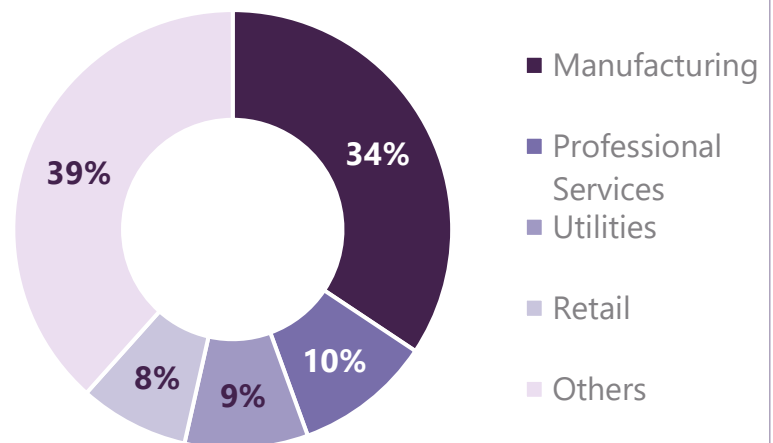
Overview of IoT and global IoT market

The Internet of Things (IoT) refers to a network of physical devices that are embedded with sensors, software, and other technologies that connect and enable exchange of data with other devices and systems. IoT devices, also known as smart objects, may range from an ordinary household object like smart thermostat to sophisticated industrial systems like smart irrigation systems.

Global spending on IoT is estimated to reach $806 bn in 2023 and cross $1 tn by 2026, recording a CAGR of 10.4% during the period.

Global IoT spending ($ bn)

CAGR ⟫ 4.5% ⟫ 10.4%

2018	2023F	2026F
646	806	1,085
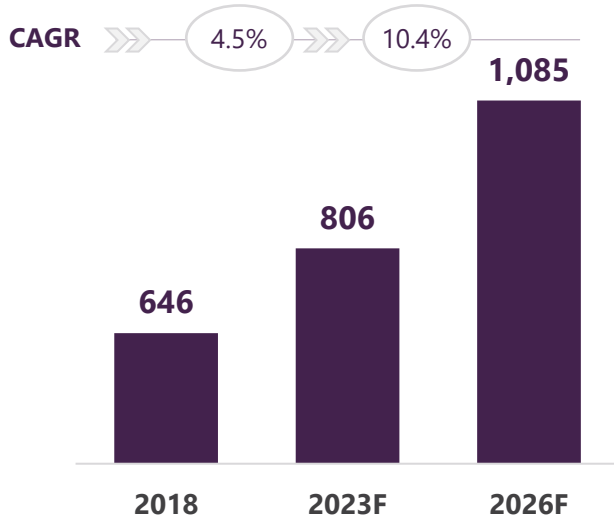
Share of global IoT market by industry (2023)

- Manufacturing — 34%
- Professional Services — 10%
- Utilities — 9%
- Retail — 8%
- Others — 39%

Market drivers

Focus on data
- Growing popularity of data-driven analysis
- Ability to enable massive real-time data collection
- Growing importance of big data analytics for deriving insights to enhance decision-making and process optimization

Value proposition
- Rapidly becoming a core enabler for digital transformations
- By 2030, IoT is estimated to generate a value of $5.5-12.6 tn globally, including the value accrued by consumers and customers of IoT products and services.

Technology advancements
- Better networks
- Increased connectivity with 5G / 6G
- Wider coverage by sensors
- Faster computing
- Ubiquitous storage
- Advanced analytics

Increased investment
- Rising investments in discrete and process manufacturing expected to account for more than a third of global IoT spending during 2023-27

Source: IDC, McKinsey

Saudi IoT market expected to post CAGR of 12.8% until 2025 to reach $2.9 bn
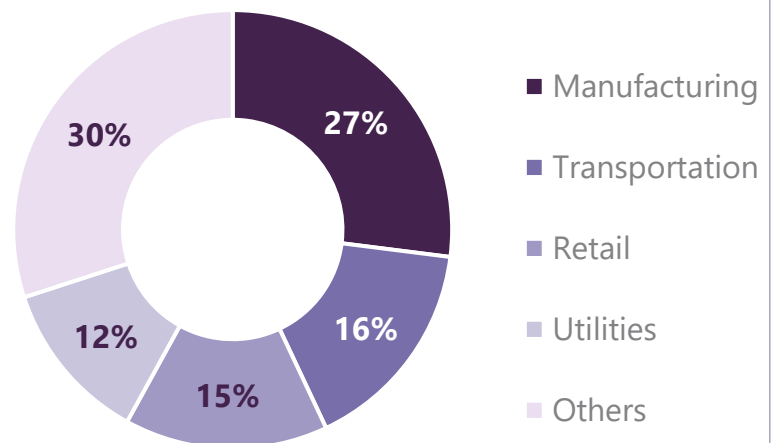
IoT in KSA

Saudi Arabia's digital transformation (DX) initiatives are focused on promoting Industry 4.0, smart city, and smart metering solutions. DX is enabling the expansion of IT services, enhancing digital infrastructure, and fueling the exploration of emerging technologies, all of which are driving the demand for IoT in the kingdom.

Organizations in Saudi Arabia are expected to make significant investments in IoT-enabled processes as part of their industrial automation plans.

IoT spending in Saudi Arabia ($ bn)

CAGR   12.8%

- 2022: 2.02
- 2025F: 2.90
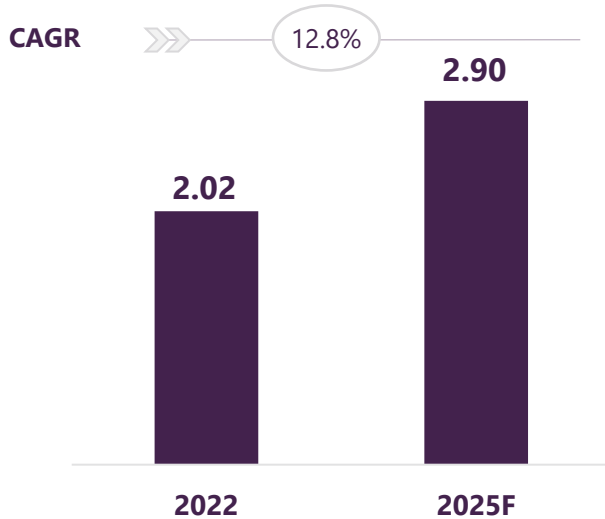
Share of Saudi IoT market by industry (2023)

- Manufacturing: 27%
- Transportation: 16%
- Retail: 15%
- Utilities: 12%
- Others: 30%

Use cases across industries

Manufacturing

- Quality control and compliance
- Asset tracking and management
- Predictive maintenance
- Smart factories
- Process optimization

Transportation

- Fleet management
- Traffic management
- Parking management
- Freight monitoring
- Autonomous vehicles

Retail

- Advanced payment
- In-store contextualized marketing
- Staff identification
- Warehouse inventory management
- Video surveillance
- Omnichannel operations

Utilities

- Smart metering solutions
- Narrowband IoT
- Digital twins
- Smart grid

Vision 2030

Saudi Arabia's Vision 2030 acknowledges the significance of IoT and its potential to contribute to economic diversification, efficiency improvement, and the overall development of various sectors. While the specific IoT-related initiatives within Vision 2030 may not be detailed yet, the broader technology-focused goals of the vision are expected to naturally encompass the adoption of IoT. Neom is one of the projects that is expected to drive the demand for IoT in the country.

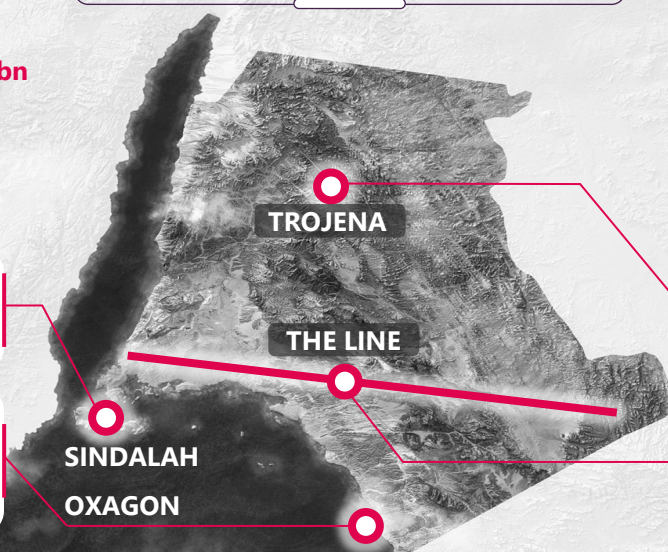### What will Neom encompass

26,500 km²
Land Coverage Area

$500 bn
Budget

1.5-2 mn
Residential Capacity

468 km
Coastline Length

TROJENA

THE LINE

SINDALAH

OXAGON

- **IoT-enabled** golfing destination
- Artistic and **smart** infrastructure enhanced with **IoT**

- Accelerating **Industry 4.0** using **IoT**
- Next-gen ports with integrated **IoT-based** supply chains

- **IoT**-enabled sports and entertainment activities
- **Smart hospitality** services

- **IoT-powered** energy management
- **IoT-based** climate control sensors

How will the Line operate

170 km

0.5 km

0.2 km

Pedestrian Layer

Service Layer

Spine Layer
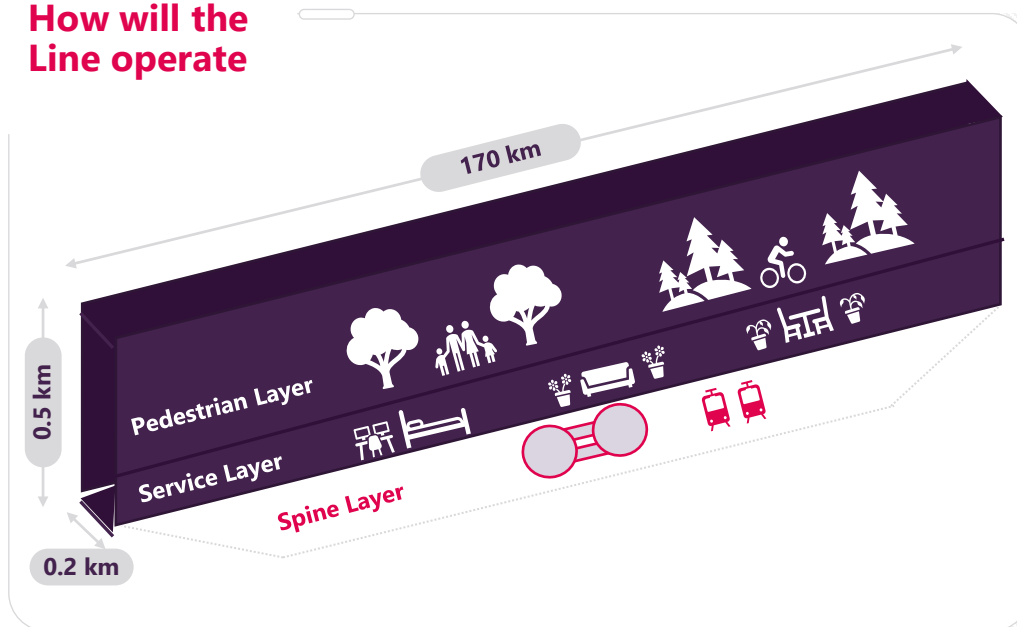
Space
- Vehicle-free **smart transportation system**
- **Smart grids** and **energy-efficient IoT solutions** to reduce energy consumption

Economy
- The deployment and maintenance of **IoT** systems will create job opportunities
- **IoT** is expected to foster innovation, as well as spawn new markets and revenue opportunities

Time
- The High-speed transits using **IoT** will enable the 170 km long Line to contain it to **a 15-min city** as residents will be able to travel longer distances in shorter time

Source: NEOM, Vision 2030 and News Articles

Market drivers

The key drivers of IoT adoption in Saudi Arabia include a demand for higher production efficiency, better customer experience, improved communication services, Industry 4.0, and smart travel. The government, in line with its Vision 2030, is making efforts in the right direction by developing new joint ventures and government initiatives, as well as promoting various technological advancements.

New joint venture specific to IoT

In March 2022, Saudi Telecom Company (STC) **announced a $131 mn partnership with the Public Investment Fund (PIF) to establish a new joint venture (JV) specializing in IoT.** The JV, named IOT Squared, is aimed at expanding STC's capabilities to become a 'one-stop-shop' for IoT solutions by using the experience and technology of existing IoT partners.

The initial capital could be increased to $240 mn three years after the JV's establishment. The venture reflects the fact that STC, which has more than 15,000 communication towers and an urban coverage rate of more than 85%, is investing in expanding its 5G and NarrowBand-IoT connection infrastructure.

Future Factories Program

The program is expected to help 4,000 factories to shift from labor-intensive solutions to those that drive operational efficiency, automation, and application of advanced industrial practices by 2027. Advanced technologies such as IoT will play a big role in achieving operational excellence and automation for these factories.

The program provides various financial and advisory support packages, as well as training to employees. It also includes knowledge resources that can link factories with technology and service providers.

Autonomous Mobility Services

Saudi Arabia plans to make 15% of its public **transport vehicles autonomous by 2030**. The kingdom has also set a target of making 25% of goods transport vehicles autonomous by the start of the next decade.

In April 2023, Saudi Arabia launched a trial for its first autonomous electric vehicle, Dhahaina (Smart), to boost awareness and adoption of autonomous vehicle (AV) technology.

5G/6G

In 2022, 5G was available to **78% of the Saudi population, compared with 43% in 2020**. Ultra-fast speed and low latency for connected devices are a few of the main advantages of the technology and will likely drive the **adoption of IoT**. Further should Saudi Arabia continue to be an early adopter for 6G, just like 5G, it could capture a substantial share of the global 6G market (estimated KSA 6G market - $30[1]bn by 2035). The adoption of 6G will lead to increase in implementation of IoT.

Smart Hajj

Launched in 2018, "Smart Hajj" is making pilgrimage hi-tech. It helps to identify a pilgrim's preferences and captures real-time insights from crowd flows **through IoT-based devices** and sensors that enable geospatial analysis. It reflects the diversity of pilgrims in culture and language, which is especially useful in emergency situations requiring a rapid response.

Additionally, launching of Smart Cards, Smart App and Smart Bracelet for the pilgrims, and deployment of robots to distribute sacred water, **all are based on IoT**.

Significant IoT deals enabling growth in KSA

IoT pacts in Saudi

In alignment with Vision 2030, companies in Saudi Arabia are making progress through strategic collaborations, joint ventures, and partnerships to foster the development of IoT industries. Most of these partnerships pertain to building an IoT service ecosystem. The formation of IoT Squared by STC and PIF* was a strategic step in this direction. These partnerships will likely help to build interoperability between different IoT systems.

Top IoT deals in 2023

Companies involved	Month	Description
DETASAD SIEMENS	Feb-23	**DETASAD** and **Siemens** have partnered to introduce Siemens' industrial IoT (IIoT) as a service in the KSA. The collaboration is expected to streamline the IoT procurement process for government and corporate clients.
stc GO	Feb-23	**STC Group** and **GO Telecom** have partnered to offer IoT services, which are expected to boost digital growth for individuals and businesses. The collaboration could help GO Telecom to expand its connectivity services to cater to the rising demand for IoT technology.
iot² software AG	Mar-23	**IoT Squared** and **Software AG** have formed a strategic partnership to enable IoT-driven innovations in the KSA. The collaboration aims to create an ecosystem that supports IoT adoption and advances the country's digital economy, in line with the Vision 2030 goals.
stc CHINA TELECOM	Apr-23	**STC Group** and **CTG Limited** have inked an MOU to enhance their IoT endeavors and seek collaborative opportunities for mutual growth. The MOU primarily focuses on advancing IoT industries, particularly connected car projects in Saudi Arabia.
iot² OQ TECHNOLOGY	May-23	**IoT Squared** and **OQ Technology** have inked an MoU to boost satellite connectivity with IoT in the KSA. OQ Technology will supply IoT Squared with IoT-based satellite services, products, and technical assistance. The companies will work together to identify target markets, industries, and applications in the KSA.
disrupt-X ABM INDUSTRIAL SERVICES	May-23	**Disrupt-X** and **ABM** have formed a strategic partnership to localize the former's IoT platform implementation in Saudi Arabia. ABM will take ownership as well as brand the IoT platform and mobile apps, offering them to its clients.
iot² machinestalk	Aug-23	**IoT Squared** has acquired **Machinestalk**, a Saudi-based IoT company specializing in smart mobility, cities, buildings, transportation, and IIoT. The acquisition strengthens its leadership in the region's IoT solutions market.
zain Pioneers SYSTEMS	Sep-23	**Zain KSA** and **Pioneers Systems** have joined forces in a strategic partnership to foster innovation in the kingdom's communications and digital services sector through IoT solutions and specialized product localization.

Note: *Refer to previous slide for details

Video surveillance emerging as the most prominent use case

Use cases

In Saudi Arabia, IoT solutions have been majorly implemented for video surveillance, fleet management, staff identification and freight forwarding. More than half of the organizations in the country have already adopted IoT and witnessed efficiency gains, improved customer experiences, and better security. However, the headwinds for adoption of IoT are lack of awareness or a relevant IoT solution availability.

CCTV Omni-channel Operation Digital Signage
Hospital Asset Tracking
Manufacturing Operations Maintenance & Field Services
Fleet Management ATM Remote Tracking System Smart Buildings
Construction Machinery Management Freight Monitoring
Production Asset Management Food Traceability Intelligent Transportation
Connected Vending Machines
NFC Payments Staff Identification

Surveillance System

- The Ministry of Interior has mandated that all commercial premises must be equipped with smart CCTV security and surveillance systems.
- The Ministry of Education declared that 33,000 schools across the country will soon have CCTV camera systems.

Fleet Management

- Fleet management solutions will allow bus operators to maximize productivity and cut costs based on findings from analytical reports.
- The Ministry of Transportation mandated that all heavy-duty and commercial vehicles are required to be managed by fleet management systems.

Staff Identification

- Saudi enterprises are planning to use IoT-based staff identification systems and create a connected workforce through IoT-enabled devices, such as smart entry in workspaces with voice recognition / biometric scanning.
- The use of embedded IoT sensors in wearable devices can help companies to track employee behavior, location, and activities in real-time.

Freight Forwarding

- The government is implementing innovative technological solutions to automate freight-forwarding processes.
- Infrastructural developments are expected to closely connect ports, major transport hubs, warehouses, freight terminals, and distribution centers.

Advanced connectivity, edge computing and AI are gaining prominence with IoT

Enhanced technological ecosystem

Amid the endless growth possibilities, Saudi Arabia's plan for a more promising future can be accelerated by creating an IoT ecosystem. IoT is gaining traction in the country and the kingdom has dedicated significant funding to its IT industry. Growth in IoT is further driving the growth in other technologies such as Advanced connectivity, edge computing and AI. In terms of internet infrastructure capacity, Saudi is leading the way in the region with its Vision 2030-aligned expansion plans.

Advanced connectivity

- The Communications and Information Technology Commission (CITC) expects the contribution of 5G and Wi-Fi 6E to the country's GDP to increase from $4.7 bn in 2021 to more than $18 bn by 2030.

- Average data speeds more than doubled from 2019 to 2021. The country ranks in the top 15 globally for the fastest average and peak download speeds (230Mbps and 637Mbps, respectively), and for 5G video experience, availability, and reach.

- As of 2022, there were over 20,000 Narrowband-IoT sites in the kingdom with 98% of the population covered under it across all spectrums.

Edge computing

- Edge computing is amongst the top three emerging technologies across the world[1]. It allows data from IoT devices to be analyzed at the edge of the network before being sent to a data center or the cloud. IoT is a huge enabler for the growth of this new technology. The surge in data generation intensifies data gravity, driving the need to shift computing capabilities nearer to data sources, a trend addressed by edge computing.

- STC's partnership with Ericsson to develop ICT infrastructure, including edge computing, aligns with Vision 2030 goals. (more than 15K towers with STC)

AI integration

- In 2021, Kingdom's Public Investment Fund (PIF) formed the Saudi Company for Artificial Intelligence (SCAI), an initiative under National Strategy for Data & AI. The company is aimed at attracting funding for advanced data and AI investment opportunities and stimulating AI systems development.

- Saudi Arabia topped the Government Strategy Index (2022) for Artificial Intelligence, indicating that the kingdom's strategy on AI is getting noticed by the world.

Interoperability issues, skills availability and security act as key inhibitors

Inhibitors

Although IoT is gaining traction, there still are several challenges to its widespread adoption, including a lack of established IoT protocols, interoperability issues, a shortage of trained professionals, and cyber threats. The government is working with business leaders to invest in research and development to close the knowledge and skill gap in the kingdom.

Interoperability and standardization issues

- **Device heterogeneity:** To unify devices globally, a common standard is needed to address their heterogeneity over the internet.

- **Need for cooperation:** Collaboration among manufacturers, developers, industry organizations, and regulatory bodies is crucial to the development of unified protocols, standards, and frameworks for IoT devices.

- **Unknown IoT device configuration:** Factors like varying data rates, frequencies, protocols, language, and syntax due to various configurations of devices make it challenging to find interoperable solutions.

- **Semantic conflicts:** Varying data-handling capabilities of IoT sensors and devices hinder rapid and robust deployment.

Workforce skill development

- **Traditional education system:** The complex and centralized decision making in the education system hinders its development making it difficult to meet the demands of the growing IoT industry.

- **Insufficient focus on STEM education:** Saudi Arabia's educational focus on STEM is far less than other developed countries. Its percentage of tertiary graduates in the field of engineering, manufacturing and construction is one of the lowest (6.8%) among OECD and partner countries with rank 43/44. This hinders the growth of IoT in the kingdom as STEM's development is essential for it.

- **High Dependency on Foreign Workforce:** Due to low focus on STEM in the kingdom, the IoT industry has high dependence on foreign workforce, estimated to be around 77% (2021).

Security and privacy considerations

- **Increasing IoT-related attacks**: As per Gartner's survey, out of 80% organizations that implemented IoT, 20% experienced an IoT-related attack within the last three years.

- **Incompatible security standards:** Most industry players are facing issues as the security standards of devices developed by major companies that deploy proprietary IoT solutions are incompatible.

- **Gaps in technical sophistication:** A comprehensive end-to-end approach to enhance overall security is needed.

- **IoT network security:** Inadequate security across linked devices can create vulnerabilities, increasing the risk of damage across an entire network.

Source: HCDP, Unified National Platform Saudi Gov, Gartner, CITC and News Articles

Regulations being set up for secure IoT implementation

CITC to regulate IoT usage

The Communications and Information Technology Commission (CITC), in accordance with the Telecommunications Act, regulates all IoT services and use cases in the kingdom, including service provisioning and device and spectrum licenses.

To meet the goals under Vision 2030, CITC is planning a wide range of policies to enable IoT implementations in the right direction.

Devices

- All IoT devices must comply with the technical specifications published by CITC.
- All IoT devices need to obtain the Certificate of Conformity from the CITC and then the Customs Clearance Permission.
- The features and functionalities of a device must be mentioned on its user manual.
- IoT devices should allow users to modify credentials.
- CITC recommends the use of IPv6 over IPv4 due to enhanced technical benefits of the former
- IoT users and service providers must ensure interoperability between IoT networks and equipment

Connectivity service provisioning

- IoT connectivity, using licensed frequency bands, can only be provided by companies that have a CITC connectivity license.
- IoT networks that use license-exempt frequencies can only be built outdoor by licensees
- All IoT connectivity must use numbers from the M2M numbering range as per the 'National Numbering Plan' published by CITC.

Others

- IoT service providers should make end users aware of
  - The importance of network and data security and provide them recommendations to protect their data.
  - Potential interference risks from others, which can impact service quality.
  - How to effectively utilize IoT networks and solutions, explaining the technology's characteristics and quality of service.
- All IoT components, devices and hosts of the data must be maintained inside the kingdom
- IoT Service providers must provide CITC with reports on regular basis

Source: CITC's regulatory framework on IoT

Factories, homes and offices have immense opportunities in IoT space

IoT opportunities in varied spaces

Most spaces across Saudi Arabia have high-to-medium applicability of IoT devices, with factories, homes and offices accounting for the highest number of possible IoT device use cases. The ways in which IoT adds value to various sectors have the potential to radically reshape industries. Manufacturing is one such industry that has seen multiple benefits of IoT applications in the kingdom. With everything moving towards the 'Smart' concept, adoption of IoT solutions in the kingdom is anticipated to move to its full potential in the coming years.

	Homes	Offices	Retail stores	Hospitals	Hotels	Factories
Security systems	Video doorbells Smart water leak detection	Emergency exit devices Facial recognition systems	Smart smoke detectors Electronic article surveillance (EAS) tags	Gas sensors Motion sensors	Glass break detectors RFID / BLE cards and readers	Access control systems Suppression systems
Health and fitness devices	Air freshener dispensers Smart armbands	Smart glasses Smart toilet paper dispensers	Intelligent wheelchairs Fall detection devices	Connected implants Hand hygiene monitoring	Smart towel dispensers IoT safety gear	Carbon monoxide detectors Smart thermometers
Electronic appliances	Smart Television Smart air fryer	Smart mug Smart water bottles			IoT coffee tables Smart mirrors	
Wearables	Smart watches Smart jewellery	Smart bags Smart badges	Bodycam automated checkout	Remote patient monitoring Fall detection	Concert LED wristbands Smart bands for rides	Smart helmets Smart belts
Smart furniture	Smart lamp Smart plug	Smart chairs Smart desks	Smart fitting rooms Smart shelves	Tilt detectors Ventilation controllers	IoT bookshelves IoT sofas	Product-sensing devices QA assurance sensors
Smart lighting	Smart bicycles Smart skateboard	Occupancy sensors Ambient light sensors	LED signage Smart dimmer		Landscape lighting Smart switch	Smart industrial lighting Smart laser blade lights
Smart mobility devices		Weigh-in-Motion (WIM) systems Smart parking sensors	Smart shopping carts Delivery robots	Smart wheelchair Smart mobility implants	Pedestrian counters Smart luggage carts	Automated guided vehicle (AGV) Smart forklifts
Telecom devices	Signal repeaters / boosters Smart Routers	Data analytics sensors Smart firewalls	IoT hub Device activation tracker	Power distribution units (PDUs) Range extenders	Network switches Guest tracking	Cable and line fault detectors Cell site optimization devices
Fleet management devices			Smart packaging UWB tags	Temperature-controlled carriers Smart ambulance	IoT luggage tracking GPS trackers	Smart containers Connected warehouse robots

Use cases   High   Med   Low

Note: The table does not showcase an exhaustive list of spaces and devices. Under each category only 2 notable use cases of IoT devices have been shown as example.

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Evalueserve Technology, Media, & Telecom (TMT) Practice

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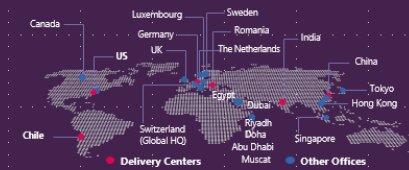More than 500+ FTE engagements with Fortune 100 corporations

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70% 14 of Top 20 Global Software and Services Firms

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4

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