SAMPLE

GLOBAL INTERNET OF THINGS (IOT) MARKET (2021-2026)

The Study Offers:

- A detailed understanding of the current market dynamics and growth opportunities
- The impact of rapid technological ecosystem developments in the IoT market
- Assessment of COVID-19 impact on the industry
- An overview of the competitive intelligence, along with product innovations and strategies of the major players

Domain: ICT	Base Year: 2020	Forecast Period: 2021-2026

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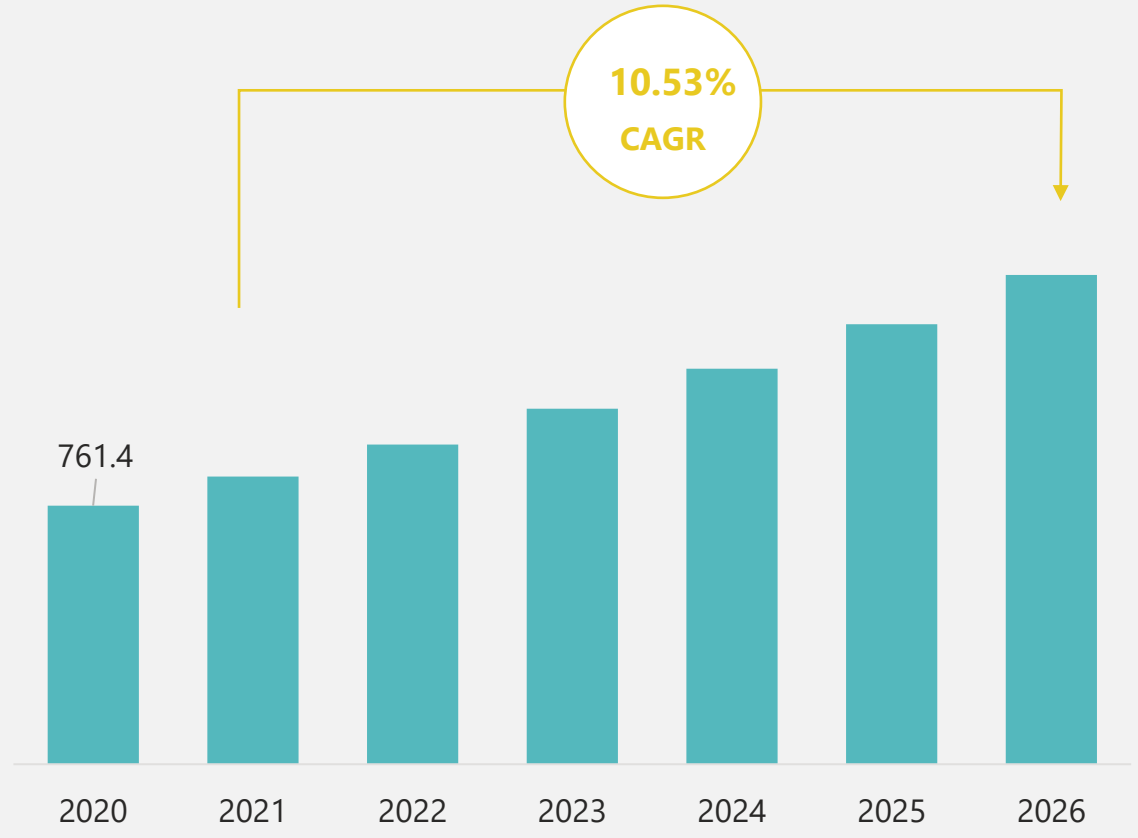
EXECUTIVE SUMMARY

IOT MARKET

Spending in USD billion, Global, 2019-2025



SOURCE: Mordor Intelligence

01 The global IoT market (henceforth, referred to as the market studied) was estimated to be around USD 761.4 billion in 2020, and it is projected to be reach USD xx billion by 2025, registering a CAGR of 10.53%, during the period 2021-2026.

02 By Type, the General Capacitor segment accounted for the largest market share of 34.95%, in 2018. The Array segment is expected to witness the highest CAGR of 7.7%, over the forecast period.

03 By Rated Volume Range, the High Range accounted for the largest market share of 49.15%, in 2018. The Low Range segment is expected to witness the highest CAGR of 8.0%, over the forecast period.

04 By [illegible] share of 29.41%, in 2018. [illegible] segment is expected to witness the highest CAGR [illegible] forecast period.

DETAILED ANALYSIS IS PROVIDED IN THE FULL REPORT

05 By End-User Industry, the Automotive segment accounted for the largest market share of 39.29%, in 2018. Moreover, the Industrial segment is expected to witness the highest CAGR of 8.2% over the forecast period.

06 The Asia – Pacific region accounted for a share of 39.33% of the market studied in 2018. The Asia-Pacific region is expected to witness the fastest growth, recording a CAGR of 7.81%, over the forecast period.

STUDY ASSUMPTIONS AND MARKET DEFINITION

STUDY ASSUMPTIONS

- The base currency considered was the US Dollar (USD). Conversion of other currencies to USD was considered on the basis of the average exchange rate for the respective review-period years. The exchange rate conversion for forecast period was determined according to the base year's conversion rates.
- The base year was identified based on the availability of annual reports and secondary information. The base year considered for this study is 2020, based on the key market metrics gathered till 2020.
- The review period considered for this study is from 2015-2019. The CAGR considered is for the forecast period of 2021-2026.
- Inflation is not part of the pricing and the average selling price (ASP) was kept constant throughout the forecast period for each country.
- Distribution of primary interviews conducted was based on the regional share of the market and the presence of key players in each region.
- As a result of data triangulation through multiple methodologies and approaches, the weighted averages of resulting estimates were considered to be the final values.

MARKET DEFINITION

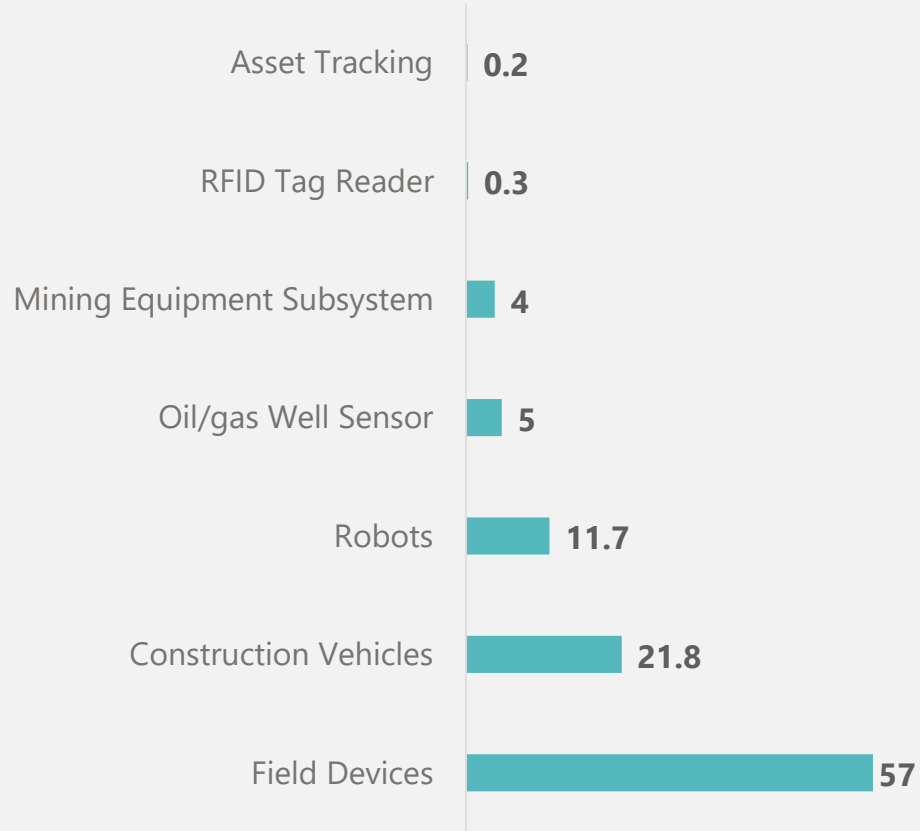
- IoT is a network of internet-connected objects. These objects collect and exchange the data using sensors embedded within them. IoT systems connect together specialized devices designed for specific purposes with a limited degree of programmability and customizability. Moreover, IoT systems also store and process data in a distributed manner.
- IoT has combined hardware and software with the internet to create a more technically-driven environment. The scope of study on IoT market is structured to track the spending on hardware, platforms and services across end-user industries, such as manufacturing, transportation, retail, healthcare, energy and utilities, and other end-user industries.

MARKET OVERVIEW

- IoT technology is the keystone for the various organization to digitally transform, thus, empowering them to upgrade existing processes by creating and tracking new business models. Enterprises and service providers have been looking at IoT as the key enabler to augment digital transformation and to unlock the operational efficiencies.
- With the increasing focus of the governments developing smart cities, the connected environment's demand had been increasing. Adopting smart connected spaces often demands sourcing, developing, and integrating a variety of fragmented technologies. In response, several companies offer streamlined, comprehensive solutions that address the complexities and challenges around creating secure, smart, connected spaces across industries worldwide.
- For instance, in December 2020, Qualcomm Technologies, Inc. announced the Qualcomm IoT Services Suite, that offers comprehensive, end-to-end, IoT as a Service (IoTaaS) solutions to facilitate the digital transformation of smart cities and smart connected spaces globally.
- Exemplifying the IoTaaS and help it include to in the Qualcomm IoT Services Suite, in December 2020, Qualcomm Technologies also launched the Qualcomm Smart Campus in San Diego, manifesting a real-life use case of commercially available, end-to-end solutions. Replicating a city environment in the campus, the Qualcomm Smart Campus includes a 5G network and various intelligent capabilities, including smart parking, lighting, transportation, logistics, trash cans, and edge-AI cameras for security.
- The growing adoption of IoT technology across end-user industries, such as manufacturing, automotive, and healthcare, is driving the market's growth positively. With the traditional manufacturing sector amid a digital transformation, the IoT is fueling the next industrial revolution of intelligent connectivity. This is changing the way industries approach increasingly complex processes of systems and machines to improve efficiency and reduce downtime.

IOT MANUFACTURING SPENDING (%)

by Application, Global, 2020



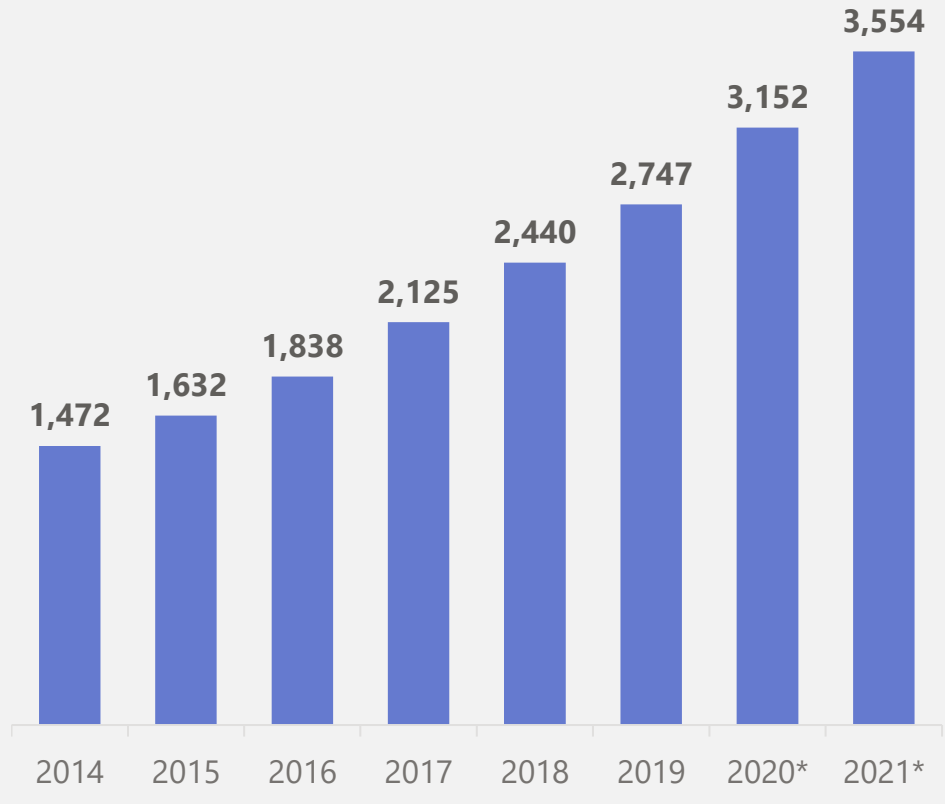
Source: NASSCOM (India)

MARKET OVERVIEW

- Industry 4.0 and IoT are at the center of new technological approaches for development, production, and management of the entire logistics chain, otherwise known as smart factory automation. Massive shifts in manufacturing due to industry 4.0 and acceptance of IoT require enterprises to adopt agile, smarter, and innovative ways to advance production with technologies that complement and augment human labor with robotics and reduce industrial accidents caused by a process failure.
- With the high rate of adoption of connected devices and sensors and the enabling of M2M communication, there has been a surge in the data points that are generated in the manufacturing industry. These data points could be of various kinds, ranging from a metric describing the time taken for the material to pass through one process cycle or a more advanced one, such as the calculation of the material stress capability in the automotive industry.
- In February 2021, Semtech announced that its LoRa devices have been integrated into US-based startup Swarm Technologies' growing global Low Earth Orbit (LEO) satellite network that enables two-way communications to and from its satellites and has a particular focus on connecting IoT devices.
- According to Zebra's latest Manufacturing Vision Study, smart asset tracking solutions based on IoT and RFID are expected to overtake traditional, spreadsheet-based methods by 2022. A study by Industrial IoT (IIoT) company Microsoft Corporation found that 85% of companies have at least one IIoT use case project. This number would increase, as 94% of respondents said they would implement IIoT strategies by 2021. The advancement in the field devices, sensors, and robots will further expand the scope of the market. IoT technologies are overcoming the labor shortage in the manufacturing sector. For more and more organizations, using Industry 4.0 technologies like robotization is part of day-to-day operations.

INDUSTRIAL ROBOTS

Operational Stock of Industrial Robots in thousand units, Global, 2014-2021



Source: International Federation of Robotics (IFR)

MARKET OVERVIEW

- According to the International Federation of Robotics, the market for collaborative robots is expected to reach USD 12.3 billion by 2025. Intelligent robots work alongside workers and can be programmed by most factory workers to take on the most routine, tedious tasks and deliver with accuracy. These robots have become increasingly used in the manufacturing industry as they are easy to train, and are making workplace environments safer for humans, by taking their place in potentially dangerous situations.
- Highly trainable and collaborative, robots are also delivering safer working environments for humans by switching places with them in dangerous or unsuitable situations. For instance, autonomous dump trucks used at mining sites can be remotely controlled by operators, eliminating the need for human drivers.
- According to IFR, the operational stock of industrial robots is expected to reach 3554 (in thousand units) by 2021 from 2,440 (in thousand units) in 2018. The combination of robotics and IoT technologies is expected to shape the future of both the robotics and IoT markets.
- Sensors and robots are currently smarter, and through the IoT, are capable of interfacing with external AI or analytics engines that allow these machines to automatically adjust for greater efficiency even without human intervention. IoT would play an important role in helping robot operators to have more control over their equipment, such as by manipulating the machines from the distance using an app. Some companies in the United Kingdom (UK) are combining the IoT with robotics to make strides in applications such as precision agriculture. Some of the robots in development use sensors that can conduct soil tests more efficiently than humans can.
- **EMMERGING USE-CASES**: The advent of IoT in the automotive industry has opened new opportunities for buyers and carmakers all across the world. With usage at both commercial and industrial levels. IoT in the automotive sector has become a prominent hotspot for multi-purpose applications. From connected vehicles to automated transport systems, the role of IoT is expected to open up significant opportunities for the global automotive market.

MARKET OVERVIEW

- Connected cars are connected over an IoT network called cellular vehicle to everything that connects vehicles and smart transport systems with each other. Connected cars facilitate the fast transmission of data and increase drivers' response time through enhanced vehicle communication.
- IoT infused semi-autonomous vehicles take real-time decisions while partly controlling the vehicle operations to avoid any accidents and reduce the load from the driver. Along with proximity sensors and cameras, cars are integrated with IoT systems to minimize human error and make driving more comfortable and safer.
- For instance, the Government of France is promoting the development of self-driving cars, to deploy "highly automated" vehicles on public roads between 2020-2022. By 2020, the government aims to establish a legislative regulation that will allow the use of autonomous public transport and the circulation of third-level autonomous cars.
- The connected cars bring opportunity for almost all the members in the automotive supply chain, with automobile OEMs, parts suppliers of electronics equipment. For the automotive industry internal application of IoT solutions to test their vehicles in the production line and other phases is expected to create opportunities.
- In 2019, the BMW Group announced that it would collaborate with Microsoft to develop an open manufacturing platform to develop and encourage more collaborative IoT development in the manufacturing sector. The collaboration majorly focuses on smart factory solutions and building standards to develop them in areas like machine connectivity and on-premises systems integration.
- **5G and IoT**: The 5G era is expected to reshape current wireless communication methods used for IoT-based applications. IoT cannot succeed without effective and affordable wireless connectivity, interoperability, and common standards. 5G has the potential to make a significant impact on the way in which IoT ecosystems are designed, especially in the areas of reliability, scalability, latency, security, and the level of individual control on connectivity parameters.

MARKET OVERVIEW

- Cellular IoT deployments are accelerating across the connected cars, utilities, and transportation industries, and with 5G on the horizon, IoT adoption would grow even faster. There is an increase in the number of connected devices in China. In 2019, GSMA, the industry association of more than 750 operators with nearly 400 companies in the broader mobile ecosystem, globally, reported that China, with 64% of the 1.5 billion global cellular connections, is the world's largest Internet of Things (IoT) market.
- Currently, unmanned aerial vehicles (UAVs) are equipped with high-quality wireless communication functions, including 5G, Wi-Fi, Bluetooth, RFID, and other communication means. UAVs are being used increasingly for the development of the IoT. For example, UAVs have been broadly used in the military IoT, smart cities, and smart agriculture to obtain and transmit geospatial information, sensor data information, and controlling information. In smart agriculture, UAV systems are used to gather near real-time remote sensing data for precision farming.

IOT USE CASES IN HEALTHCARE: The IoT continues to aid innovators in the medical industry worldwide. New devices enabled by smart technology offer healthcare professionals with the tools to gather patient data on a larger scale, resulting in a level of effectiveness and agility that was previously unknown to healthcare services. As a result, healthcare IT solutions have been implemented to help hospitals and other care facilities manage and process IoT-provided patient data.

- The convergence between IoT and medical fields reflects the emergence of seamlessly-connected sensors and devices that can improve healthcare services and an expectation-improved IoT utilization in Healthcare. The adoption of the IoT in the healthcare sector and growing demands to support M2M and M2H communication can be owed to the advanced medical equipment, making its entrance in the healthcare sector.

MARKET OVERVIEW

- It is expected that healthcare technologies would be a greater priority among IoT service providers once the disruptions caused by the COVID-19 slowdown. With major disruptions in global healthcare and supply chains, governments, hospitals, insurers, and logistics providers wish that a more connected world could help better address the current crisis and avert or mitigate future ones.
- Hence, IoT will play a big role in modernizing healthcare and disaster prevention, public safety and security, supply chain, and manufacturing and production.
- As part of its effort to contain the spread of the pandemic, a country such as China is also using 5G patrol robots developed by Guangzhou Gosuncn Robot Co., Ltd using Advantech technology to monitor mask-wearing and body temperatures in public places. Gosuncn's 5G patrol robots integrate AI, IoT, Big Data technologies, and cloud computing to conduct environmental sensing, autonomous motion control, dynamic decision-making, as well as behavioral sensing and interaction.
- At a broader level, the outbreak of COVID-19 has affected the production facilities of several industries,, including automotive industries across the globe. COVID-19 outbreak in European countries has affected the automobile industry in the region. Italy is the worst-affected country after China, and the unprecedented lockdown of the country has heaped fresh pressure on the region’s ailing car sector. Such slow performing industry trends may have a negative impact on the IoT investments.
- The primary effect of COVID-19 has been the halting of China’s manufacturing economy during 1Q 2020. Supply chains and the labor supply have been negatively impacted across most industry verticals. Among other impacts, this would certainly slow IoT investment and deployments in the medium term.

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Detail Analysis Available with the Report

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ASSESSMENT OF IMPACT OF COVID-19 ON THE INDUSTRY

- Due to the recent outbreak of COVID-19, the global supply chain and demand for electronics is disrupted, owing to which the IoT market hardware adoption is expected to be severely influenced until the end of 2020. Due to the production shutdown in countries, such as China, during the months of February and March, the electronics industry is observing a shortage of supply of electronics.
- However, a few OEMs have maintained an additional inventory of electronics during the Chinese New Year, which is expected to be sufficient for the production of electrical products until the end of April. In case of reduction in the number of COVID-19 cases over the coming months, the production is expected to resume. In case of prolonged disruption to the supply chain, the electronics industry may observe shrinkage in production and slump in sales.
- During the initial lockdown phase, the global demand for electronic products, such as laptops, phones, and other electronics, surged. However, the overall shipment of electronics during Q1 2020 slumped due to a decrease in business activities across the world.
- The demand for IoTs in government-deemed essential industries, such as healthcare, food, agriculture, and education, is increasing, due to lack of workforce and requirement of remote monitoring and working. However, in the case of industrial demand, IoT is expected to be influenced severely.
- Inevitable delays in IoT projects may influence the retraction of investments or even cancellation by operators. Some of the large verticals integrators, such as automotive, have been affected severely by the pandemic. For example, General Motors has temporarily closed its production plants as an effort to stem the spread of the virus, and suppliers to the automotive industry, such as Schaeffler Group in Germany, have adjusted their production schedules.
- China is one of the major producers of electronics components and an epicentre of the pandemic. The production of raw material and components came to a grinding halt in the country, which disrupted the global supply chain. For instance, Apple issued a warning to its investors in February 2020 that the iPhone supply will be “temporarily constrained” due to COVID-19.

ASSESSMENT OF IMPACT OF COVID-19 ON THE INDUSTRY

- Some enterprises have committed significant funds to mitigate the impact. For example, AWS and IBM have made funds available to encourage innovation from developers in response to the crisis. Alibaba foundation set up a new platform to enable medical authorities to share information across borders.

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Detail Analysis Available with the Report

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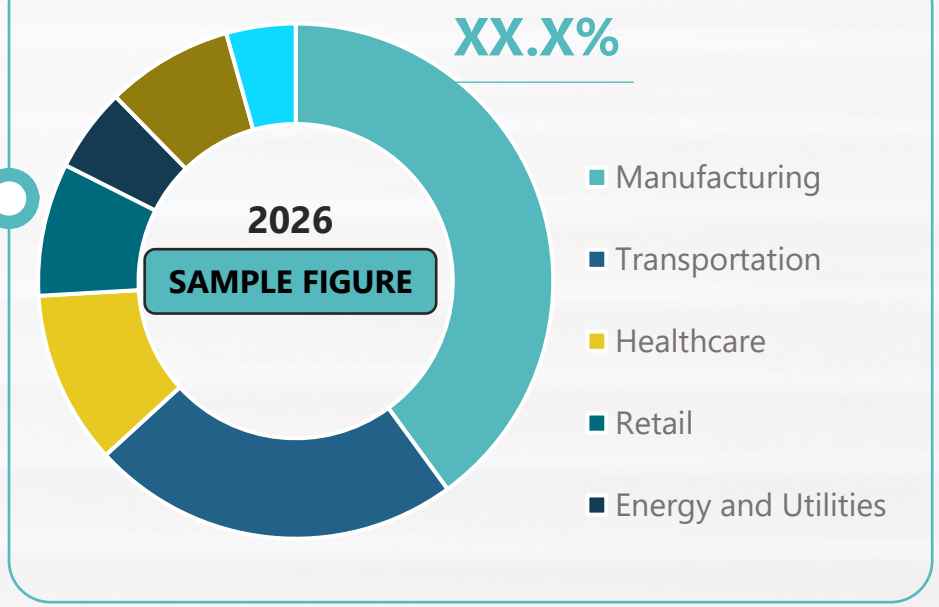
MARKET SEGMENTATION - BY END-USER INDUSTRY

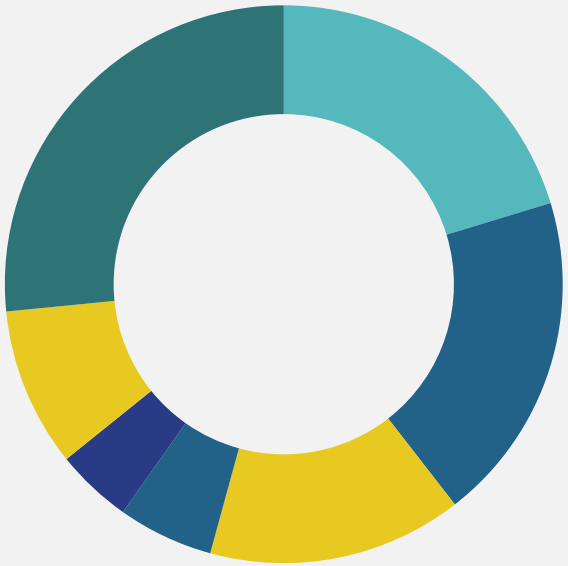
- Manufacturing
- Transportation
- Healthcare
- Retail
- Energy and Utilities
- Other End-user Industries



BY END-USER INDUSTRY

IOT MARKET

Spending Share (%), by End-user Vertical, Global, 2020



SOURCE: Mordor Intelligence

IOT MARKET

Spending in USD billion, by End-user Vertical, Global, 2020-2026

End-user Industry	2020	2021	2022	2023	2024	2025	2026	CAGR (%)
Manufacturing	xx.x	xx.x	xx.x	xx.x	xx.x	xx.x	xx.x	**xx.x**
Transportation	xx.x	xx.x	xx.x	xx.x	xx.x	xx.x	xx.x	**xx.x**
Healthcare	xx.x	xx.x	SAMPLE DATA			xx.x	xx.x	**xx.x**
Retail	xx.x	xx.x	xx.x	xx.x	xx.x	xx.x	xx.x	**xx.x**
Energy and Utilities	xx.x	xx.x	xx.x	xx.x	xx.x	xx.x	xx.x	**xx.x**
Residential	xx.x	xx.x	xx.x	xx.x	xx.x	xx.x	xx.x	**xx.x**
Other End-user Industries	xx.x	xx.x	xx.x	xx.x	xx.x	xx.x	xx.x	**xx.x**

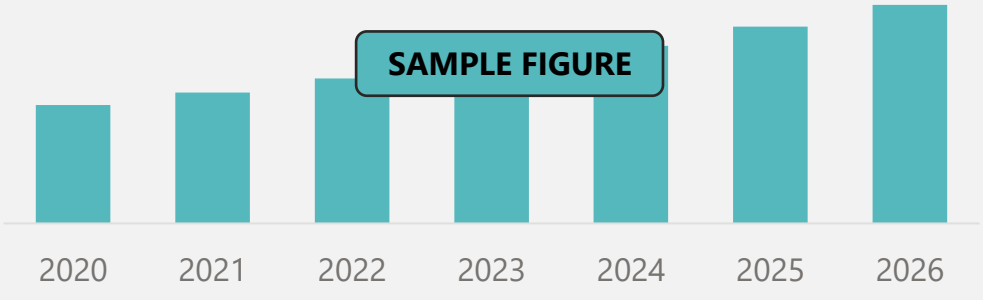
SOURCE: Mordor Intelligence

MANUFACTURING

- Over the last decade, IoT solutions have been increasingly adopted for optimizing discrete manufacturing products and environments. Discrete manufacturers (in automotive, industrial machinery), along with process manufacturers, are facing intense competition; hence, they are increasingly investing in new technologies that leverage the capabilities of IoT, cloud, and Big Data analytics to enhance their ability to innovate and maximize return on their assets.
- With the advent of Industry 4.0, trends, like Industrial IoT (IIoT), smart manufacturing, smart factory, predictive manufacturing, industrial robots, sensors, edge computing, digital twins, and Software-as-a-Service (SaaS), have made IoT the central backbone of these discrete and process manufacturing environments enabling remote monitoring, continuously scanning capabilities from the equipment on the factory floor, real-time analysis, and supporting new capabilities, such as predictive maintenance.
- Jabil, an US-based manufacturing service provider, uses Microsoft Azure's IoT Suite to integrate predictive analytics in real-time manufacturing environments and to create the 'Factory of the Future' by enhancing production, along with reducing waste.
- IoT has also enabled many OEMs to monetize software alongside the actual physical product that they have been selling for years. Some OEMs are also offering Equipment-as-a-Service (EaaS) with the help of an IoT Platform. In November 2019, Zira launched an industrial IoT platform with data integration, the marketplace, and AI-driven process automation.
- The growing adoption of IoT sensors, especially in automotive manufacturing and increasing deployment of industrial robots for achieving smart factory trends are some of the primary drivers of the studied segment's growth.

IOT MARKET

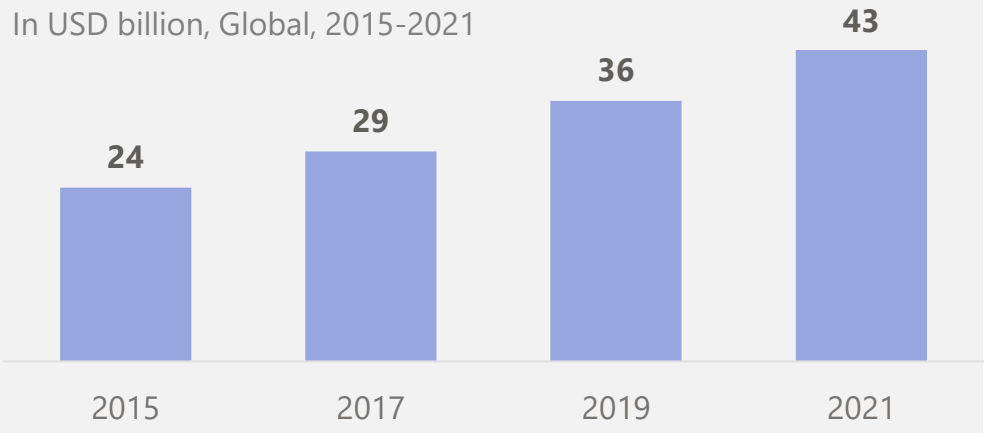
Spending In USD billion, Manufacturing, 2020-2026



Source: Mordor Intelligence

AUTOMOTIVE SENSORS MARKET

In USD billion, Global, 2015-2021



Source: RBC Capital Markets

MANUFACTURING

- Although the recent COVID-19 outbreak has impacted many manufacturing facilities around the world, it also shows the benefits of smart manufacturing. Industry 4.0 drives the capabilities of IoT for remote operations, monitoring, and maintenance of production lines and plants.
- However, data security is one of the primary concerns in the sector, due to IoT. According to US-based Aruba Networks, 84% the of organizations that have adopted IoT have experienced an IoT-related security breach.

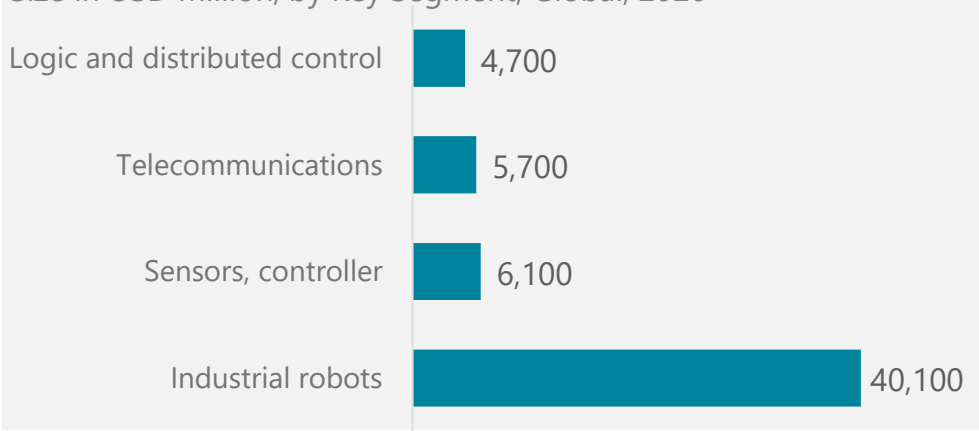
- In June 2018, Telia, Ericsson, and the KTH Royal Institute of Technology announced their partnership to boost the development of 5G in Sweden, and targeting IoT applications, such as smart manufacturing. In 2019, the UK's first live 5G factory trials went live, intending to test out new IoT applications to improve manufacturing productivity. And in the same year (2019), Ericsson also announced to open its first 5G smart factory in the United States. The facility received a direct investment from the Swedish telecom of roughly USD 100 million and will start operating in 2020.

Detail Analysis Available with the Report

- Due to intense competition, many legacy vendors in the infrastructure management space are offering software to gain a stronghold throughout the value chain. For instance, in 2019, Honeywell launched a new industrial internet of things (IoT) analytics platform called Honeywell Forge. The software platform comes under a segment called enterprise performance management for operations technology.
- In 2019, IBM rolls out asset performance management tools to better target industrial IoT. GE is also planning to launch an independent industrial IoT company. These factors are motivating many new players and start-ups for product innovation.
- For instance, an India-based start-up, Uncode Labs, is utilizing AI and industrial IoT solutions to increase the profitability of manufacturers. The company helps manufacturers automate visual inspection and improve overall equipment effectiveness (OEE) by identifying product defects using computer vision and artificial intelligence with the help of deep learning.

SMART FACTORY MARKET SIZE

Size in USD million, by Key Segment, Global, 2020



Source: The Federation of Korean Information Industries (FKII)

Source: IFR

MANUFACTURING

- FANUC America was struggling with its operational efficiency. The company collaborated with Cisco to utilize cloud and IoT for preventing downtime, increasing uptime for connected machines in the robotics manufacturing industry.

❑ CHALLENGES

- No insight into product maintenance needs.
- Typical problems could cost customers more than USD 20,000 per minute.

❑ SOLUTIONS

- Connecting FANUC robots to the Cisco cloud with Cisco Intercloud Fabric let FANUC remotely monitor industrial robots, proactively detect potential equipment or process problems, and reduce unplanned downtime.

❑ RESULTS

- Cisco technologies embedded in FANUC machines and aggregated data devices analyze Big Data onsite before transmitting results to the Cisco cloud. Automatic notifications alert FANUC service personnel to issues.
- FANUC completed a pilot with a major auto manufacturer. The Cisco solution dramatically reduced production downtime and increased overall equipment effectiveness.
- A single unplanned downtime event can cost a manufacturer USD 2 million, so connected machines can have significant financial benefits for FANUC's customers.

BUSINESS ACTIVITY COMPARISON IN POST COVID-19 CHINA

	Nov -19	Dec -19	Jan -20	Feb -20
Manufacturing Purchasing Managers' Index (%)	50.2	50.2	50	35.7
New orders index (%)	51.3	51.2	51.4	29.3
New export orders index (%)	48.8	50.3	48.7	28.7
Finished goods inventory index (%)	46.4	45.6	46	46.1
Import index (%)	49.8	49.9	49	31.9
Raw materials inventory index (%)	47.8	47.2	47.1	33.9
Employment index (%)	47.3	47.3	47.5	31.8
Non-Manufacturing Business Index (%)	54.4	53.5	54.1	29.6

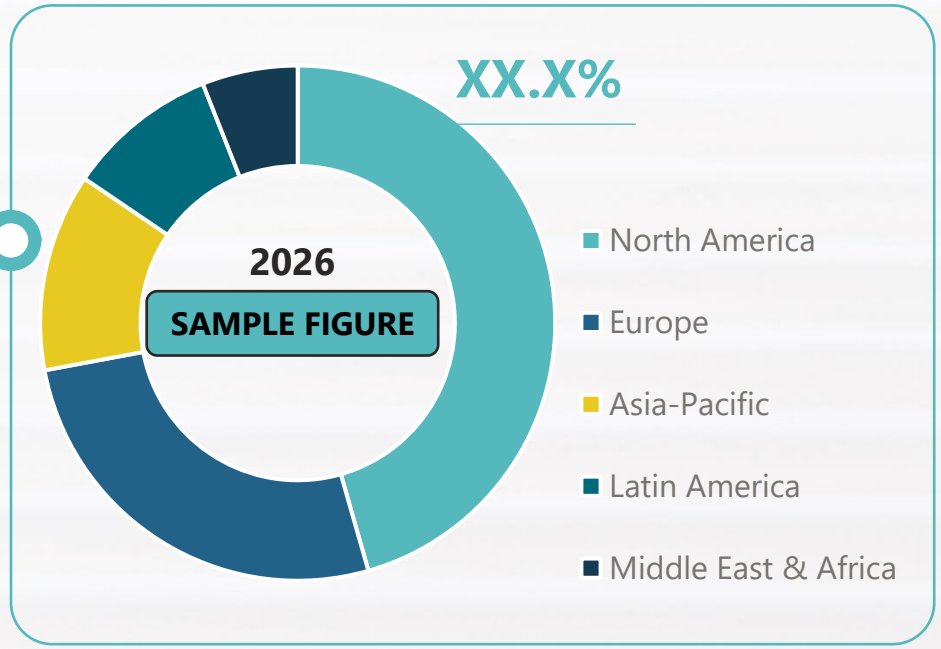
SOURCE: National Bureau of Statistics, China

	United States	China
Factories open	99%	100%
Capacity	90-100%	90-100%
Lead time delays	0-2 weeks	1-2 weeks
Unit cost changes	None	0-10% on paper
Upcoming closures	Unknown	None

SOURCE: Lumi, as of 30th March 2020

MARKET SEGMENTATION - BY GEOGRAPHY

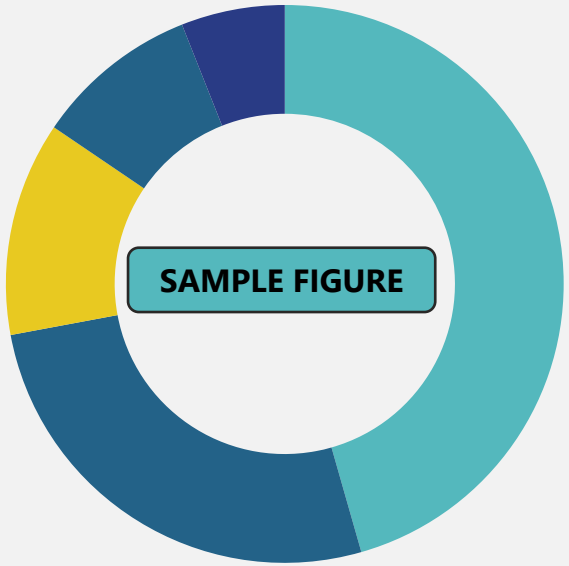
- North America
- Europe
- Asia-Pacific
- Latin America
- Middle East & Africa



BY GEOGRAPHY

IOT MARKET

Spending Share (%), by Geography, Global, 2020



SOURCE: Mordor Intelligence

IOT MARKET

Spending in USD billion, by Geography, Global, 2020-2026

Geography	2020	2021	2022	2023	2024	2025	2026	CAGR (%)
North America	xx.x	xx.x	xx.x	xx.x	xx.x	xx.x	xx.x	**xx.x**
Europe	xx.x	xx.x	xx.x	xx.x	xx.x	xx.x	xx.x	**xx.x**
Asia-Pacific	xx.x	xx.x	xx.x	xx.x	xx.x	xx.x	xx.x	**xx.x**
Latin America	xx.x	xx.x	xx.x	xx.x	xx.x	xx.x	xx.x	**xx.x**
Middle East & Africa	xx.x	xx.x	xx.x	xx.x	xx.x	xx.x	xx.x	**xx.x**

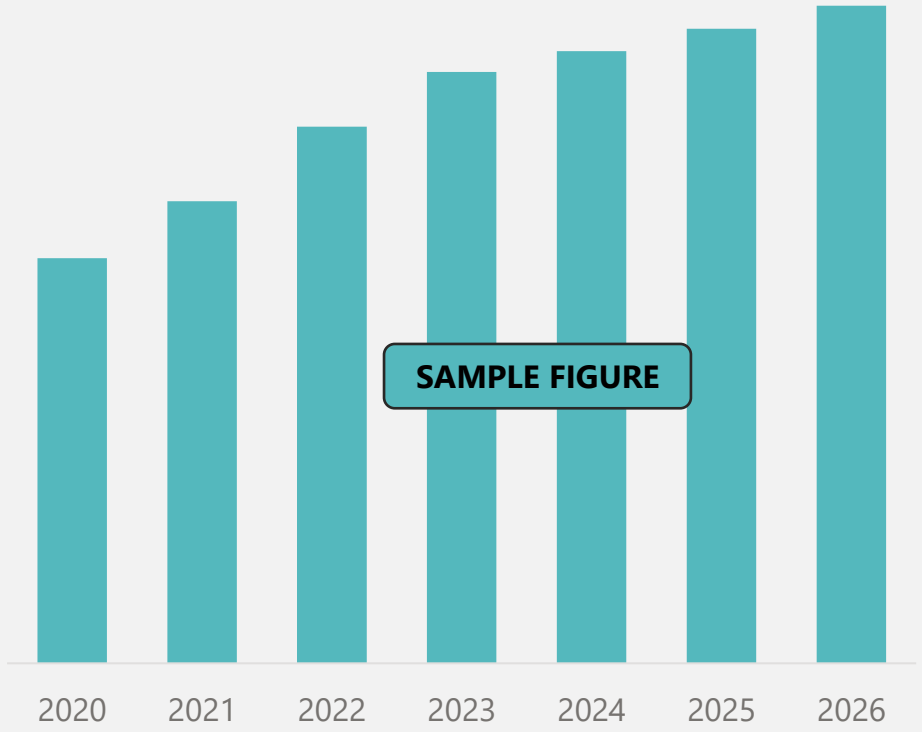
SOURCE: Mordor Intelligence

NORTH AMERICA

- North America is expected to be a prominent market, owing to the growing role of IoT among the significant revenue-generating end-user industries of the region, driven by the deployment of connected cars, smart energy projects, home automation, and focus on smart manufacturing. Additionally, rapid digitalization across industry verticals and technological advancements have further fueled the growth of IoT in this region.
- The United States and Canada are the early adopters of technologies, such as Big Data, IoT, and mobility, and it creates significant growth opportunities for the IoT market. These countries have established economies, which empower them to invest in R&D activities strongly. Moreover, the start-up culture in the region is growing more rapidly in comparison to the other regions.
- Moreover, the region has a strong foothold of IoT vendors, which contributes to the growth of the market. Some of them include IBM Corporation, Microsoft Corporation, Intel Corporation, Cisco Systems, Inc., and Google Inc, among others.
- In February 2020, Cisco announced enhancements to its IoT portfolio that enable service provider partners to provide optimized management of cellular IoT environments and new 5G use-cases. New wireless technologies such as 5G, Wi-Fi 6 – would lead to more devices and new IIoT use cases and would give service providers the tools to create competitive cellular IoT offerings for their customers. Machine-to-machine connections are anticipated to rise 19% and account for 50% of all connections by 2023, according to Cisco's 2020 Annual Internet Report.
- The emergence of information technology (IT) and the increased usage of IoT across a wide range of manufacturing, industrial, and automotive applications, have added a new dimension to the way of conducting business operations in the country. The increasing adoption of IoT in the manufacturing sector in the region is expected to create opportunities for the market. Businesses across the United States are taking advantage of the ability of IoT based technologies to streamline processes and increase efficiency.

IOT MARKET

Spending in USD billion, North America, Global, 2020-2026



Source: Mordor Intelligence Analysis

NORTH AMERICA

- Manufacturers in the region are relying on IIoT platforms for general process optimization, dashboards and visualization, and condition monitoring. SMEs are becoming flexible in incorporating new technologies with their existing systems, whereas large manufacturers have massive budgets for digitization.
- For instance, Daimler Trucks adopted the IoT solution for enhanced agility and scalability to support its production needs. The deployed wireless connectivity was used by employees and machines to be connected all over the manufacturing unit. This shared network helped the management to be connected with the process. Moreover, the solution offered robust and standard-based cybersecurity to the company.
- Companies in North America are taking up the concept of smart manufacturing, owing to the rapid growth of improved operational efficiency, productivity, optimization of asset utilization, new business start-ups, and reduction in downtime. Smart technologies continue to spread roots in the industrial sphere. In this region, most of the factories are already fitted with modern machines and technology, and it will be easier for the companies to switch over to smart manufacturing compared to staying with traditional forms of manufacturing.
- Canadian manufacturers depend on innovation and investment in technologies to be competitive. In an environment of increasing input, labor cost, and competition from the large global manufacturers, it is expected to invest in technologies, such as IoT to remain competitive and maintain the operating margins. US lawmakers have introduced the “IoT Readiness Act” for massive IoT growth with the arrival of 5G networks.
- End-users in Canada has also been investing in the market. For instance, the Canadian energy sector alternatively has been procuring internet-connected sensors toward monitoring of a range of activities across generating plants, distribution networks and home smart meters. However, Canadian companies, in comparison to United States, have been slower to adopt advanced technologies, as per the 2020 Advanced Manufacturing survey of SME’s in the North America.

NORTH AMERICA

- With the growing focus of grid automation across the region, the market for IoT had witnessed significant boost. As of February 2020, in order to help the industry, the federal government announced a CAD 818,000 grant support, along with a CIO Strategy Council project, to oversee the setting of standards. The council is expected to work together with the North American Electric Reliability Corporation (NERC), to set industrial IoT standards.
- Currently, in the United States, the utilities industry faces complex pressure. As the energy consumption globally is on the rise, the US Energy Information Administration estimated it to further rise by 48% by 2040, whereas, the energy generation through renewable resources has also increased significantly in the country.
- With smart grids envisioned to take over the entire energy industry in the country, the IoT utilities are expected to gain traction over the forecasted period. The popularity of IoT devices, combined with tax incentives and home insurance discounts, has encouraged both the consumers and the utility companies to take steps to make their services smart and suitable for the new age of home builders and owners and to remain competitive in such an evolving market. This is anticipated to aid the demand for IoT.
- Another primary market in the region is the home automation systems. The products consumers are looking to add to their homes include connected cameras (highest demand), video doorbells, connected light bulbs, smart locks, and smart speakers of late. According to a study at Stanford University and Avast, North American homes have the highest density of IoT devices of any region in the world. Notably, 66% of homes in the region have at least one IoT device. Additionally, 25% of North American homes boast more than two devices. The average household in the region would have an average of 9 devices by 2022, and nearly half (48%) of total devices and connections will be video capable.
- However, automakers in the United States have faced increased pressure to shut down their factories, owing to the COVID-19 pandemic, and after the federal, state, and local governments started recommending people stay in their homes as much as possible. This has caused supply chain disruptions across various industries.

BY GEOGRAPHY

NORTH AMERICA

- Ford and General Motors among others have suspended the production at their respective manufacturing facilities in North America amid the coronavirus outbreak. Honda North America and BMW also closed their plants throughout the U.S. and Europe owing to an expected decline in demand for cars related to the global coronavirus outbreak. Hence such trends are expected to affect the market's growth in the short run.
- In the region, infrastructure legislation is promoting the deployment of key foundational technologies, like 5G mobile broadband networks that will serve as the core architecture for the IoT. Efforts are also being made by the government to direct the NTIA and FCC to allocate commercial licensed and unlicensed spectrum in a technology-neutral and service-neutral way across a wide range of frequencies to address the breadth of IoT in manufacturing use cases today and into the future.
- In October 2019, IoT America and Rural Telecommunications of America (RTA) partnered to deliver IoT-powered wireless, data analytics, and visualization technologies to customers in rural areas of the country.
- The first phase of this project would witness IoT America, offering soil monitoring, asset tracking, and tank level monitoring solutions to RTA customers, who live in traditionally underserved non-urban areas. Both companies would handle every aspect of the implementation and delivery of IoT technologies, which will include installation, data analytics, and sensor management.

KEY VENDOR PROFILES

VENDORS BY HARDWARE AND SOFTWARE

- Huawei Technologies Co. Ltd
- Robert Bosch GmbH
- Google Inc.
- Cisco Systems Inc.
- PTC Inc.
- Siemens AG
- Honeywell International Inc.
- Koninklijke Philips NV

**List Not Exhaustive*

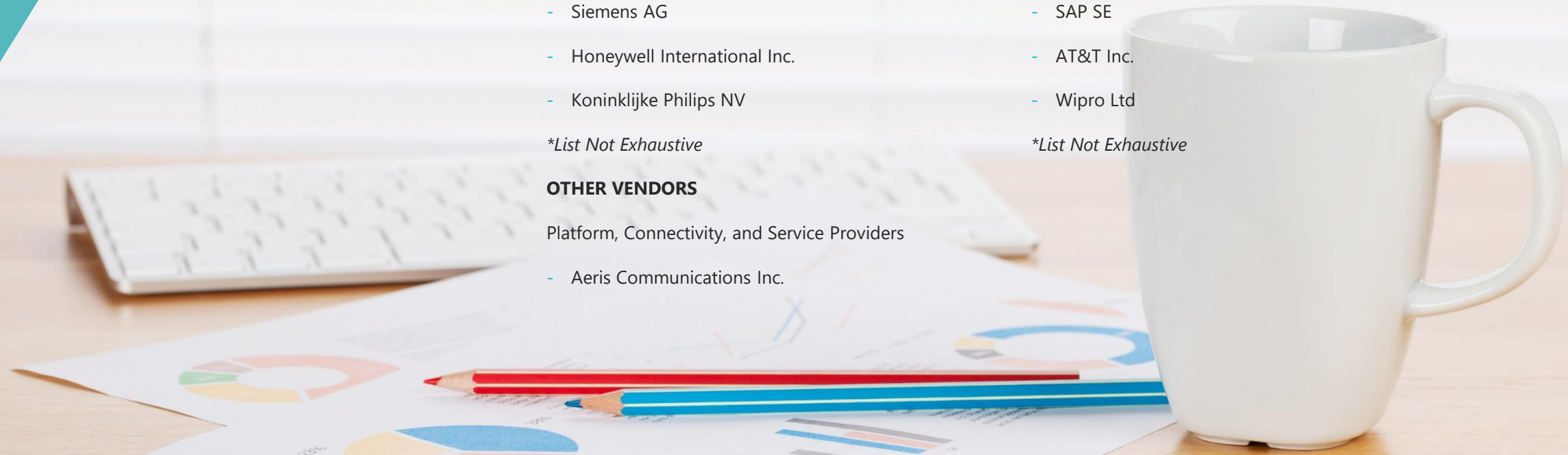
- Amazon Web Services Inc.
- IBM Corporation
- Microsoft Corporation
- General Electric Company
- Fujitsu Ltd
- Oracle Corporation
- SAP SE
- AT&T Inc.
- Wipro Ltd

**List Not Exhaustive*

OTHER VENDORS

Platform, Connectivity, and Service Providers

- Aeris Communications Inc.



IBM CORPORATION - OVERVIEW

- IBM Corporation operates through five major segments, namely, Cognitive Solutions, Global Business Services, Technology Services and Cloud Platforms, Systems, and Global Financing.
- The Cognitive Solutions segment includes Watson, the first commercially available AI platform that has the ability to interact in natural language, process vast amounts of Big Data, and learn from interactions with people and systems. With IBM Watson IoT, the company offers protection and security to an IoT environment, while gleaning insights from IoT data and driving revenue streams.
- The Technology Services and Cloud Platforms (TS&CP) segment provides comprehensive IT infrastructure and platform services. The services include Infrastructure Services, Technical Support Services, and Integration Software.
- In addition to these segments, it operates IBM Research, the largest industrial research organization in the world, with twelve labs across six continents.

USD 73.62 billion Revenue

+383,800 Employees

175+ Countries

USD 5.5 billion Net Income

9,130 R&D Patents

Source: *All financials(Unaudited) are of IBM Corporation for the Year Ended December 2020, sourced from the press Release

IBM

Founded in 1911

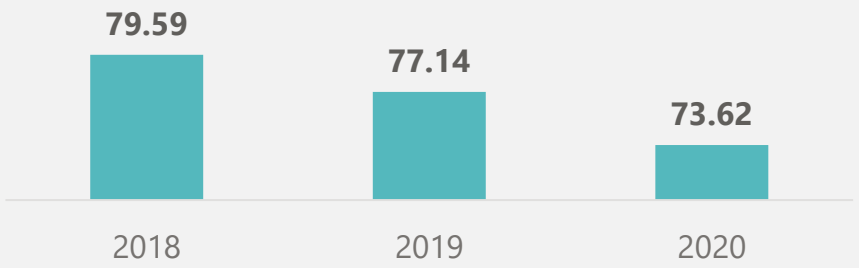
New York, United States

https://www.ibm.com

1-800-426-4968

IBM CORPORATION

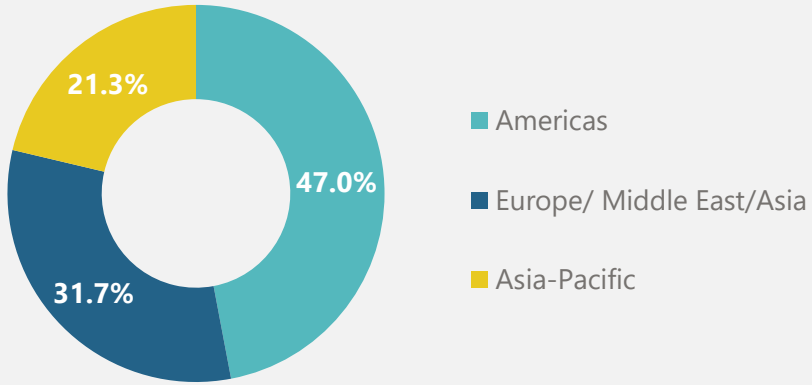
Revenue in USD billion, 2018-2020



IBM CORPORATION - BUSINESS SEGMENTS

IBM CORPORATION

Revenue Share (%), by Geography, 2019

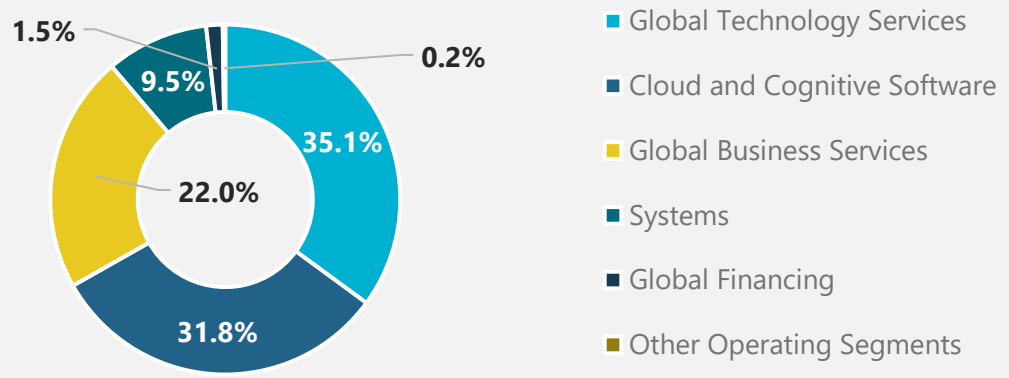


- The revenue in the American segment decreased by 1.9% y-o-y, with a decline in the North American segment, as reported and adjusted for currency. Within the North American segment, revenues in the United States decreased by 2.4%, while revenues in Canada increased by 4.0%.
- The revenues in Europe, Middle East Asia decreased by 4.1% in 2019, compared to the prior year. The revenues in the Germany decreased by 7.9%, and the revenues in the United Kingdom decreased by 2.9%.
- The revenue in Asia-Pacific decreased by 4.0% in 2019, whereas, the revenue in the Japanese segment increased by 2.3% and declined by 17.3% in the Australian segment. However, in China and India, revenue decreased by 13.4% and 11% respectively.

*Note: The Geographic segments share are for 2019 as the region share has not been released yet for the 2020.

IBM CORPORATION

Revenue Share (%), by Operating Segment 2020



- Revenues for the full year totaled USD 73.6 billion, a decrease by USD 3.52 billion, compared to USD 77.1 billion in 2019.
- The Global Technology Services segment was the highest revenue generating operating segment in 2020 as it generated USD 25.81 billion in revenues and accounted for a revenue share of 35.1%.
- The Global Business Services segment registered a revenue of USD 16.16 billion and accounted for a revenue share of 22% that was followed by Systems that generated USD 6.97 billion in revenues and accounted for a revenue share of 9.5%.
- The Cloud & Cognitive Software segment generated USD 23.37 billion revenue in 2020 and accounted for a revenue share of 31.8%, which is nearly USD 0.4 billion growth when compared to 2019.

IBM CORPORATION - SOLUTIONS AND STRATEGIES

SOLUTIONS

- **IBM Watson IoT Platform -** This platform provides real-time insights from connected stores, combined with cognitive computing, for in-store experience. It streamlines operations and infuses intelligence into merchandising and supply networks.
- IBM Watson offerings ensure high availability of physical infrastructure at store level, utilizing cloud for efficiency and flexibility.
- Watson IoT Platform is a managed, cloud-hosted service designed to make it simple to derive value from users' IoT devices. Its additional add on services, such as blockchain service and analytic service, enable organizations to capture and explore data for devices, equipment, and machines, and discover insights that can drive better decision-making.
- The products offered include enterprise asset management and product development, among others.
- **Enterprise Asset Management:** The features offered by EAM includes work management, phases of maintenance, planning and scheduling, supply chain management, health and safety, mobility, analytics, and Cloud. The solutions by the company include IBM Maximo Enterprise Asset Management, IBM Maximo industry solutions, IBM Maximo Asset Monitor, IBM Maximo MRO Inventory Optimization, and IBM Maximo Worker Insights.
- **IBM Maximo Enterprise Asset Management:** IBM Maximo is a fully integrated platform that uses advanced analytic tools and IoT data to improve operational availability, while reducing risk. It offers benefits, such as improvement of operations, integration of asset information and history, unification of asset management processes, extension of asset lifecycles, and optimization of maintenance work processes.

STRATEGIES

- The company is strategizing on redoubling its efforts to reinvent its core hardware, software, and services franchises, while simultaneously investing in Cloud, data, cognitive, security, and the other businesses that comprise the company's strategic imperatives.
- In addition, the company is highly focused on offering high-quality security services encompassed with up-to-date features, owing to which, it is highly-involved in the new product launch strategies.
- IBM inventors received a record 9,130 patents in 2020, marking the company's 28th consecutive year of the US patent leadership. IBM led the industry in the number of AI, cloud computing, security, and quantum computing-related patent grants that can power its services-based portfolio for years to come.
- The company is continuously capitalizing on acquisitions to broaden, complement, and enhance its product and service offerings, add new customers and certified personnel, and expand the sales channels. In the past, it had integrated complementary businesses, which have often contributed entirely to new products and services that have added to its revenues and profitability.

IBM CORPORATION - SWOT ANALYSIS

STRENGTHS

- The company has a significant global presence and is one of the most recognized brand names in the world consistently.
- It's product portfolio covers a wide range of offerings catering to multiple industries.
- The company has strong presence and competency in cloud technology. Over the past few years, IBM acquired over 18 companies related to cloud.

WEAKNESSES

- Despite a strong focus on the managed services business, the segment's revenue has not been consistent in the past few years. In the absence of a long-term strategy, the company might struggle in the highly competitive services space.
- IBM's revenue growth has stalled due to weak client spending, sluggish demand in the software sector, a strong dollar eating up its overseas revenues, and divestments of lower margin businesses.

S W O T

OPPORTUNITIES

- With the increasing demand for cloud-based services, IBM Cloud's broad array of services and expertise help the world's smarter businesses transform their processes, assimilate new technologies and capabilities, and adapt quickly to new market opportunities.
- Moreover, with the expansion of IoT and IIoT, Watson offers a complete spectrum of cognitive technologies, to professionals in the retail industry. Also, the increasing number of smart city initiatives posed a lucrative opportunity for the IoT solutions providers, primarily to tap into the growing market.

THREATS

- Downturn in the economic environment and client spending budgets could negatively impact the company's business.
- Due to the company's global presence, its business and operations could be impacted by local legal, economic, and political conditions.

RESEARCH METHODOLOGY

- Mordor Intelligence (MI) advocates an appropriate mix of secondary and primary research to meet client objectives.
- MI translates market insights (market dynamics, competition, varying consumer demands, and regulations) into actionable business insights.
- The following phases are practiced at Mordor for efficient delivery of various syndicated and consulting assignments:

STEP 1 SCOPING/ PROJECT INITIATION

- Decipher *client requirements*/ market to be studied
- *Tailor-made research approach* for customized reports
- Effective use of *Mordor's knowledge repository* to gather relevant insights
- *Confirm the objectives* of the assignment with the client
- *Finalize report contents* and establish a deliverable format

STEP 2 MARKET ANALYSIS

- Extensive desk research to identify most relevant secondary information available
- Contact Mordor's empaneled experts and identify industry experts across the market
- Conduct primaries and surveys to gather qualitative and quantitative insights
- Triangulate and analyze data to finalize actionable business insights

STEP 3 PROJECT DELIVERY

- Report delivery with high quality market insights, competitive landscape, etc., as per the proposed content

RESEARCH PHASES EXPLAINED

SECONDARY RESEARCH

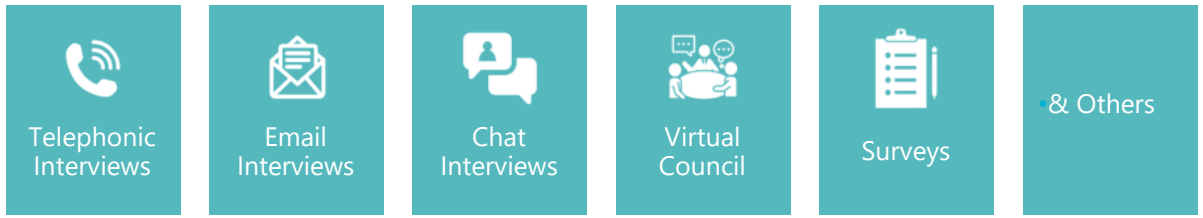
This phase involves a thorough synthesis of existing publications across the web to gather meaningful insights on the current situation of the market, technology developments, and any other market related information. The sources include, but are not limited to:

- Scientific Journal & Technical Papers
- Technology Magazine & Publication, and Government Websites
- Investor presentations, technical brochures, annual reports, press releases, transcripts of key personnel interviews, and other strategic publications by several competitors in the market
- Product/Software information including technical specifications, approvals, patents, etc.
- IoT Vendors, End-user Industries
- Paid sources (Questel, Orbit, Factiva, Bloomberg, Seeking Alpha, etc.)
- Other sources, including journals, articles, etc.

PRIMARY RESEARCH

- At Mordor, we pool in industry experts across the value chain, to gather first-hand insights on the market studied. In addition to these knowledgeable industry veterans or retired experts, consultants and freelancers are a call away to collaborate with Mordor on any assignment that requires real-time industry insights.
- We are also equipped to conduct market surveys to gather qualitative insights and the opinion of individuals related to the industry.
- Primary research is used both to validate the data points obtained from secondary research and to fill the data gaps after secondary research. Data gathered during the primary research phase are useful to arrive at critical insights, both qualitative and quantitative; these insights can be used to ascertain the following:
  - Critical market dynamics (drivers, restraints, future, and regulations) and their impact on shaping the market landscape.
  - Market distribution across various applications
  - Market entry for new companies and insights on competitive landscape.

MODES OF PRIMARY RESEARCH



RESEARCH PHASES EXPLAINED

DATA TRIANGULATION & INSIGHT GENERATION

- Based on the factors (both endogenous and exogenous in nature) identified and collected during the secondary and primary phases, our in-house subject matter experts transform the quantitative data extracted and use them to infer critical insights.
- The market size estimations are carried out through 'bottom-up' and 'top-down' approaches.
- Our top-down and bottom-up approaches are integrated into our 'In-house Model Sheets', which are used to generate the market estimates and growth rates (depending upon the historical trends of the respective markets, along with various factors, such as drivers, restraints, and recent developments in the market) of the product segment in the respective country.

DATA TRIANGULATION

It is a process of combining outcomes from different sources to increase the validity and reliability of the results. This process also helps strengthen conclusions about findings and reduce the risk of false interpretations. The insights obtained from both secondary and primary research are analyzed and validated by the process of data triangulation to arrive at closer estimates.

ECONOMETRIC MODELLING

An econometric model is a simplified representation of a real-world process. Here, the tools of econometric theory are used to analyze and forecast economic phenomenon and to solve unknown quantities, such as forecast demand, supply, investment, production, consumption, etc.

REPORT WRITING

After the data is curated, analysts populate the report. From data and forecasts, insights are drawn to visualize the entire ecosystem in a single report.

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