

Internet of Things

The Key for Beyond Industrial Technology



Mohamad Ridwan

Industrial Evolution



18th Century

Industry 1.0

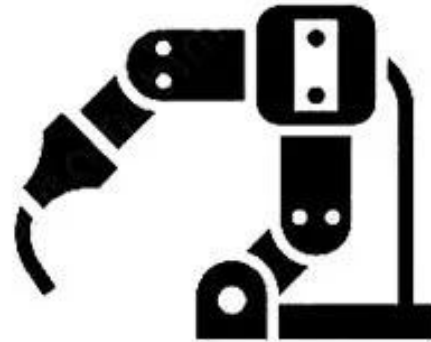
Mechanical production equipment powered by steam



19th Century

Industry 2.0

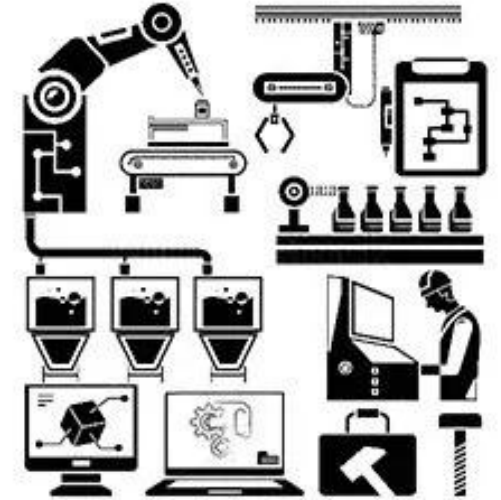
Mass production assembly lines requiring labour and electrical energy



20th Century

Industry 3.0

Automated production using electronics and IT



Today

Industry 4.0

Intelligent production incorporated with IoT, cloud technology & big data

Industry 4.0 – The Digital Transformation

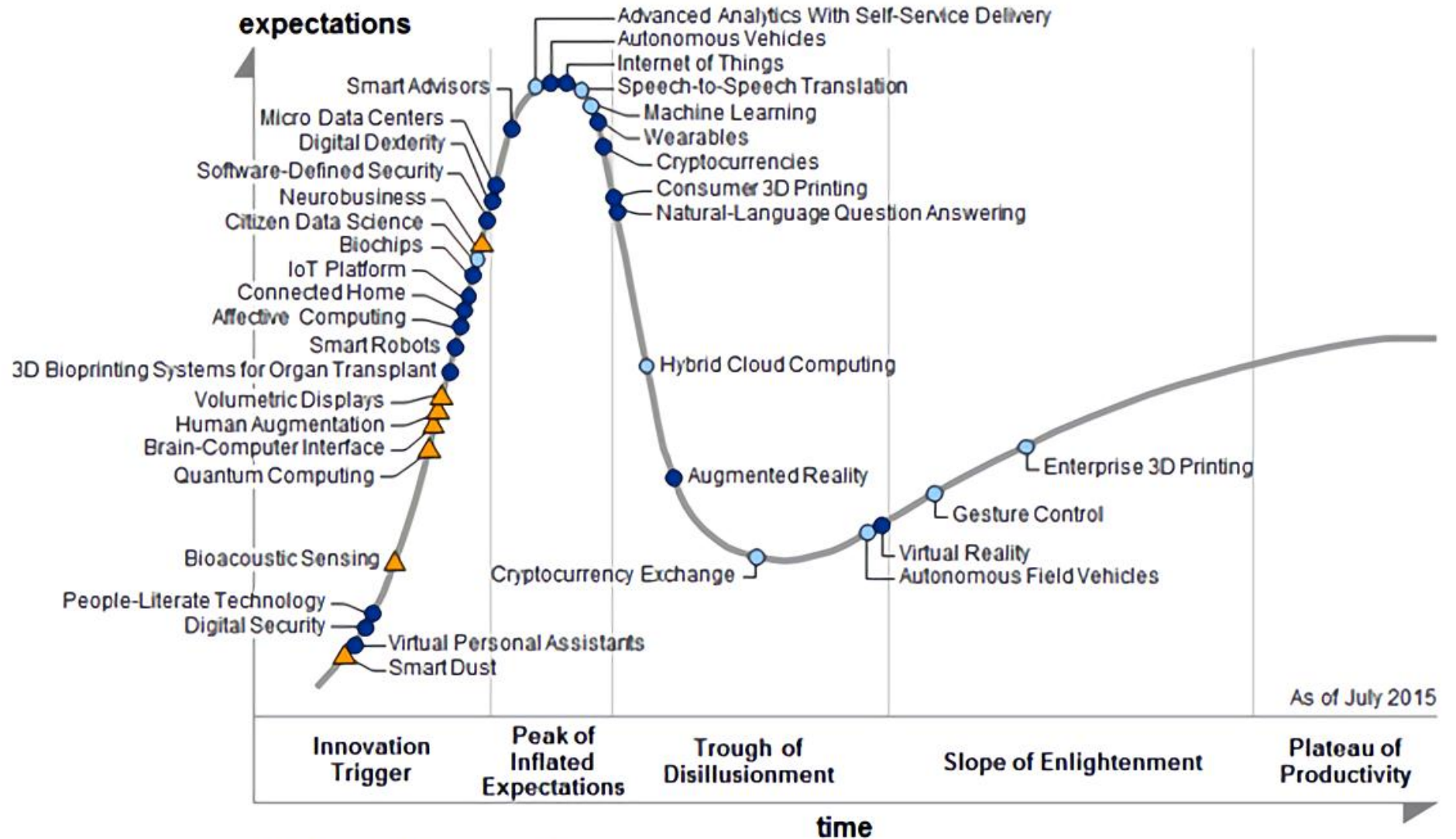


Industry 4.0 refers to :

- The intelligent networking of machines and processes for industry with the help of information and communication technology (*Platform Industry 4.0*)
- A connected environment of big data, people, processes, services, systems and IoT-enabled industrial assets with the generation, leverage and utilization of actionable data and information

A key role is indeed played by the Internet of Things or IoT

Emerging Technology Hype Cycle

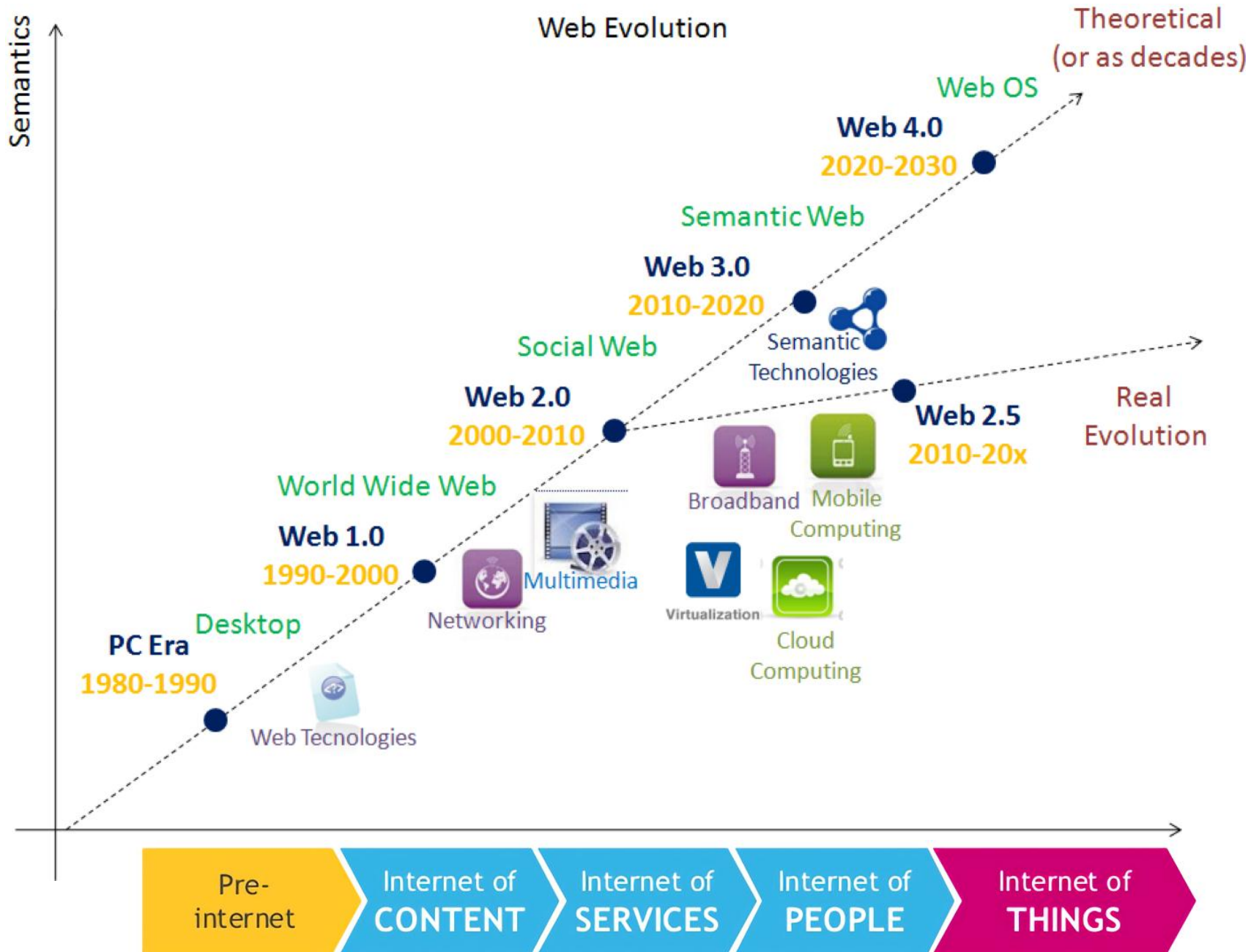


Plateau will be reached in:

- less than 2 years
- 2 to 5 years
- 5 to 10 years
- ▲ more than 10 years
- ⊗ obsolete before plateau

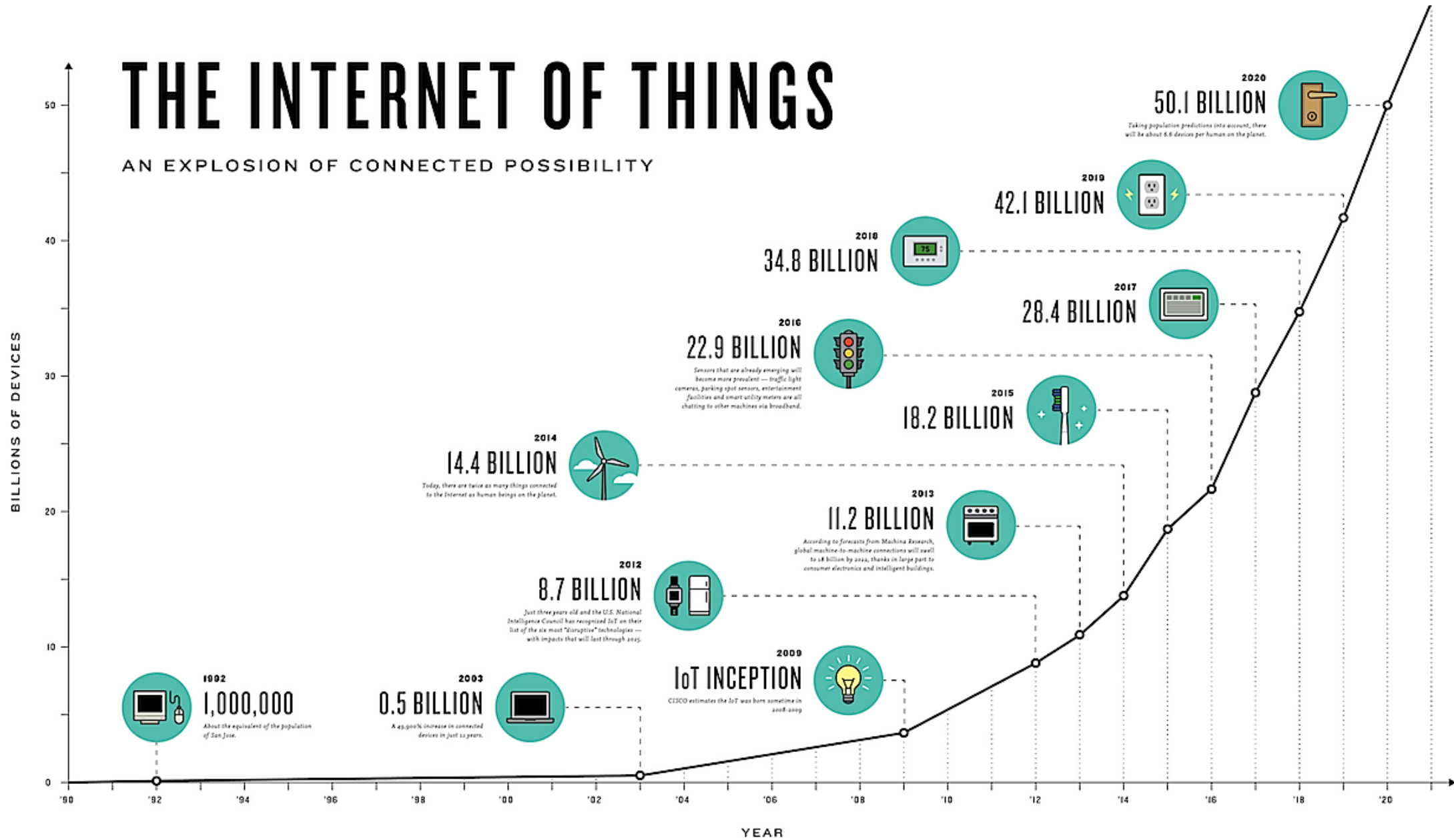
<https://www.gartner.com/imagesrv/newsroom/images/emerging-tech-hc.png>

Internet Evolution

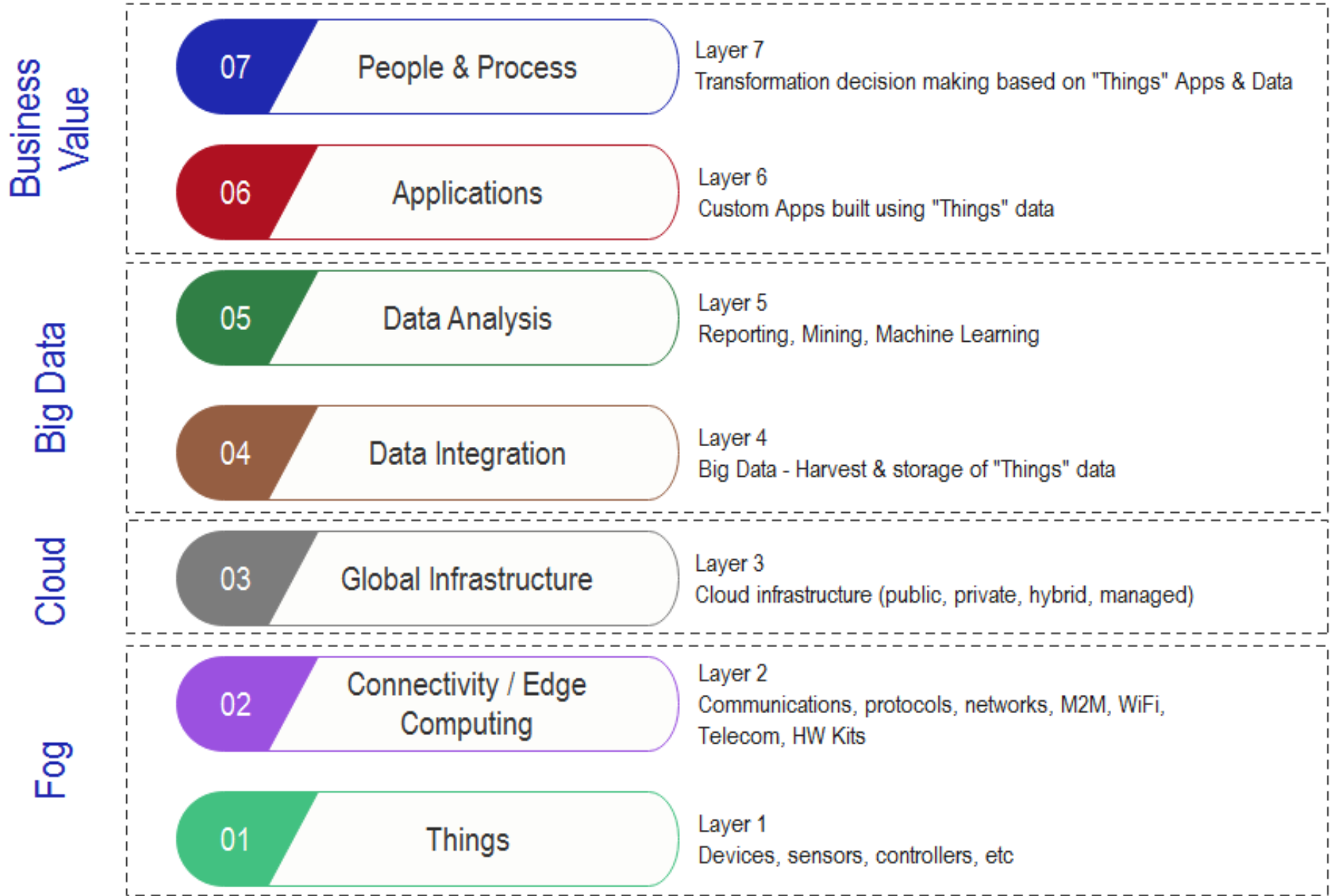


THE INTERNET OF THINGS

AN EXPLOSION OF CONNECTED POSSIBILITY



7 Layers of the Internet of Things (IoT)



IoT Applications

01 Smart Home

02 Smart Wearable Technology

03 Smart City

04 Smart Office

05 Smart Farming

06 Smart Robotics

07 Smart Industrial Automation

08 Smart Healthcare

09 Smart Transportation System

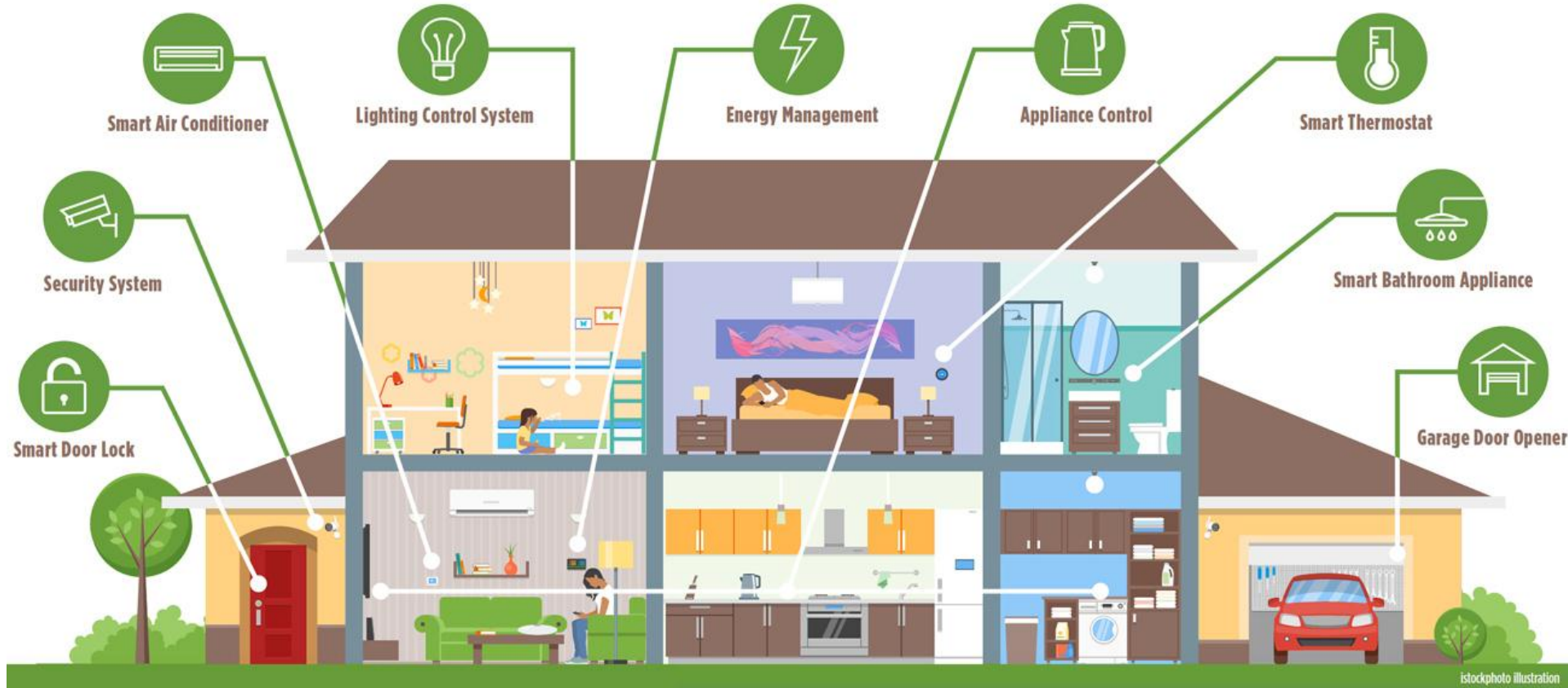
10 Smart Energy Management System

11 Smart Retail & Logistic

12 Smart Business

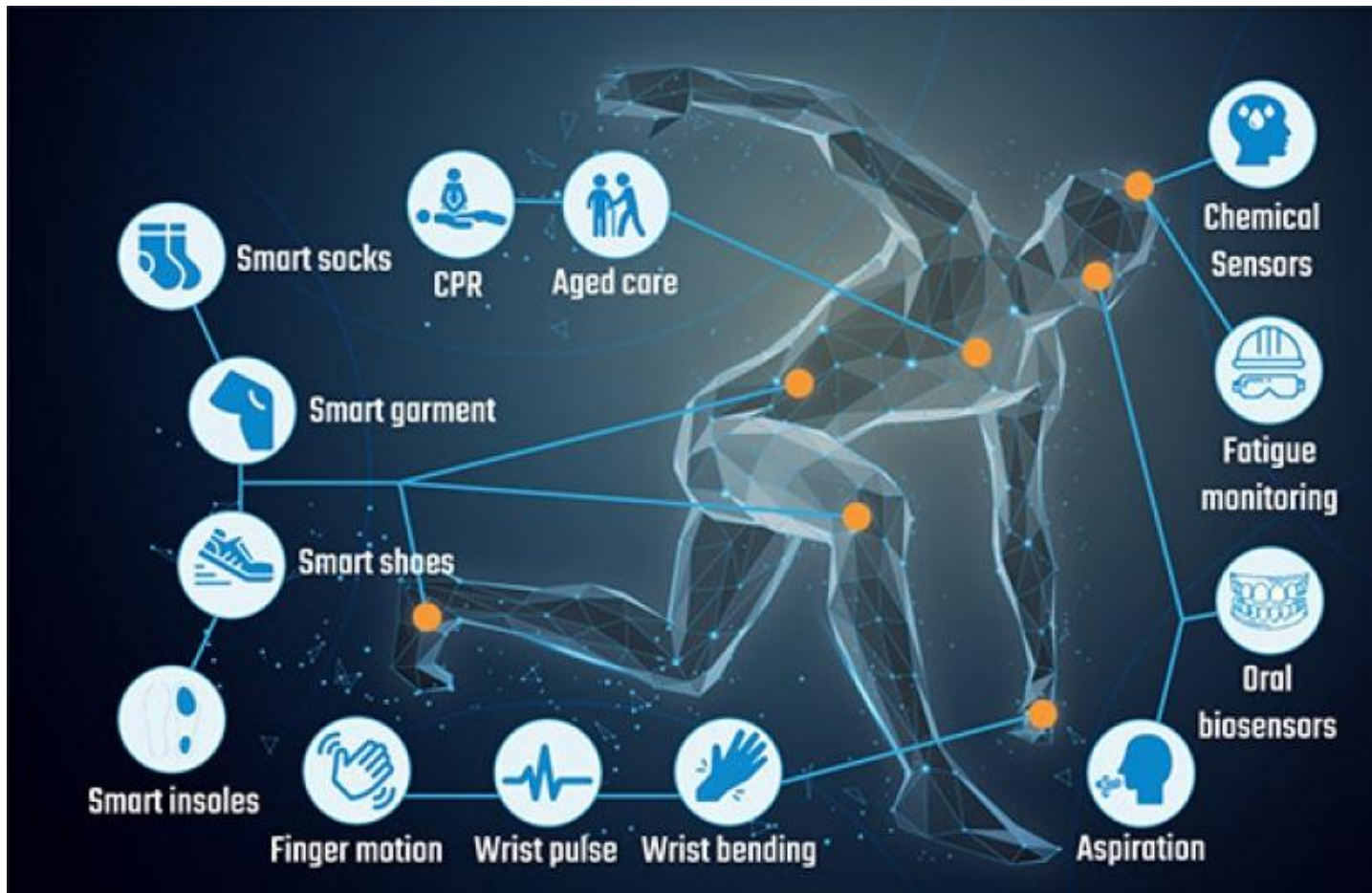
HOME, SMART HOME

Cool gadgets, practicality drive trend in residential lifestyle technology



A smart home is defined to be one in which the devices can communicate with each other and with their environment. In a smart home one can customize and control the home environment for more security and increased efficiency in energy management. There is a large variety of technologies that can be used for creating smart homes (e.g., smart home lighting, air quality sensing, learning thermostat, smart refrigerator control, etc.)

Smart Wearable Technology



Wearable IoT technology is a large field that involves a variety of devices such as health, assistive, and entertainment equipment. Currently, wearables represent one of the hottest trends in IoT use. Examples of smart wearables are:

1. Activity trackers,
2. Smart watches/fitness bands/rings,
3. Smart phones,
4. Interactive socks/shoes,
5. Smart clothing,
6. Smart glasses,
7. Helmets
8. Headphones/earbuds,
9. Smart jewelry/collars



Smart Office



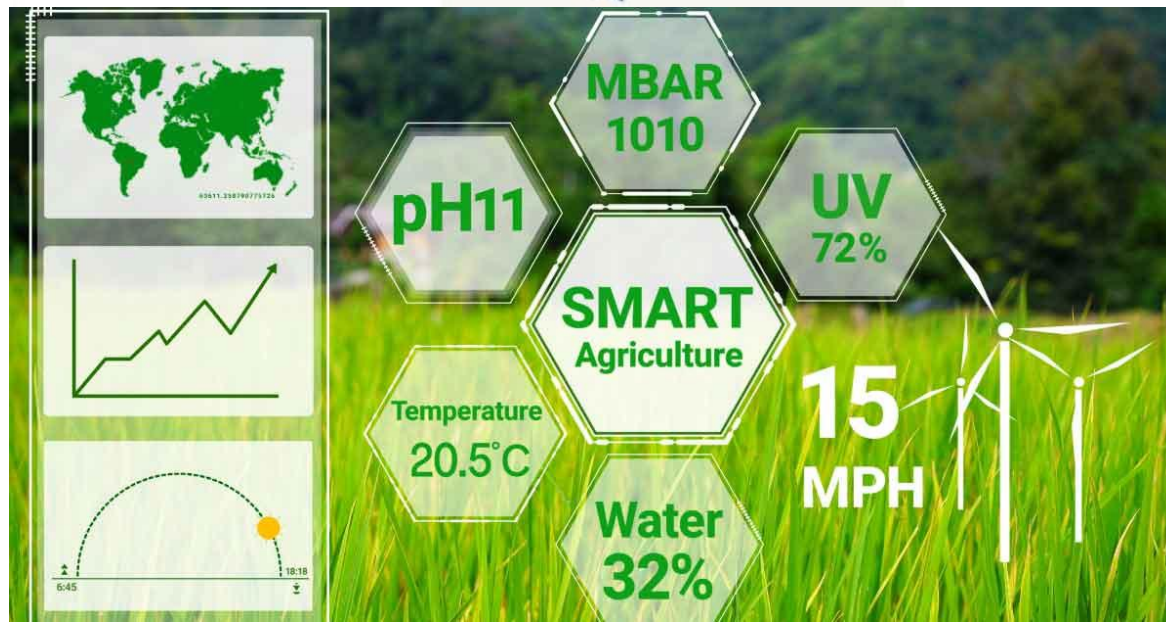
A smart office uses several IoT devices (notepads, printers, smart lighting, etc.) that are connected (they talk each other). Ideally, in a smart office everything from the furniture to the copier are connected through IoT. Smart IoT-based office functions include adjustment of room temperature, checking who is at the doors, locking doors, etc.

Smart Farming

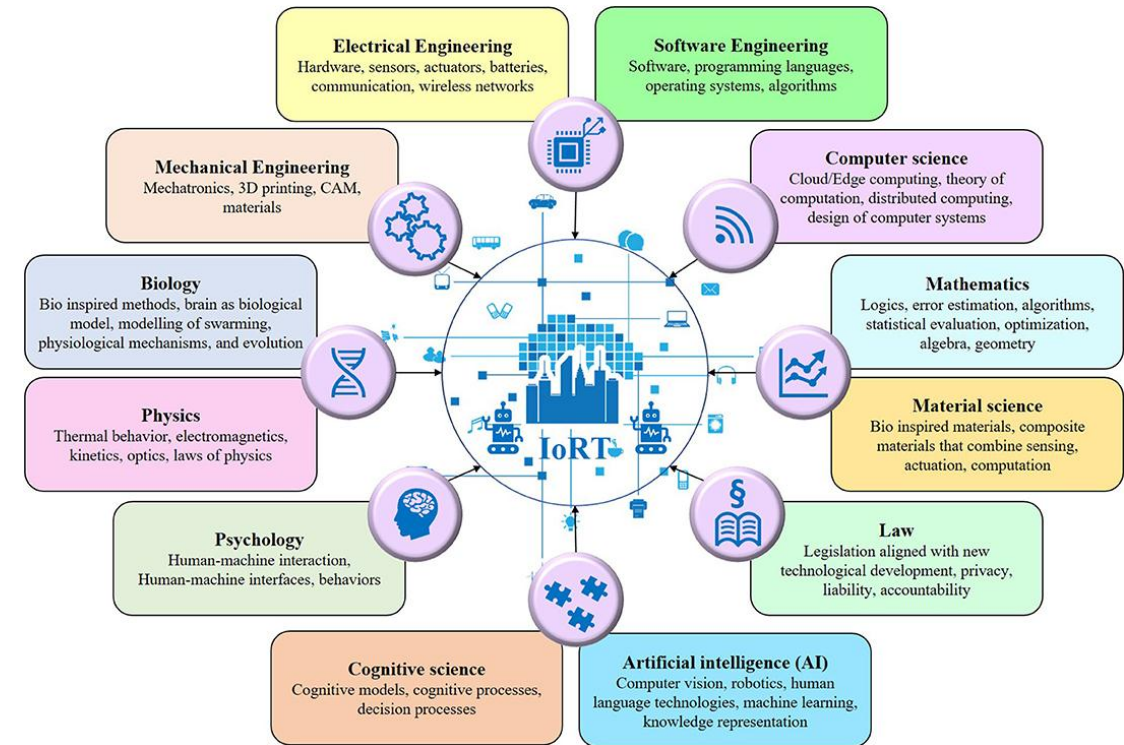


The agricultural sector requires highly scalable technology solutions that can be provided by IoT applications. Here, IoT contributes in several ways, e.g.,

- ✓ sensor-based field and resource mapping,
- ✓ monitoring soil moisture,
- ✓ remote crop monitoring,
- ✓ control of microclimate conditions for improving fruit and vegetable production and quality,
- ✓ forecasting snow, ice or wind changes,
- ✓ control of temperature and humidity levels to prevent microbial/fungus contaminants,
- ✓ river water quality analysis and management with regard to its use for drinking,
- ✓ smart logistics and warehousing, etc.



Smart Robotics



The incorporation of robotic issues into the wider IoT was called by ABI Research “Internet of Robotic Things” (IoRT). IoRT is actually concerned with machine to machine (M2M) communication between robots and devices in an ecosystem in where data are leveraged to drive insights and actionable outcomes.

Potential applications of IoRT include:

- Use a robotic device to check if a car is allowed to use a given park lot in a corporate parking area.
- Collaboration of IoRT and humans in a manufacturing unit to make operational and other decisions.
- Use of IoRT for elderly assistance and domestic cleaning.

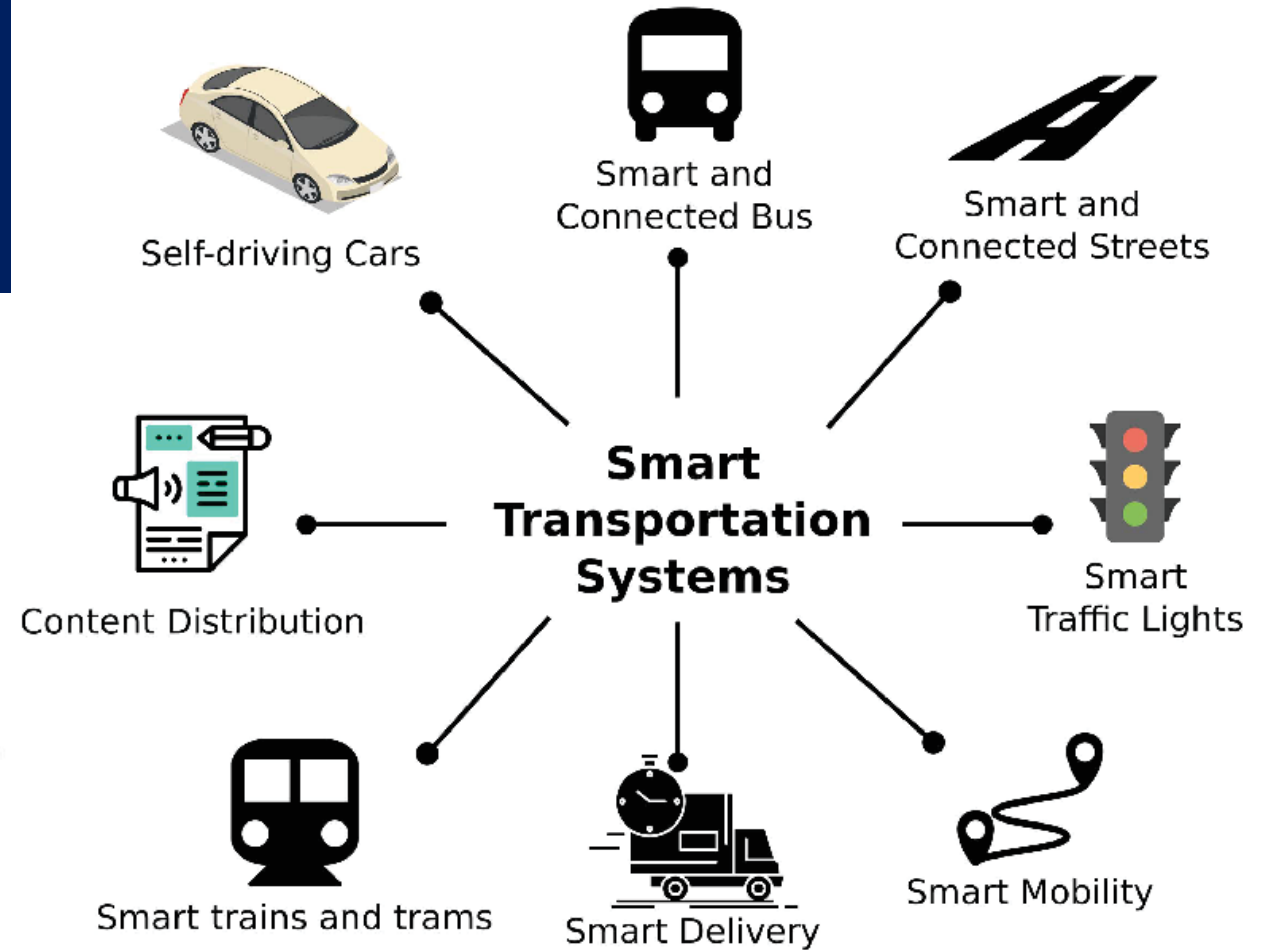
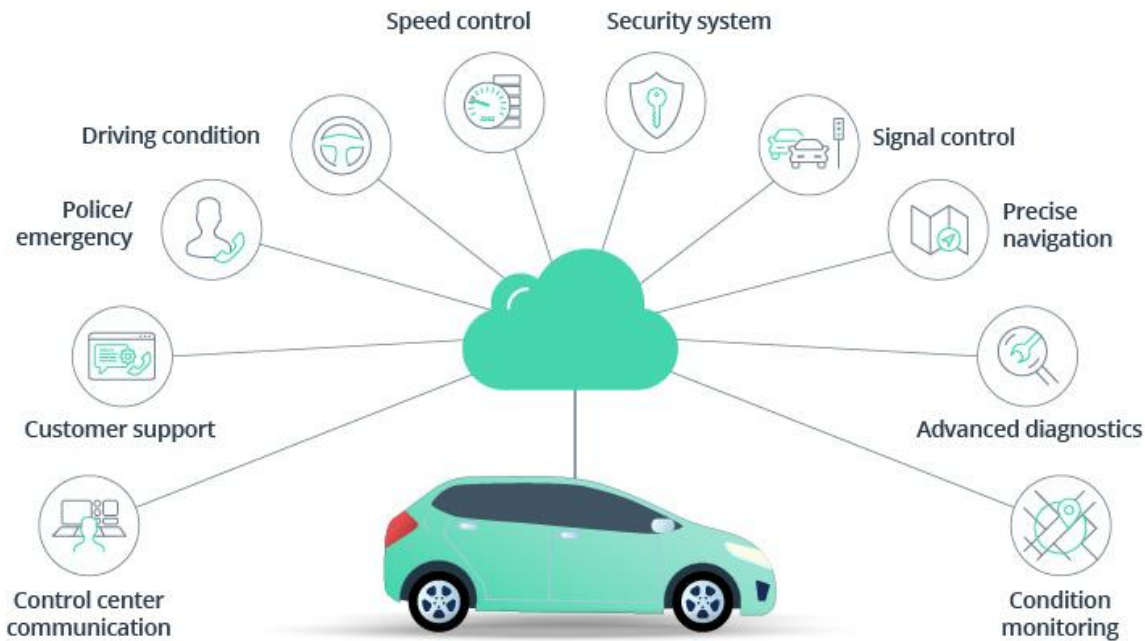
Smart Industrial Automation



This constitutes one of the major application areas of IoT. With the aid of IoT infrastructure, advanced sensor networks, wireless connectivity, and M2M communication, conventional industrial automation is modernized completely.

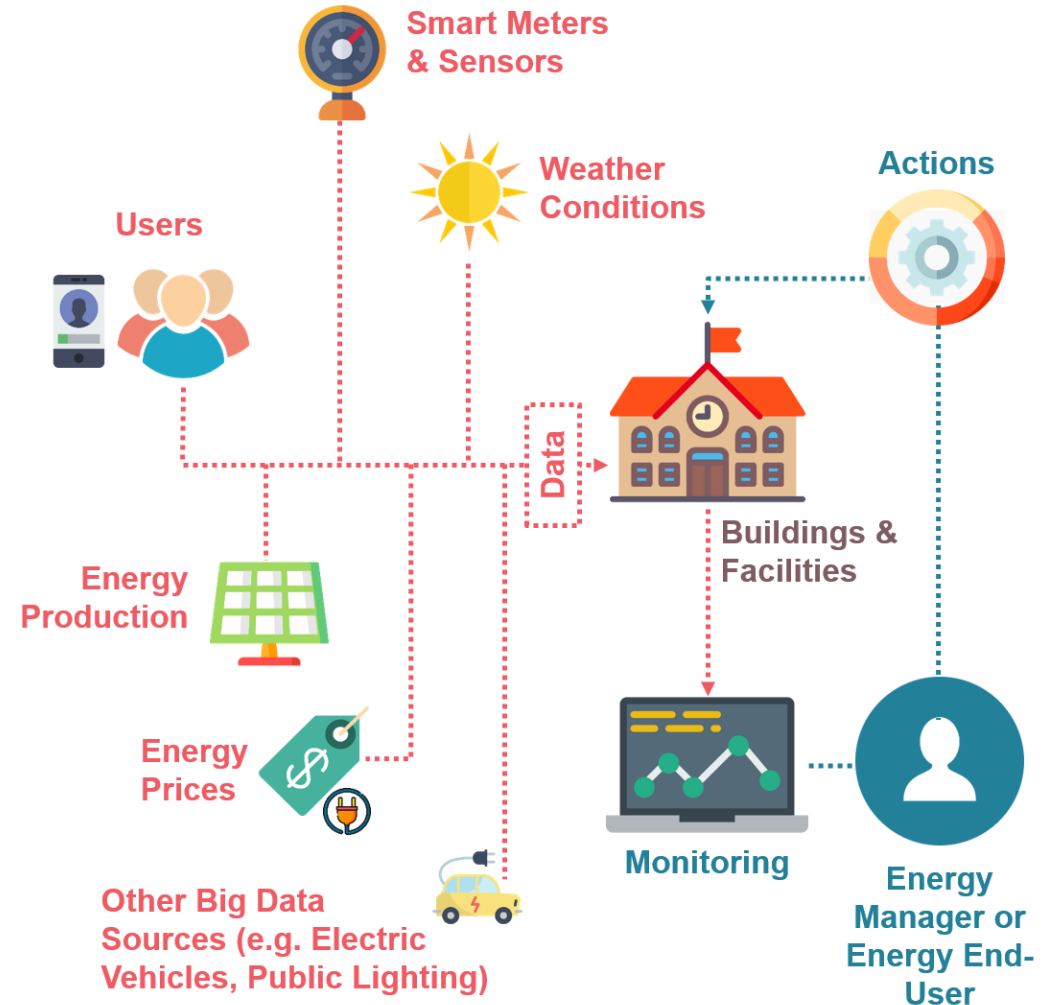
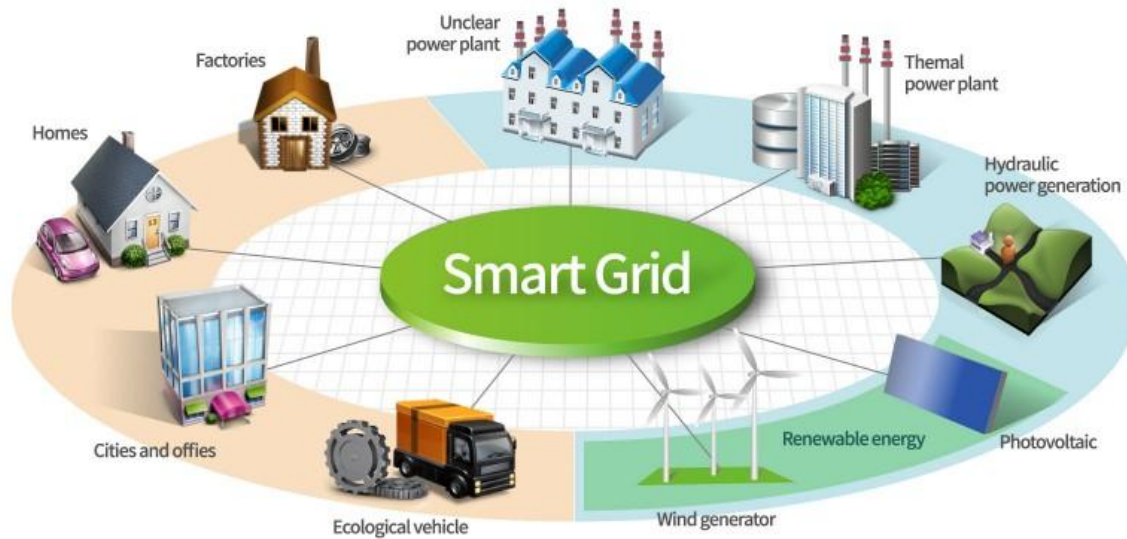
Most industries (small and large) have already adopted and are using IoT enhancements. IoT based industrial automation represents the present state of automation, called industrial automation 4.0 or “Industrial Automation Internet of Things”(IIoT).

Smart Transportation System



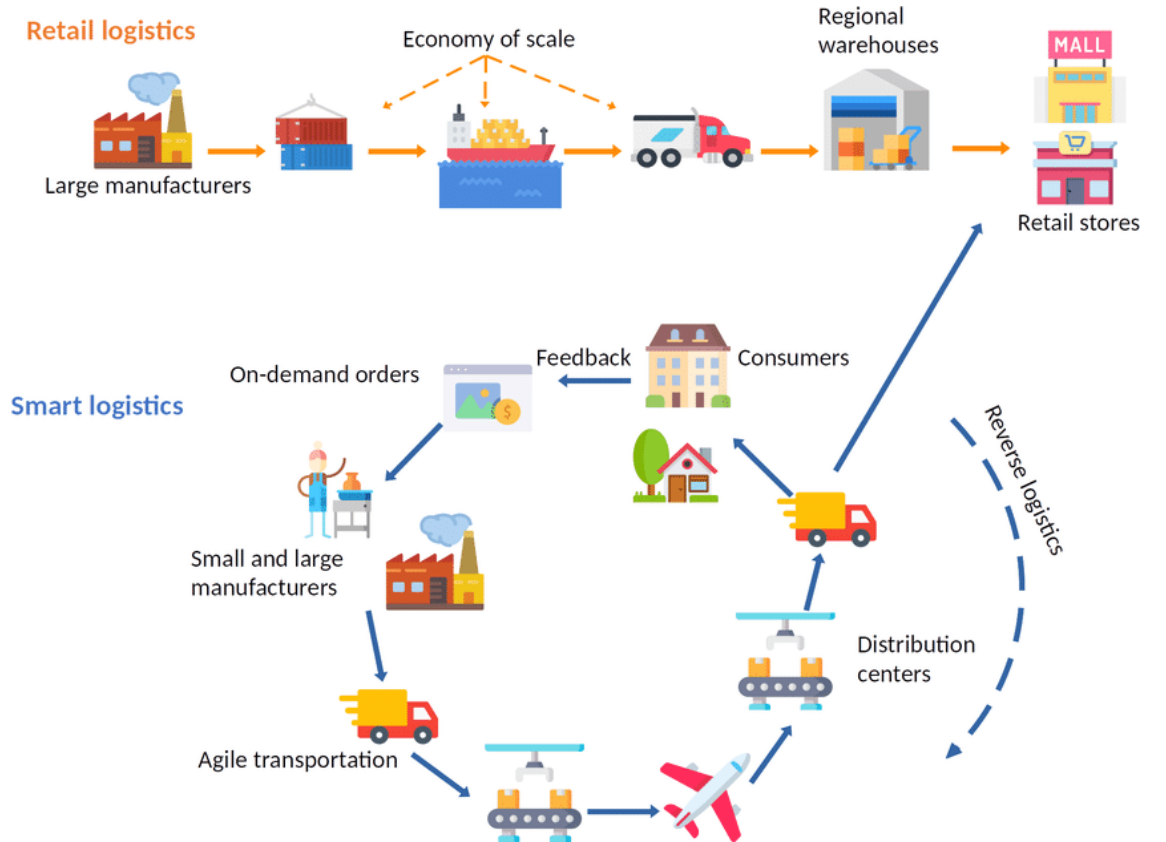
IoT can help to manage transportation and traffic congestion much better than current standard networks. Cars equipped with IoT sensors can monitor traffic and transmit the information to a centralized control system which sends feedback to vehicles on road according to an optimal traffic control law (e.g., regulating the speed limits in congestion areas, suggesting shortest possible routes for reaching desired destinations, etc.).

Smart Energy Management System



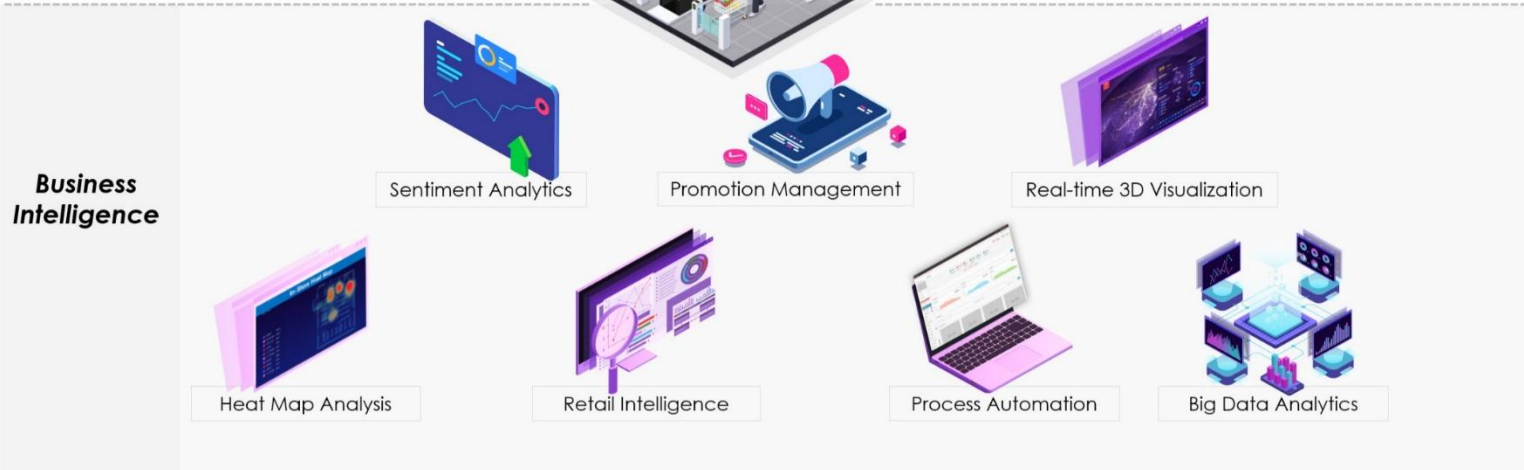
This area of IoT applications finds increased popularity with the use of power grids that are very smart and highly reliable. Smart grids collect data in an automated way and analyze the behavior of electric energy suppliers and consumers aiming at improving both the efficiency and economics of electricity use

Smart Retail & Logistic



IoT finds extensive application in retail and logistics. The proximity-based advertising model of smart retailing is already a reality. In chain management IoT contributes in monitoring of storage conditions along the supply chain. IoT can also facilitate product tracking for traceability purposes and payment processing on the basis of the location and duration of various operations (public transport, car parking, etc.)

Smart Business



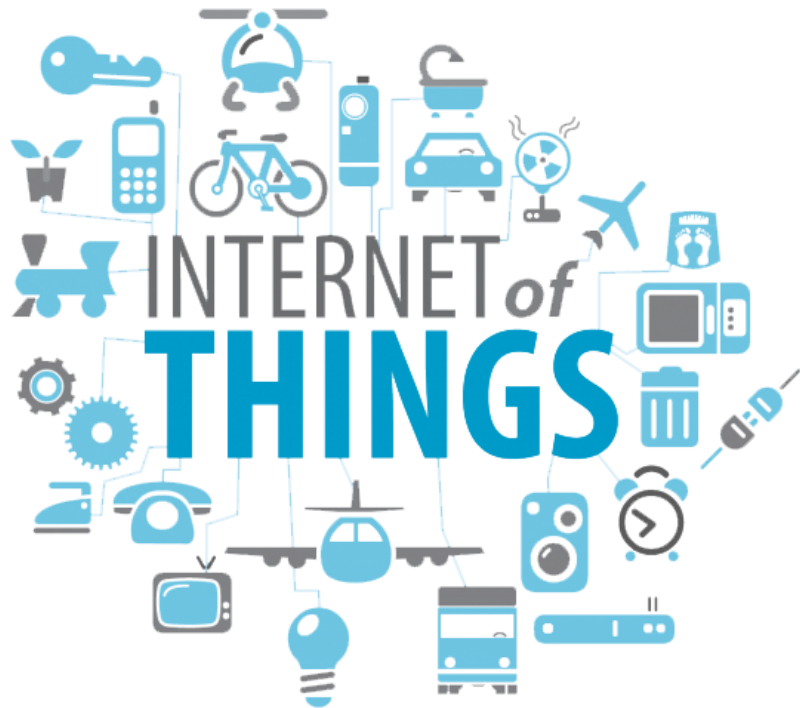
					
Tablet	Audio Assistant	Wireless Printer	Smart TV	Wireless Speakers	VOIP Phone

The adoption of IoT in business improves interest rate, and brings a change in business processes leading to cost minimization and quality improvement. Customers of a product can be easily monitored, and assets following and inventory control are facilitated.

In general, IoT business models with smart components for monitoring, control, optimization, and automation are distinguished in two categories:

- Enhancement of available products with IoT add-on services
- Development of IoT products that is impossible to exist without IoT

Advantages of IoT



01

Communication and
connectedness

IoT supports communication between devices and machines (M2M communication) and between humans and machines (H2M communication) enabling them to stay connected, and so making total transparency available with better quality

02

Monitoring

IoT can give more information that could not be otherwise collected.

03

Impact to society

IoT benefits all (individuals, community, business stakeholders), and, in general, through lower energy consumption and faster delivery of services, etc., contributes to the betterment of society and people's quality of life.

04

Money saving

Through efficient interconnection and sharing of devices, our work, our services and our systems are made cheaper and more efficient.

05

Accuracy

IoT involves a huge amount of data. Analyzing large amounts of data allows one to make right decisions easily and perform tasks accurately.

06

Time

Time means money. IoT helps to save a lot of time. In present days, all of us need more valuable time.

07

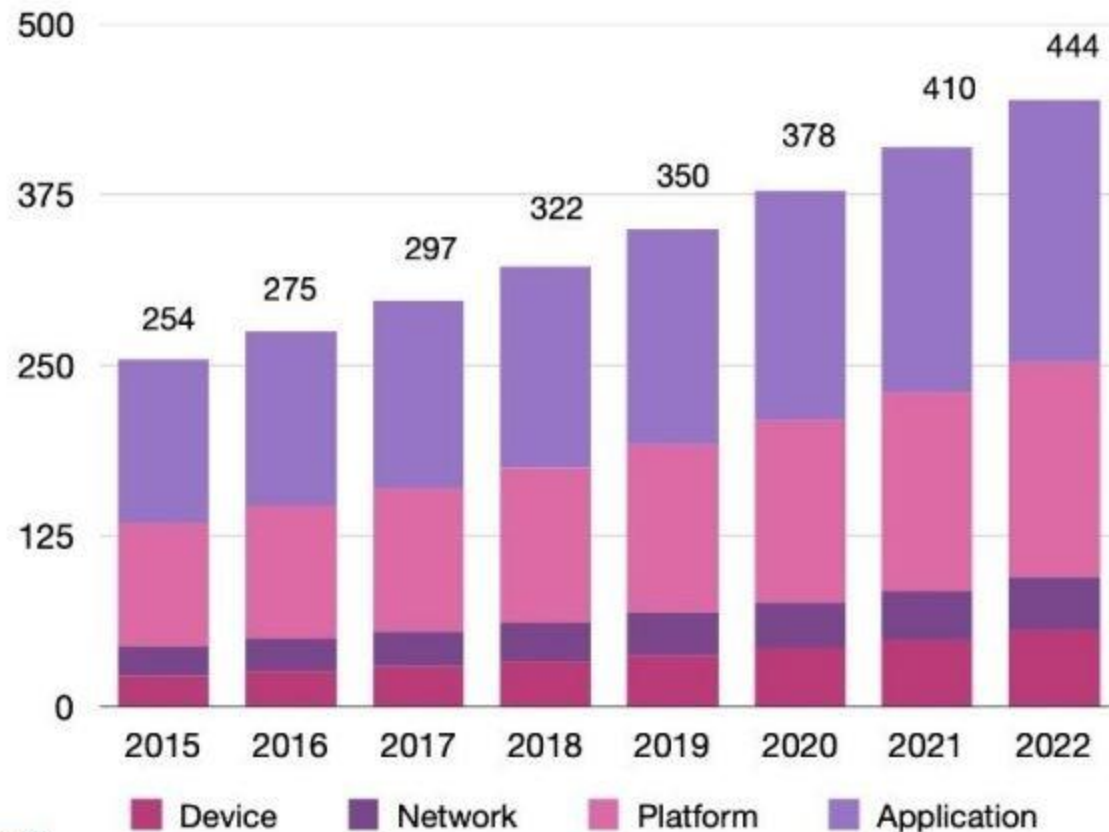
Improved customer
engagement

In standard information applications, customer engagement is normally passive or very little. In IoT this is completely changed. Customers are actively engaged in the processes and functions involved.

IoT Market in Indonesia

Indonesia IoT Market 2015-2022 (Trilyun Rp)

Huge opportunities, 78% on Application & Platform



The biggest verticals for Service/ Application comes from following segments:

- Transportation,
- Home/Building,
- Public Sector,
- Manufacturing,
- Retail,
- Healthcare,
- Banking/Security

Menteri Perindustrian Airlangga Hartarto menjelaskan, pangsa pasar **Internet of Things (IoT) di Indonesia** diperkirakan berkembang pesat dan nilainya bakal mencapai Rp 444 triliun pada tahun 2022.



Source:

- <https://www.kominfo.go.id/content/detail/15354/potensi-pasar-internet-of-things-di-indonesia-capai-rp-444-t/0/>
- sorotan_media
- IoT Forum Indonesia
- Internal Telkom Analysis

Conclusion

- Challenging specific topics for further consideration include the following: security and protection of personal data in the cloud computing, people centric (participatory) sensing, data analytics, and encryption.
- General topics include IoT architectures and platforms, new protocols, standardization, efficiency, and quality of service (QoS).
- New protocols for sensing in IoT will play a primary role in complete realizations. Participatory sensing will reduce the cost of sensing in the user's local environment.
- Currently, many international initiatives are in the air, and many others are predicted to emerge across the academia and industry which will allow a coordinated exploitation and implementation of IoT worldwide.

The World Is Getting Smarter

**THANK YOU
TECHNOLOGY**

