



FEDERATION OF MYANMAR ENGINEERING SOCIETIES

The Emerging Technology ABC of IoTs Resulting in Validations and Capabilities, Developments, Profits, Challenges

Knowledge Sharing

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Plan of Presentation

- ❖ What is Internet of Things?
- ❖ How IoT Works?
- ❖ Current Status & Future Prospect of IoTs
- ❖ Knowledge Management- From Data to Wisdoms
- ❖ The Future of IoT
- ❖ The Potential of IoT
- ❖ Few application of IoT
- ❖ Technological Challenges of IoT
- ❖ Criticisms & Controversies of IoT

What is IoT?

The Internet of Things (IoT) is the network of physical objects or "things" embedded with electronics, software, sensors, and network connectivity, which enables these objects to collect and exchange data.

IoT allows objects to be sensed and controlled remotely across existing network infrastructure, creating opportunities for more direct integration between the physical world and computer-based systems, and resulting in improved efficiency, accuracy and economic benefit.

"Things," in the IoT sense, can refer to a wide variety of devices such as heart monitoring implants, biochip transponders on farm animals, electric clams in coastal waters, automobiles with built-in sensors, DNA analysis devices for environmental/food/pathogen monitoring or field operation devices that assist fire-fighters in search and rescue operations.

These devices collect useful data with the help of various existing technologies and then autonomously flow the data between other devices.

History of IoT

The concept of the Internet of Things first became popular in 1999, through the Auto-ID Center at MIT and related market-analysis publications. R

Radio-frequency identification (RFID) was seen as a prerequisite for the IoT at that point. If all objects and people in daily life were equipped with identifiers, computers could manage and inventory them. Besides using RFID, the tagging of things may be achieved through such technologies as near field communication, barcodes, QR codes, bluetooth, and digital watermarking.

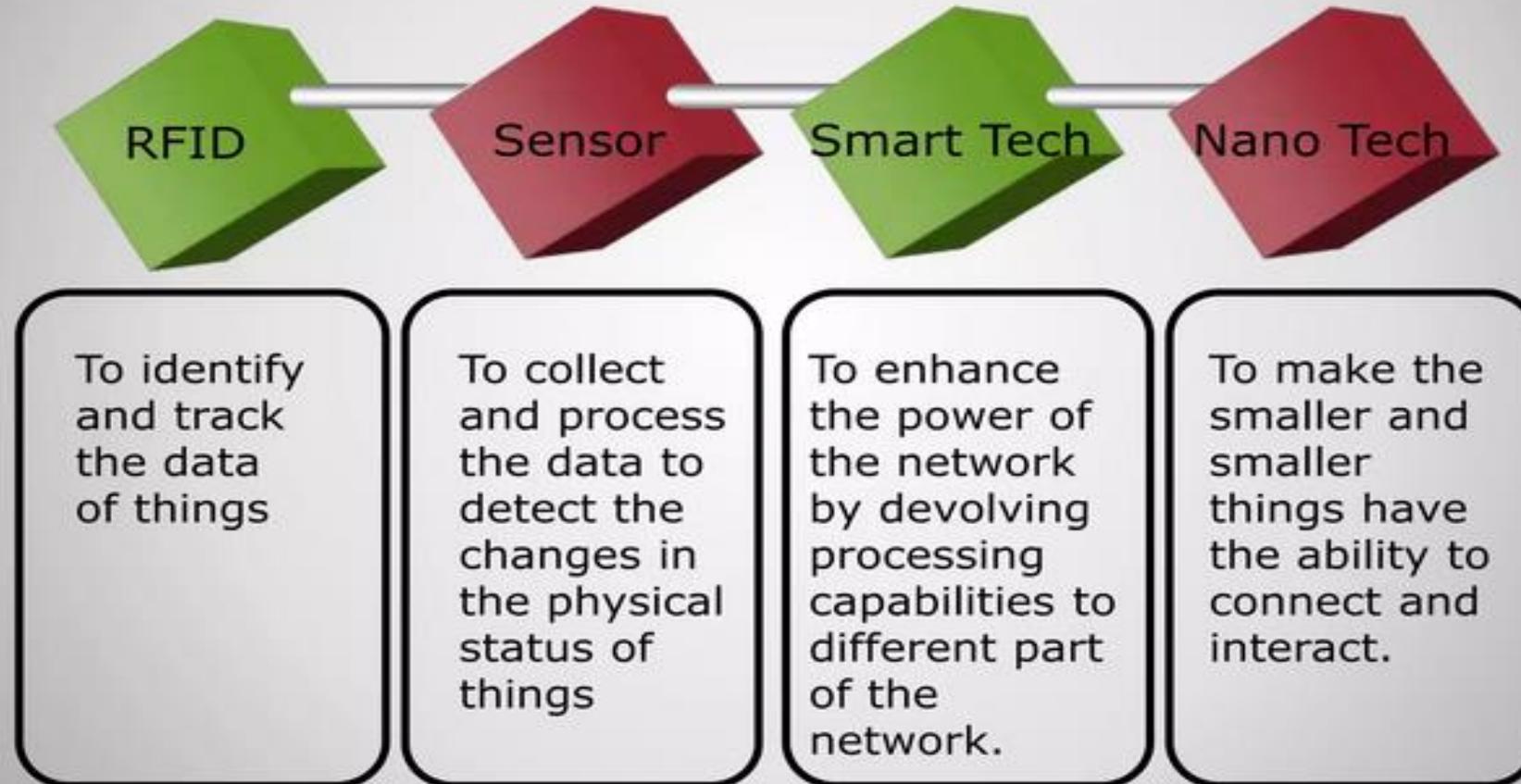
How IoT Works?

Internet of Things is not the result of a single novel technology; instead, several complementary technical developments provide capabilities that taken together help to bridge the gap between the virtual and physical world.

These capabilities include:

- ***Communication and cooperation***
- ***Addressability***
- ***Identification***
- ***Sensing***
- ***Actuation***
- ***Embedded information processing***
- ***Localization***
- ***User interfaces***

How IoT Works?

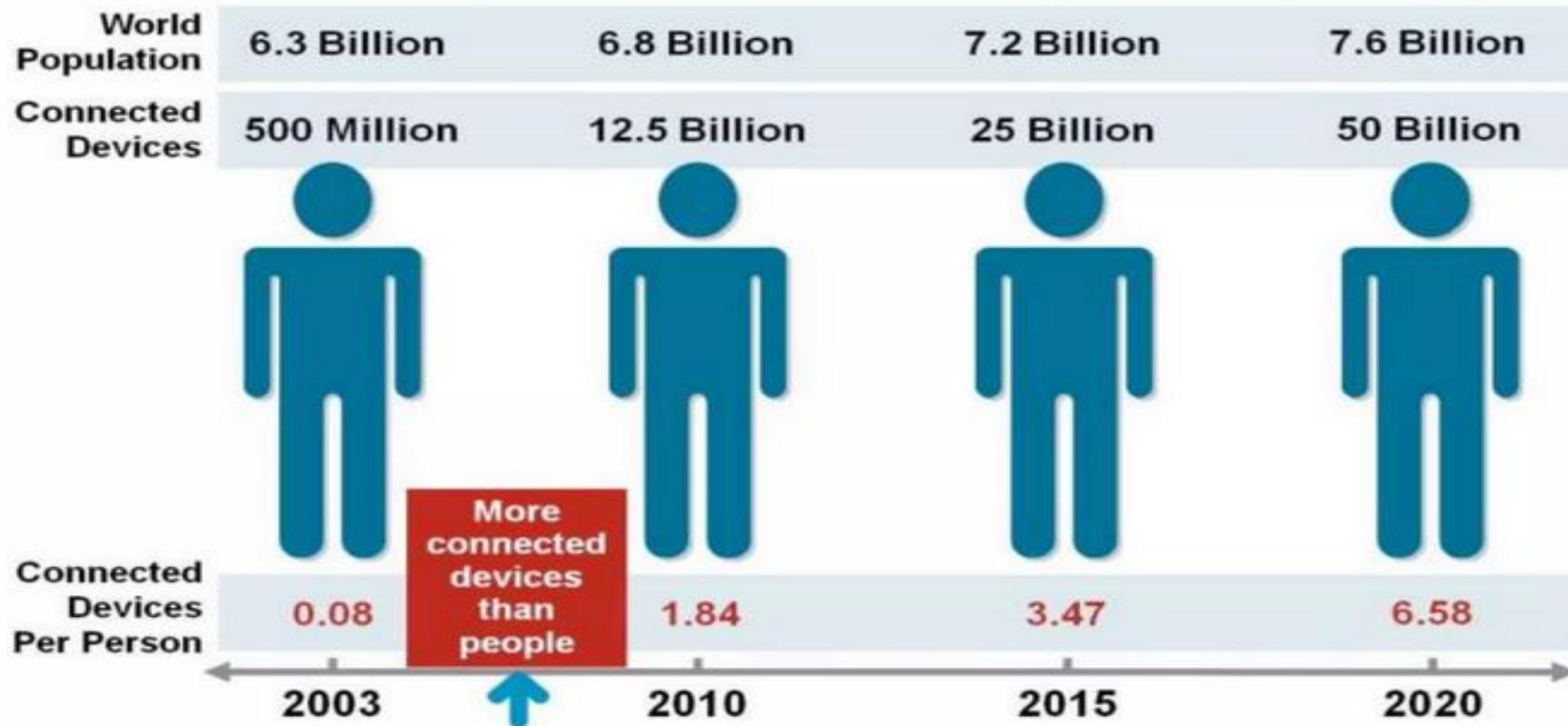


The Structure of IoT

The IoT can be viewed as a gigantic network consisting of networks of devices and computers connected through a series of intermediate technologies where numerous technologies like RFIDs, wireless connections may act as enablers of this connectivity.

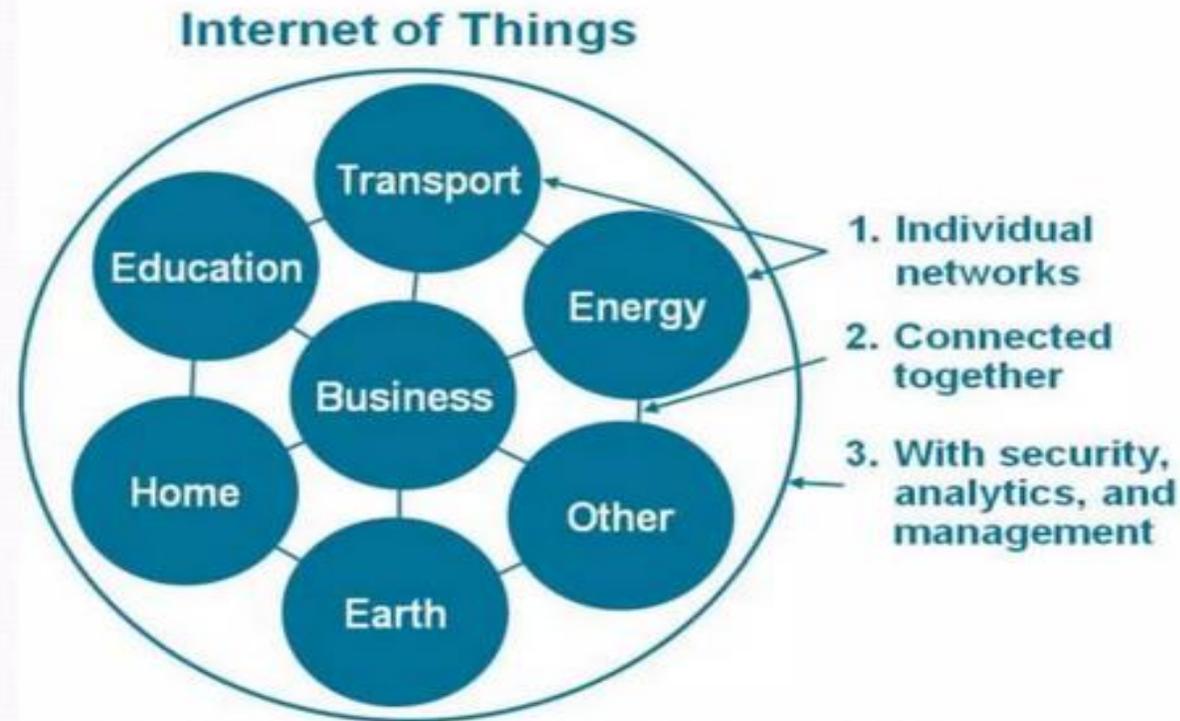
- **Tagging Things** : Real-time item traceability and addressability by **RFIDs**.
- **Feeling Things** : **Sensors** act as primary devices to collect data from the environment.
- **Shrinking Things** : Miniaturization and **Nanotechnology** has provoked the ability of smaller things to interact and connect within the “things” or “smart devices.”
- **Thinking Things** : **Embedded intelligence** in devices through sensors has formed the network connection to the Internet. It can make the “things” realizing the intelligent control.

Current Status & Future Prospect of IoT



“Change is the only thing permanent in this world”

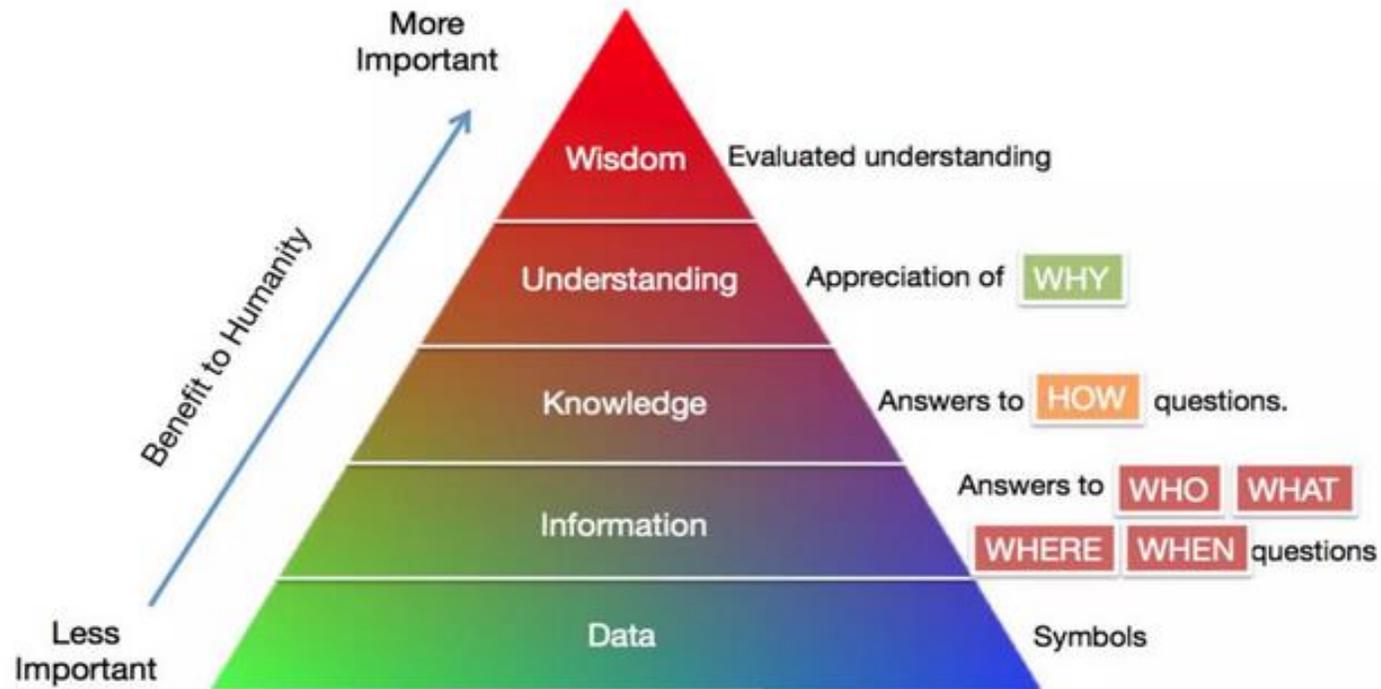
IoT as a Network of Networks:



These networks connected with added security, analytics, and management capabilities. This will allow IoT to become even more powerful in what it can help people achieve.

IoT is not only data collection, it's also...

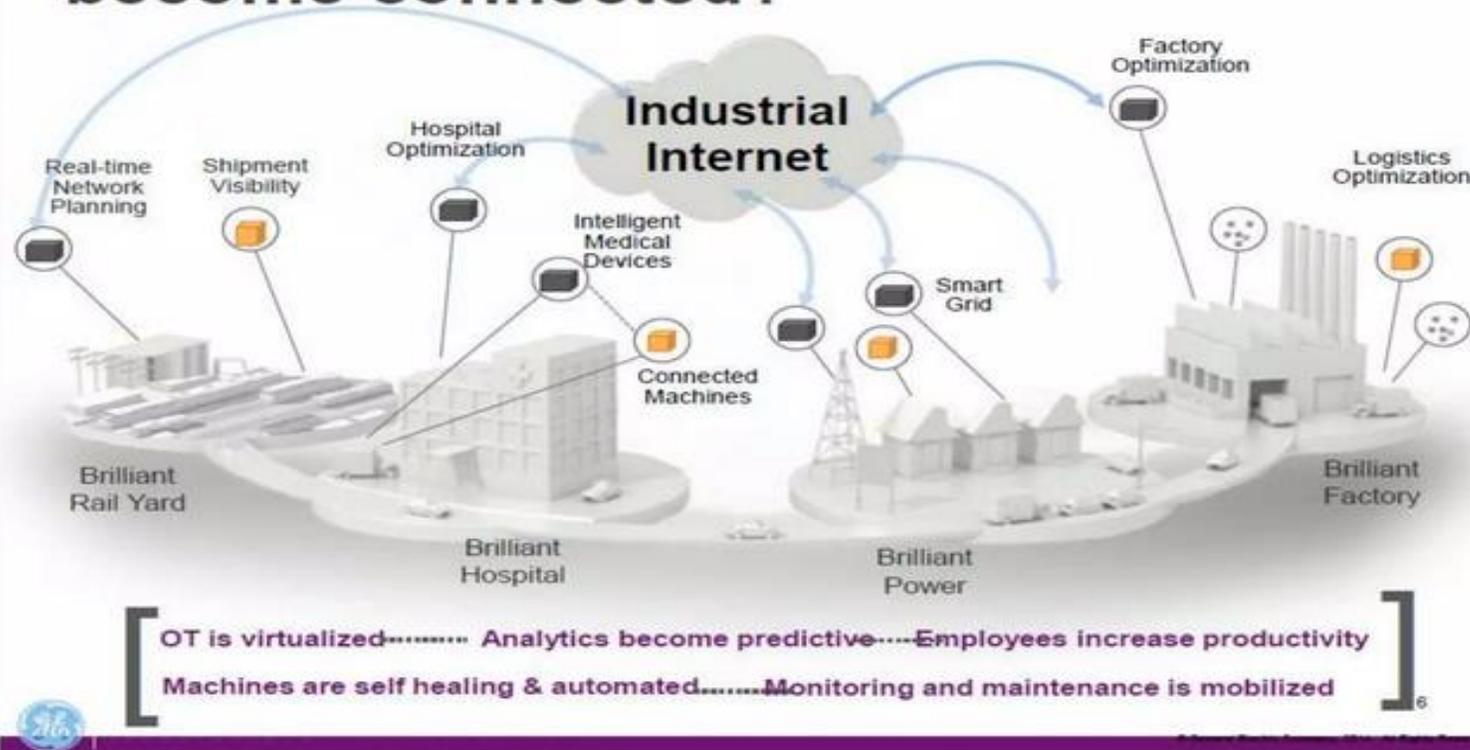
...processing it and converting into **wisdom**



The more data that is created, the better understanding and wisdom people can obtain.

The Future of IoT

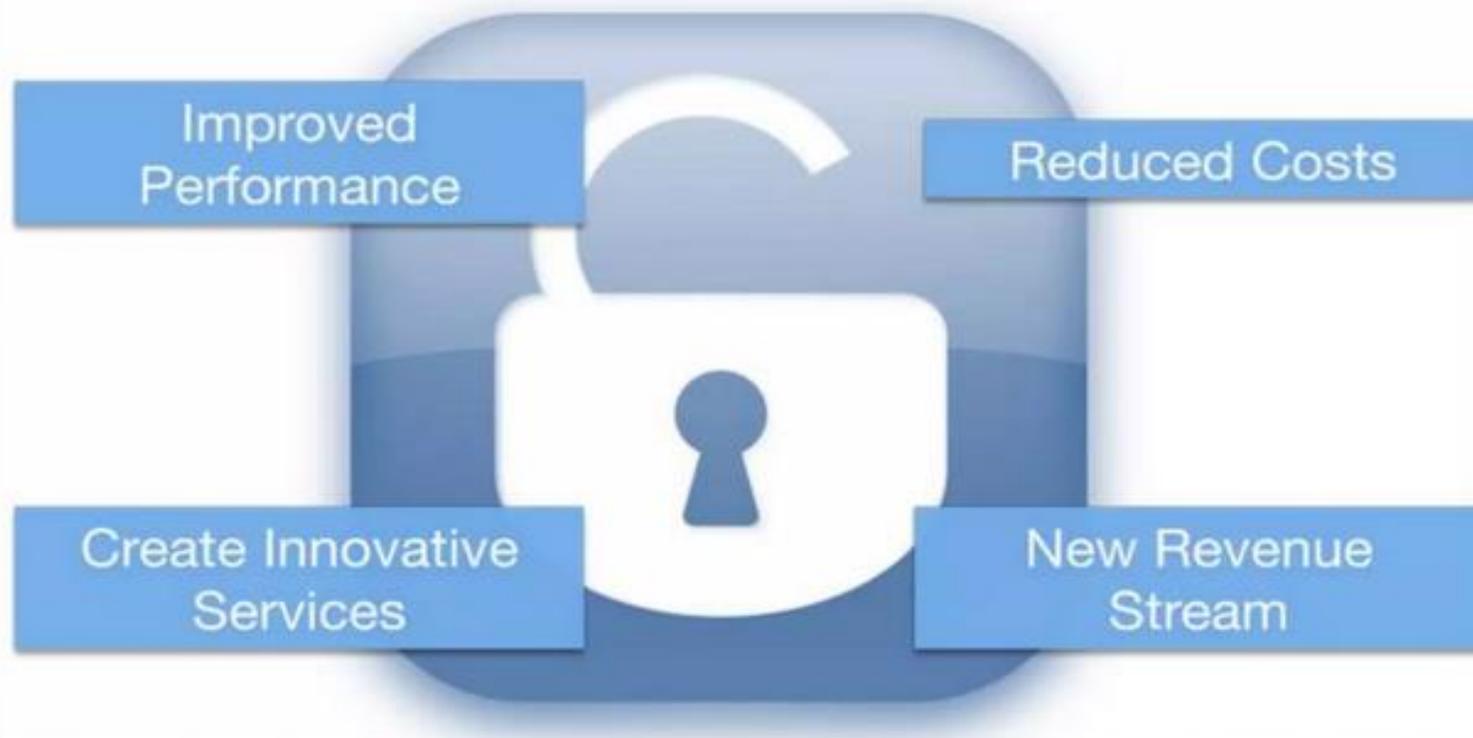
What happens when **50B Machines** become connected?



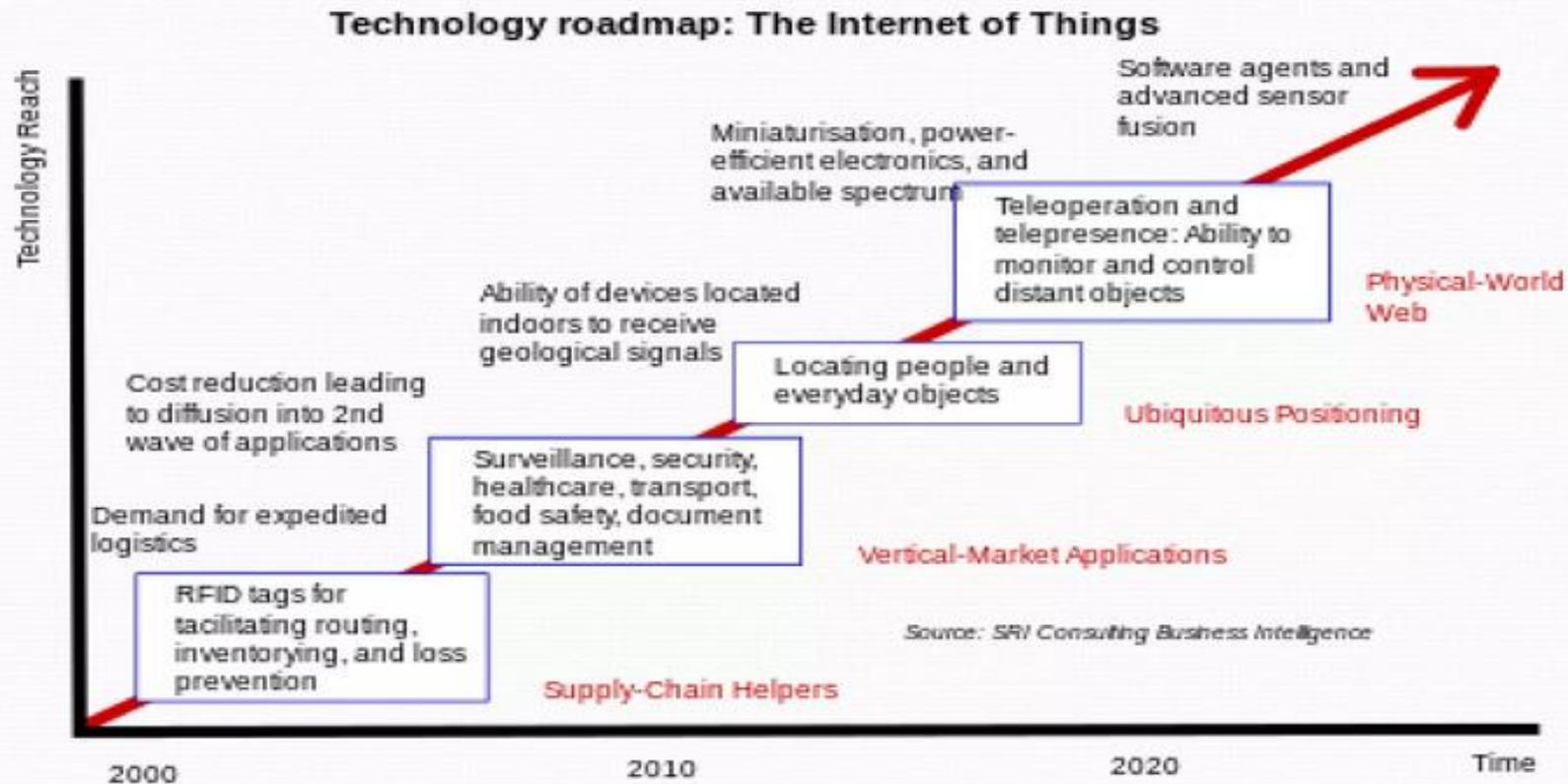
[OT is virtualized..... Analytics become predictive.....Employees increase productivity
Machines are self healing & automated.....Monitoring and maintenance is mobilized]

"The Sky's not the limit. It's only the beginning with IoT."

Unlock the Massive potential of IoT



Technology roadmap of IoT



Top Internet of Things (IoT) Use Cases

Asset Tracking

Asset tracking streamlines labor-intensive and error-prone equipment and inventory management by monitoring asset usage in real-time throughout a location, such as a building, warehouse, yard or campus.



Industrial Monitoring

Industrial monitoring improves performance, productivity and efficiency of industrial processes in manufacturing, mining, oil and gas, utilities and other industries by monitoring the condition of assets, predicting maintenance and ensuring quality.



Smart Badges

By issuing sensor-based badges to employees and guests, organizations can take a simple yet sophisticated approach to identifying, locating, and providing secure access to personnel in their facilities.



Fleet Management

Fleet management allows fleet operators to automate processes by providing visibility in real time to monitor vehicle maintenance, usage, and driver performance.



Smart Buildings

Smart buildings enable organizations to monitor building characteristics to optimize the environment and operations, such as automating and controlling security or HVAC systems.



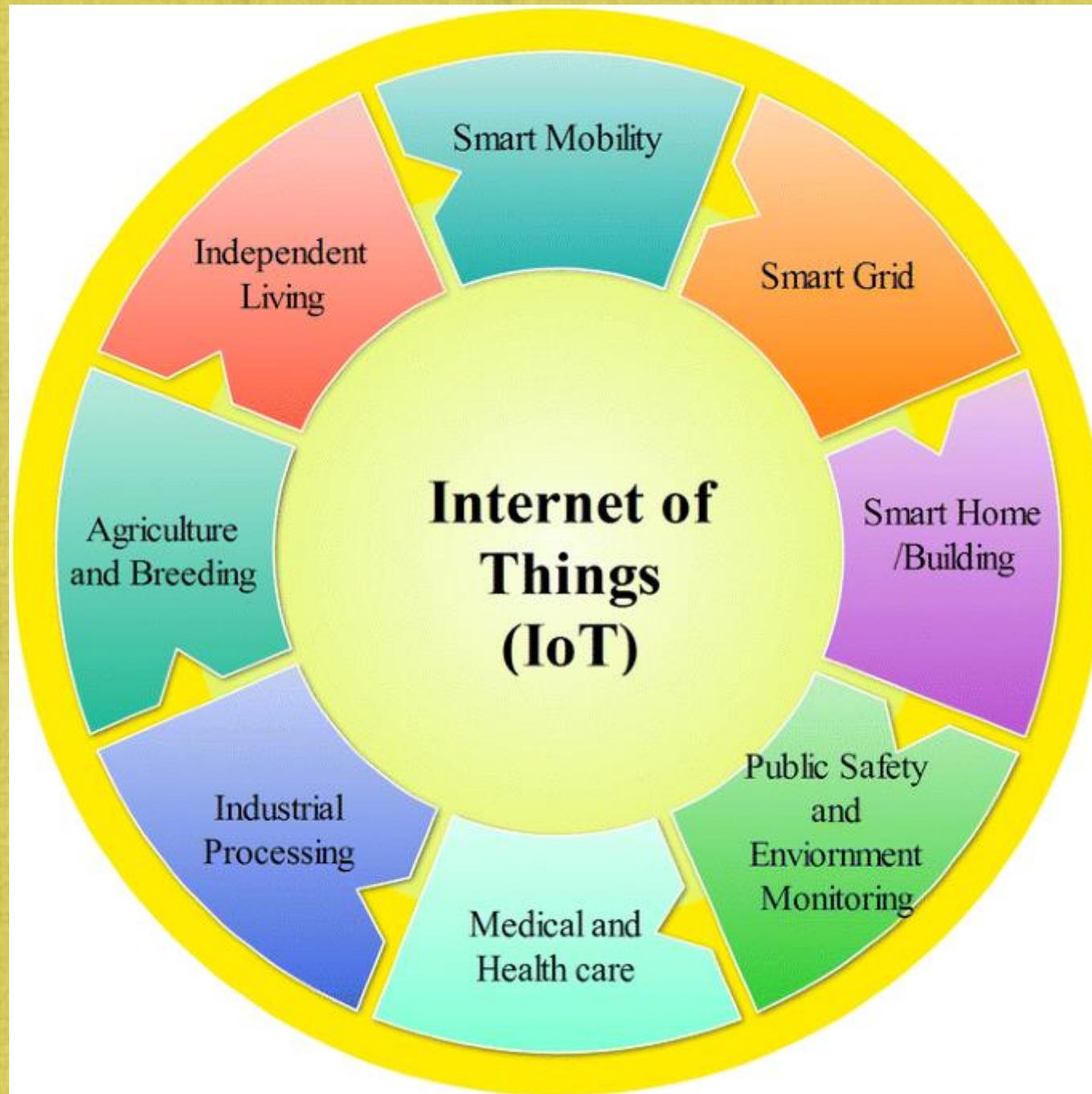
Few Applications of IoT

- ✓ Building and Home automation
- ✓ Manufacturing
- ✓ Medical and Healthcare systems
- ✓ Media
- ✓ Environmental monitoring
- ✓ Infrastructure management
- ✓ Energy management
- ✓ Transportation
- ✓ Better quality of life for elderly
- ✓

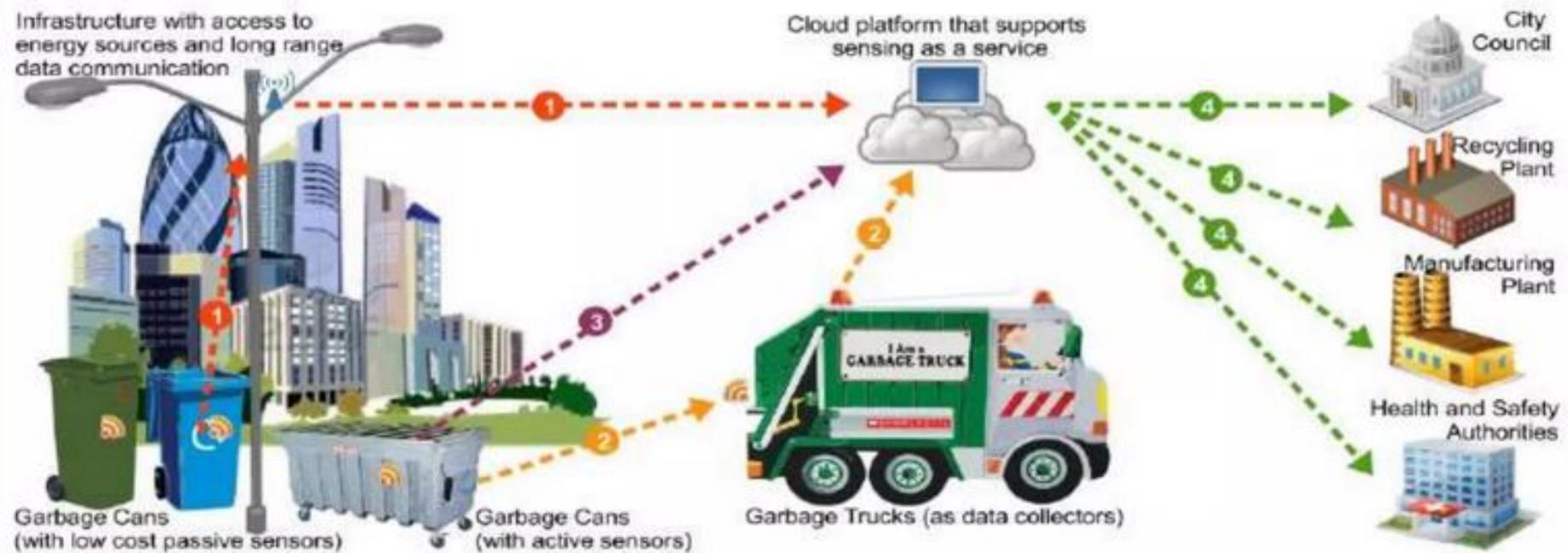
You name it, and you will have it in IoT!

TO DIVERSE APPLICATIONS





Efficient Waste Management in Smart Cities Supported by the Sensing-as-a-Service



[Source: "Sensing as a Service Model for Smart Cities Supported by Internet of Things", Charith Perera et. al., Transactions on Emerging Telecommunications Technology, 2014]

IOT Application Scenario - Shopping



(2) When shopping in the market, the goods will introduce themselves.



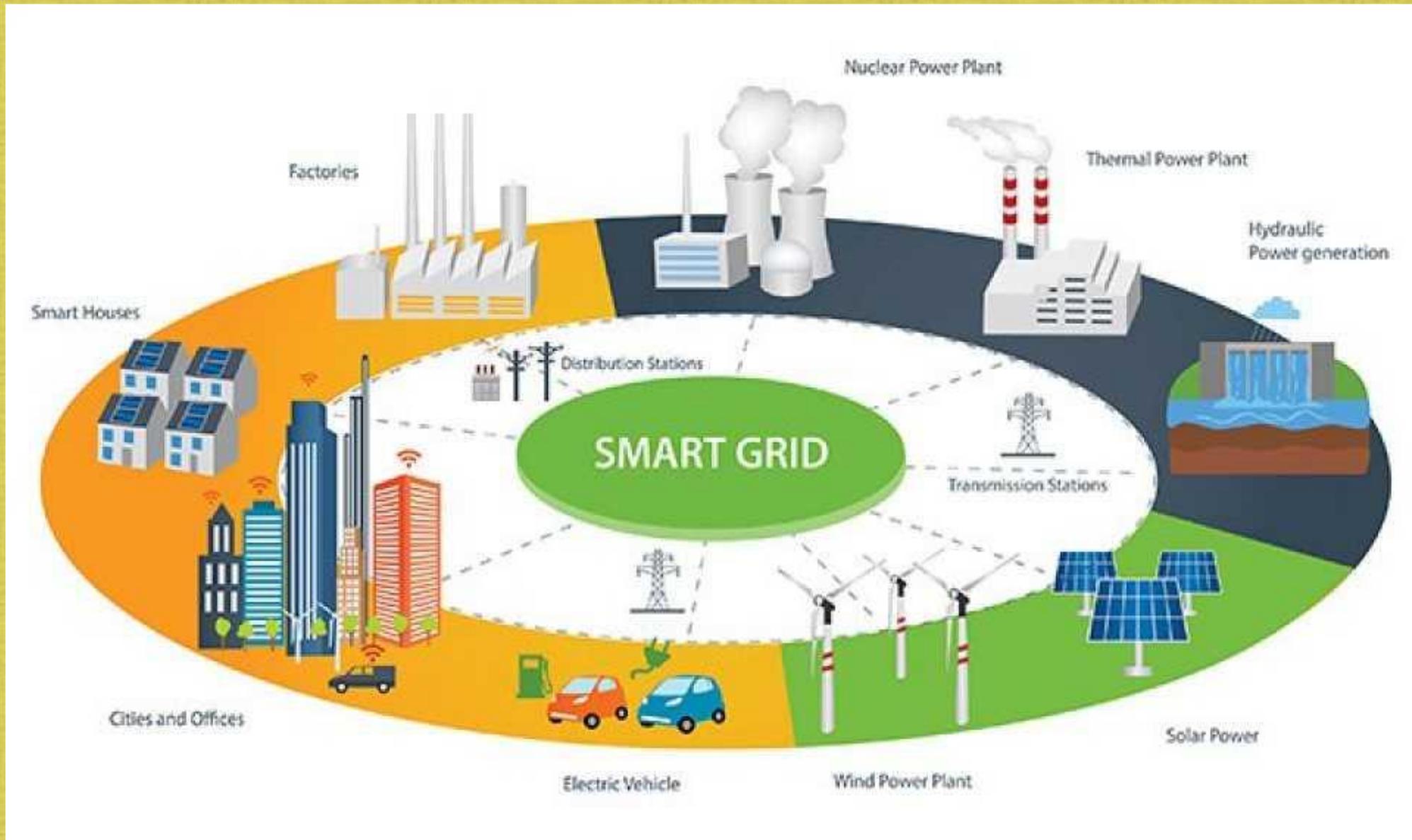
(1) When entering the doors, scanners will identify the tags on her clothing.



(4) When paying for the goods, the microchip of the credit card will communicate with checkout reader.

(3) When moving the goods, the reader will tell the staff to put a new one.

Top10 IoT application in 2023



A photograph of a sandy beach with several footprints leading away from the viewer towards the top right. The sand is a warm, golden-brown color. The text is overlaid on the center of the image.

HOW MANY STEPS
HAVE YOU
WALKED TODAY?

How Well Do I Sleep?

Sleep



Your sleep pattern ■ asleep ■ awake



You went to bed at
11:00PM

Time to fall asleep
0min

Times awakened
20

You were in bed for
6hrs 40min

Actual sleep time
6hrs 6min

8 h 50 mins asleep

- Awake for 212 mins (81x)
- Restless for 278 mins (91x)



Thursday, February 27

Sleep Stats

Time asleep over the past 30 days in hours



Times awoken over the past 30 days

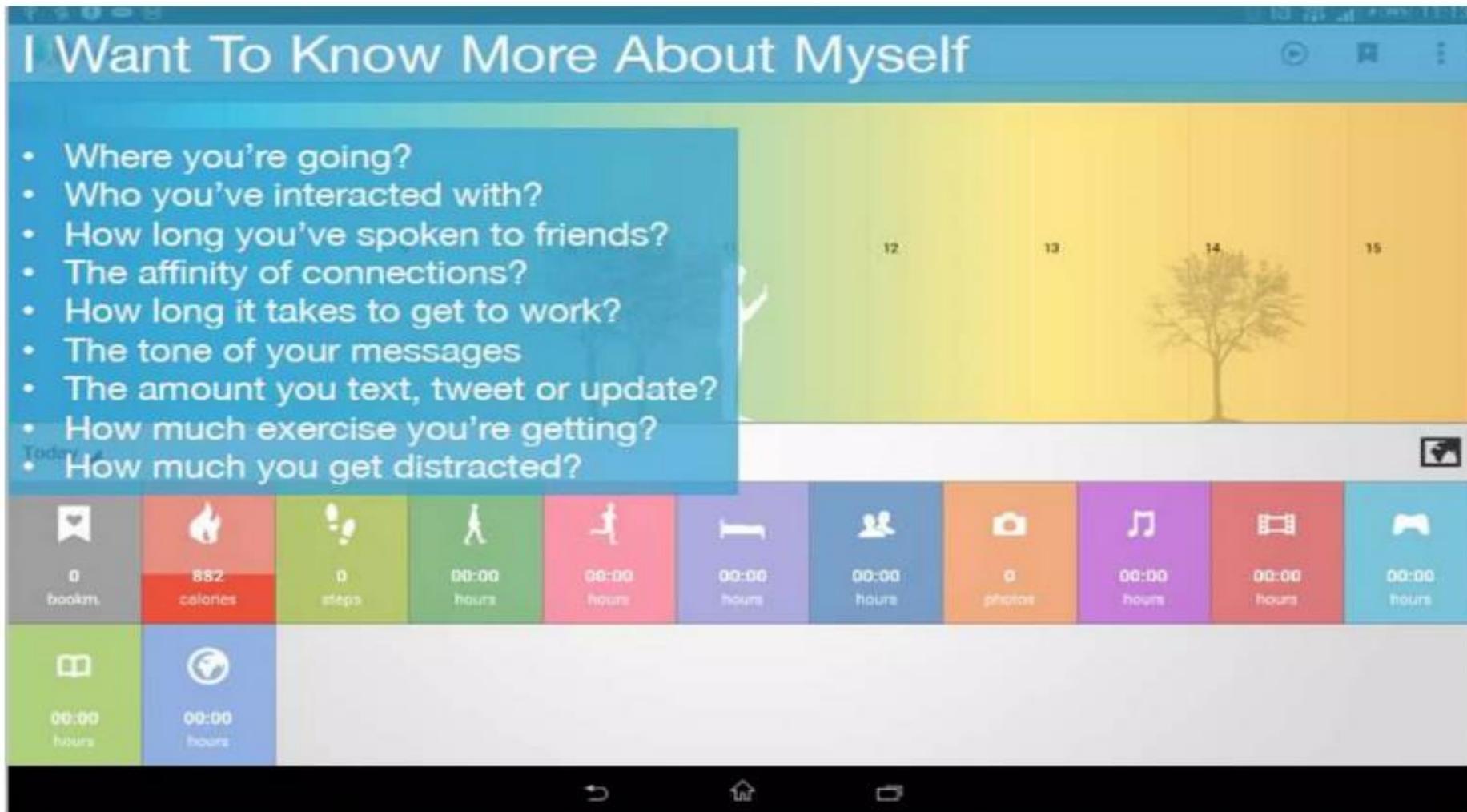


fitbit flex
Wireless Activity + Sleep Wristband



I Want To Know More About Myself

- Where you're going?
- Who you've interacted with?
- How long you've spoken to friends?
- The affinity of connections?
- How long it takes to get to work?
- The tone of your messages
- The amount you text, tweet or update?
- How much exercise you're getting?
- How much you get distracted?



Can Internet of Things (IOT) Help Us To Know More About Ourselves?

IoT helps you in LIFE LOGGING

Thought Controlled Computing



The flagship product, MindWave, is a headset that can log into your computer using just your thoughts. Researchers recently used the EEG headset to develop a toy car that can be driven forward with thought.

NeuroSky's smart sensors can also track your heart rate and other bodily metrics and can be embedded in the next generation of wearable devices.

"We make it possible for millions of consumers to capture and quantify critical health and wellness data," Yang (CEO of Softbank) said. Softbank is the funder.

TECHNOLOGICAL CHALLENGES OF IoT

At present IoT is faced with many challenges, such as:

- Scalability
- Technological Standardization
- Inter operability
- Discovery
- Software complexity
- Data volumes and interpretation
- Power Supply
- Interaction and short range communication
- Wireless communication
- Fault tolerance

Benefits and Challenges of Internet of Things for Telecommunication Networks

IoT-Based Smart Environments



Smart city



Smart grid



Smart industry



Smart transportation



Smart home



Smart building



Smart health



Smart agriculture

Based on the application requirements, IoT can be integrated with different smart environments. So, IoT-based smart environments can generally be classified into the following areas: (a) smart homes, (b) smart buildings, (c) smart cities, (d) smart grid, (e) smart health, (f) smart transportation, (g) smart industry, and (h) smart agriculture.

“Big Data is not magic. It doesn't matter how much data you have if you can't make sense of it.”

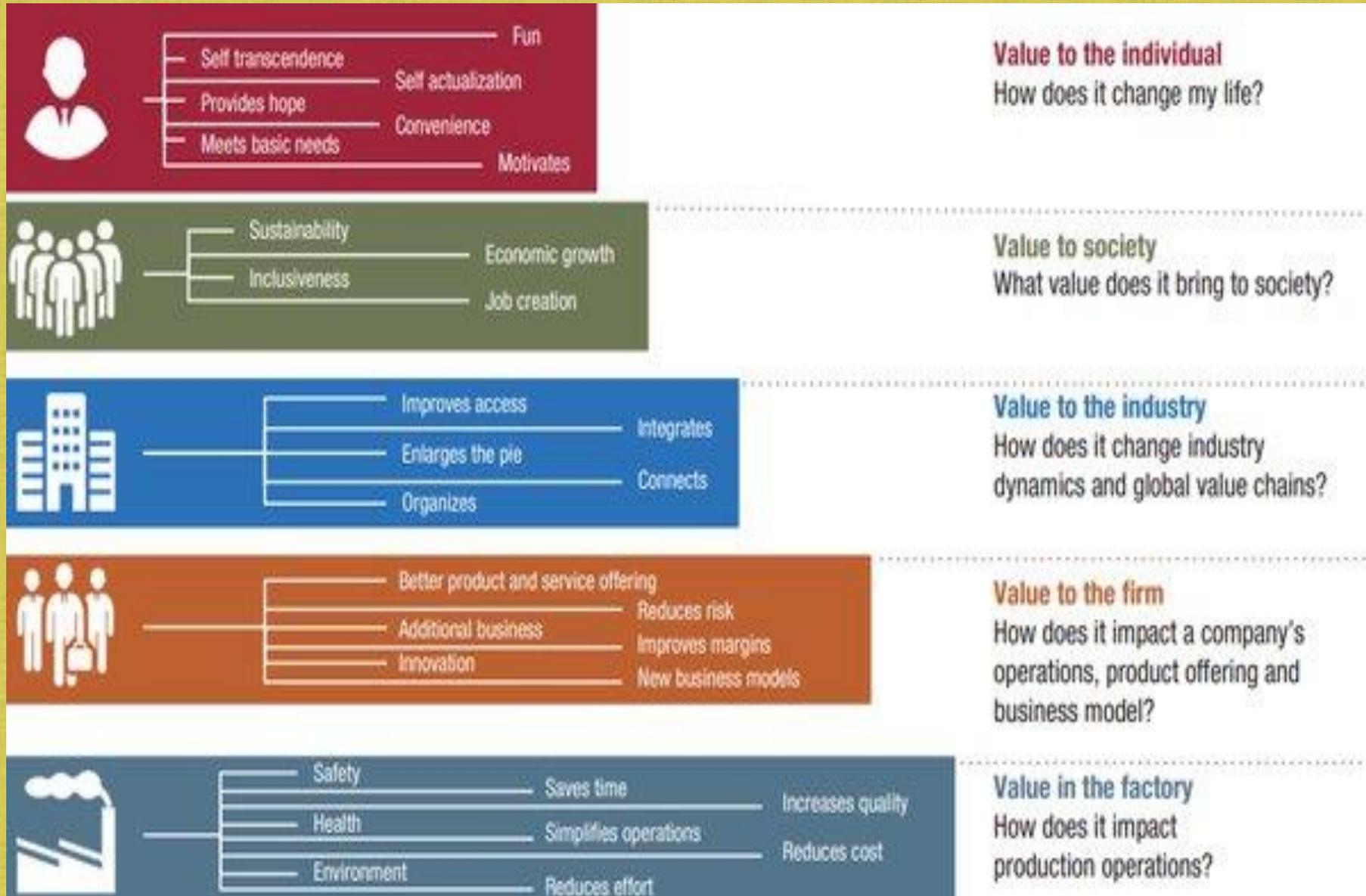


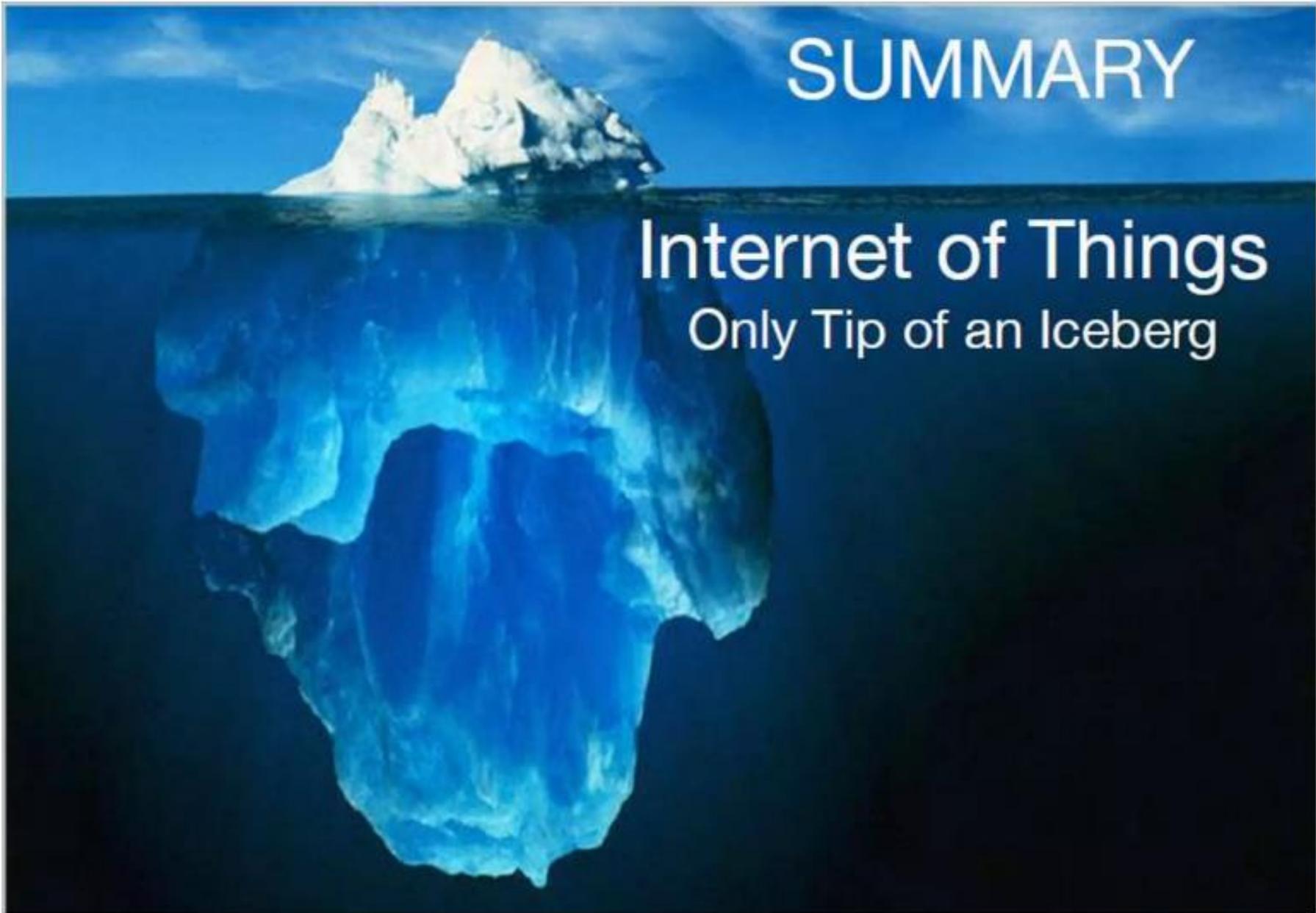
Criticisms and Controversies of IoT

Scholars and social observers and pessimists have doubts about the promises of the ubiquitous computing revolution, in the areas as:

- Privacy
- Security
- Autonomy and Control
- Social control
- Political manipulation
- Design
- Environmental impact
- Influences human moral decision making

What are the latest emerging technology trends? Are there new ways that help technology interface more sustainably with living systems?



A photograph of an iceberg floating in the ocean. The tip of the iceberg is visible above the water surface, while the much larger, submerged part is visible below. The sky is blue with some light clouds. The water is dark blue. The text is overlaid on the right side of the image.

SUMMARY

Internet of Things
Only Tip of an Iceberg

References

1. www.google.com
2. https://en.wikipedia.org/wiki/Internet_of_Things
3. Cisco whitepaper, "The Internet of Things" - How the Next Evolution of the Internet Is Changing Everything, by Dave Evans, April 2011.
4. GE cloud expo 2014, "Industrial Internet as a Service", by Shyam Varan Nath, Principal Architect.
5. Dr. Mazlan Abbas, MIMOS Berhad, Wisma IEM, Petaling Jaya

THANK YOU!

