BIG DATA ANALYTICS AND VISUALISATION

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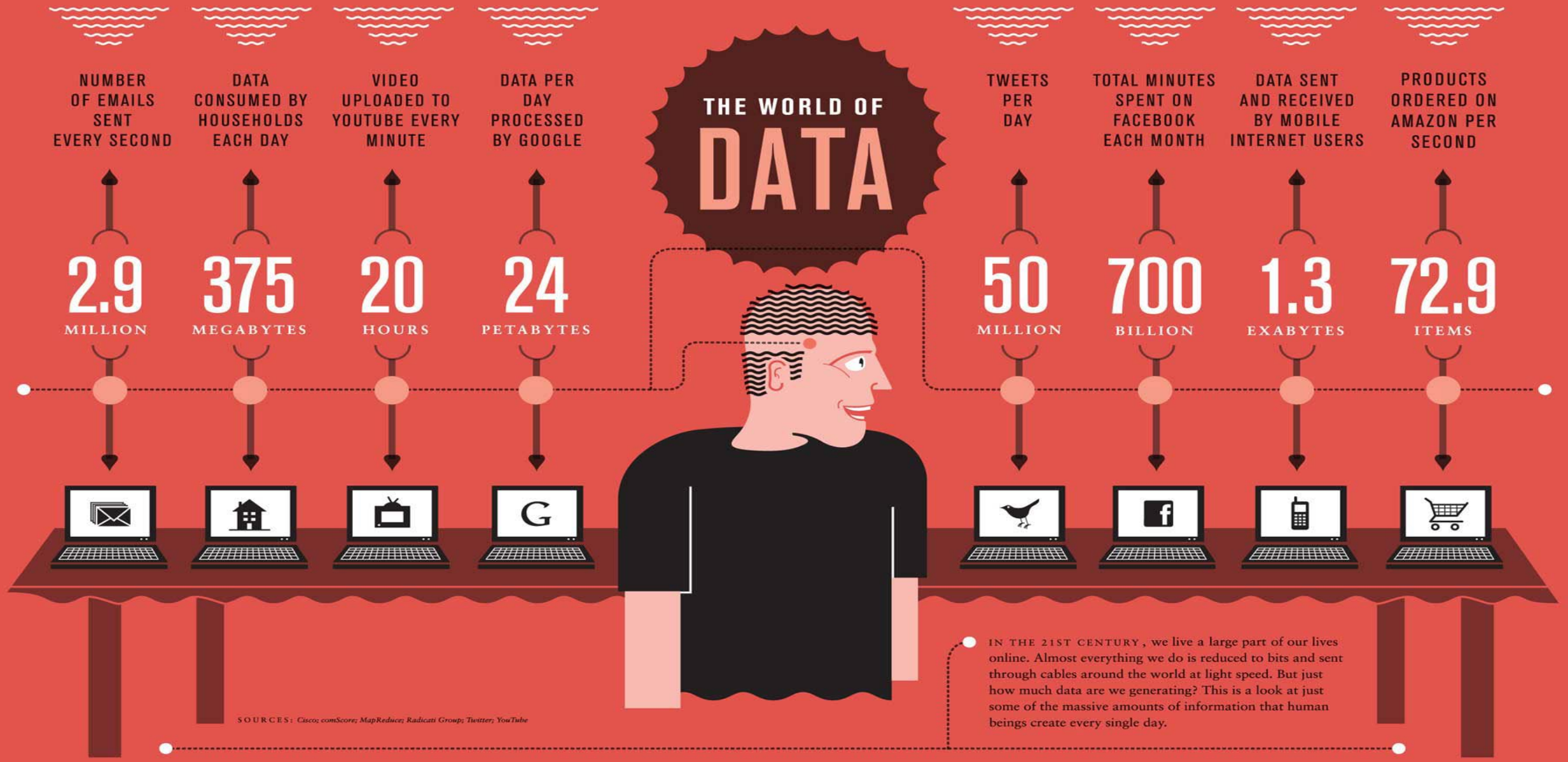
2022 Chinese optical quantum computer Jiuzhang 2.0 can solve a problem 10^24 faster than a classical computer.



5 EXABYTES

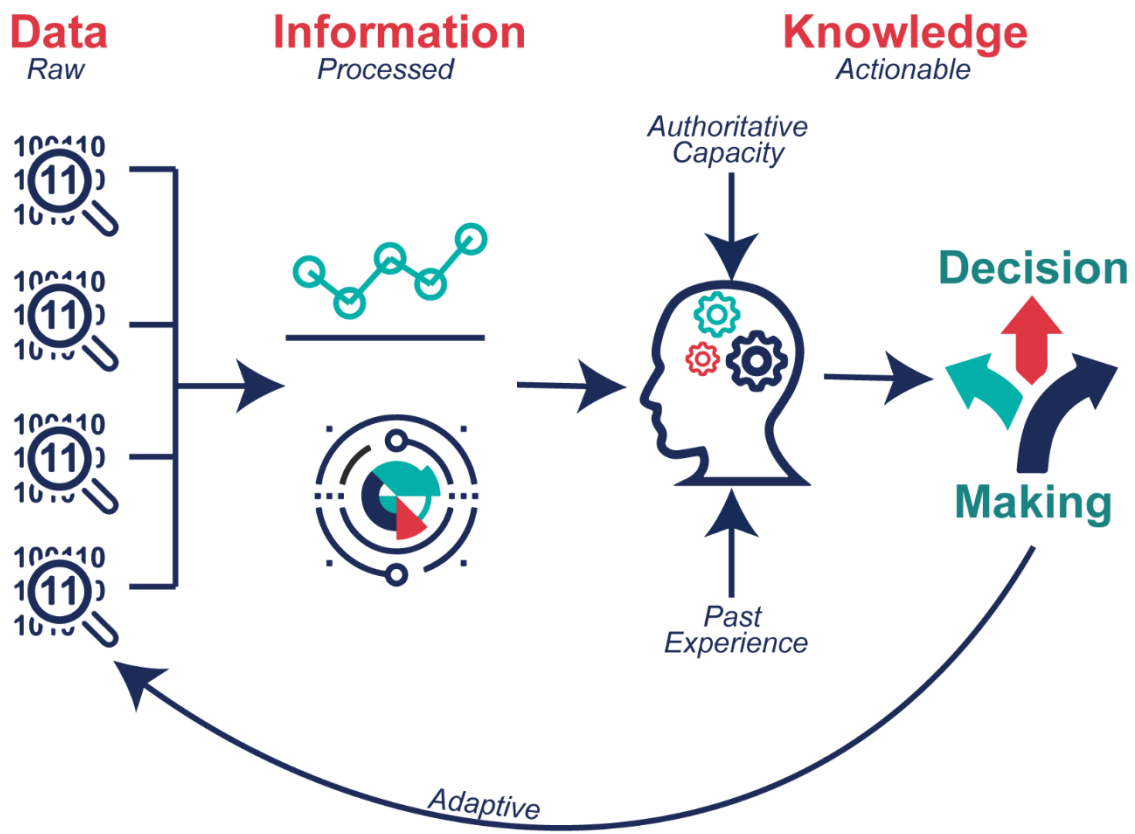
OF DATA CREATION TOOK
1000 YEARS IN 2003
15 DAYS IN 2011
10 MINUTES AS WE SPEAK

Unit	Value	Size
bit (b)	0 or 1	1/8 of a byte
byte (B)	8 bits	1 byte
kilobyte (KB)	1000^1 bytes	1,000 bytes
megabyte (MB)	1000^2 bytes	1,000,000 bytes
gigabyte (GB)	1000^3 bytes	1,000,000,000 bytes
terabyte (TB)	1000^4 bytes	1,000,000,000,000 bytes
petabyte (PB)	1000^5 bytes	1,000,000,000,000,000 bytes
exabyte (EB)	1000^6 bytes	1,000,000,000,000,000,000 bytes
zettabyte (ZB)	1000^7 bytes	1,000,000,000,000,000,000,000 bytes
yottabyte (YB)	1000^8 bytes	1,000,000,000,000,000,000,000,000 bytes

THE DATA EXPLOSION: WELCOME TO THE ERA OF ANALYTICS

THE ADVENT OF BIG DATA

Data



Source: https://internetofwater.org/valuing-data/what-are-data-information-and-knowledge/#:~:text=Data%20in%20their%20simplest%20form,Knowledge%20is%20what%20we%20know.

We Leave a Trail

Browsing online.

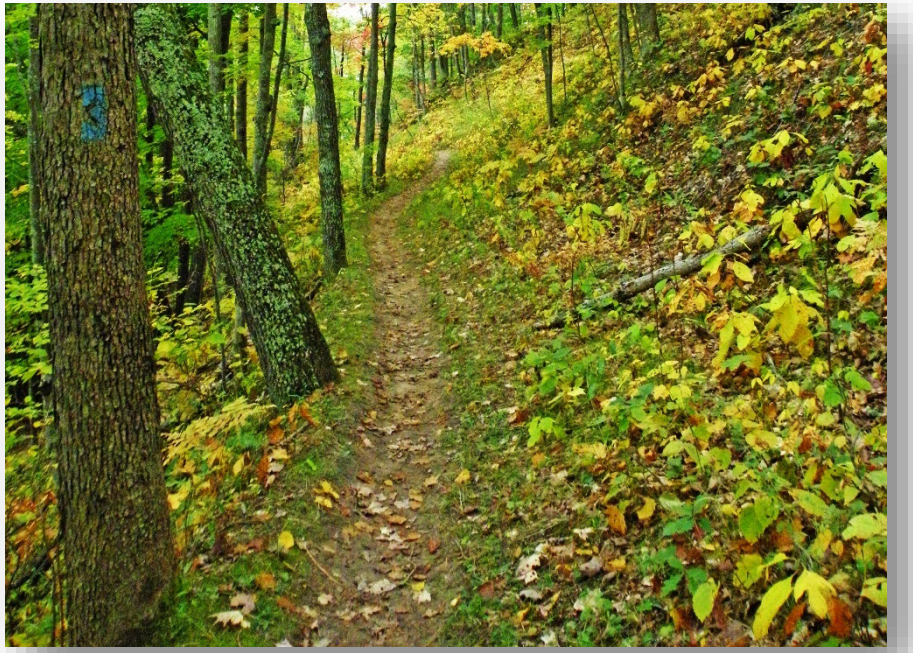
Shopping in a bricks-and-mortar store with a credit card.

Sending an email.

Taking a photograph.

Reading an online article.

Even walking down the street if you are carrying a mobile phone (or with CCTV around).



Google

Knows what you have searched for online.

Knows your age and gender (even if you have never told them).

Facebook

Knows who you are friends with.

Knows who you are in a relationship with.

Can predict whether your relationship is going to last, or if you are single when you are about to be in a relationship.

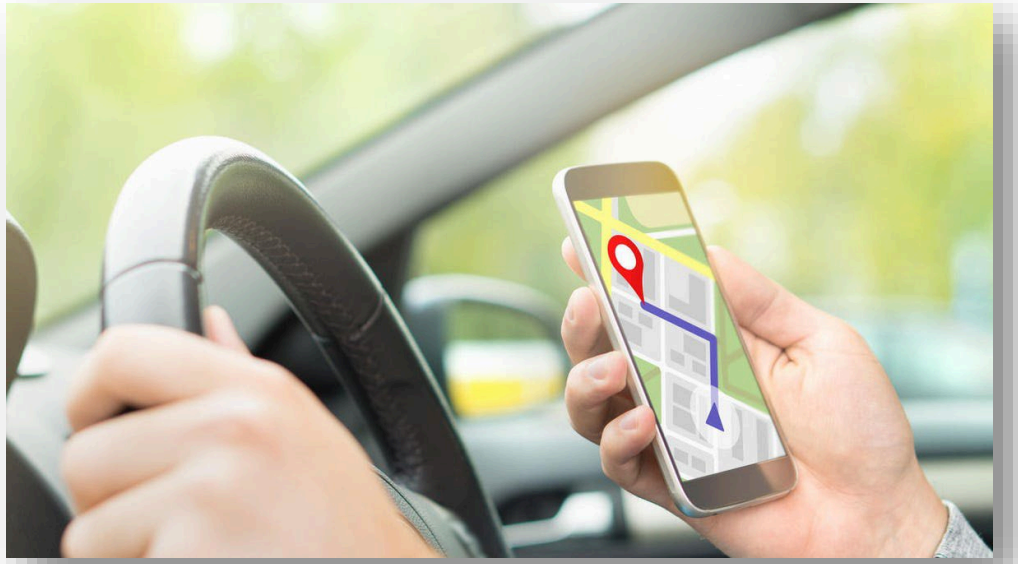
Can also tell how intelligent you are based on an analysis of your likes.

The Police

Knows where you are driving.

Your Phone

knows how fast you are driving.



Grocery Store Loyalty Cards

Tracks the brands you like.

Collects information on your purchasing habits and preferences.

Retailers use this data to personalize your shopping experience.

Predict what else you might want to buy in future.

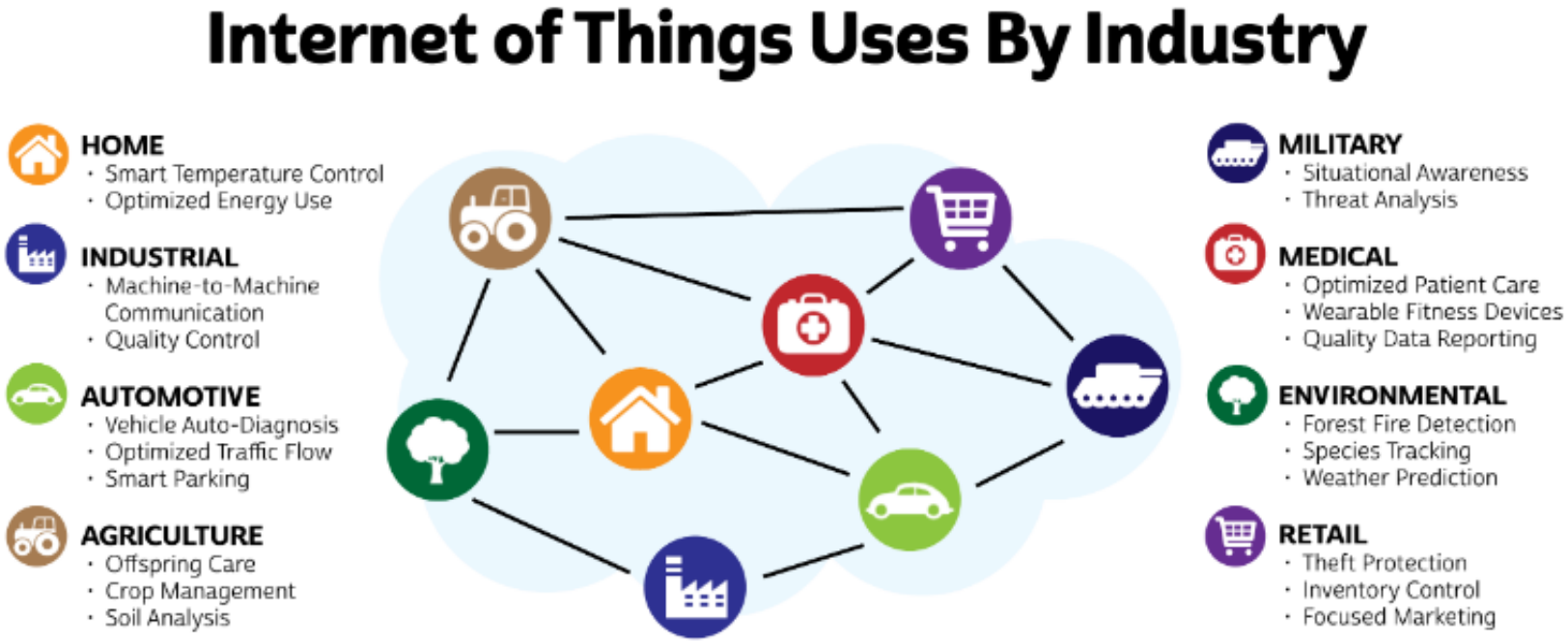
Example:

A US retailer, Target, predicted a teenager girl was pregnant (based on her buying habits) and started sending her baby-related offers.

WHERE DOES BIG DATA COME FROM?

Internet of Things (IOT)

IOT refers to devices that collect and transmit data via the Internet, e.g. smartphone, smartwatch, Fitbit band, TV and refrigerator.



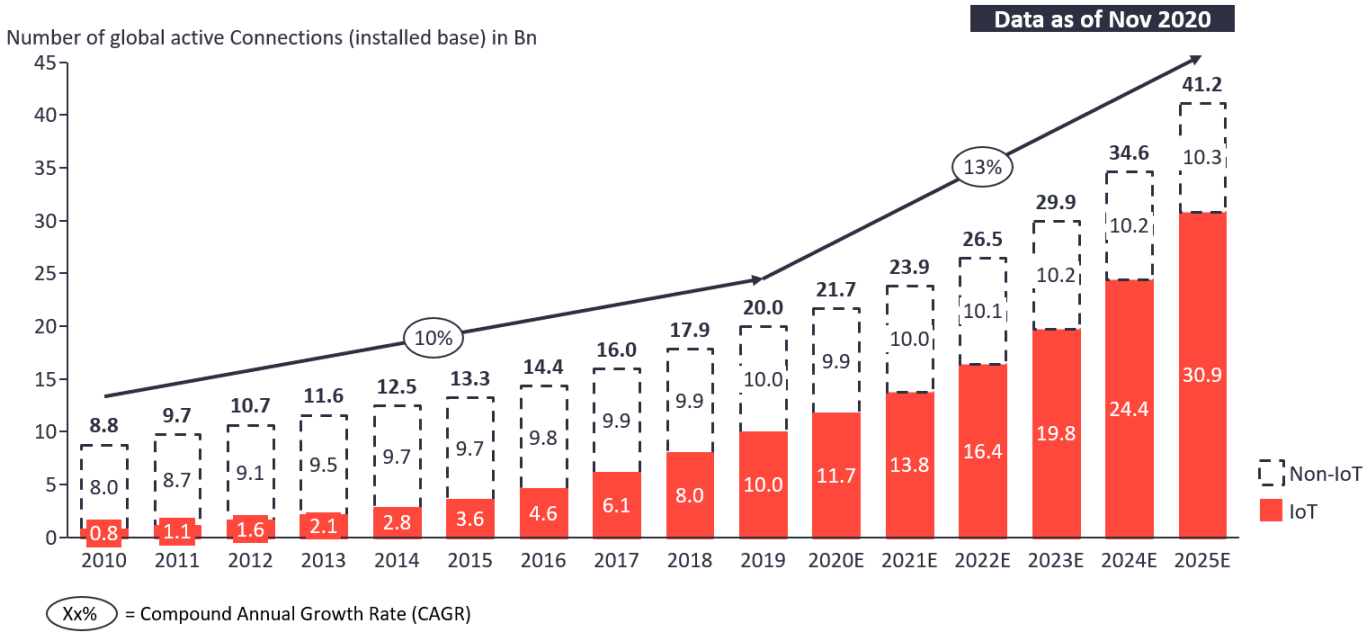
Number of IOT Devices

IOT ANALYTICS

Insights that empower you to understand IoT markets

Total number of device connections (incl. Non-IoT)

20.0Bn in 2019– expected to grow 13% to 41.2Bn in 2025

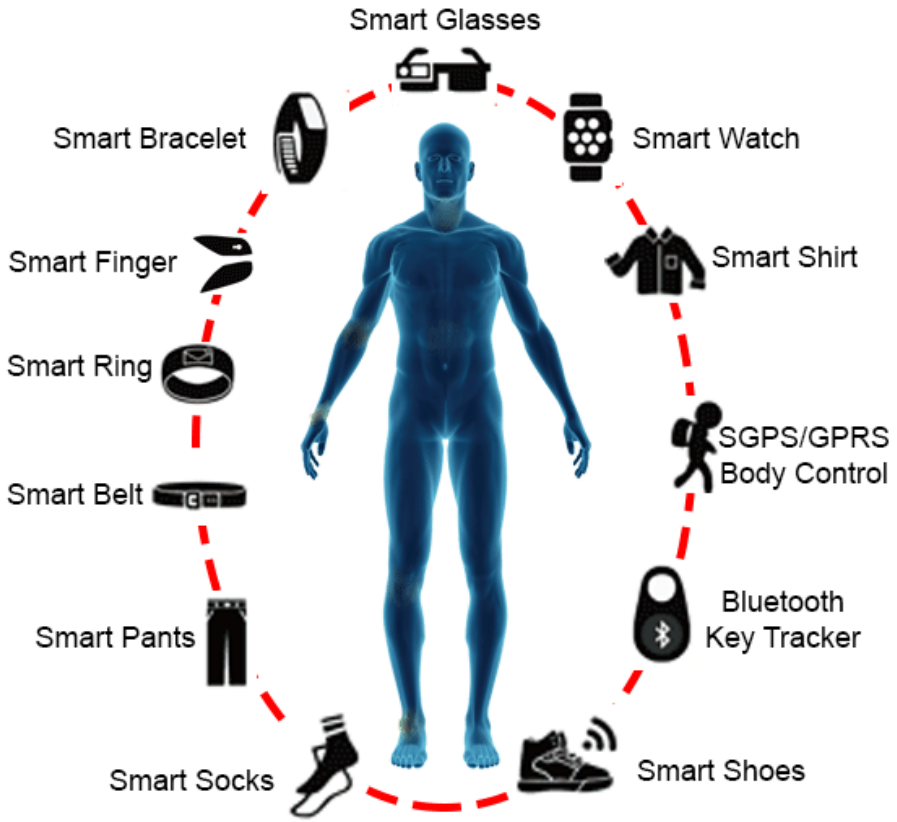


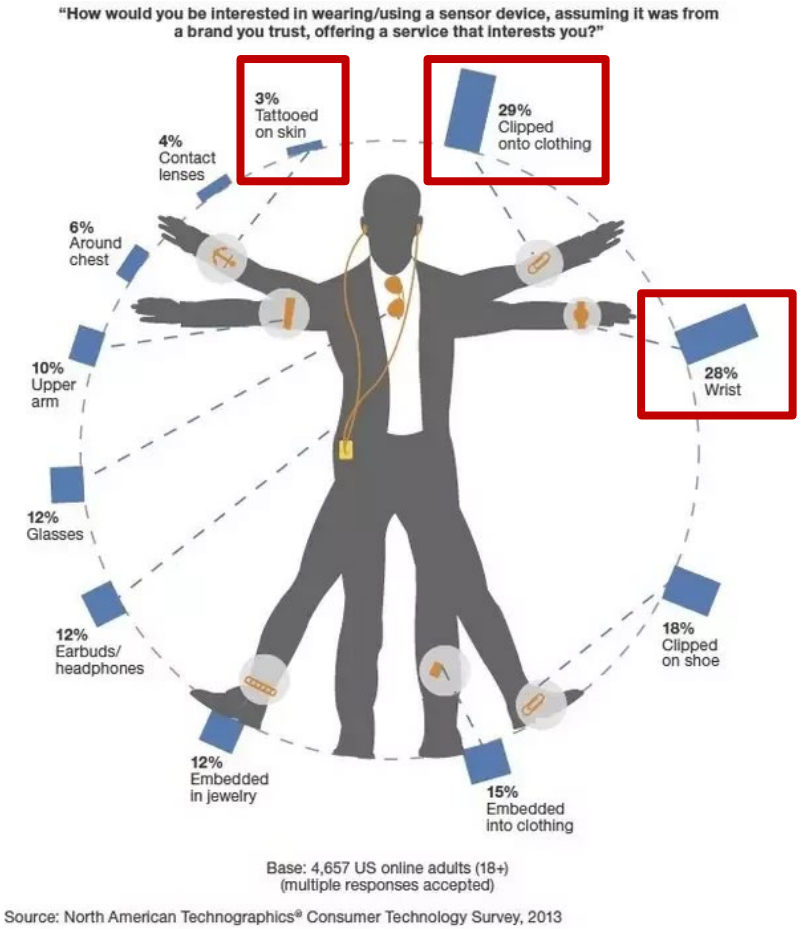
Note: Non-IoT includes all mobile phones, tablets, PCs, laptops, and fixed line phones. IoT includes all consumer and B2B devices connected – see IoT break-down for further details

Source(s): IoT Analytics - Cellular IoT & LPWA Connectivity Market Tracker 2010-25

Smart Devices

Wearables





WHERE HAVE BIG DATA BEEN APPLIED?

Supply Chain Management

Data analysis used in inventory management, forecasting, and transportation logistics.

Warehouses and distribution centres will effectively run themselves with very little need for human interaction.

Retail

Matching customers to products.

Analytics applied at every stage of retail process:

- Working out what the popular products are by predicting trends,
- Forecasting where the demand will be for those products,
- Optimizing pricing for a competitive edge, identifying the customers likely to be interested in them and
- Working out the best way to approach them, taking their money and finally working out what to sell them next.

Banking

Royal Bank of Scotland (RBS) "Personology" programme to reconnect with customers.

- Have customers been paying twice for services?
- Wishing customers "Happy Birthday" when they visit branch.
- Sending automated text messages to let them know that their cash is safe if they accidentally leave it behind after withdrawing it from an ATM.

Domino's Pizza Delivery

Use data to improve the efficiency of their marketing.

Data combined with United States Postal Service, as well as geocode information, and demographic and competitor data, to allow in-depth customer segmentation.

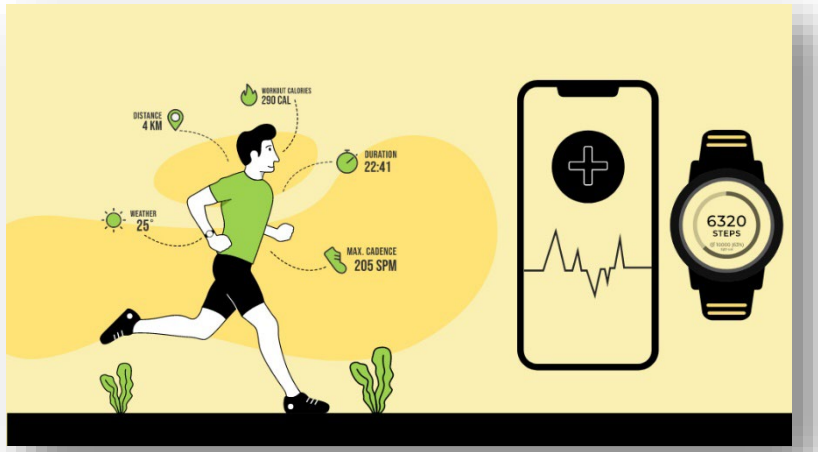
Different coupons and product offers – based on statistical modelling of customers fitting their profile.

Data used to assess performance and drive growth at individual stores and franchise groups.

Health

Smartphones and other popular smart devices now have the capacity to help people track their progress towards a healthier lifestyle.

Apps and devices to help people track and monitor chronic ailments like diabetes, Parkinson's and heart disease are also being developed.



BIG DATA WILL AFFECT BUSINESSES!

ANY ORGANIZATION MUST BECOME A DATA BUSINESS!

Data is a Key Business Asset

It is central to the success of every company.

It is the key to competitive advantage.

A company's ability to compete will increasingly be driven by how well it can leverage data, apply analytics and implement new technologies.

Data and the ability to turn data into business value will become increasingly important in every sector.

International Institute of Analytics (IIA)

Businesses using data see US$430 billion in productivity benefits over competitors who are not using data.

Information is Power

Big data is providing information we could not have dreamt of collecting or analyzing just a few short years ago.

Companies that do not evolve and embrace the data revolution will be left behind.

There will be explosion of the use of external data (from government sources, external providers, etc.).

Example: IBM's acquisition of The Weather Channel, mainly for its data.

International Data Corporation (IDC)

predicts that companies will have to commit to digital transformation on a massive scale, including fundamental cultural and operational transformations.

Rather than using new technologies to complete old tasks, companies and IT departments will be looking at entirely new functions.

Summary

The meaning of data.

The advent of Big Data.

Where does Big Data come from?

Where have Big Data been applied.

How Big Data will affect businesses.

What Will You Learn?

Strategic Big Data Needs

Different Types of Data Analytics

How to use Big Data in Data Analytics

Data Visualisation

Tableau as a tool for Data Visualisation

Design of a Good Data Visualisation

Data Visualisation methods

Data Storytelling

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