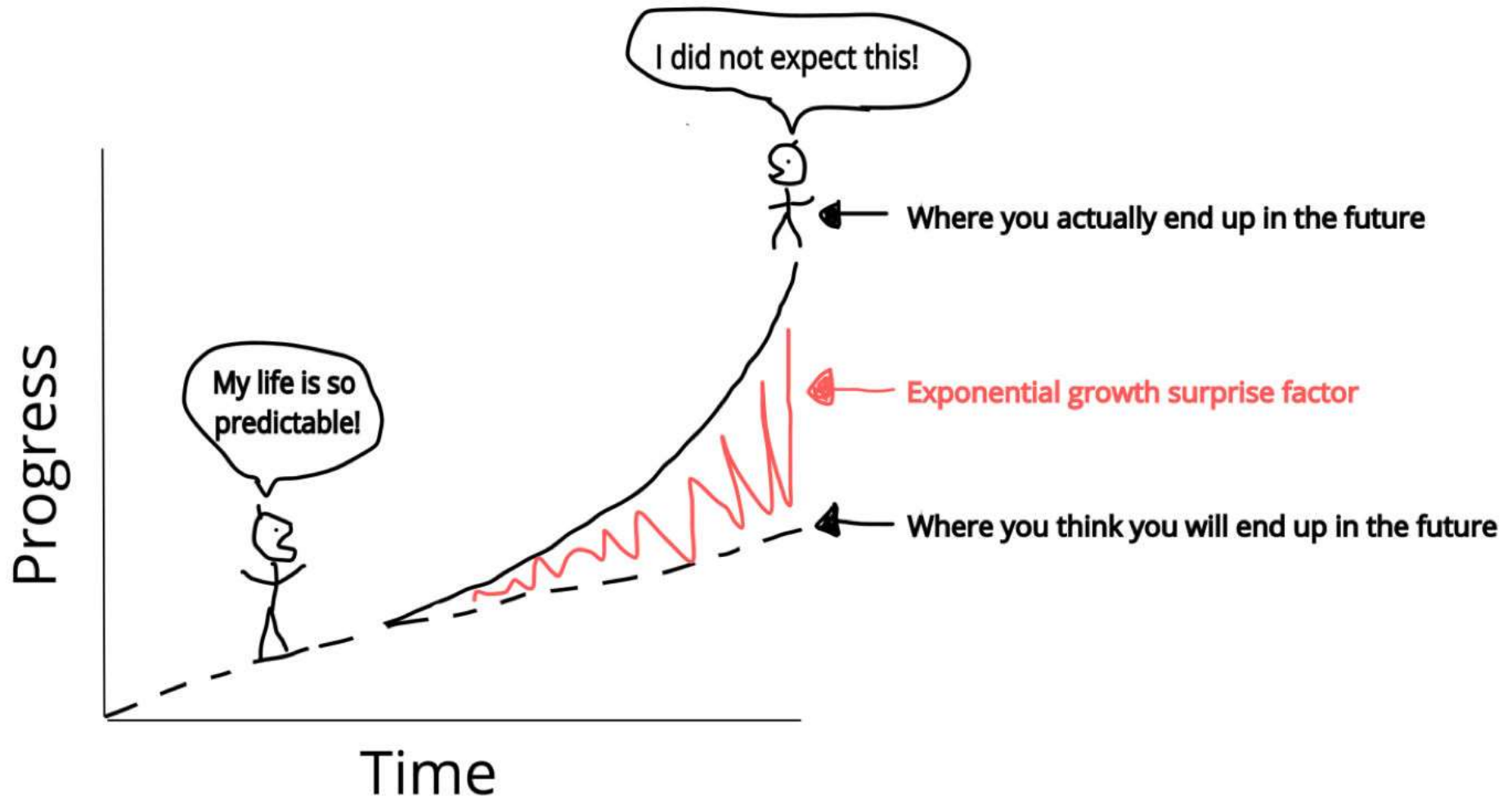


# 5. Technology and Innovation in Hospitality



## 1 The accelerating pace of change ...



## 2 ... and exponential growth in computing power ...

Computer technology, shown here climbing dramatically by powers of 10, is now progressing more each hour than it did in its entire first 90 years

### COMPUTER RANKINGS

By calculations per second per \$1,000



**Analytical engine**  
Never fully built, Charles Babbage's invention was designed to solve computational and logical problems



### Colossus

The electronic computer, with 1,500 vacuum tubes, helped the British crack German codes during WW II



### UNIVAC I

The first commercially marketed computer, used to tabulate the U.S. Census, occupied 943 cu. ft.



### Apple II

At a price of \$1,298, the compact machine was one of the first massively popular personal computers



### Power Mac G4

The first personal computer to deliver more than 1 billion floating-point operations per second

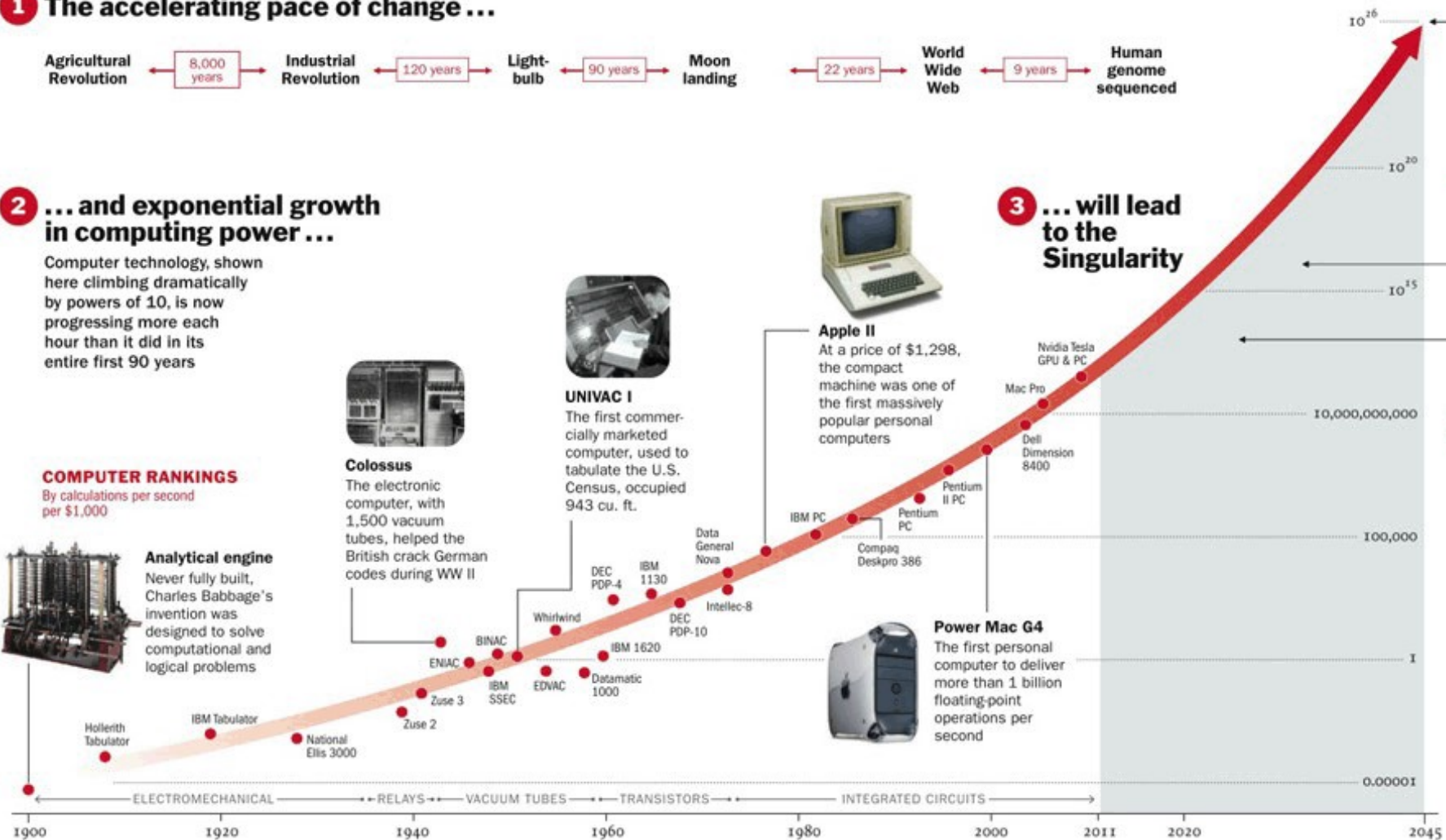
## 3 ... will lead to the Singularity

**2045**  
Surpasses brainpower equivalent to that of all human brains combined

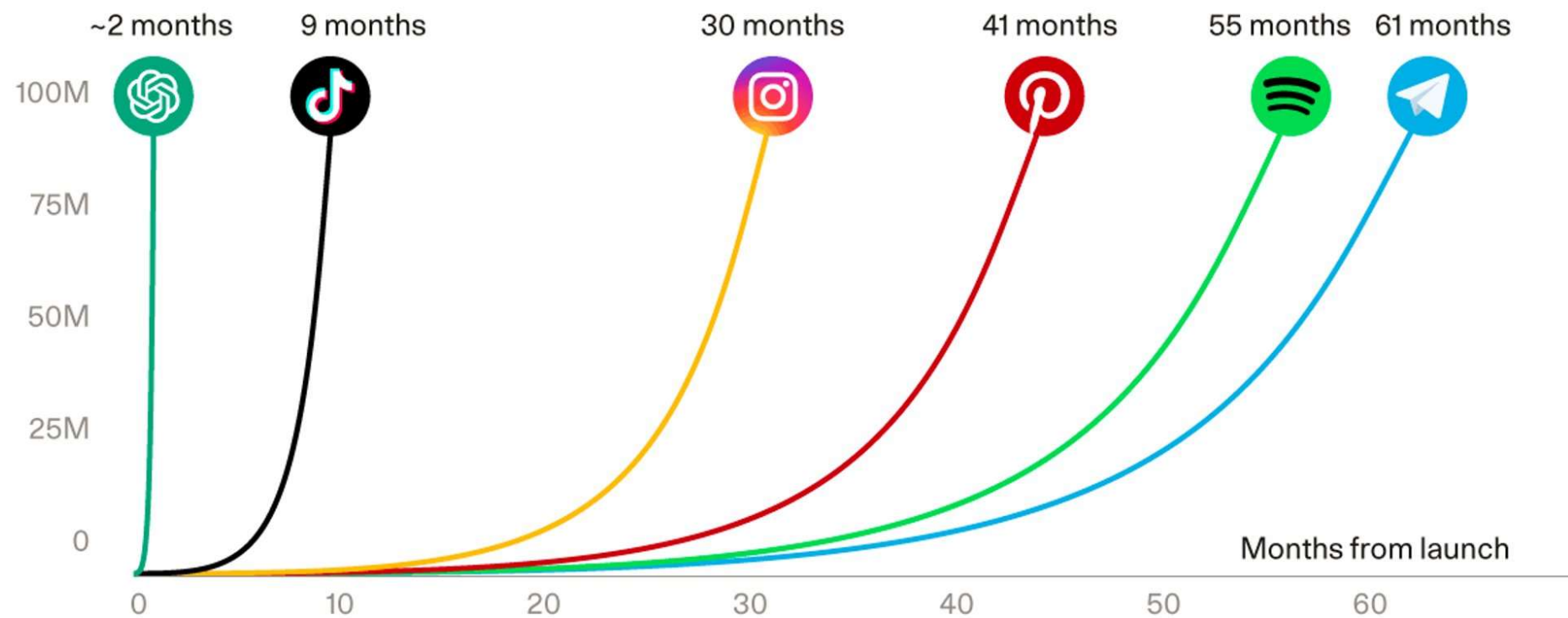
Surpasses brainpower of human in 2023



Surpasses brainpower of mouse in 2015



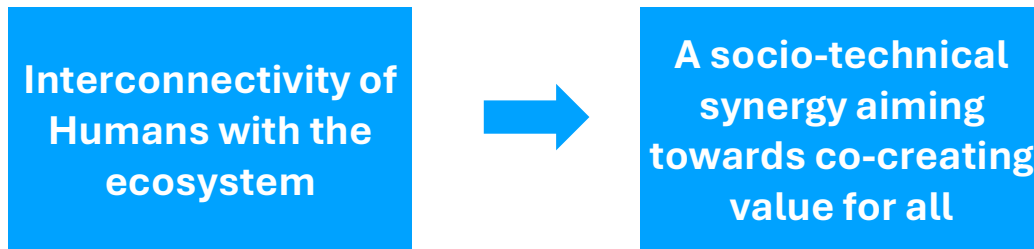
# Path to 100 Million Users (stylized)



## A new paradigm

***“A common aspect in smart places is the reintroduction of the socio-technical paradigm, emphasising the connection between society and technology (Orlikowski, 1992). People and technology are connected and perceived as equal actors (Latour, 2005; Meijer and Bolívar, 2015) collaboratively creating economic, social and environmental prosperity for all (Vargo and Lusch, 2004).”***

**(Boes, Buhalis & Inversini, 2015)**



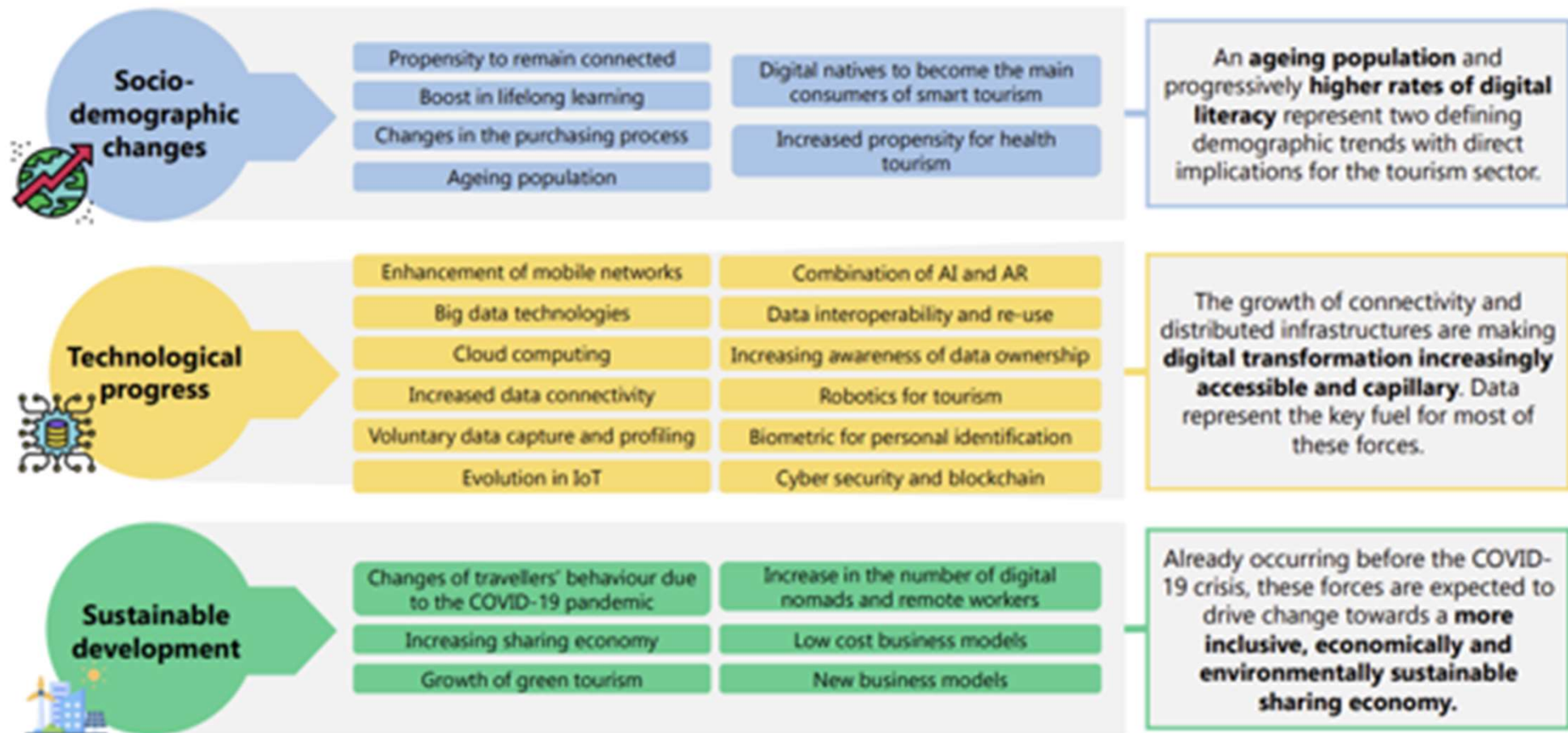
**Service-Dominant logic (S-D)  
principles**

# A new paradigm

Shift from e-tourism to Smart Tourism (Gretzel et al, 2015)

	e-Tourism	Smart Tourism
<b>Sphere</b>	Digital	Bridging digital & physical
<b>Core technology</b>	Websites	Sensors & smartphones
<b>Travel phase</b>	Pre- & post-travel	During trip
<b>Lifeblood</b>	Information	Big data
<b>Paradigm</b>	Interactivity	Co-creation
<b>Structure</b>	Value chain/intermediaries	Ecosystem
<b>Exchange</b>	B2B, B2C, C2C	Public-private-consumer collaboration

# Forces driving change





# Smart Tourism



(Gretzel et al, 2015)



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IoT

AR/VR

5G

AI

Metaverse

Robotics

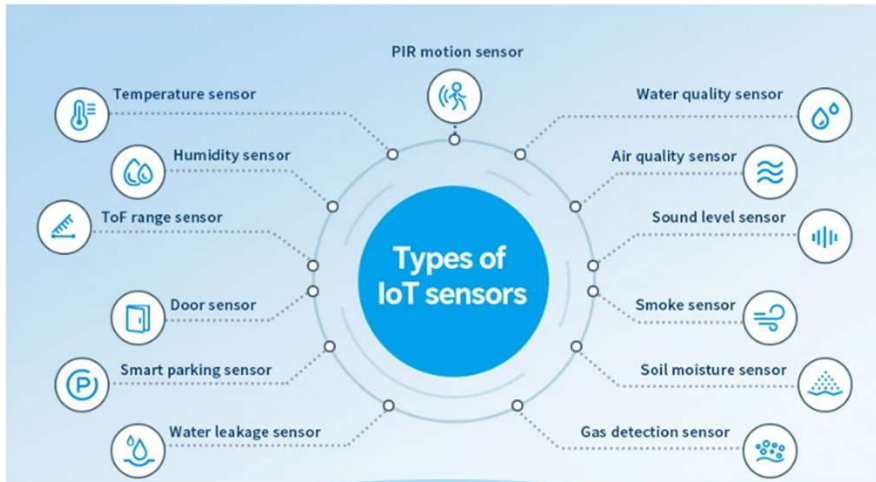
Facial Recognition

Bigdata



# Internet of Things

- Network of physical devices, vehicles, appliances, and other physical objects that are embedded with sensors, software, and network connectivity, allowing them to collect and share data



## Applications

- Smart Hotels (hotels are equipped with IoT-powered devices that provide a more comfortable and customised stay for guests)
- Smart Locks and Check-In: IoT-enabled smart locks allow for seamless check-in and entry
- Energy Efficiency: IoT sensors can detect when guests leave the room and automatically turn off lights or adjust the air conditioning to reduce energy consumption.
- Luggage Tracking: IoT-enabled luggage tracking systems offer a solution to this persistent problem, providing travellers with real-time updates on their belongings and hassle free travel.
- Smart Kiosks: IoT-powered kiosks equipped with AI assistants are placed at airports, hotels, and tourist attractions to provide real-time information on local events, directions and attractions

## Internet of Things



# AR/VR

## Augmented reality (AR)

Augmented reality (AR) is an enhanced version of the real world, achieved through the use of computer-generated digital information. These include visual, sound, and other sensory elements. AR uses computer hardware and software, such as apps, consoles, screens, or projections, to combine digital information with the real-world environment.

### SINGAPORE CASE:



# AR/VR

## VIRTUAL REALITY

Virtual Reality (VR) is a computer-generated environment with scenes and objects that appear to be real, making the user feel they are immersed in their surroundings. This environment is perceived through a device known as a Virtual Reality headset or helmet.





# Metaverse & Digital Twins



Collecting data from various sources



Centralization and analysis in real time data



Real-time visualization on a 3D model



Decision making support info



Automated communication with different stakeholders



More efficient and immediate actions



AI

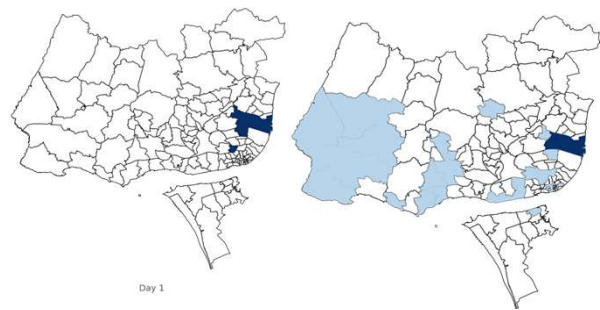




Today!

BIG DATA

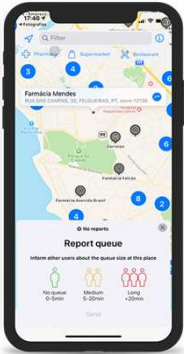
MOBILE



MOBILE



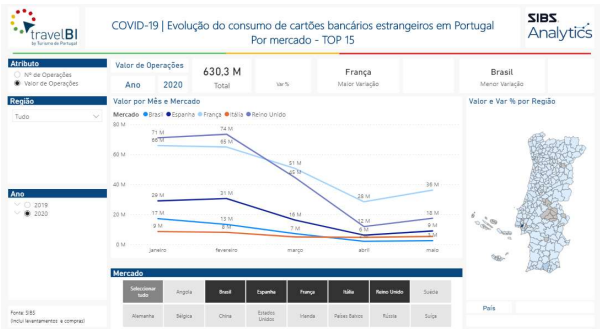
MOBILE



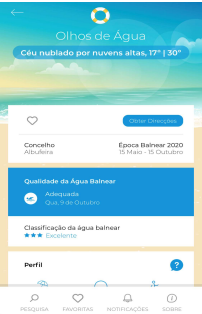
AIRLINES



BANK CARDS



IoT



**Reality or dream?...**

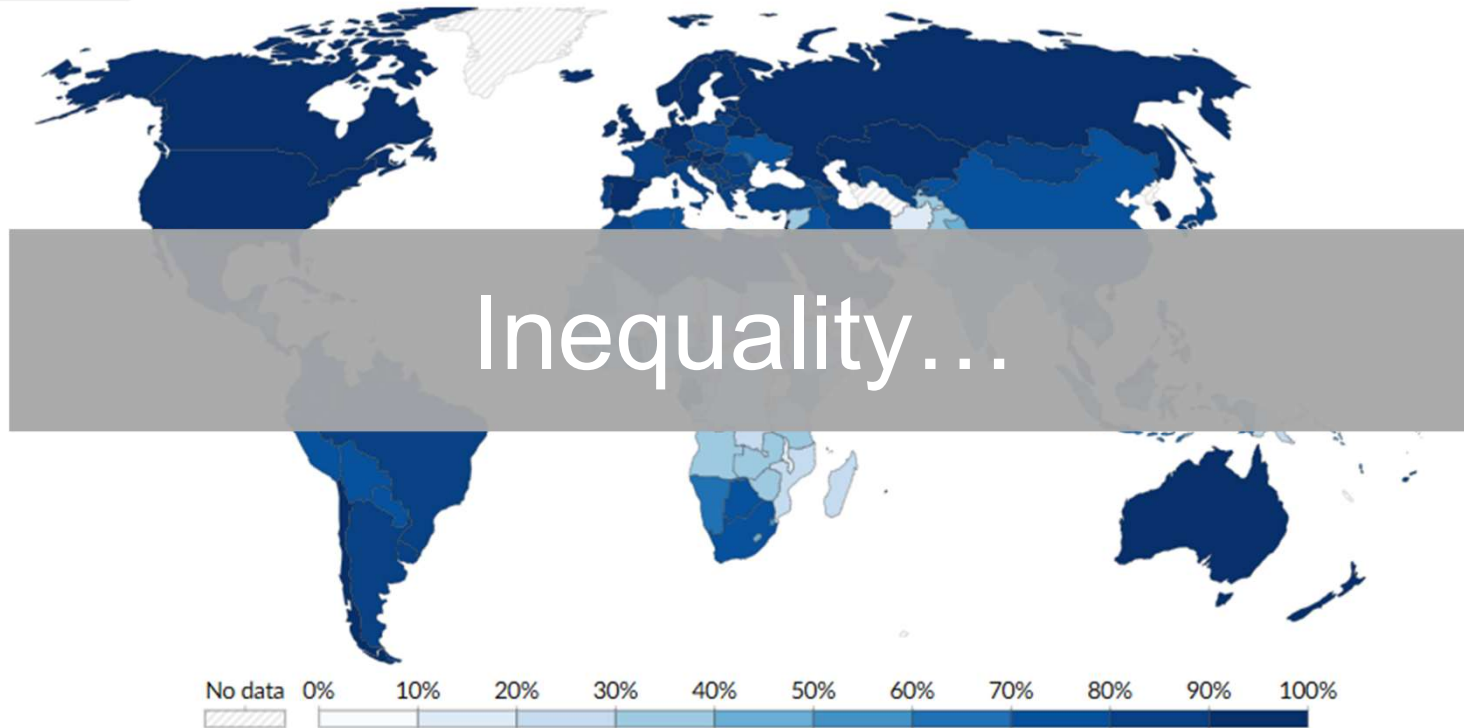
# Share of the population using the Internet, 2023

Share of the population who used the Internet in the last three months.

Our World  
in Data

Table Map Chart

World



Play time-lapse

1960

2023