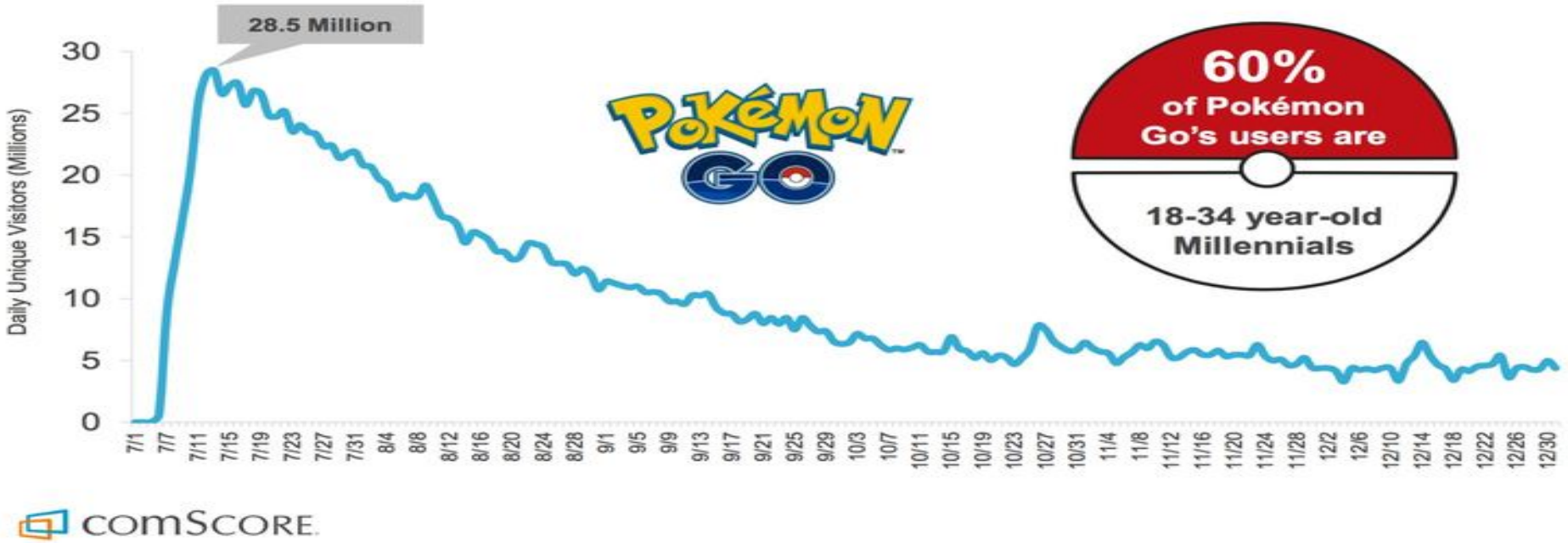
THE WORLD AT A GLANCE: DIGITAL TRENDS

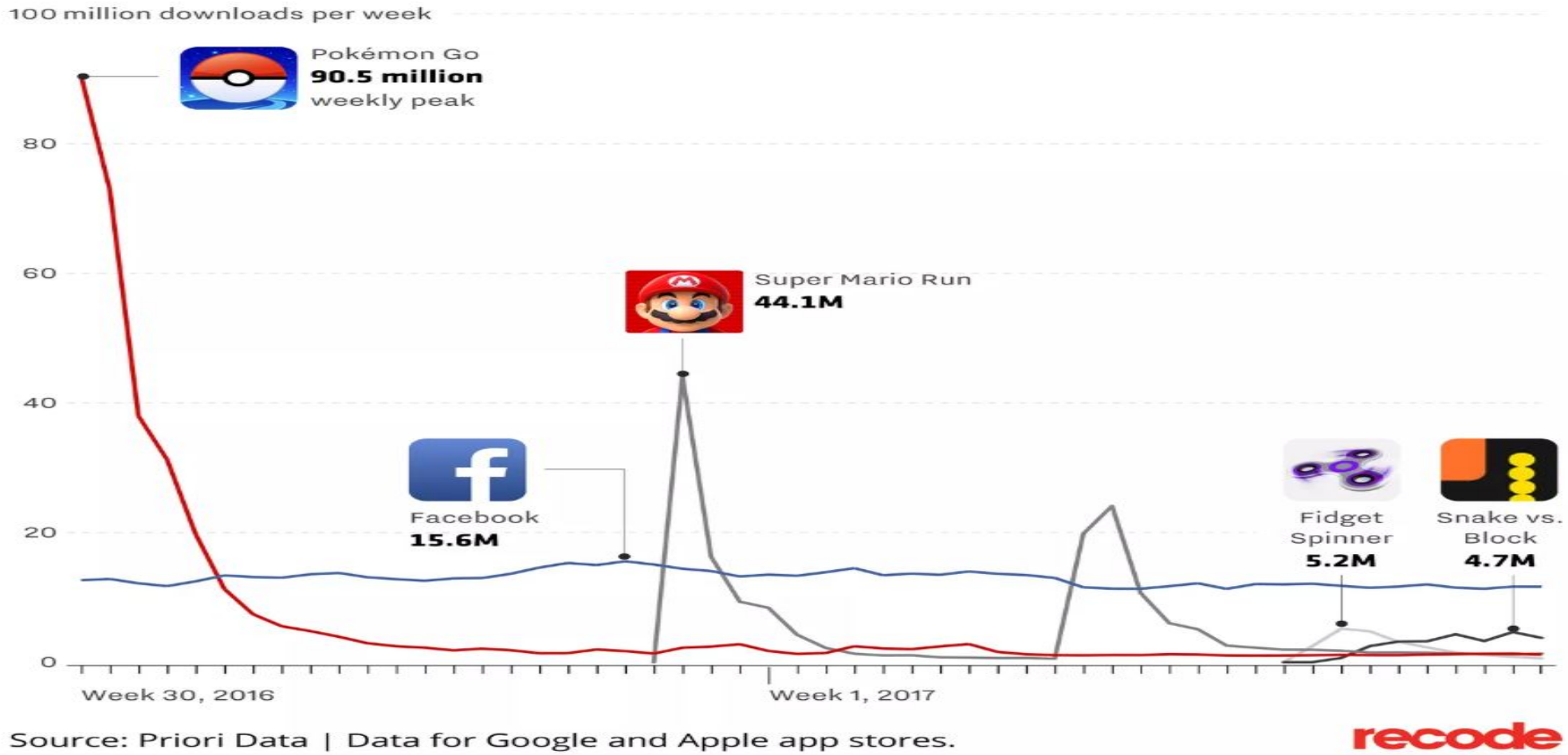
Pokémon GO was a mobile app phenomenon that quickly surged to attract a huge audience but has since come back down to earth



INSIGHT

Pokémon GO – a location-based augmented reality game – launched on July 6th, and in just a matter of days it was consistently capturing more than 20 million daily users. It peaked at 28.5 million daily users on July 13th and, though eventually tailing off, provided an important glimpse into the potential of augmented reality to engage users.

THE WORLD AT A GLANCE: DIGITAL TRENDS



INTRODUCTION

Topic: Sustaining Engineering in a digitized world.

Presenter: Andrew M. Gotora.

Company: thyssenkrupp Industrial Solutions South Africa.

Role: Business and product development ©2019.

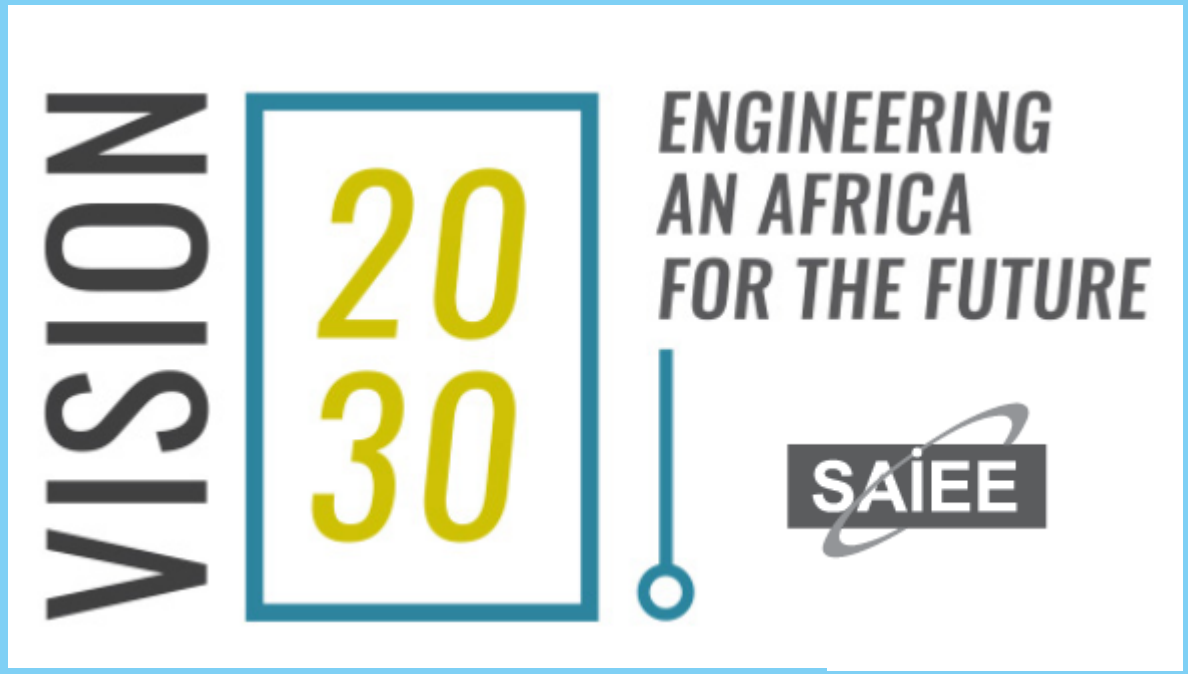
Background: Electronics and electrical engineering + IT.

Passion : All things digital.

SUSTAINING ENGINEERING IN INDUSTRY 4.0

OUTLINE

- Industry 4.0
- Digitized Engineering.
- Sustaining the Future of Engineering.
- Conclusion: Investec.



THE INDUSTRIAL REVOLUTIONS TIMELINE

1784 — 1870 — 1969 — Now

1st Industrial Revolution:

- Mechanization, steam power, weaving looms
- Large-scale transportation with steam-powered vessels and railroads
- Replacing human and animal power with machines

2nd Industrial Revolution:

- Electricity, assembly line, mass production
- Internal combustion engines, automobiles
- Radio and television

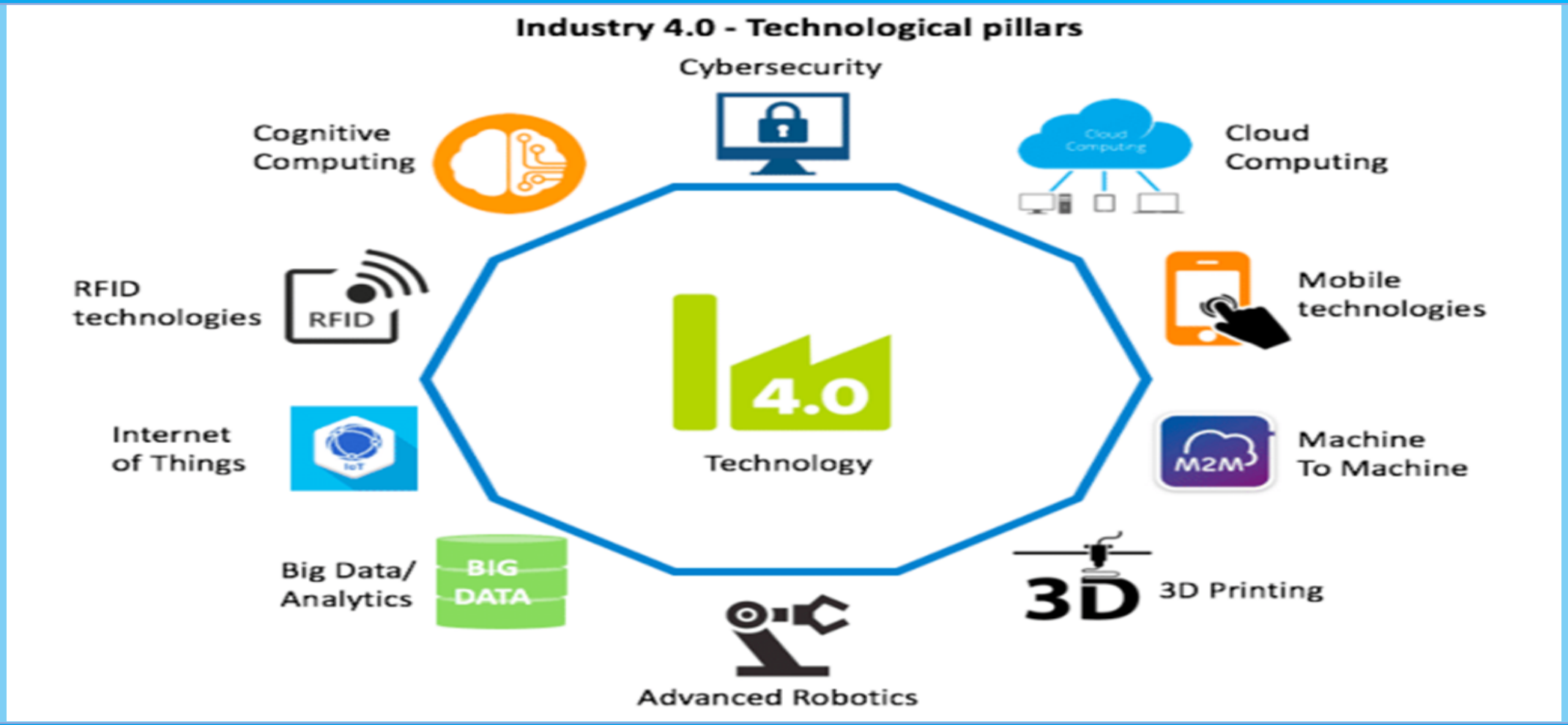
3rd Industrial Revolution:

- Electronics, computers
- Automation
- Information technology

4th Industrial Revolution:

- Cyber-physical systems
- Internet of Things
- Sensor Networks
- Advanced Robotics
- Big Data
- Machine Learning
- Cloud Computing
- Driverless cars
- 3D/4D printing-based manufacturing
- Blockchain transaction architecture

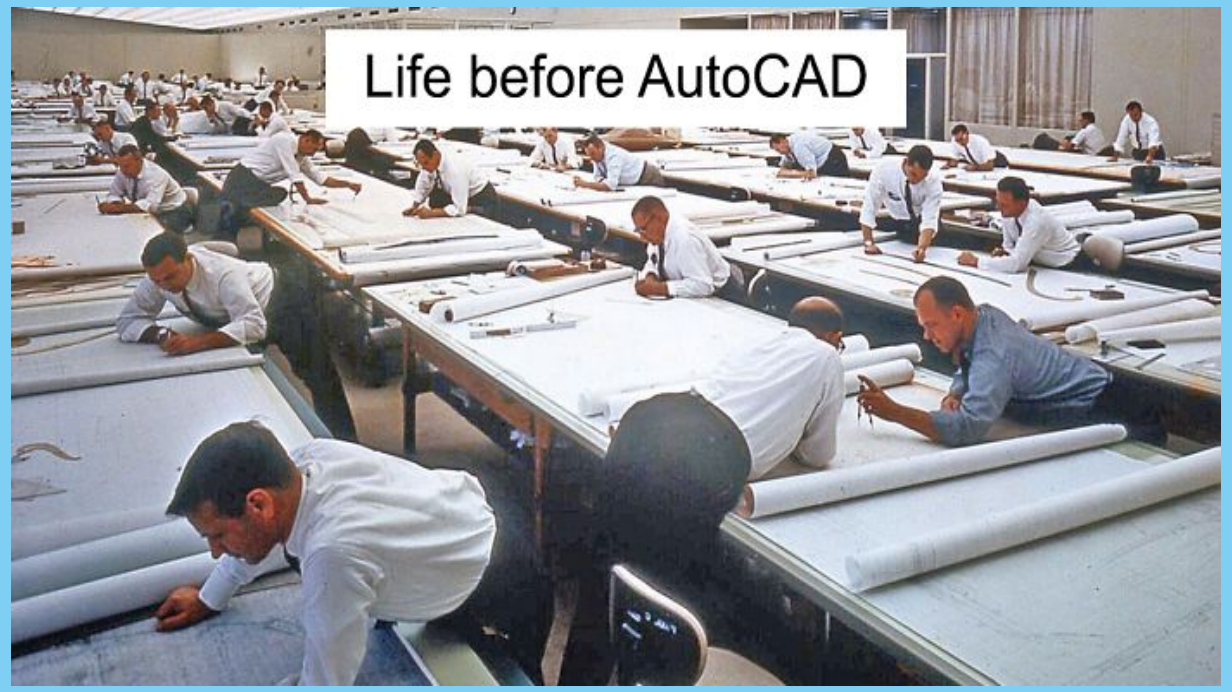
FOURTH INDUSTRIAL REVOLUTION PILLARS



WHAT IS DIGITALIZED ENGINEERING ?

- Digitalized engineering – creation of a wider digital ecosystem through the convergence of IT and classical engineering.

CLASSICAL VS DIGITITALIZED ENGINEERING

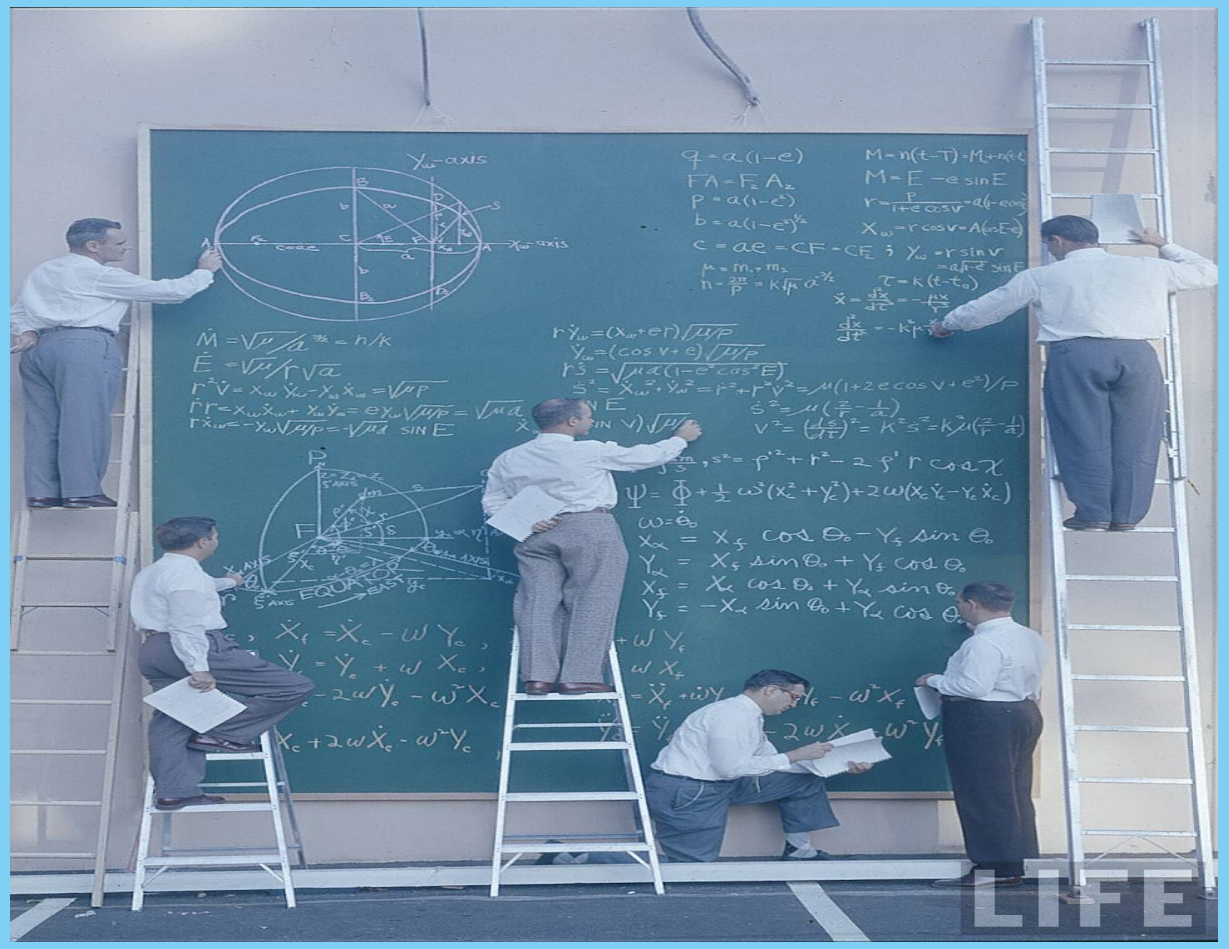


- Engineers used to draw all things on paper, with the help of drafting tools and pencils.
- Designing and putting everything on paper was tedious and time consuming.

CLASSICAL VS DIGITITALIZED ENGINEERING

Engineering at NASA.

- Before the invention of electronic calculators and computer, engineers at NASA had to do all calculations by hand.
- Due to the magnitude of calculations that needed to be worked out, engineers would use huge chalkboards and ladders to write onto the highest of places.



CLASSICAL VS DIGITITALIZED ENGINEERING

- Dragonfly is a planned spacecraft and mission that will send a mobile robotic rotorcraft lander to Titan, the largest moon of Saturn, by NASA to study prebiotic chemistry and extraterrestrial habitability at various locations.

DIGITALIZED ENGINEERING: TOOLS

- 3D modelling and additive manufucturing.
- Big data. Cloud services.
- Virtual and augmented reality.
- ML and AI. Autonomous vehicles.
- Advanced robotics and IoT.
- Engineering design software - Building Information Modelling.
- Various technologies to capture, share, manipulate and analyze big & complex data - supercomputers, advanced sensors.

PROS OF DIGITITALIZED ENGINEERING

- Pros:
  - Design and cost optimization.
  - Customization of products.
  - Improved performance and productivity.
  - Reduced deployment time.
  - Ease of use.
  - Enriched customer experience.
  - New opportunities are created. New business models.

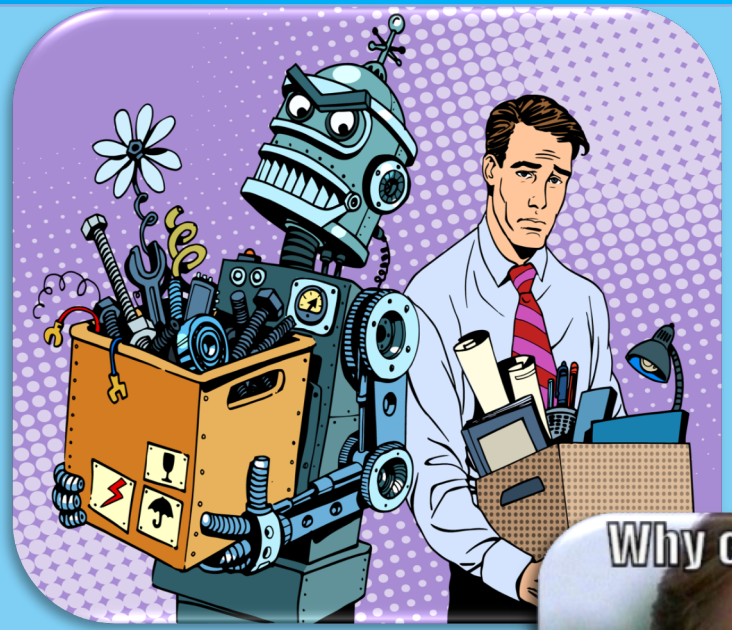
CONS OF DIGITITALIZED ENGINEERING

- Cons:
  - AI is only as good as the data used to train it. Tay!
  - High capital investment. Amazon spent $22.6 billion in 2018 – larger than Malawi & Mozambique GDP !
  - Data security. Leaks. Weaponization. Storage costs.
  - Takes time to adopt. Organizational resistance.
  - Loss of jobs.(Manual draughtsman vs AutoCAD).
  - Cost of skills development (retooling).
  - Too much reliance on technology and automation.
  - Erosion of the classical engineering skill. Engineer = Data capturer.

SUSTAINING FUTURE OF ENGINEERING

Intrinsic analysis: Man vs Machine

- MAN:
  - Emotional intelligence.
  - Social and people skills.
  - Effective communication – customer service.
  - Creativity – Innovation, Arts, Entertainment.
  - Build relationships.
- MACHINE:
  - Following instructions.
  - Collecting and processing data.
  - Strength, speed, precision and accuracy.
  - Works around the clock.

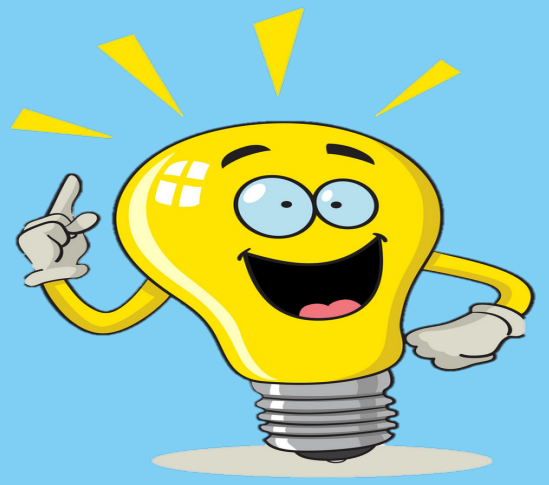


SUSTAINING FUTURE OF ENGINEERING

- Engineers should not compete with machines; they need to focus on skills that are intrinsically human. Reasoning, thinking outside the box, innovation.
- Human - machine partnerships, utilizing the best in both.
- Machines should amplify human potential, not replace the human.
- Human-centered approach; serve the human.
- A gradual shift from a knowledge-based learning system to a soft skills inclined learning system – “Humans can never compete with machine, they are smarter. We have to teach something unique so that machines can never catch up.” – Jack Ma.

SUSTAINING FUTURE OF ENGINEERING

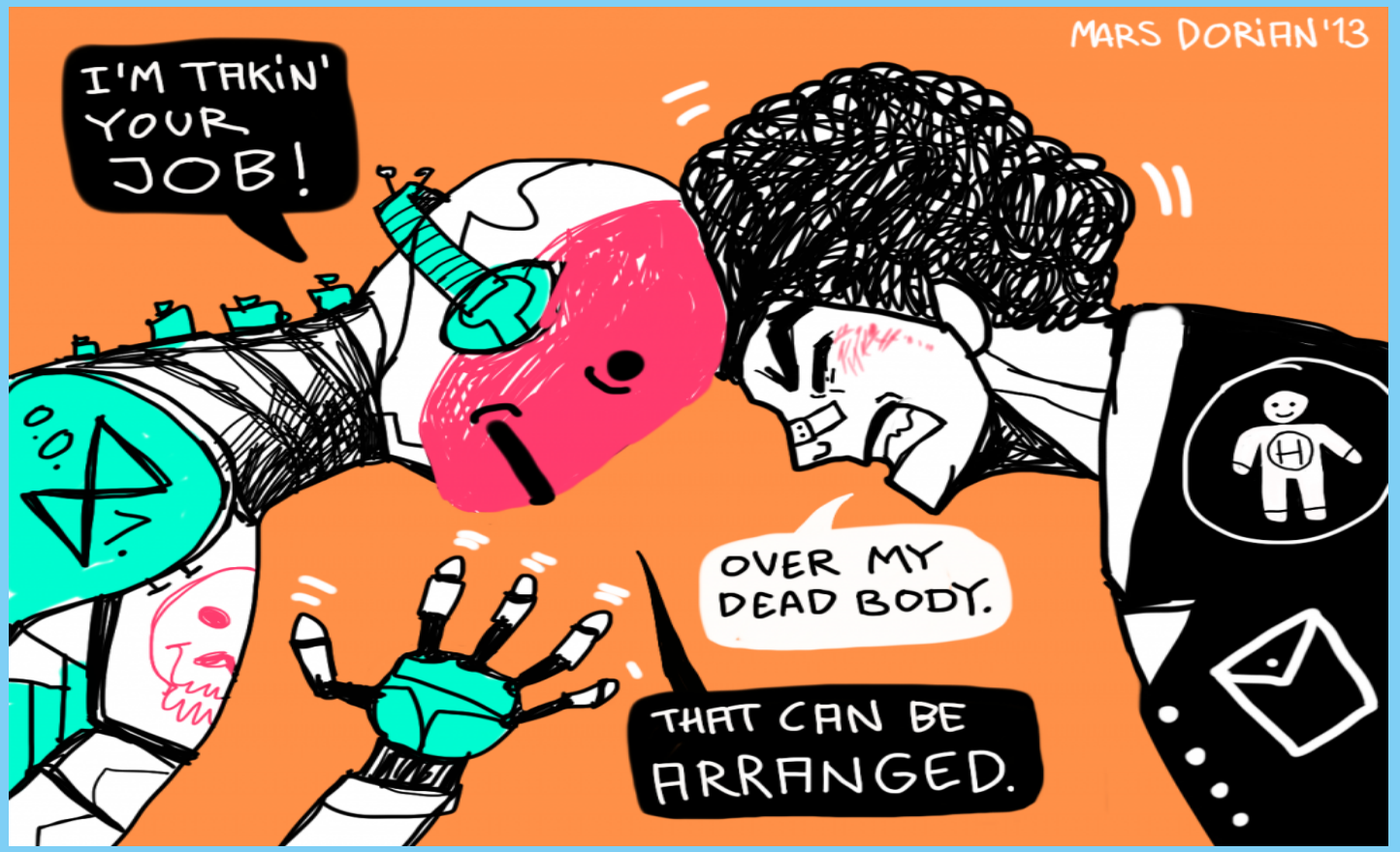
- Digital culture.
- Organizational transformation. New leadership skills.
- Keep up with digital trends.
- Adapt or face extinction. (Kodak)
- Skills development, both soft and IT skills.
- Importantly, explore new opportunities.



- “The main challenge in digitization is not technology; it is building an organizational culture that enables adoption of new technologies. Becoming a digital organization requires new leadership skills, combined with connecting people processes and data.” – Anne Bendzulla, Chief Digital Officer at tkIS.

INVESTEC: THE FUTURE OF WORK

THANK YOU.


MARS DORIAN '13
I'M TAKIN' YOUR JOB!
O.O.
OVER MY DEAD BODY.
THAT CAN BE ARRANGED.