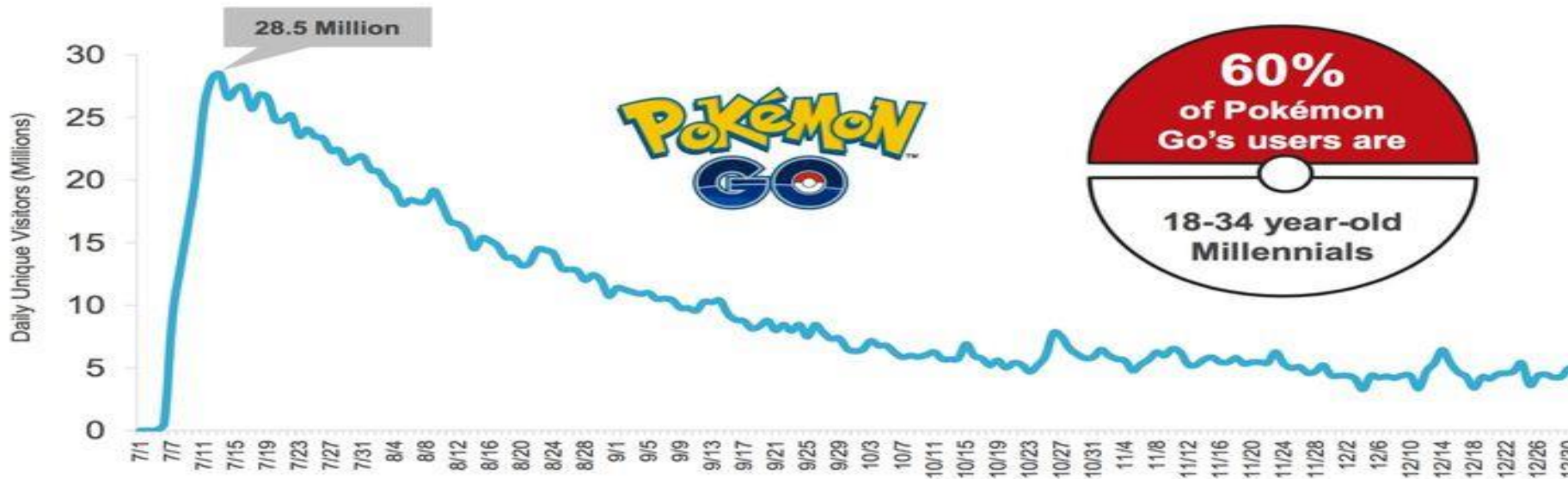


THE WORLD AT A GLANCE: DIGITAL TRENDS

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

Pokémon GO: Daily Unique Visitor Trend

Source: comScore Custom Analytics, U.S., Age 18+, Jul 2016 – Dec 2016

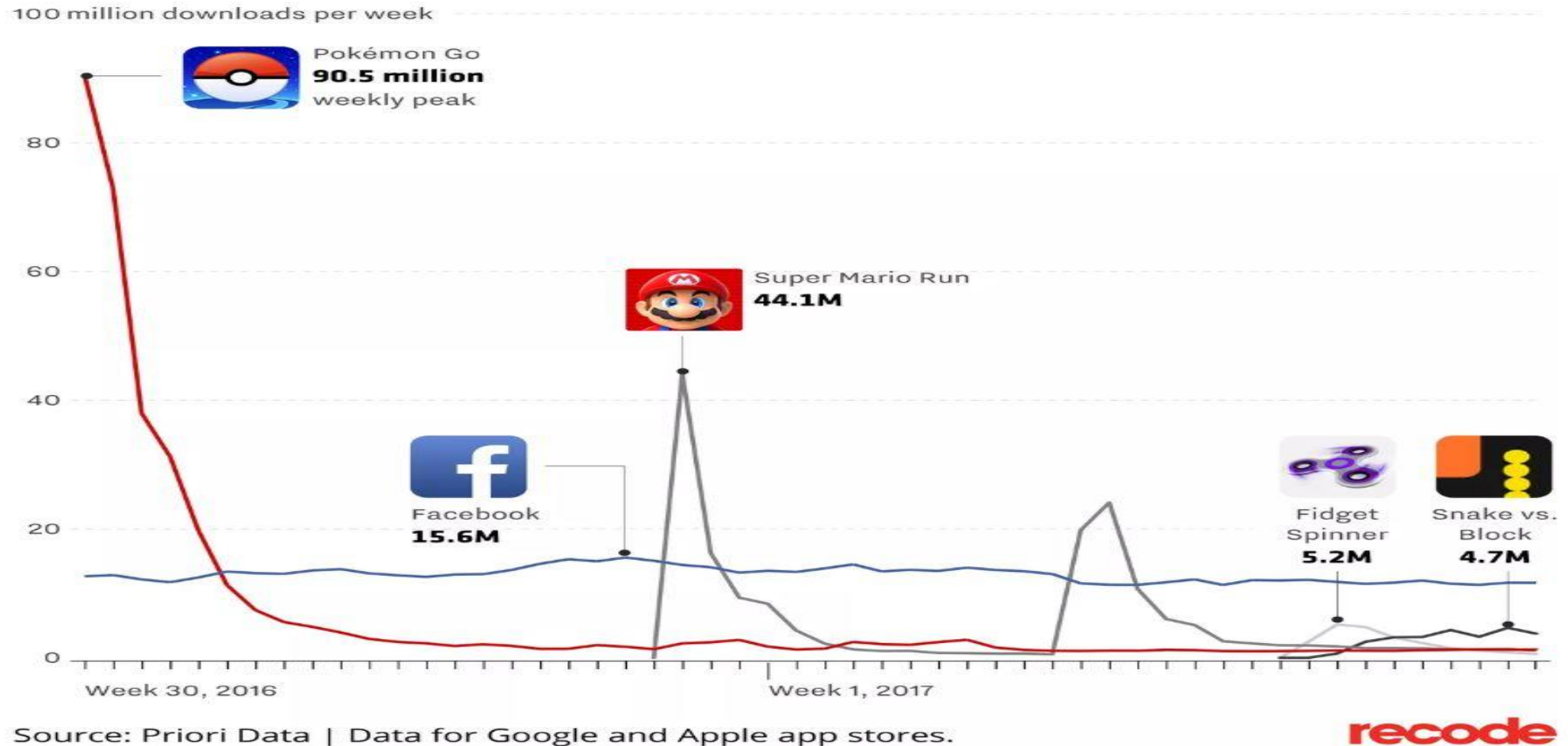


INSIGHT

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. Gotor.

Company: thyssenkrupp Industrial Solutions South Africa.

Role: Business and product development ©2019.

Background: Electronics and electrical engineering + IT.

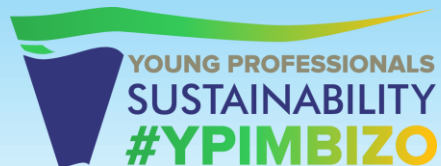
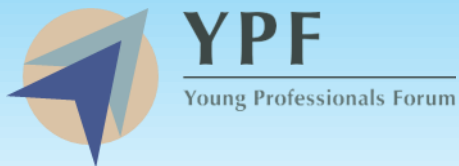
Passion : All things digital.



SUSTAINING ENGINEERING IN INDUSTRY 4.0

OUTLINE

- Industry 4.0
- Digital Transformation.
- Sustaining the future of Engineering.
- Conclusion: Investec.



SUSTAINING
THE FUTURE OF
ENGINEERING

Slack: ypf.slack.com

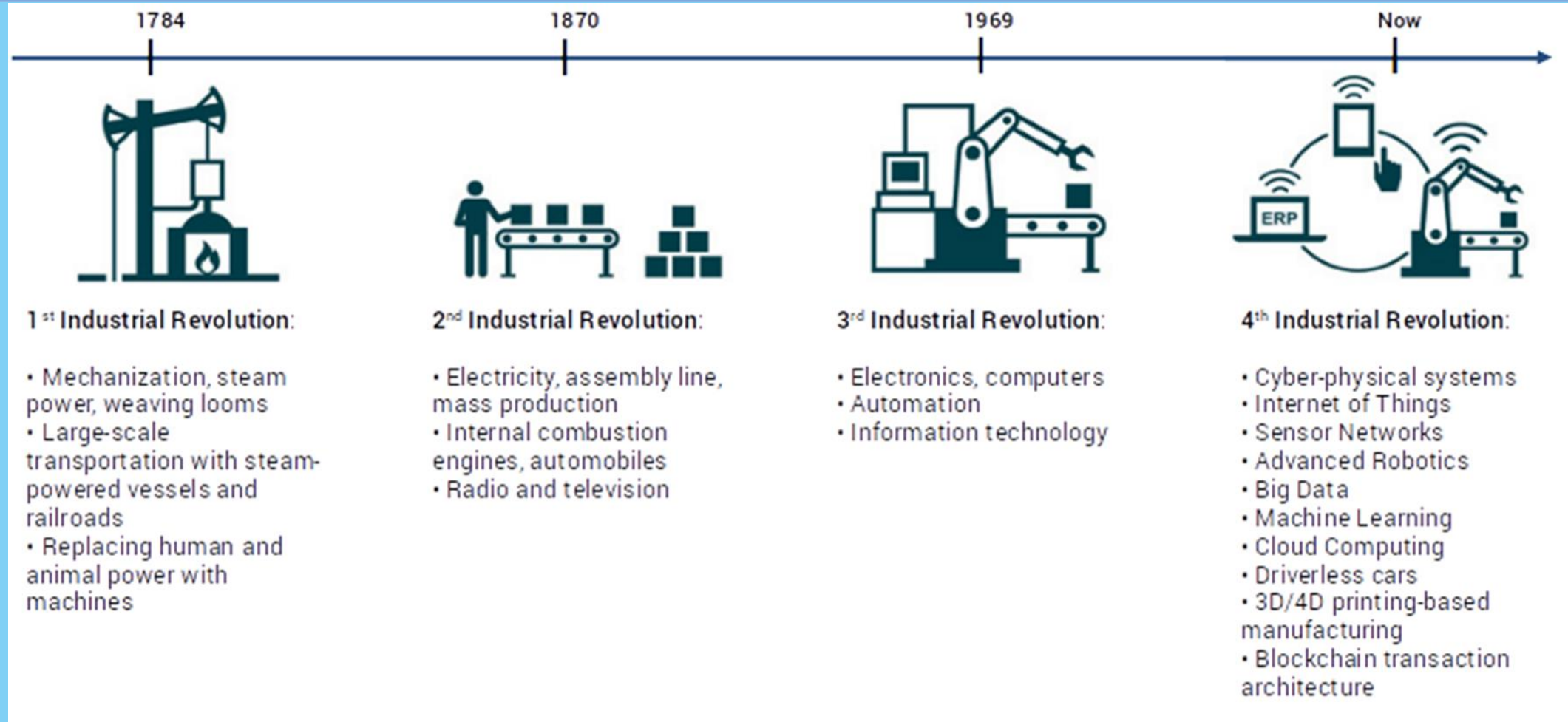
Twitter: [@CESA_YPs](https://twitter.com/CESA_YPs)

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thyssenkrupp engineering.tomorrow.together.

THE INDUSTRIAL REVOLUTIONS TIMELINE



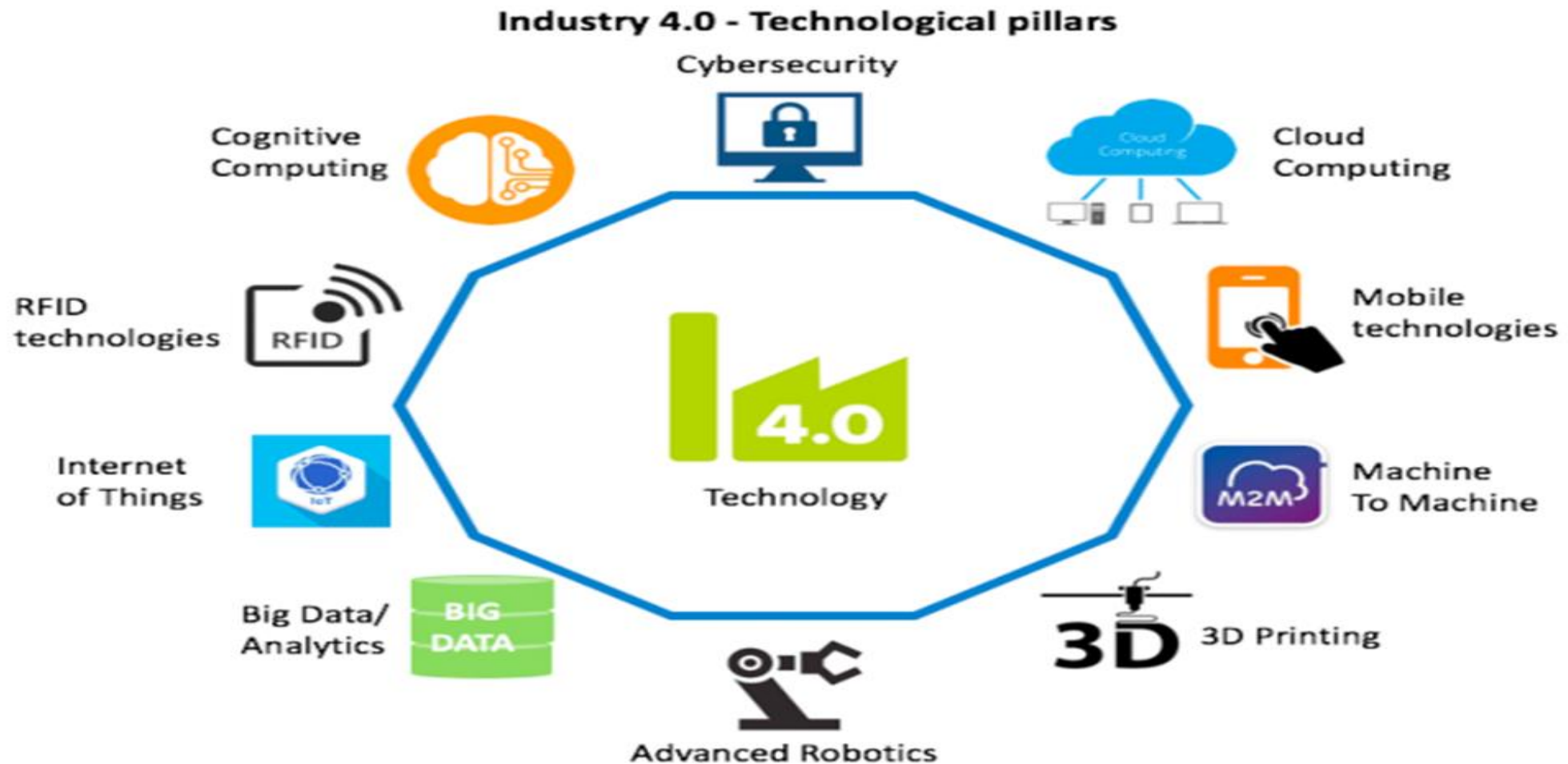
FOURTH INDUSTRIAL REVOLUTION (INDUSTRY 4.0)

"The Fourth Industrial Revolution"

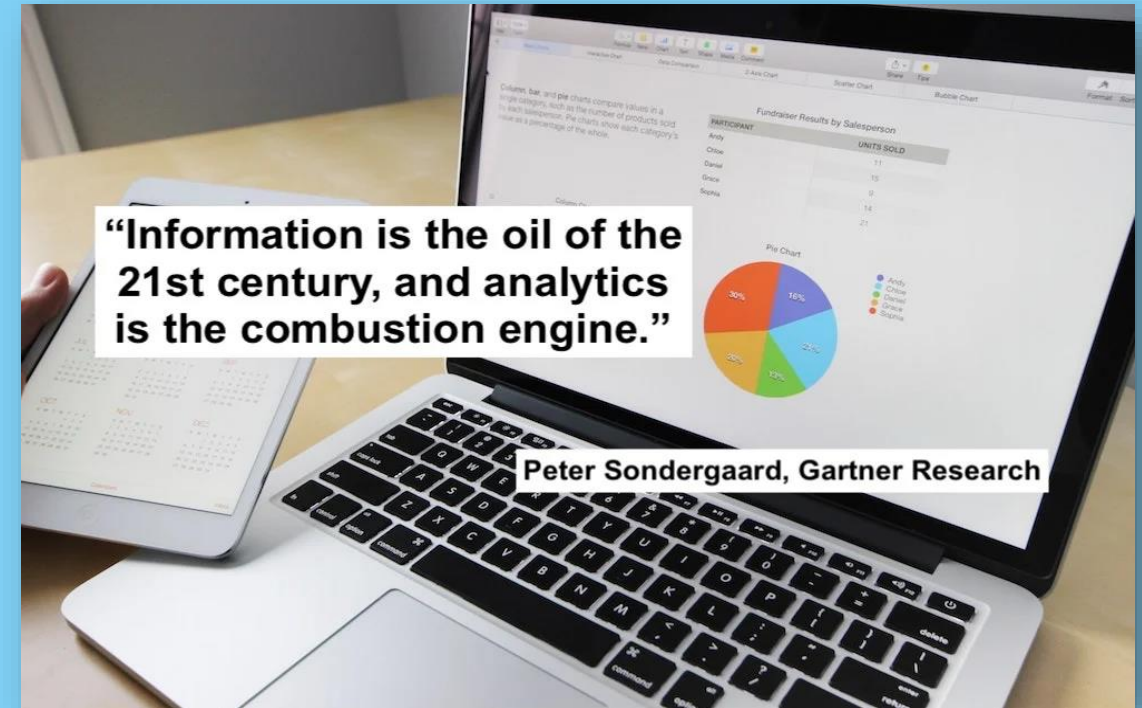
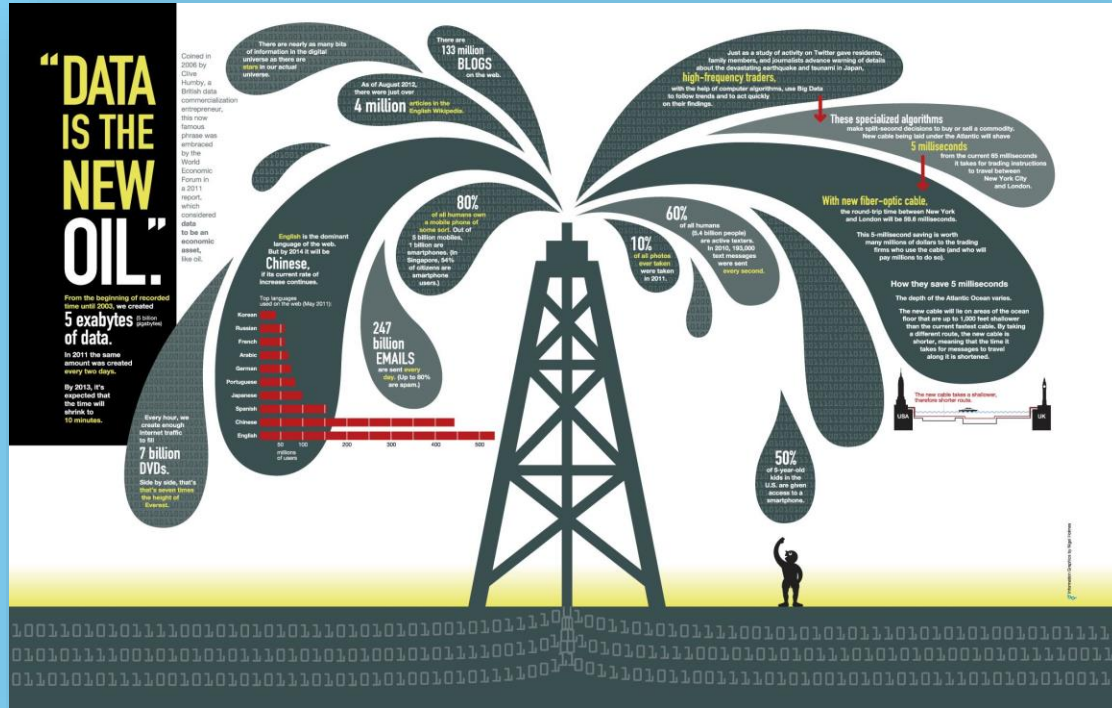
- Term first coined by Klaus Schwab, the Executive Chairman of the World Economic Forum.
- Described as the “**technological revolution**” blurring the lines between the physical, digital and biological spheres.



FOURTH INDUSTRIAL REVOLUTION PILLARS



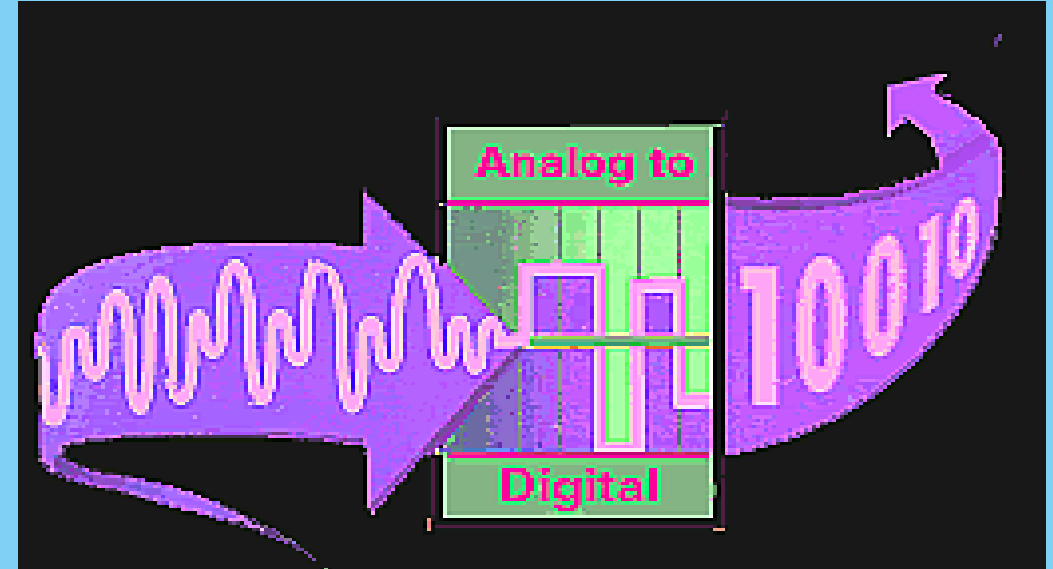
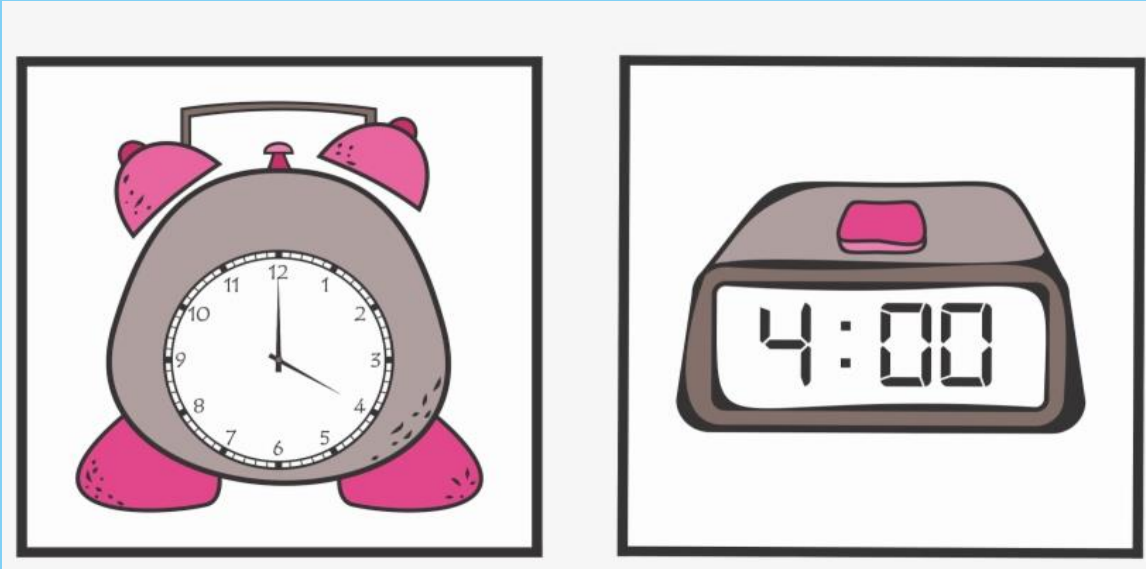
VALUE OF DATA IN THE DIGITAL ERA



- Land was wealth 300 years ago. The person who owned the land owned the wealth. Then, it was factories and production, and America rose to dominance. The industrialist owned the wealth. Today, it is information. – Robert Kyasoki.



WHAT IS DIGITAL TRANSFORMATION ?



- Digital transformation is the process of using **digital technologies** to create new - or modify existing - engineering processes, services and solutions to meet changing engineering, business and market requirements.



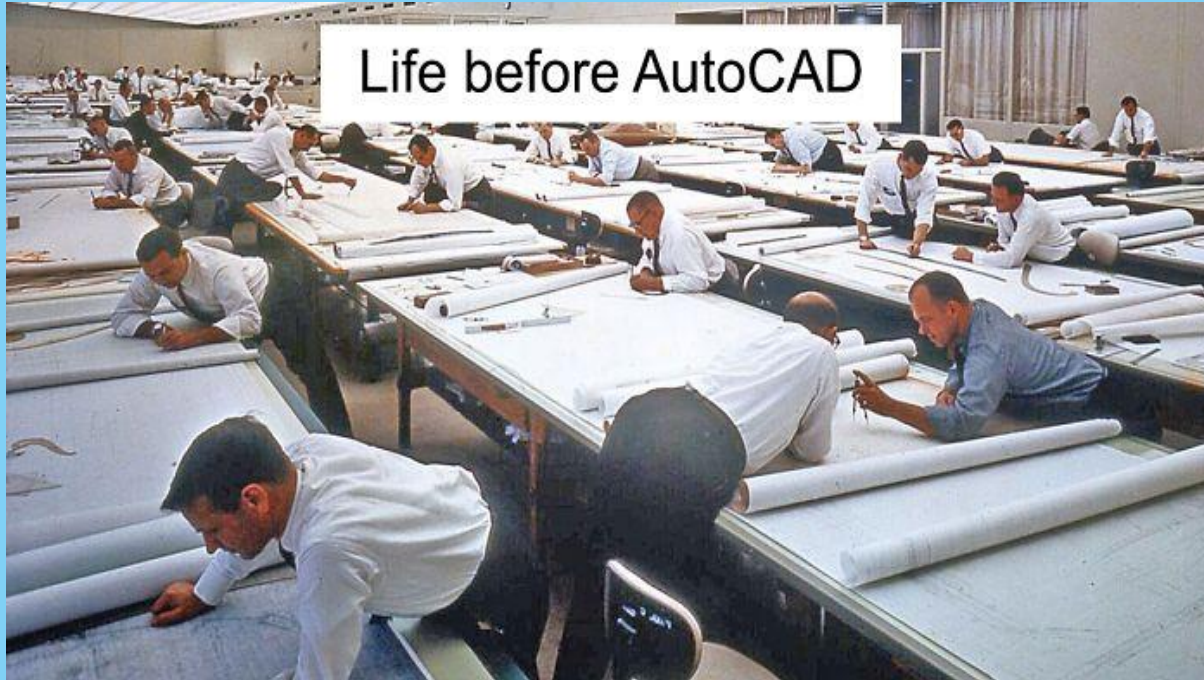
WHAT IS DIGITALIZED ENGINEERING ?



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



CLASSICAL VS DIGITALIZED ENGINEERING



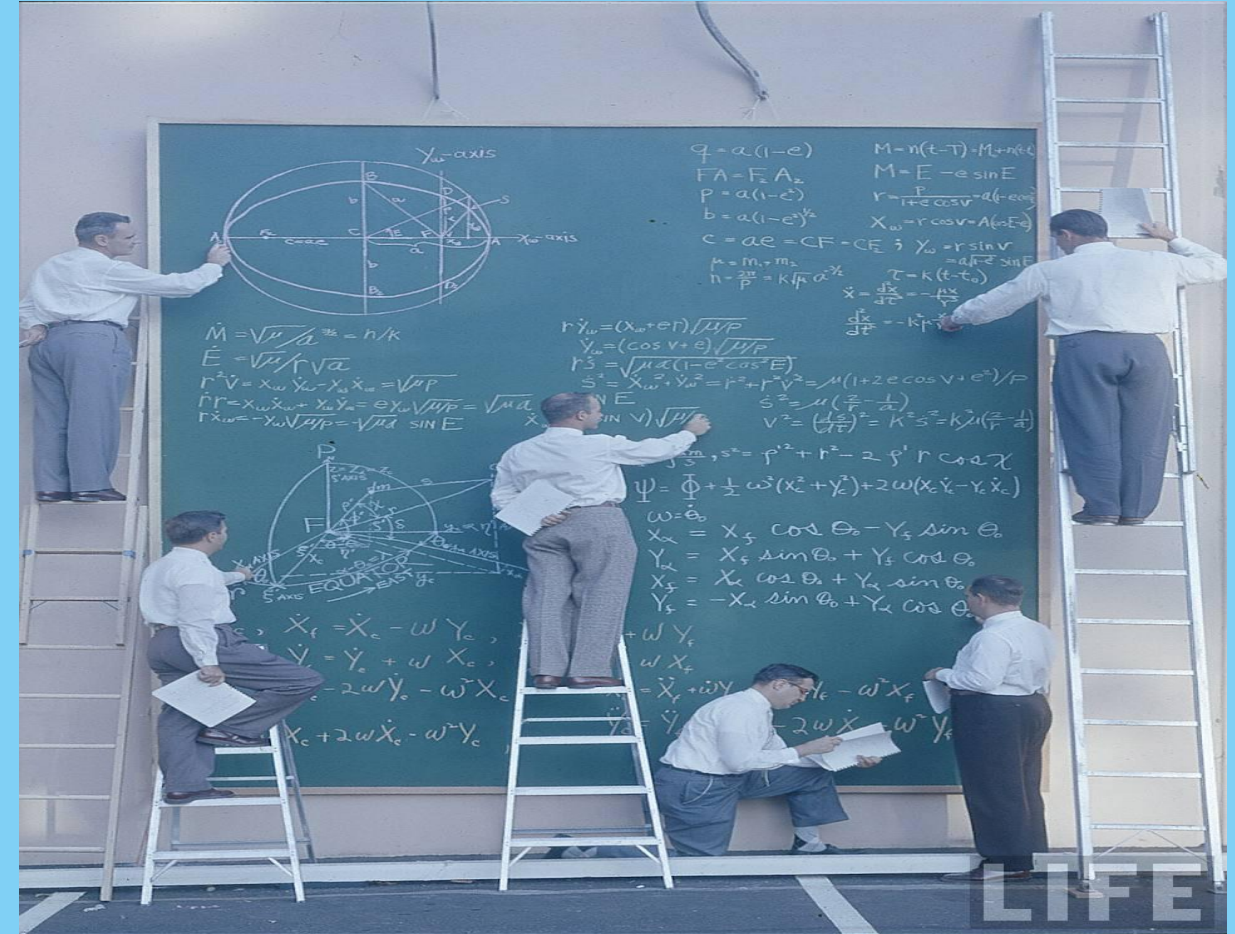
- Engineers used to draw all things on paper, with the help of drafting tools and pencils.
- Designing and putting everything on paper was tedious and time consuming.



CLASSICAL VS DIGITALIZED 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.

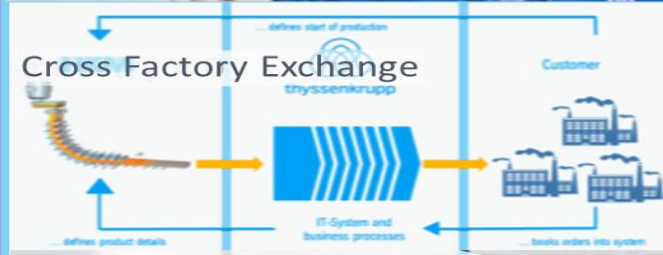


DIGITALIZED ENGINEERING: TOOLS

- 3D modelling and printing.
- 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.



DIGITALIZED ENGINEERING: TOOLS & TECH @ tk



engineering. tomorrow. together.

PROS OF DIGITALIZED 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 DIGITALIZED ENGINEERING

- Cons:

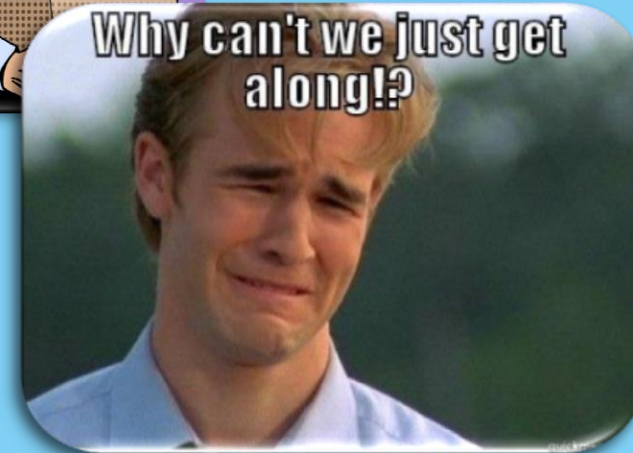
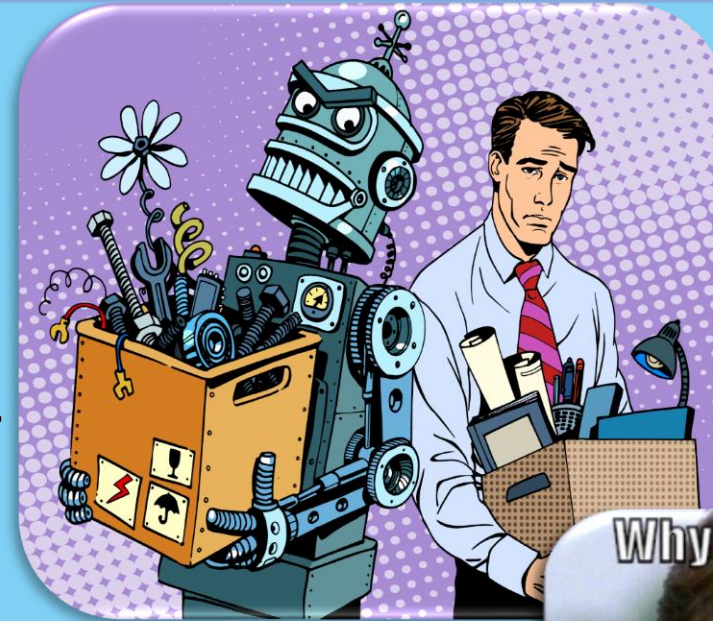
- AI is only as good as the data used to train it. Tay!
- High capital investment. Amazon spent \$22.6 billion in 2018 – larger than Malawi & Mozambique GDP !
- Data security. Leaks. Weaponization. Storage costs.
- Takes time to adopt. Organizational resistance.
- Loss of jobs.(Manual draughtsman vs 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.



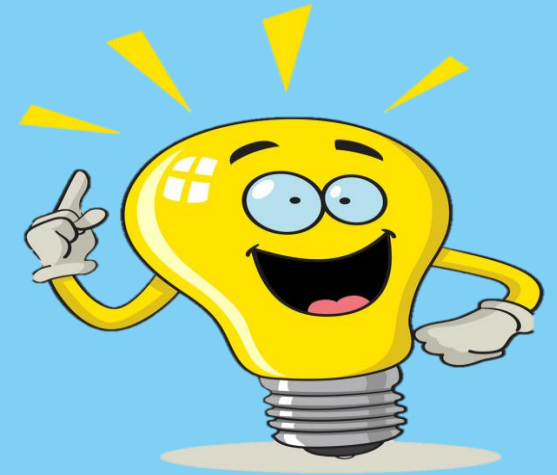
SUSTAINING FUTURE OF ENGINEERING

- 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.



DIGITIZED ENGINEERING: NEW OPPORTUNITIES

- **Business.**

- New business models.
- New set of clients.

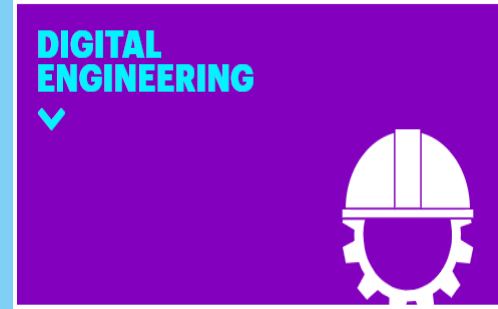
- **Education.**

- Change is happening too quickly; tertiary institutions are lagging. Filling the knowledge gap.

- **Consultancy.**

- Companies know WHAT to do but do not know HOW!
- Digital strategies.
- Engineering and IT integration.

- etc.....



DIGITIZED ENGINEERING: BUSINESS INSIGHTS



DIGITAL TRANSFORMATION



Digital transformation strategy:



20% of companies already have one

60% are working on it

20% don't have one

TOP 3 CHALLENGES
to implementing digital
transformation technology are:*



52%
Finding room in the budget



CEOs believe they need to lead a radical digitally-led transformation of their business model

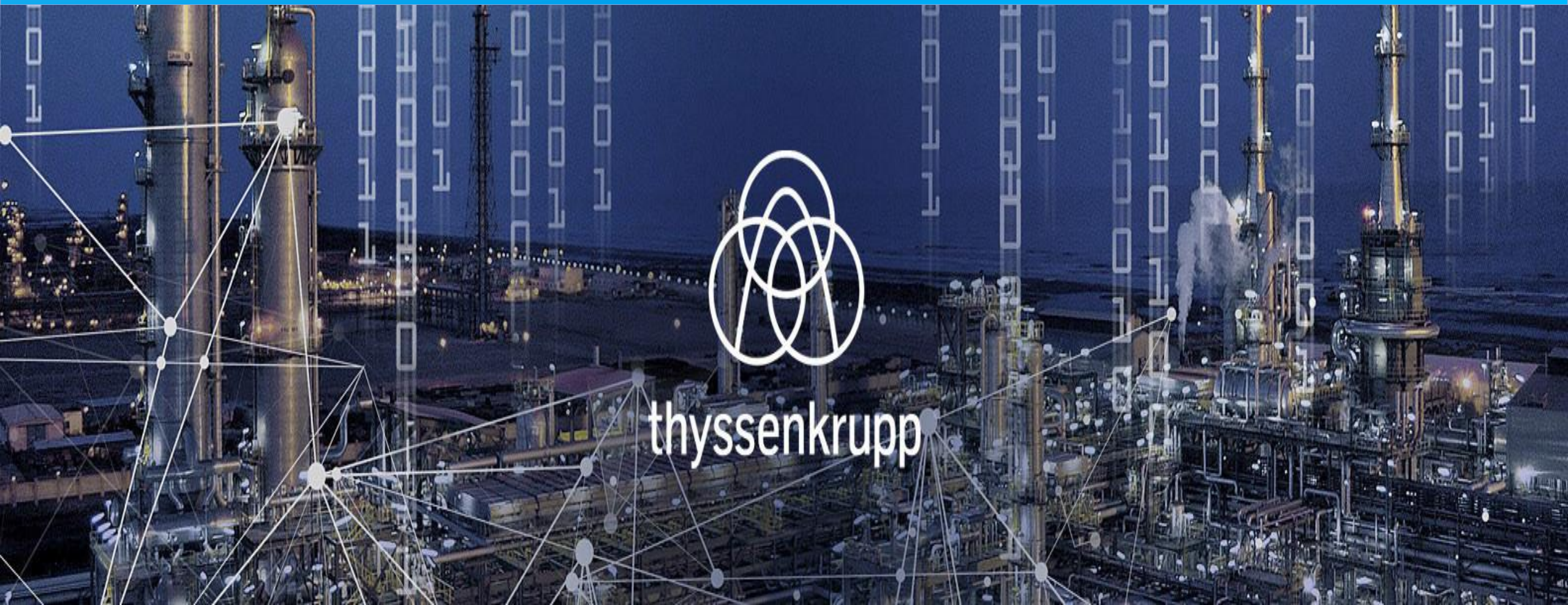


510%

51% of executives report high risk to their organizations in the next 5 years from tech disruption by startups or innovations by incumbents.



THANK YOU.



thyssenkrupp engineering. tomorrow. together.

QUESTIONS AND ANSWERS.

