



THE EU CYBERSECURITY AGENCY

FORECASTING EMERGING CHALLENGES AND CYBER SECURITY THREATS

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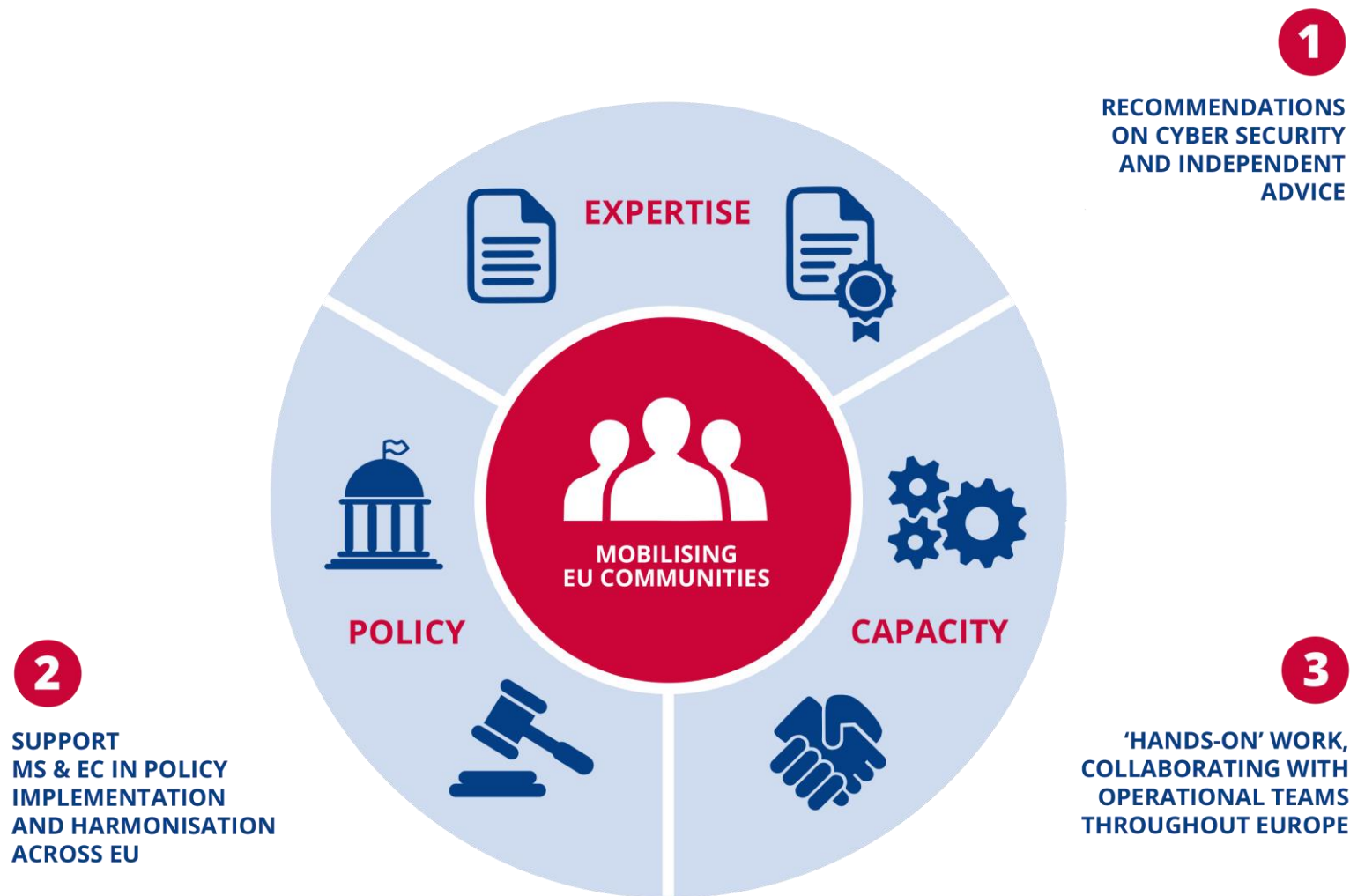


WHO AM I?



Started as data **forensics** analyst for the financial sector during the 90s. Worked with Interpol in **criminal investigation** system projects in early 2000s. With European External Action Service as **CISO** in mid 2000s. United Nations and Microsoft as regional **manager**. For the last 10 years worked with government agencies in **cyber threat intelligence**. Since last year in ENISA as cyber security **analyst lead**.

POSITIONING ENISA'S ACTIVITIES





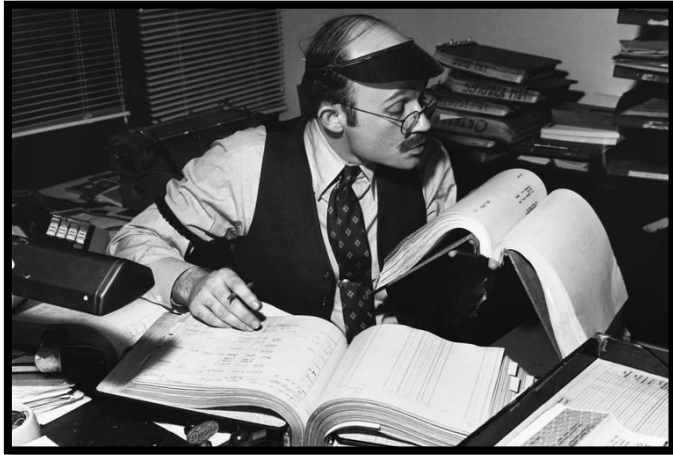
Hi, I'm John

John's business risks:

- Weather related
- Veterinary related
- Market conditions
- Product quality control
- Compliance

John is an Irish modern farmer

- Sells meat via an online digital platform;
- Receives purchase orders from distributors electronically for milk, cheese, and butter;
- Uses a satellite tracking system to monitor the cattle;
- Uses a geo-positioning system to monitor the delivery fleet;
- Uses a machine system to milk and feed the cows;
- Uses a cloud based management system to process the invoices and make payments online;
- Has a local network and one server;
- Doesn't have IT personnel but contracts a local provider;
- Employees 10 people all with mobile devices and laptops (mainly his wife and kids).
- and ... takes selfies with his cows and posts it on Facebook and Instagram.



Hi, I'm Alfredo

Alfredo's business risks:

- Compliance.
- Change in regulation.
- Negligent acts or errors.
- The danger of unknowns, such as employee fraud and other criminal acts

Alfredo will change his practice considering that:

- There is a paradigm shift in the business model.
- Value-creation needs to be redefined and follow the market trends.
- In the finance function today, companies expect to have access to predictive data.
- This will requires knowing how to turn Big Data into concise, decision-driving insights.
- Hiring financial experts with data scientists skills with both a theoretical and practical understanding of data and analytics.
- The finance practice will become more digital with the cloud as one of its main tools.
- It will require a strong investment in innovation.



Forecasting



WHAT DO YOU THINK THE FUTURE WILL BE LIKE IN 2 TO 5 YEARS FROM NOW?



Henri Poincaré

“ I think there is a world market for maybe five computers. ”

~ **Thomas J. Watson (1874-1956):**
Chairman and CEO of IBM 1914-1956



Thomas J Watson Sr by IBM. Licensed under CC BY-SA 3.0 via Wikimedia Commons

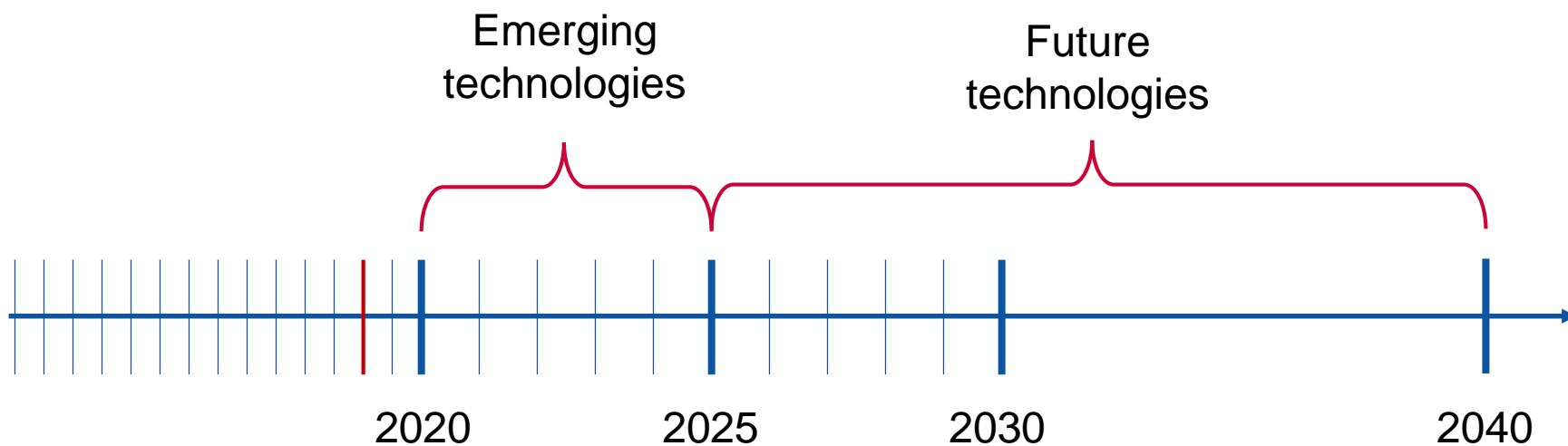
LOOKING INTO THE CRYSTAL BALL

A report on emerging technologies and associated security challenges and threats

- Identify the challenges in the digital transformation roadmap.
- Use as a tool for decision makers in future technology options and early mitigation strategies.
- Envision how the future threat landscape may look like.



FORECASTING TIME HORIZON





By 2022, 53.7% of the world population will be connected to the internet



The global mobile data traffic is set to surpass 77 exabytes per month



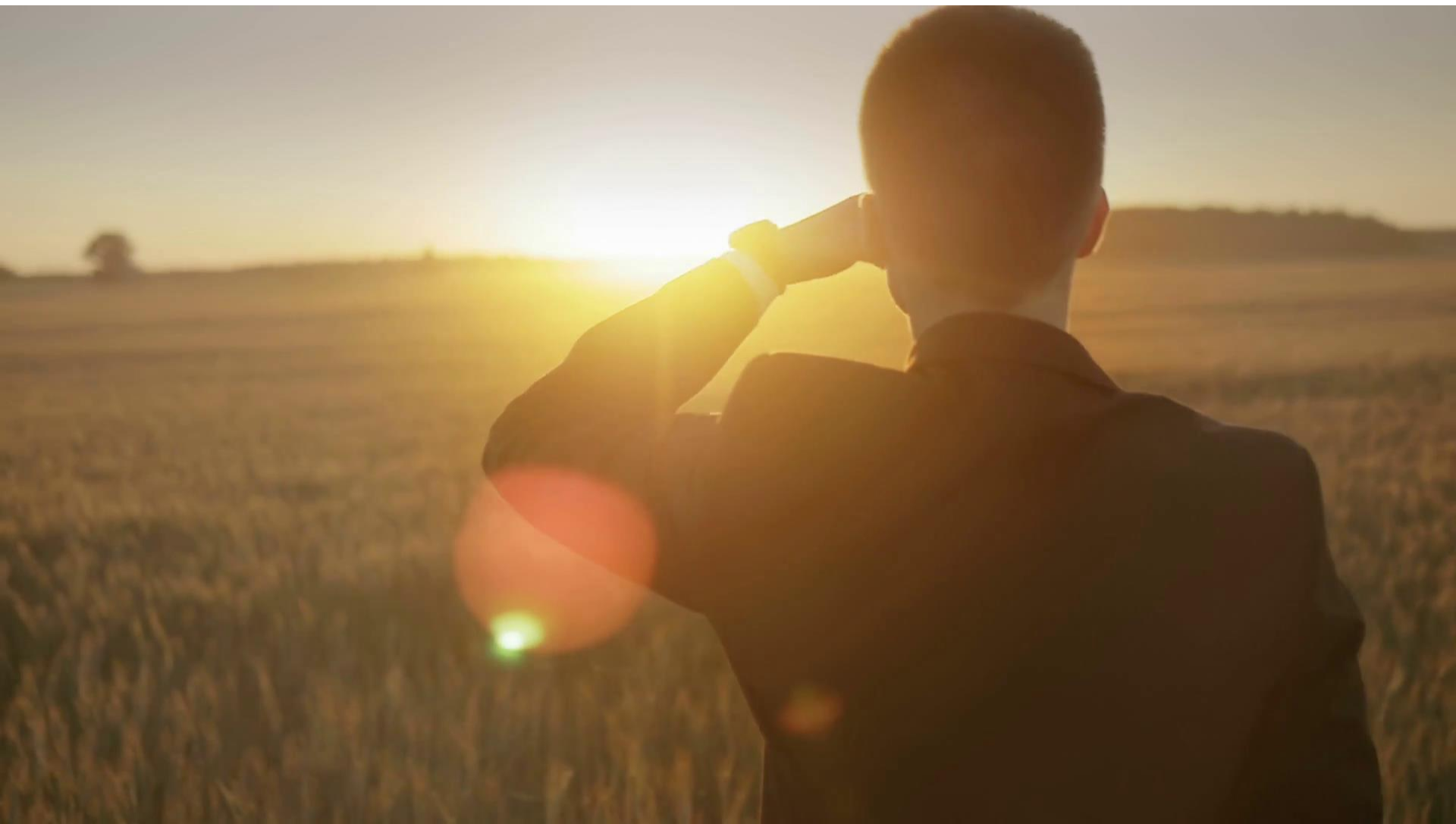
With 1.35 billion daily searches and 3 billion active users exchanging online messages.

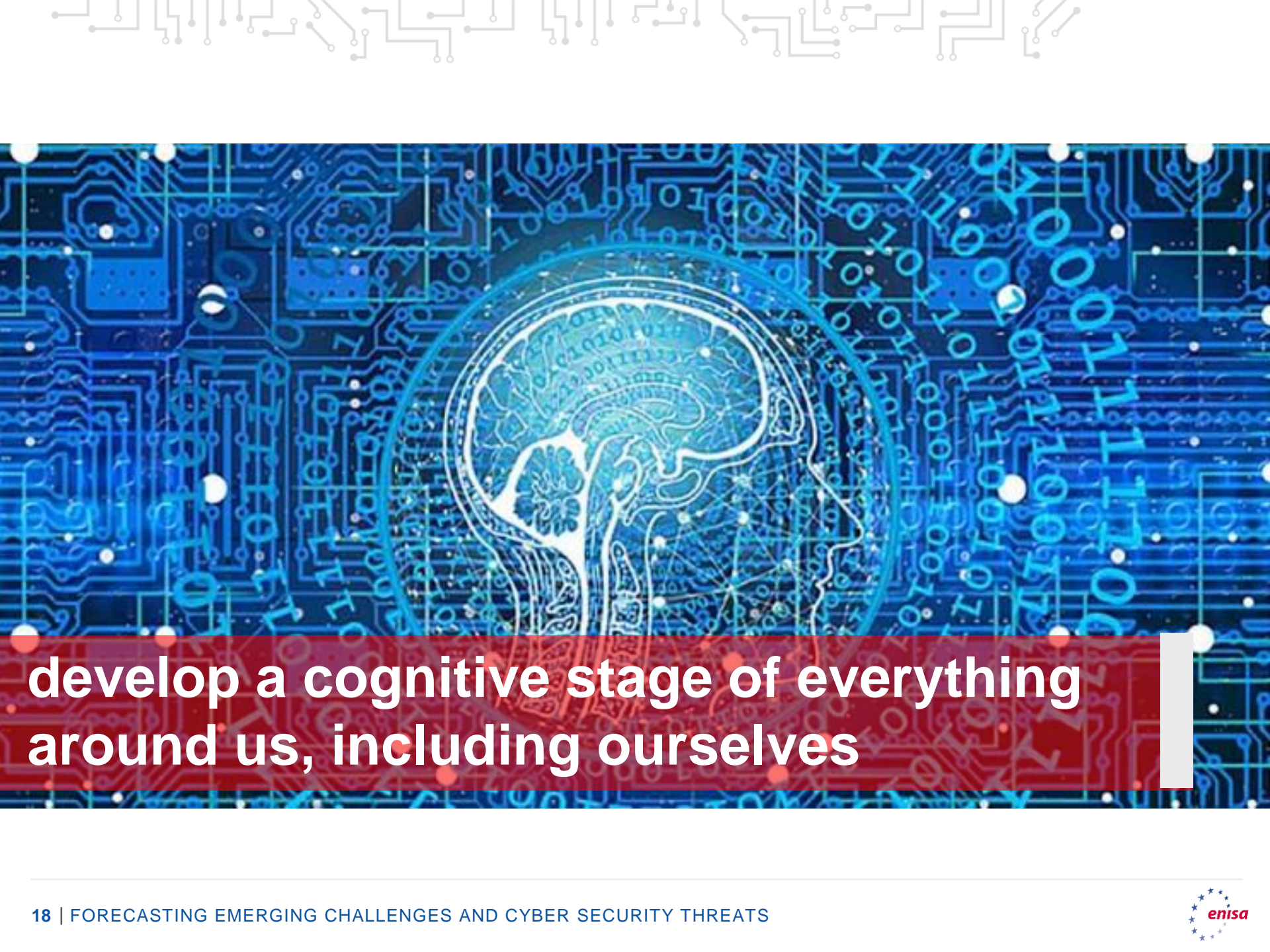


Processing 726 billion payment transactions and spending ca. 5 trillion USD online a year.



Credit: Britt Spencer



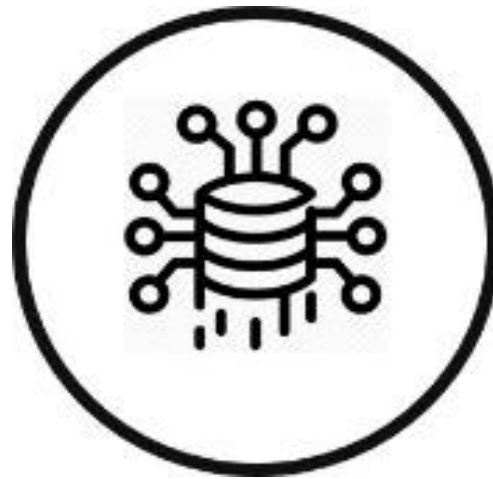


develop a cognitive stage of everything around us, including ourselves



a search to transform every aspect of our existence and surrounding environment into quantifiable data

KEY PATTERNS IN EMERGING TECHNOLOGIES

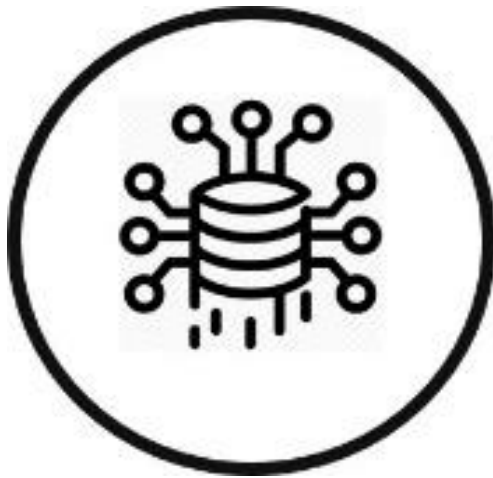


Datafication

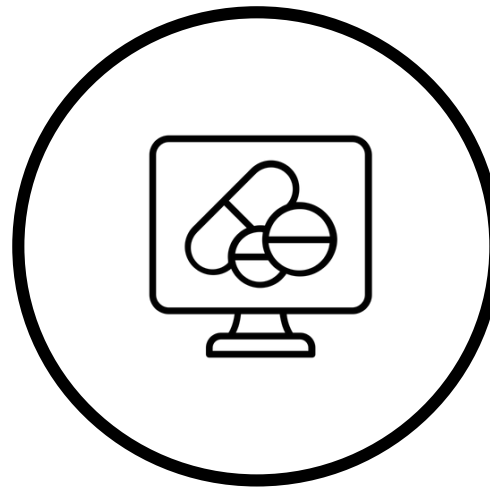
technology addition and abuse



KEY PATTERNS IN EMERGING TECHNOLOGIES



Datafication



**Technology
dependence**



**the IT and network
infrastructure is changing ...**



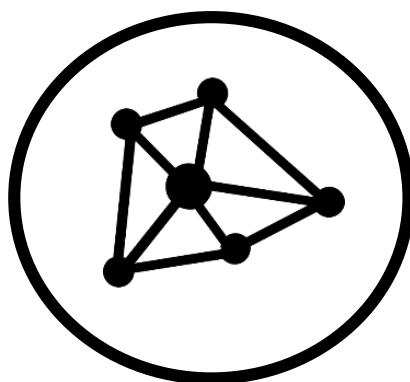
DIGITAL TRANSFORMATION

... moved by the amount of data,
number of users, services and
business requirements demanding for
more agile and scalable architectures



... moved by the datafication of the economy and society; the platformization and commoditization of the data center.

DECENTRALISED AND INTERCONNECTED



5G

Next generation of mobile networks



Edge, Fog computing and MESH



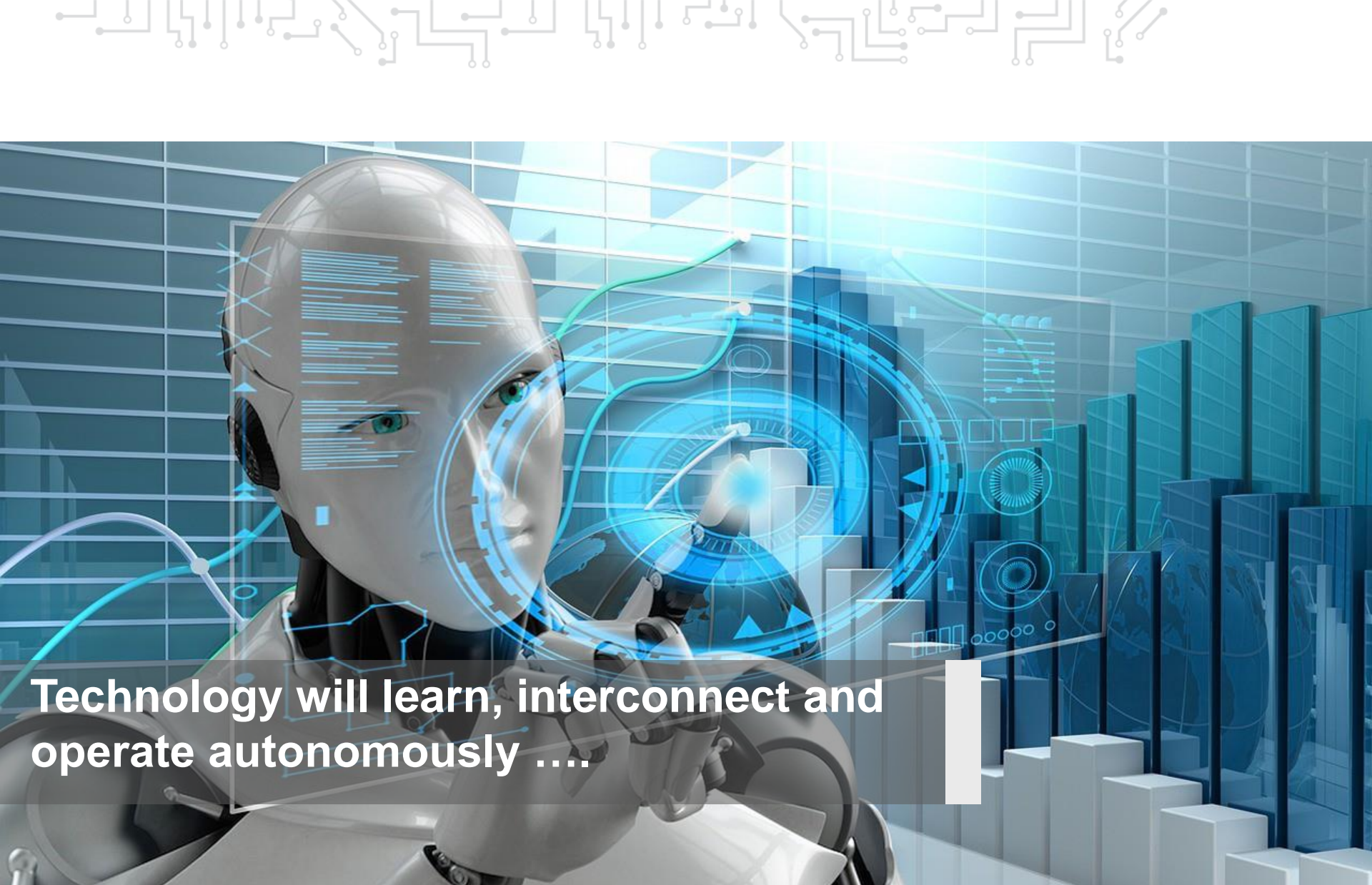
Hyper converged infrastructure



Network function virtualisation

SDN

Software defined networks

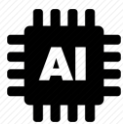
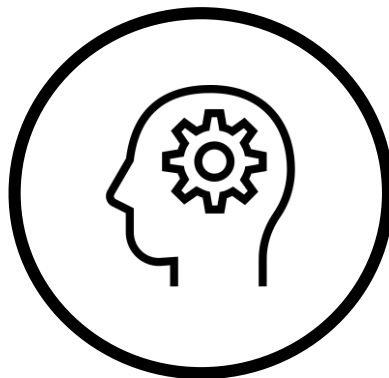


Technology will learn, interconnect and operate autonomously



to deliver business and societal benefits.

SMART AND AUTONOMOUS



Artificial intelligence
AI, Machine Learning,
Deep Learning



Internet of Things
IOT, IIOT, sensors,
wearables, digital
assistants



Autonomous systems
Robots, vehicles,
vessels and drones



Voice assistants
Interfaces, chat bots,
natural language and
processing



A new era on how we interface with technology

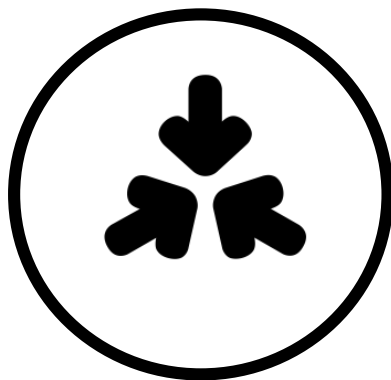


more embedded in our
daily lives ...



**changing the way we see
ourselves and the world
around us**

CONVERGED AND IMMERSIVE



Mobile/Social Internet
Search /social
/messaging /livestream



Collaborative tech
Crowd, sharing, workplace,
open source, platforms and
tools



Immersive technology
Augmented, virtual and
mixed reality




New user interface
Facial/gesture, haptics, 3D
touch and gaze tracking.

FUTURE TECHNOLOGIES MAP

The proliferation of nano-scale devices able to interconnect, self-replicate and operate on self-generated power, will spread everywhere including the human body.

Technology will break some of today's barriers to unlock key scientific breakthroughs by solving some of the hardest mathematical and computing problems.


Nanotechnology
and IoBNT

QC
Quantum
computing

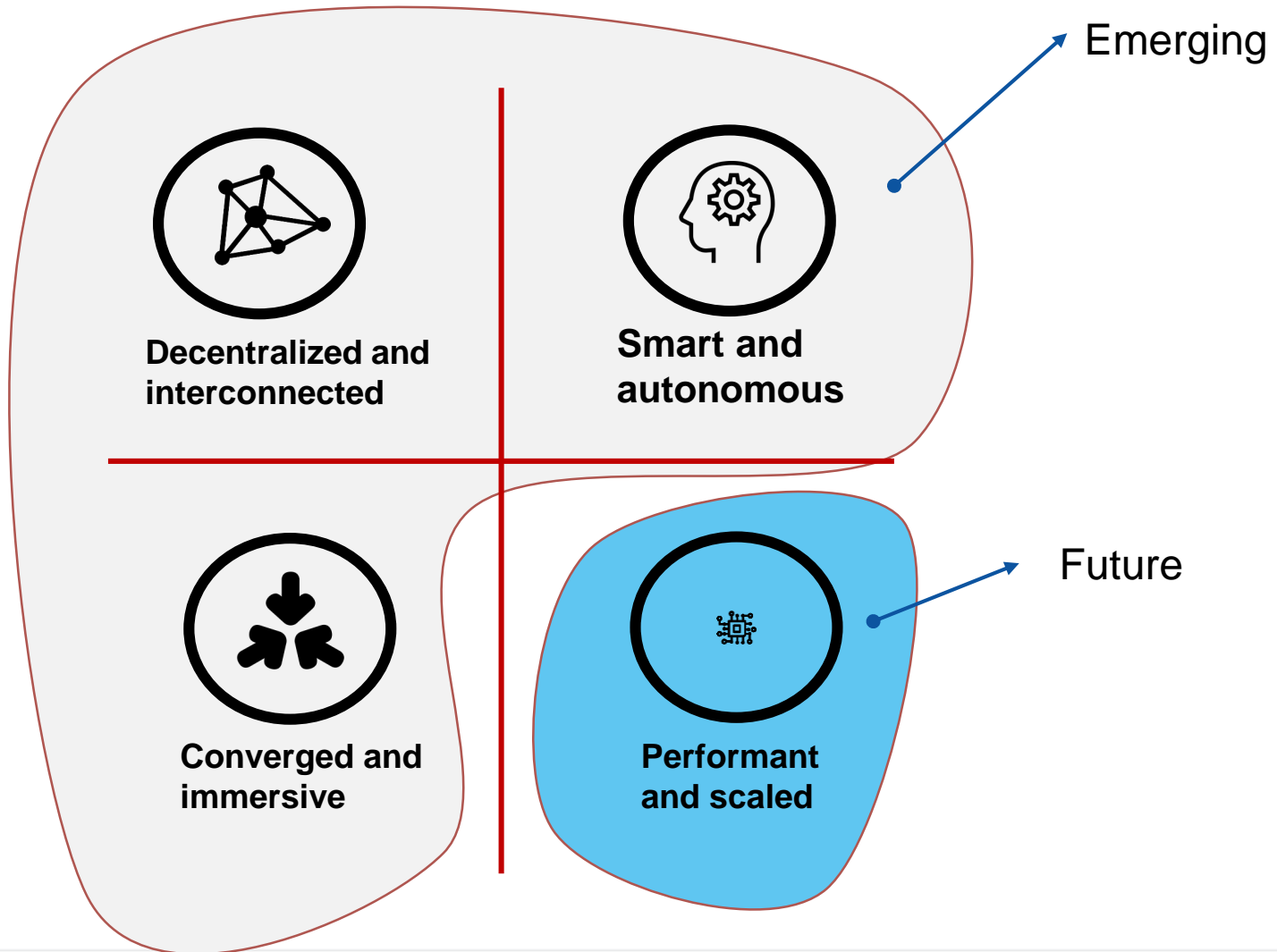
Time line

2020

2025

2030

TECHNOLOGY MEGA-TRENDS

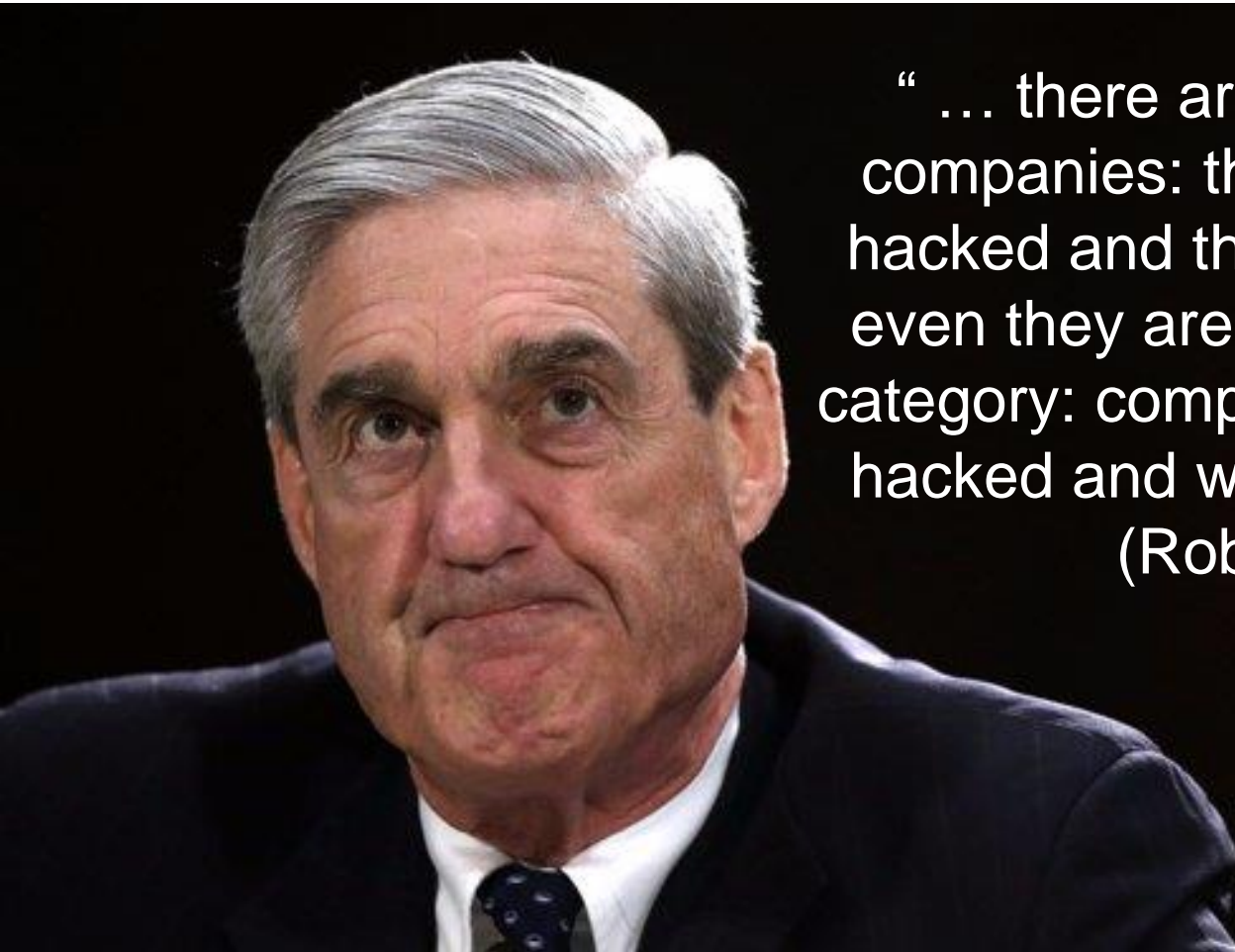




While these advancements may benefit the world in immeasurable ways ...



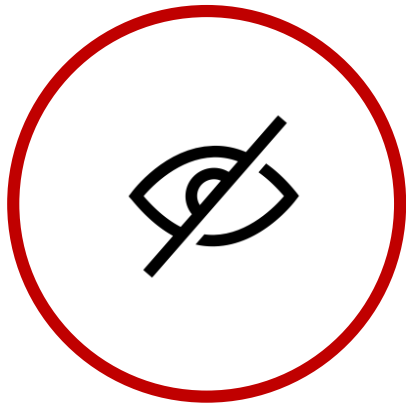
also have the potential to cause great harm in ways we don't yet even recognize.



“ ... there are only two types of companies: those that have been hacked and those that will be. And even they are converging into one category: companies that have been hacked and will be hacked again.”
(Robert Muller)



KEY EMERGING CYBERSECURITY CHALLENGES FOR THE NEXT DECADE



Privacy and
Data Protection



Trust and
Reputation



Adaptation



Deception and
manipulation



The lack of processes and systems to protect sensitive data in anticipation of new use cases



where vulnerabilities result in serious threats to the protection of privacy and personal data.



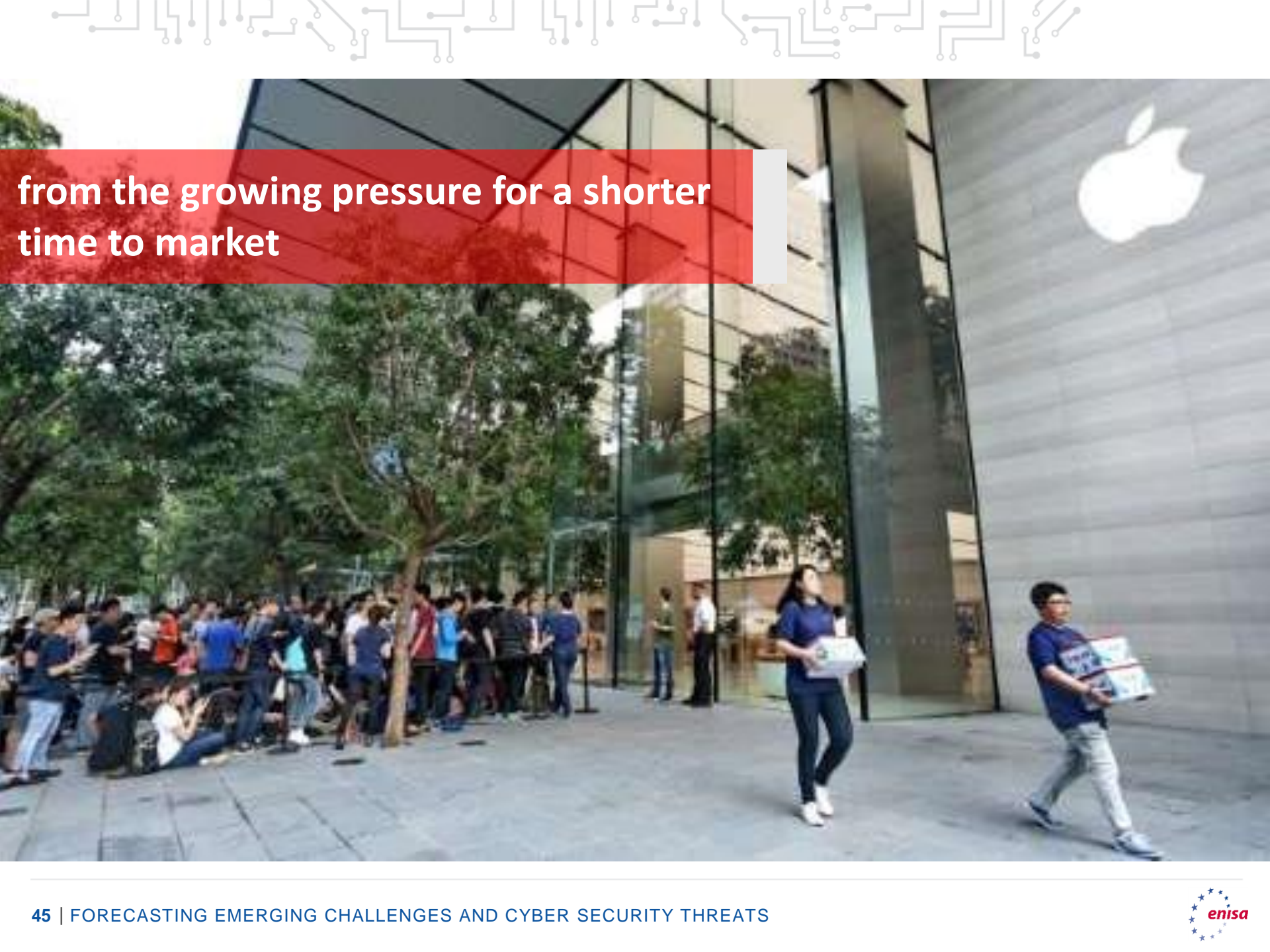
the abusive use of personal data for various purposes without respecting citizens fundamental rights



to weaponise data in a digital influence and manipulation machine.



**a growing interest in the surveillance
of citizens**



from the growing pressure for a shorter
time to market



The lack of security-by-design



The complexity of the technological environment



The difficulties for organizations to adapt to new technological realities.



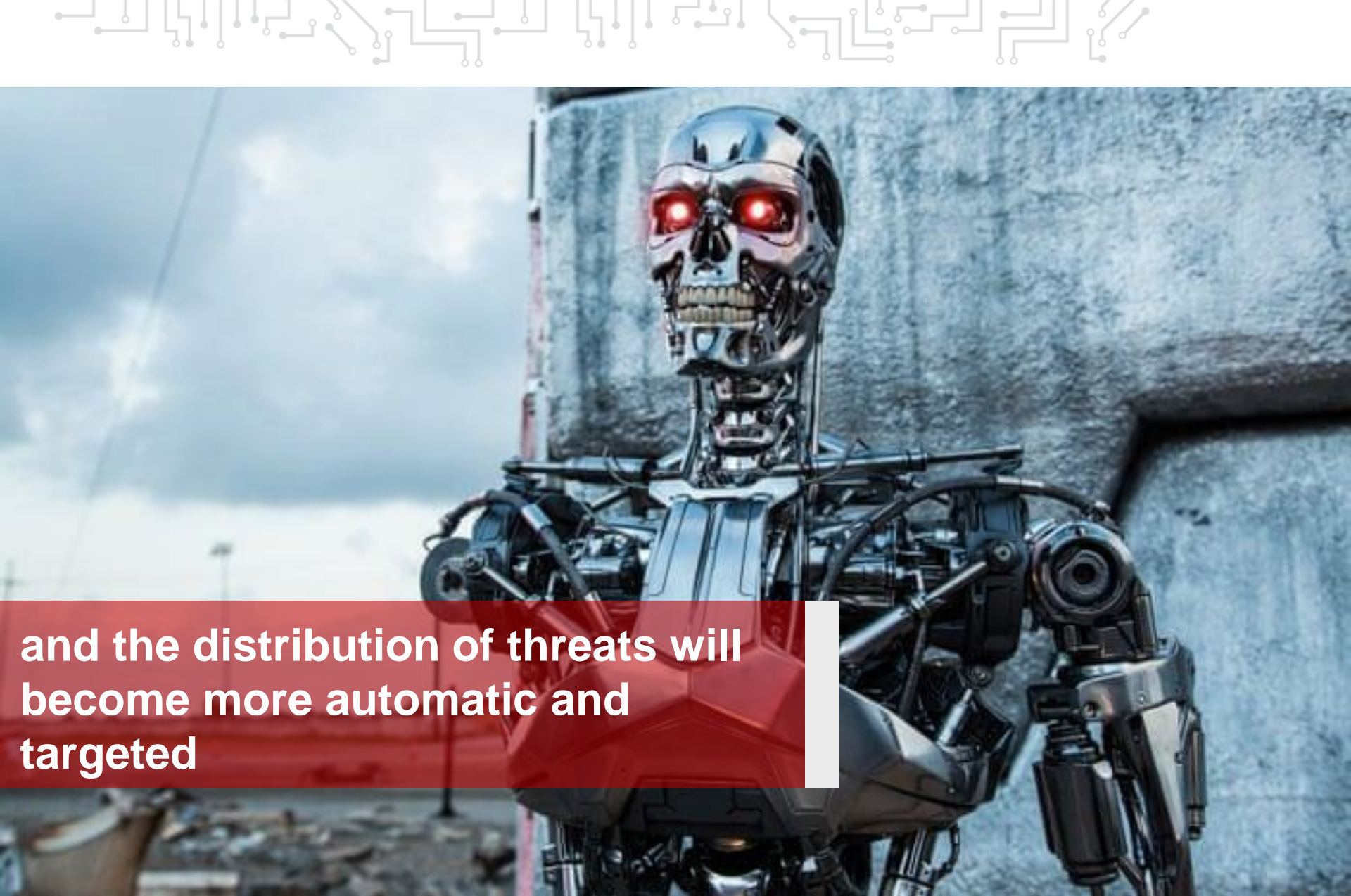
**to attract and retain the skills required
to maintain and secure the technology**



to integrate technologies with poor security standards

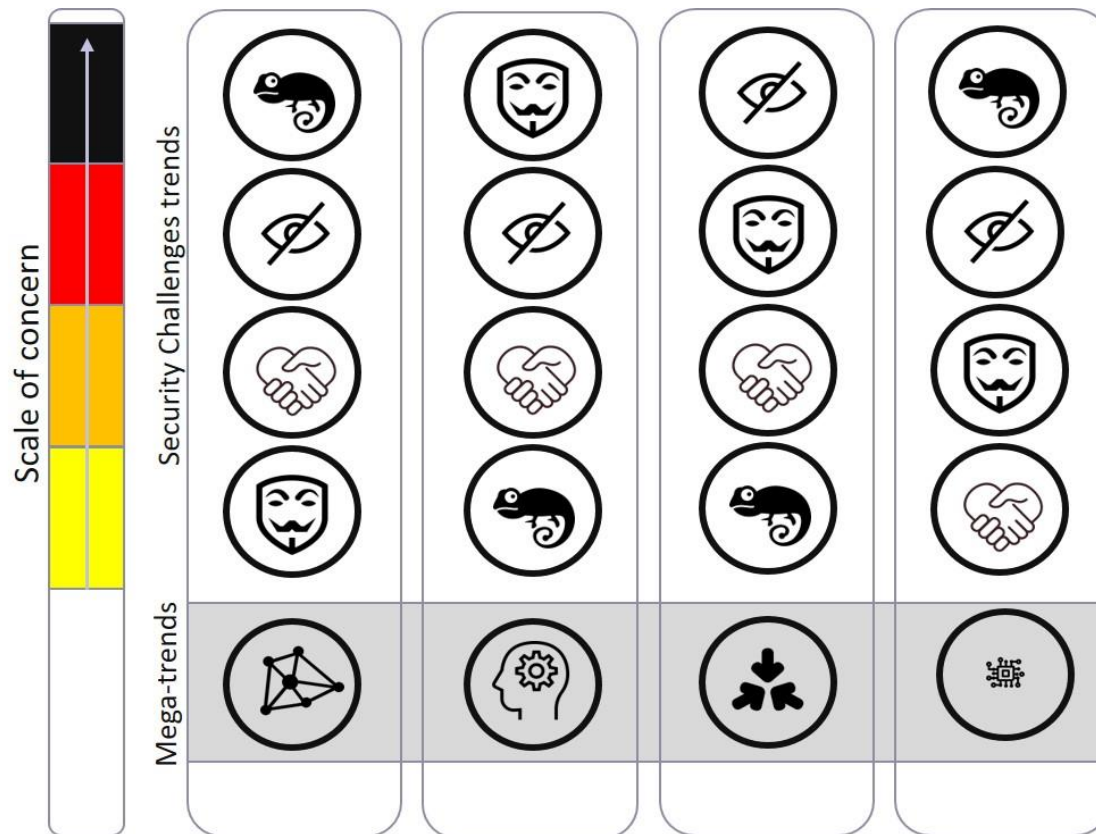


**where the dual use of technology
may have devastating
consequences**

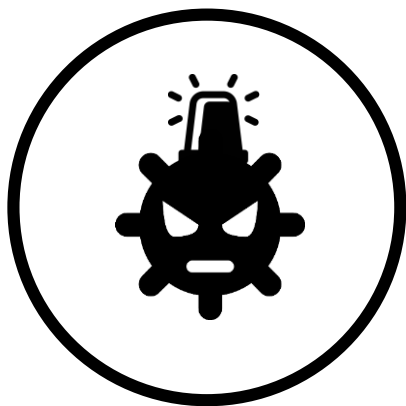


and the distribution of threats will become more automatic and targeted

SCALE OF CONCERN WITH EMERGING SECURITY CHALLENGES



KEY TRENDS WITH EMERGING CYBERSECURITY THREATS



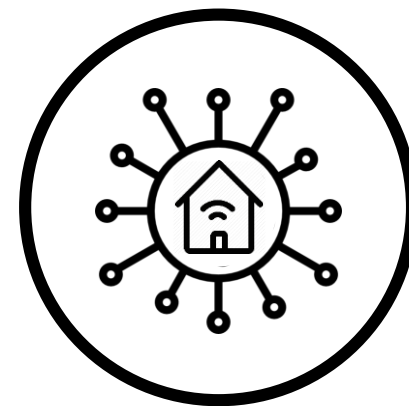
Autonomous Threats

- Autonomous threats
- Infiltrated in a device
- Better adapted to the environment
- Capable of taking decisions
- Capable of mutating
- Fileless and traceless
- Exploring the dual use of technology




Pandemicware

- Shorter duration
- Distributed model
- Exploiting new products in early stages
- Auto-replicating



IoT – Internet of Things

- Engineered as a IoT device
- Integrated into the IoT ecosystem
- Introduced in the circular economy or through the supply chain at low cost
- Exploring the dual use of technology

A photograph of Warren Buffett, an elderly man with white hair and glasses, wearing a dark suit, white shirt, and red tie. He is looking down at a fan of playing cards he is holding in his hands. The background is dark and out of focus. At the top of the page, there is a decorative border consisting of a white circuit board pattern.

Predicting rain doesn't count;
building arks does.

Warren Buffet

SUMMARY

The opportunity is now, for **decision-makers** to place the same importance identifying benefits as on assessing and evaluating the risks, and for the **industry** to adopt better security and ethical positions in the development of new products and services.

Now is also the time for **policy-makers** to legislate and regulate how these technologies are developed and implemented.

The ultimate responsibility rests with **all of us as** individuals, in our different roles, as members of society and participants in the economy.

THANK YOU FOR YOUR ATTENTION

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