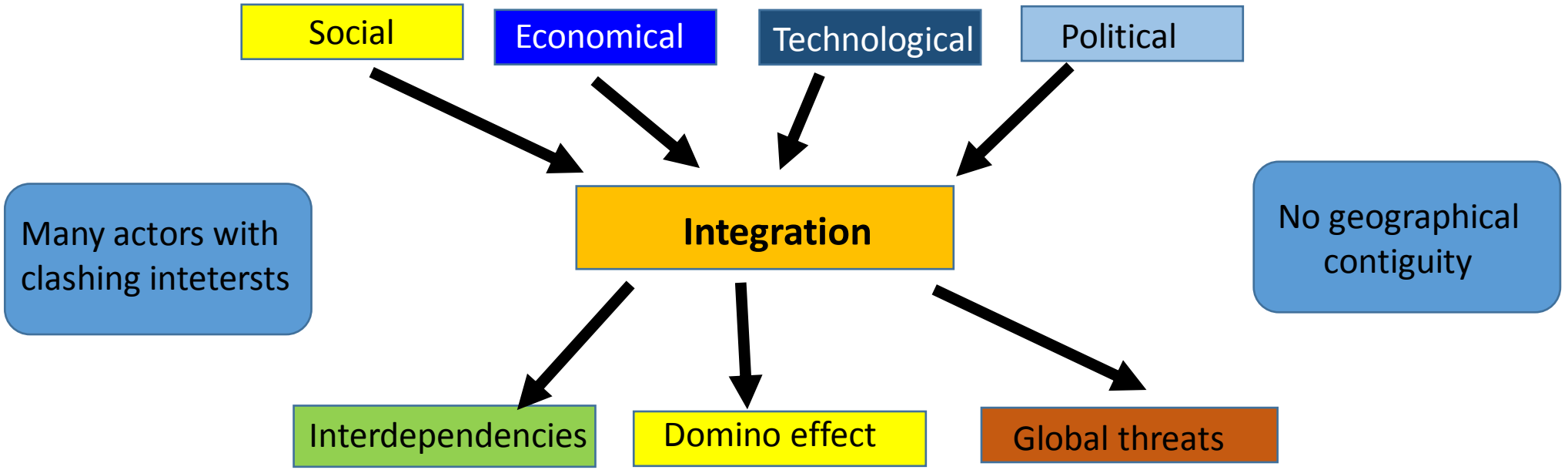
Protecting Ports and Critical Infrastructures

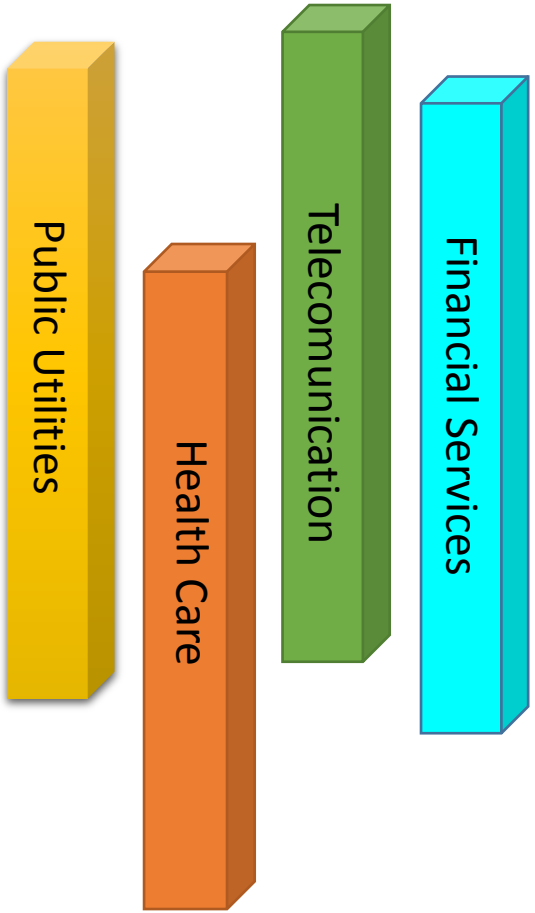
Paola Girdinio – Chair of START 4.0

Scenario

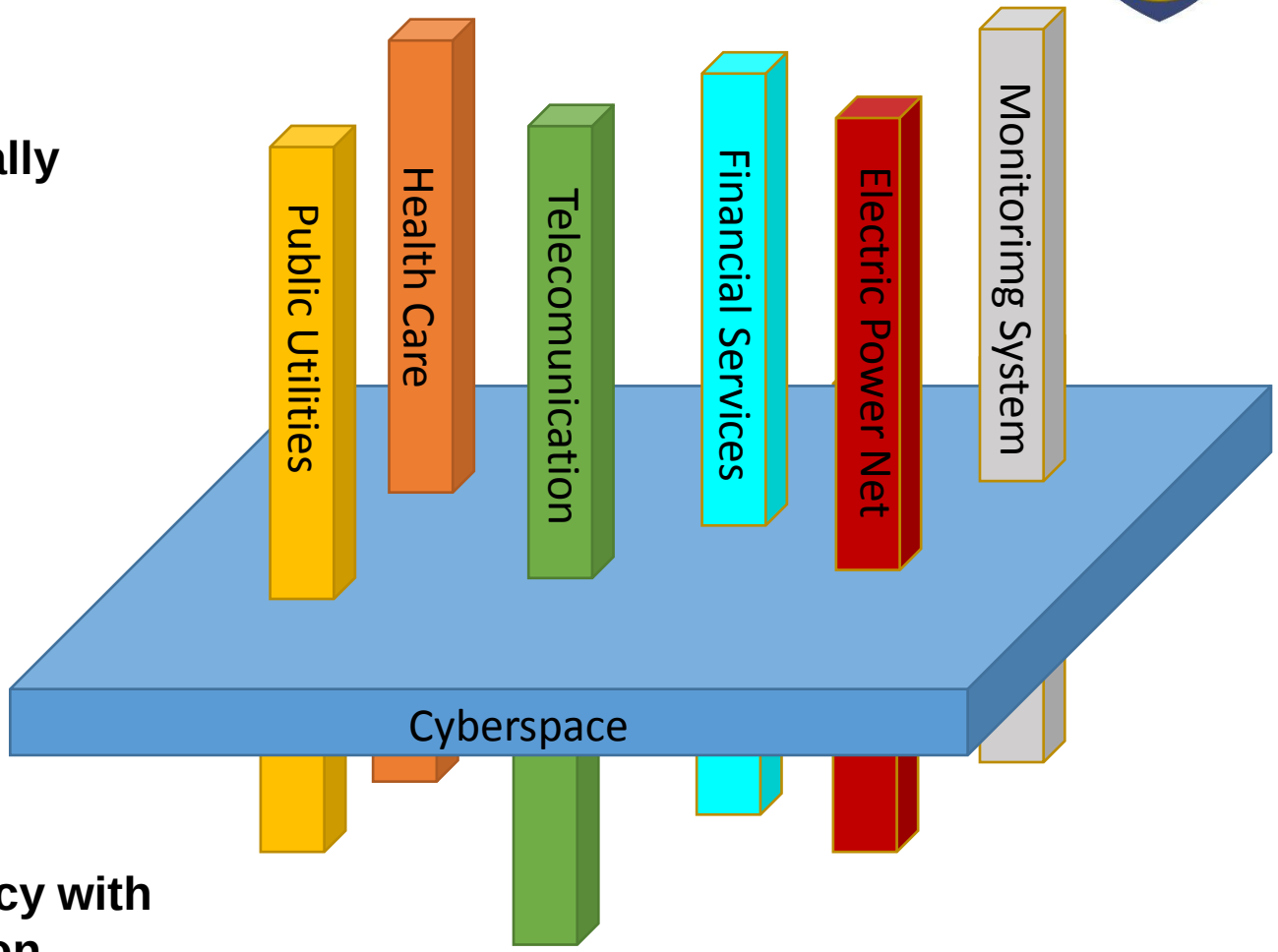


Le diverse infrastrutture risultano sempre più strettamente interdipendenti al punto che qualunque guasto, di natura accidentale o dolosa, può facilmente propagarsi ed amplificarsi attraverso di esse fino da affliggere utenti remoti, sia dal punto di vista geografico che logico, rispetto all'origine del malfunzionamento

Scenario



Before 2000
Infrastructure vertically integrated, i.e autonomous system with limited contact points

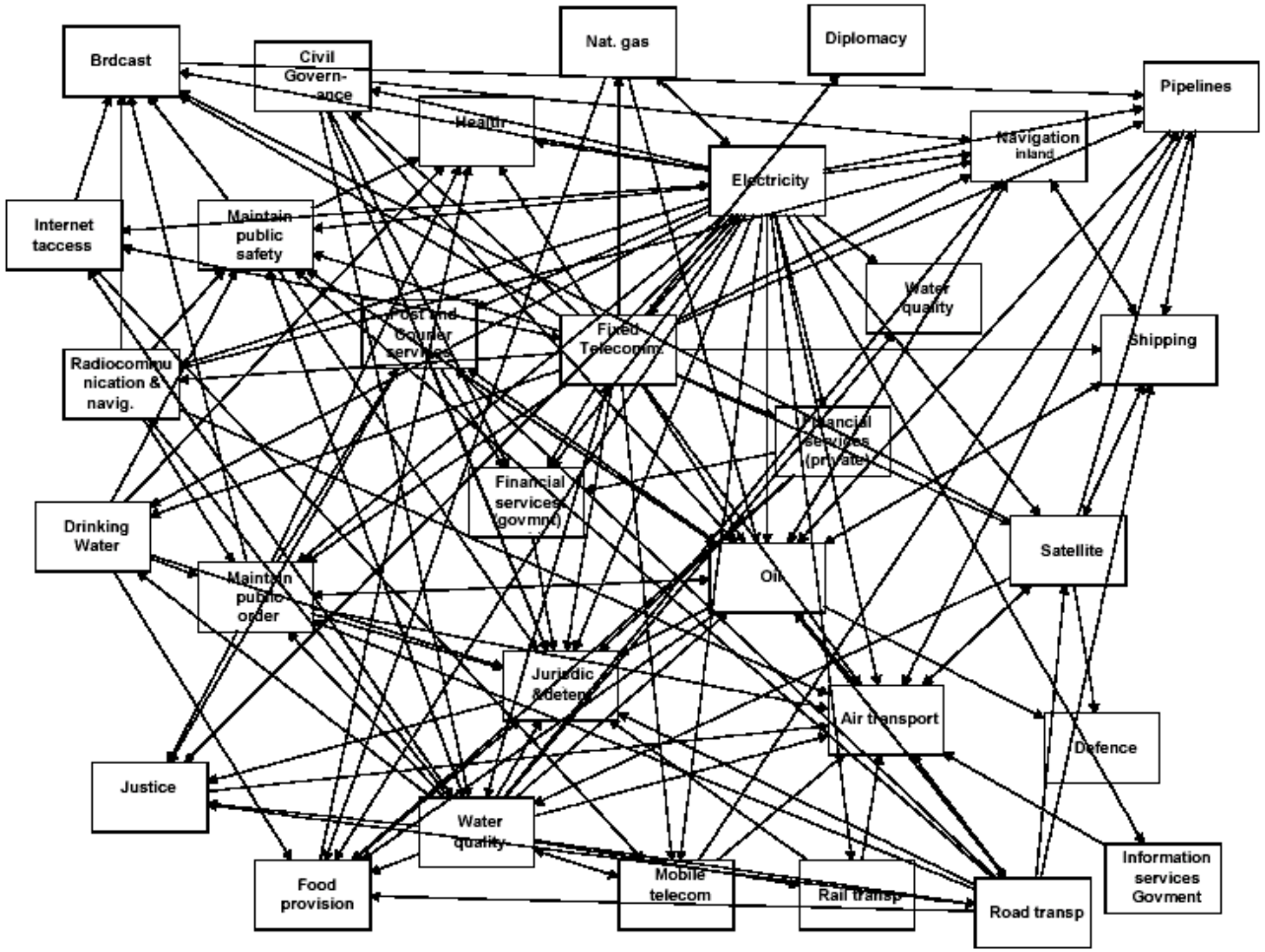


After 2000
Infrastructure integrated, interdependency with share a common framework: the cyberspace

Scenario

Interdipendecies amoung critical infrastructures

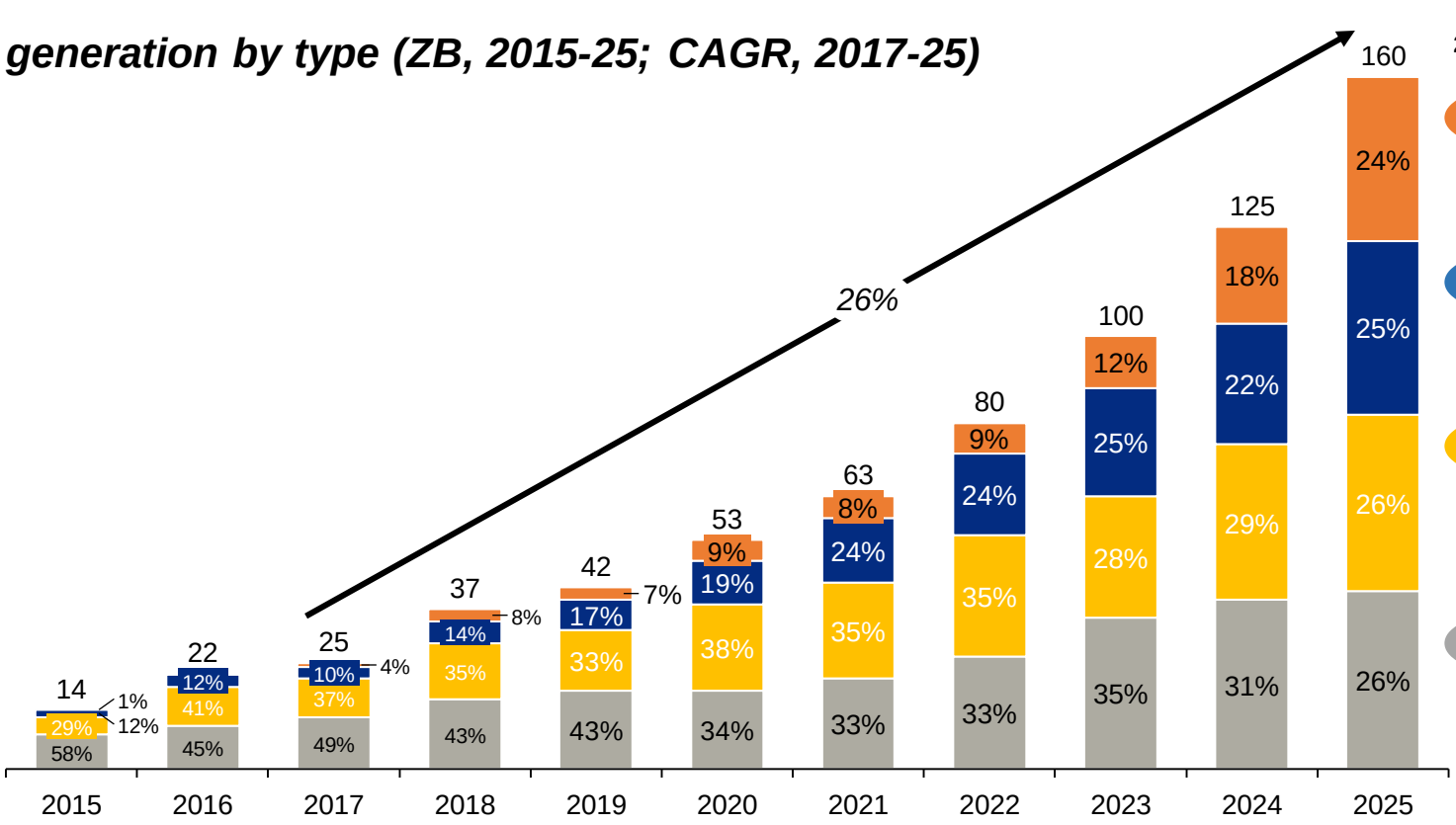
(Fonte: Progetto Quick-scan)



Scenario

Digital data generated are increasing exponentially, driven by M2M, IoT and productivity data

Data generation by type (ZB, 2015-25; CAGR, 2017-25)



58% **Embedded**: data generated by devices like **machine-to-machine e IoT**.

41% **Productivity data**: PC files and server, log files and metadata

21% **Non Entertainment**: images/video (e.i. video surveillance)

17% **Entertainment**

In 2025 over 75 billion devices are expected to be connected

Fonte: IDC (2017), IHS (2016), elaborazione A.T. Kearney

Scenario
Cyber attacks are increasing exponentially

Stuxnet
First important attack targeted to **Industrial Control System (SCADA)**
38K infected machines (22K resided in Iran)

Worm

1Bln di account compromised

YAHOO!

Data Breach

15$Mln remediation cost

SONY

Ransomware

3$Mln stolen through spear phishing

MATTEL

APT

Infected **900K end users routers for several hours**

Deutsche Telekom

Botnet

20k of encrypted devices (hit **Chernobyl**)

PETYA

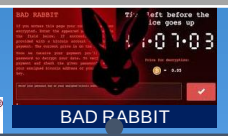
Ransomware

145M users potentially **impacted**

EQUIFAX

Data Breach

Targeted Russian and other **European countries** Media, Airports and Transport



Ransomware

Impacts on almost all the processors produced in the last twenty years

Security Bug

2010 2011 2012 2013 2014 2015 2016 2017 2018

Data Breach

Adobe

9Mln of IDs compromised

Data Breach

TARGET

Data Breach that affected over **40Mln credit cards**

Data Breach

J.P.Morgan

83 Mln accounts compromised

Trojan

SIEMENS

ADVANTECH
Enabling an Intelligent Planet

Cut off power to **hundreds of thousands of homes** for several hours in Ukraine

Malware toolkit

INDUSTROYER

Attack on **Ukraine's power grid** that **deprived part of Kiev** of power for **an hour**

DDoS

DynDNS

10 Mln IoT devices compromised

Ransomware

200k of **encrypted devices** in **150 countries**

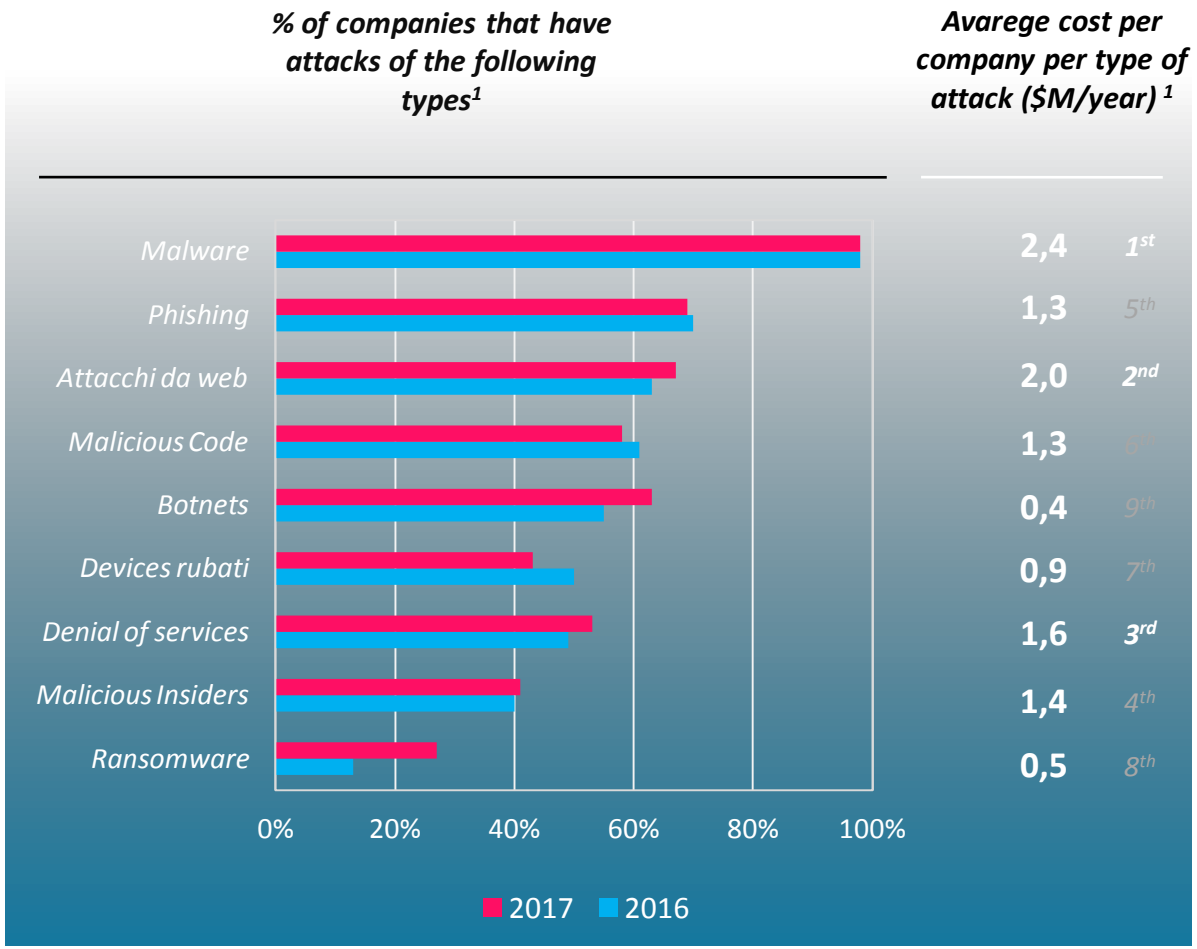
Data Breach

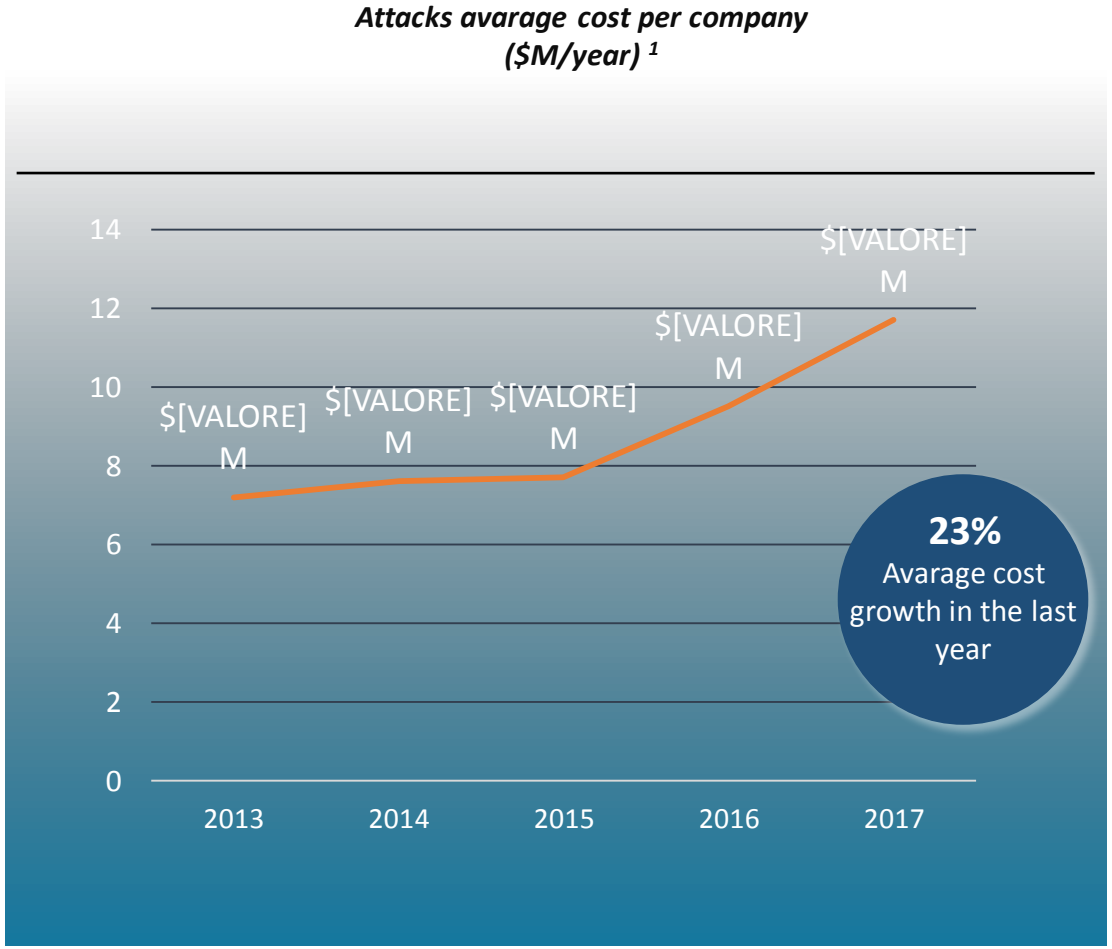
UBER

57 Mln Personal Data stolen

Scenario

All companies are subjected to cyber attacks with a rinsing avarage cost



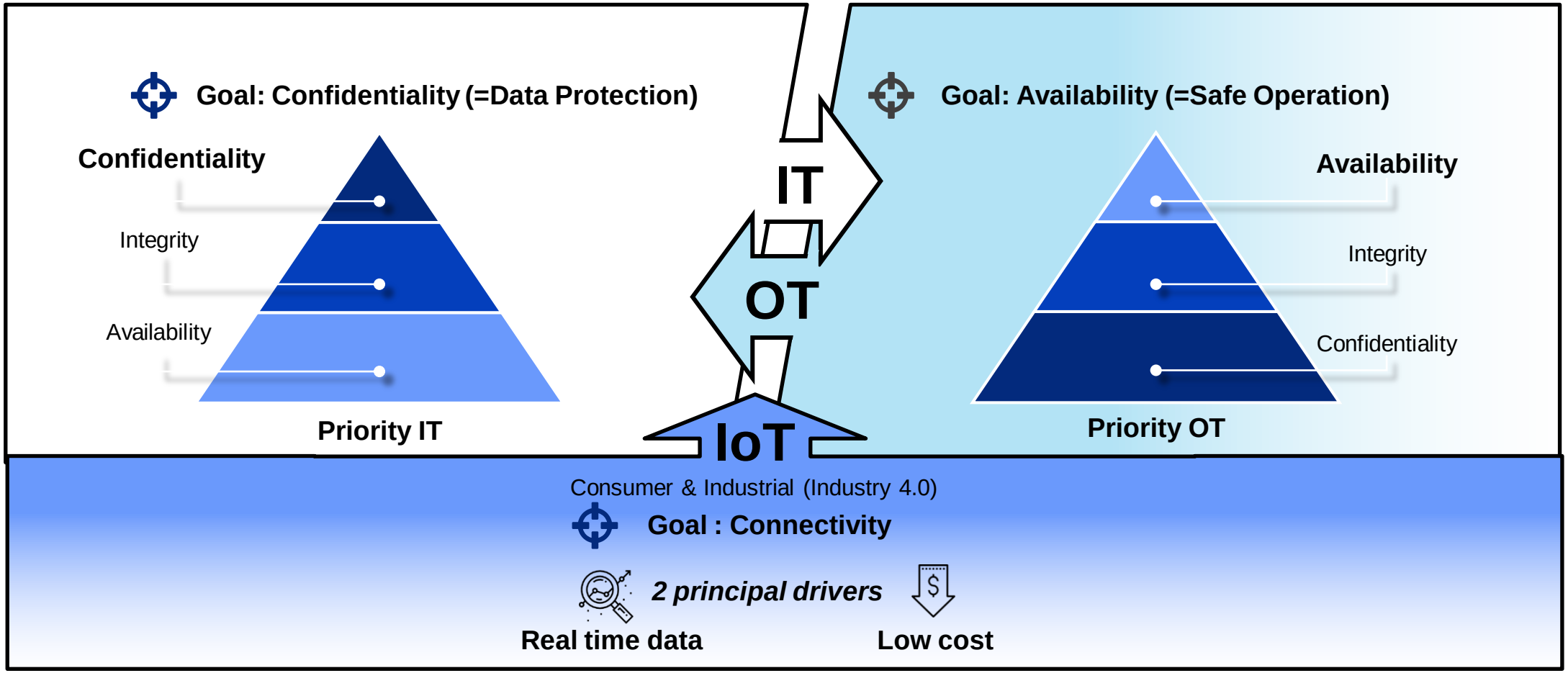


1. Percentuali e valori basate su un campione di 2.182 interviste effettuate in 254 aziende e in sette paesi (Australia, Francia, Germania, Italia, Giappone, Regno Unito e Stati Uniti). I costi sono stati calcolati facendo una media di quanto le società hanno speso nelle 4 settimane successive ad un attacco cyber e annualizzati
Fonte: Ponemon Institute (2017), Cost of Cyber Crime Study

Integration between IT and OT and Cyber Risk

IT, OT and IoT technologies require an olistic management strategy with specific needs

IT – OT integration produces advantage, but increases cyber risk
The right management model have to solve shared problems oriented to different goals



ALLIANZ RISK BAROMETER

TOP 10 GLOBAL BUSINESS RISKS FOR 2018

Source: Allianz Global Corporate & Specialty.
Figures represent the number of risks selected as a percentage of all survey responses (2,335). The 1,911 respondents could provide answers for up to two industries and up to three risks per industry.

↘ View the full Risk Barometer 2018 rankings here

▲ 2017: 37% (1)

Business interruption
(incl. supply chain disruption)

▲ 2017: 30% (3)

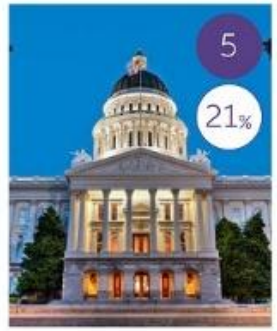
Cyber incidents
(e.g. cyber crime, IT failure, data breaches)

▲ 2017: 24% (4)

Natural catastrophes
(e.g. storm, flood, earthquake)

▼ 2017: 31% (2)

Market developments
(e.g. volatility, intensified competition / new entrants, M&A, market stagnation, market fluctuation)



▲ 2017: 24% (5)

Changes in legislation and regulation
(e.g. government change, economic sanctions, protectionism, Brexit, Euro-zone disintegration)

▲ 2017: 16% (7)

Fire, explosion

▲ 2017: 12% (10)

New technologies
(e.g. impact of increasing interconnectivity, nanotechnology, artificial intelligence, 3D printing, drones)

▲ 2017: 13% (9)

Loss of reputation or brand value

▲ 2017: 14% (8)

Political risks and violence
(e.g. war, terrorism, civil commotion)

▲ NEW

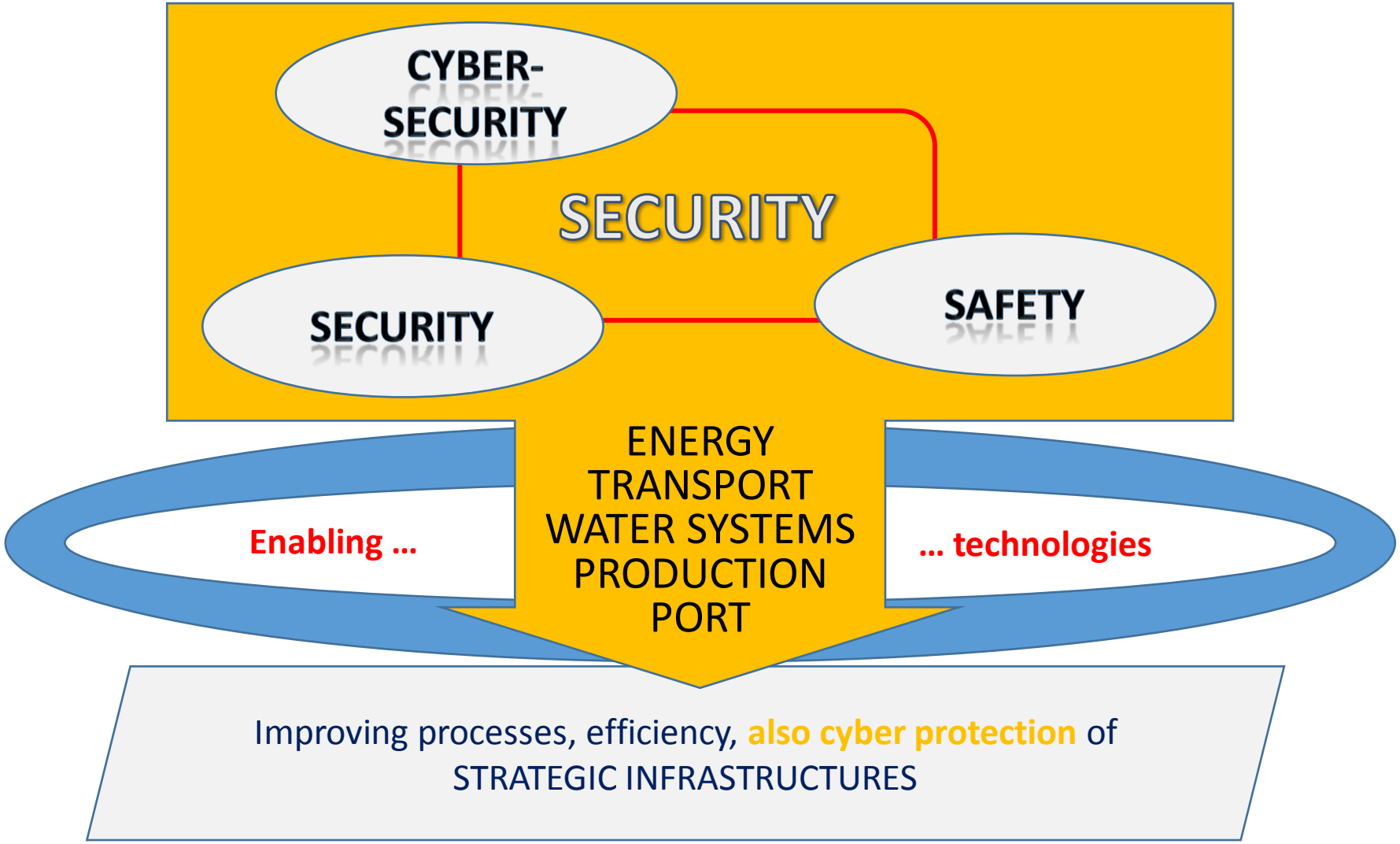
Climate change/ increasing volatility of weather

KEY
- ▲ Risk higher than in 2017
- ▼ Risk lower than in 2017
- = No change in 2017
- (1) 2017 risk ranking

"START4.0 - SECURITY AND OPTIMISATION OF STRATEGIC INFRASTRUCTURES 4.0" Competence Centre

START4.0

START4.0 - targets



START4.0 – partnership

- ✔ **CNR (coordinator)**
- ✔ **IIT**
- ✔ **Ligurian regional Authority**
- ✔ **Port Authority of the Western and the Eastern Ligurian Sea**
- ✔ **33 COMPANIES (20 SME; 13 Large Enterprises):**

Cooperation agreements with:

- **University of Genova**
- **CNIT** (National Inter-University Consortium for Telecommunications)
- **CINI** (Inter-University National Consortium for Informatics)
- **Digital Innovation Hub Liguria** (link with Confindustria DIH national network)
- **Chamber of Commerce, Industry, Crafts and Agriculture of Genoa**

- ABB
- ABIRK ITALIA
- AITEK
- AIZOON CONSULTING
- ANSALDO ENERGIA
- ANDALSO STS
- AUGENTES
- CAMELOT BIOMEDICAL SYSTEM
- CETENA
- CIRCLE
- TECNOMAR
- DGS
- DIGIMAT
- DLTM
- ETT
- EUROCHEM ITALIA
- FLAIRBIT
- FONDAZIONE R&I
- FOS
- GRUPPO SIGLA
- ISC
- IMAGING TECH ABRUZZO
- IREN
- LEONARDO
- LIGURIA DIGITALE
- NETALIA
- RINA CONSULTING
- SEDAPTA
- SIIT
- SOFTECO SISMAT
- SOFTJAM
- STAM
- TICASS

START4.0 - Services and activities

Orientation for companies

- ✓ Evaluation of digital and technological maturity level
- ✓ Scouting and technological foresight activities
- ✓ Availment of Punto Impresa Digitale (PID) of Unioncamere and Digital Innovation Hub (DIH) platform to allow virtual access to facilities the Competence center has available

Formation for companies

- ✓ Demonstration of solutions with Industry 4.0 contents
- ✓ Constitution of “Training and Research Facilities Network 4.0” composed by the 9 + 1 nodes

Innovation, industrial research and experimental development projects:

- ✓Development of products, processes or services able to reach a level of technological maturity
- ✓Business Development
- ✓Technological scouting
- ✓Test-bed

START4.0

START4.0 - why in Liguria

- ✓ LIGURIA AN IDEAL TEST BED FOR TERRITORIAL FEATURES AND FOR PROFICIENCIES
- ✓ COMPANIES KEY ROLE
- ✓ UTILIZATION OF ALREADY EXISTING INFRASTRUCTURES 4.0

START4.0

START4.0 - thematic fields

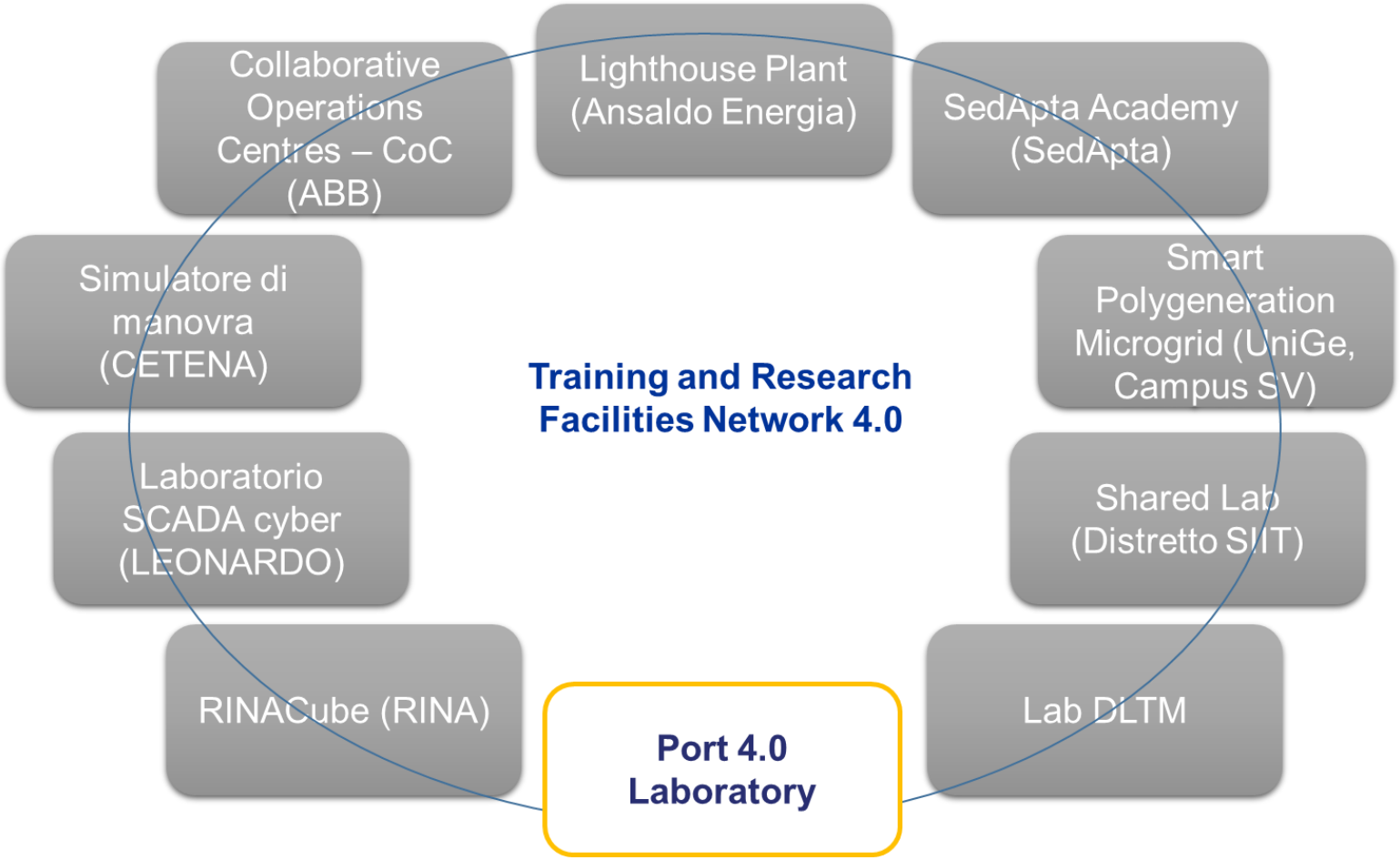
INDUSTRY 4.0 Enabling technologies

- ENERGY
- TRANSPORT
- WATER SYSTEMS
- PRODUCTIVE
- PORT

- SECURITY
- CYBER SECURITY
- SAFETY
- OPTIMISATION

START4.0

START4.0 – infrastructural nodes



START4.0 - PORT 4.0 LAB – work in progress…

- ✓ Achievement of a platform of port processes simulation which will make available
  - Development of new tools and technologies for safety in work environment
  - Predictive maintenance techniques on strategic infrastructures and production lines 4.0
  - Structures for port strategic structures protection in the face of cyber-physical threats

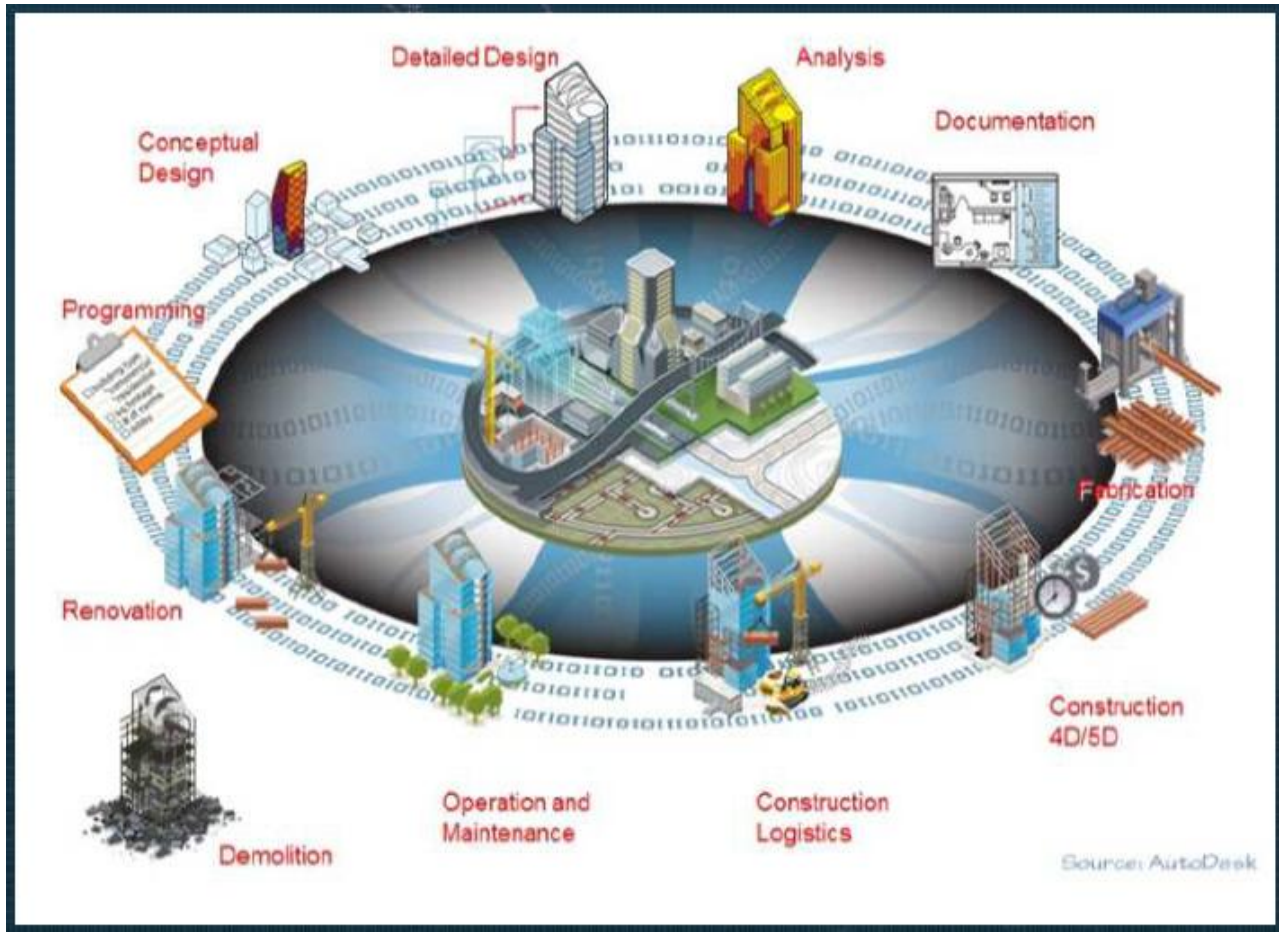
- ✓ Achievement of a **«Digital Twin»** of one of Ligurian ports in order to create a precise port processes representation. (replicable model)
- ✓ Accomplished merging a series of systems which collect, analyze, process and display data coming from IoT platform, geolocation systems, smart grid, automated terminal, ships, etc.

START4.0

How industries benefit from digital twins

Example from Construction sector

Building information Model (BIM) for construction sector

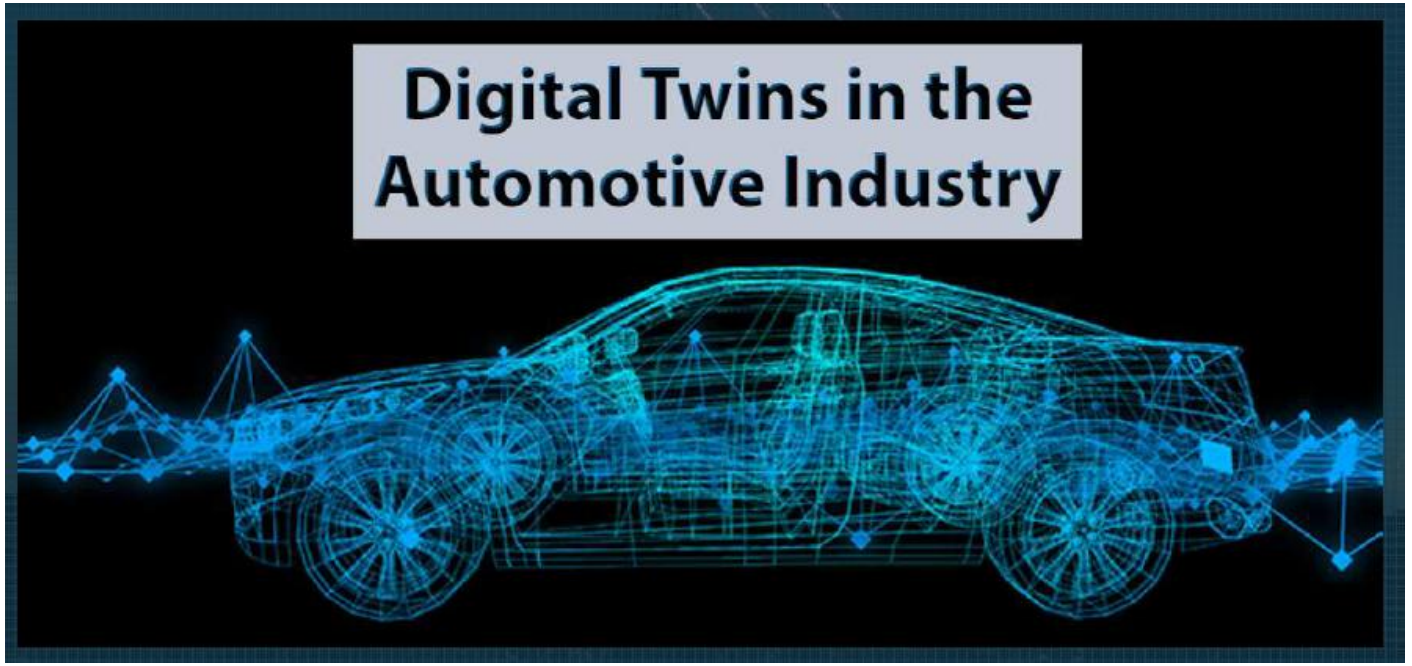


Single data lake
Digital work flow for all processes from ideation to demolition

- 6D modeling: 3D + time, cost, docs
- Structural, contextual, operational analysis
- Logistics, procurement, asset and facility management
- Coordination, cooperation and engagement

How industries benefit from digital twins

Example from automotive



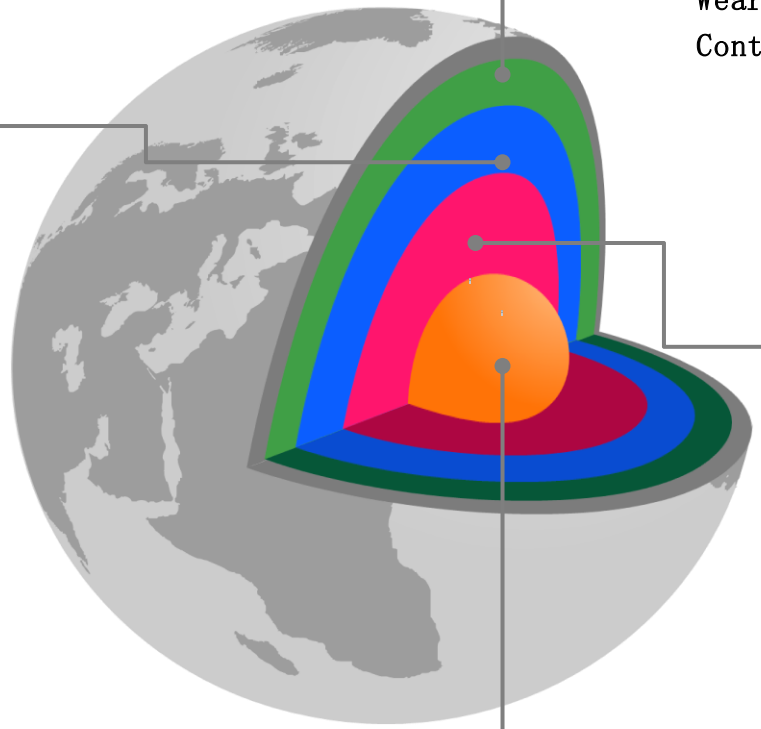
Behavioral and operational data

- Overall vehicle performance analysis
- Personalized service for customers
- Simulations to foresee future problems
- Autonomous vehicles tests
- Feedback to manufacturers

Virtual port for a global platform

As enabler of central coordination, agile organization and information flow

The future organizational model

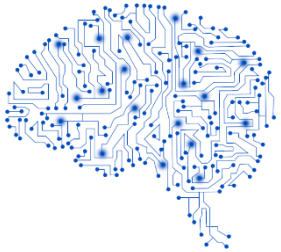


Human interface

Augmented reality
Wearables
Control room of the future

Artificial Intelligence

Port infrastructure automated modeling
Predictive maintenance
Anomaly detection
Simulation



Dynamic device and sensor data

Dynamic data from legacy systems
IoT and sensors
Digital work flows

Central core

Port legacy systems
Port infrastructure 3D modeling
Acquisition technologies and vehicles
Data transmission and cyber security

Thanks for your attention.

START4.0

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