Project meeting 5: Perugia (IT)

A G E N D A

MON, Jun 3rd 2019		
Time	Activity	Partner(s) involved
All day	Arrival in Perugia	All

TUE, Jun 4th 2019		
Time	Activity	Partner(s) involved
08:45	Greet and meet at TUCEP Via Martiri 28 Marzo, 35; 06129 Perugia	All
09:00	Welcome and official opening of project meeting	P7/TUCEP. P1/FHM
09:05	Presentation of / agreement on agenda	P3/E.N.T.E.R.
09:15	Brief presentation of the partners achievement in the project during the last 12 months (each partner reports for 5 minutes; no ppp needed)	Partner teamleader
10:45	Coffee break	
11:00	General Status of project	P1/FHM/Manfred
11:30	WP3: SMeART model and guidelines (Result 5) Current staus of guidelines editing, translation and distribution	P1/ FHM/ Philipp
11:45	WP3: SMeART Learning, Exchange and Networking Platform (Result 8) • Status • Next steps • Accquisition of users • Evaluation so far and in future by Peer 1 & 2, Evaluation results to be presented by Borut	P1/FHM/ Philipp
12:30	Lunch	
13:30	Visit at Umbra Group, an associate partner of TUCEP https://www.umbragroup.com/en/ Via V.Baldaccini 1, 06034 Foligno - Italy **Please note it is a 40km drive to the company therefore please bring your cars and navigation systems to the meeting place - we leave all together after lunch!**	all
19:00	Joint dinner [venue communicated directly at meeting]	all

WED, Jun 5th 2019		
Time	Activity	Partner(s) involved
09:00	WP3: Pilot-General status / introduction	P1 / FHM / Manfred
09:15	WP3: Status Pilot detailed - country co-ordinators presentation Each country co-ordinator presents the current consulting status of 3 companies per county in depth (including Stress Test Maturity level, planned measures, achieved results, next steps (10 min per company) based on evaluation forms	Germany: Manfred & Martin Belgium: KU Leuven Italy: Uni Perugia
10:45	Coffee break	
11:15	WP3: Status Pilot detailed status: Each country co-ordinator presents the current consulting status of 3 companies per county in depth (including Stress Test Maturity level, planned measures, achieved results, next steps (10 min per company)	Slovenia: Uni Primorsko Spain: FVEM Netherlands: Parbleu
12:45	Pilot summary and next steps What have we learned from consulting? How to improve Guidelines?	P1 / FHM / Manfred
13:00	Lunch	
14:00	WP3 evaluation results so far / status of other project evaluation processes	P11 / Uni Primorsko / Borut & Peter
14:45	WP6: Administration, financial and management issues • Overview over financial reports I-III • Consistency working units reported vs. performance in project • Deductions for the final project months • AOB	P1/FHM P3/ENTER
15:45	WP5: Dissemination and exploitation work: • Implementation of social media strategy (Result 16) • Maintenance of project website (Result 14) • Publications and print/online media appearance (Result19) • Cooperation with major national initiatives (Result 21) • Presentation at professional conferences and fairs (Result 22) • Awareness raising seminars in all partner countries (Result 23)	P1/FHM P3/ENTER all
19:00	Joint dinner [venue communicated directly at meeting]	all

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THU, Jun 6th 2019		
Time	Activity	Partner(s) involved
09:00	Project Conference and final meeting Organisation of international dissemination conference in connection with the final project meeting in B (as stated in the proposal)	P1 / FHM / Manfred alle
10:00	WP7: Quality Management and Project Monitoring • Status quo • Deviations from project plan	P3 / ENTER
10:30	Coffee	all
10:45	Industry 4.0 in Italy - scientific presentation of an Italian expert	
11:15	„Practical Smart Engineering from a management point of view" The publishing project – title, concept and publisher	P1 / FHM / Manfred
12:00	Concluding summary of the results of the meeting and outlook on the next steps, AOB	P1 / FHM / Manfred
12:30	Steering commeeting meeting	All
13:00	End of meeting	All

Participants

Organisation	Representatives	Organisation	Representatives
P1/DE/FHM	Manfred Leisenberg Marianna Gevorski Philipp Kronsbein	P9/IT/UNIPG	Roberto Marsili
P2/DE/Interrogare	-	P10/SI/CCIS	Nina Vrabelj
P3/AT/ENTER	Michael Schwaiger (+436643807754)	P11/SI/UPFM	Borut Likar
P4/DE/IPH	Martin Westbomke Benjamin Küster	P12/ES/FVEM	Joseba M. Sainz de Baranda
P5/BE/KUL	Philippe Saey Geert De Lepeleer Dimitri De Schuyter	P13/NL/Parbleu	Sandra Verweij José Laan
P6/BE/VOKA	Els Delaere Viola Vandelanotte	P14/SI/ATech	-
P7/IT/TUCEP	Gianluca Rossi Debora Ercoli	P15/BE/Pilz	Renaat Vandelanotte
P8/IT/Dimension4	Andrea Bucci		

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Marcello Marconi, PhD
Prof. Alberto Garinei

INDUSTRY 4.0

Technologies and Opportunities

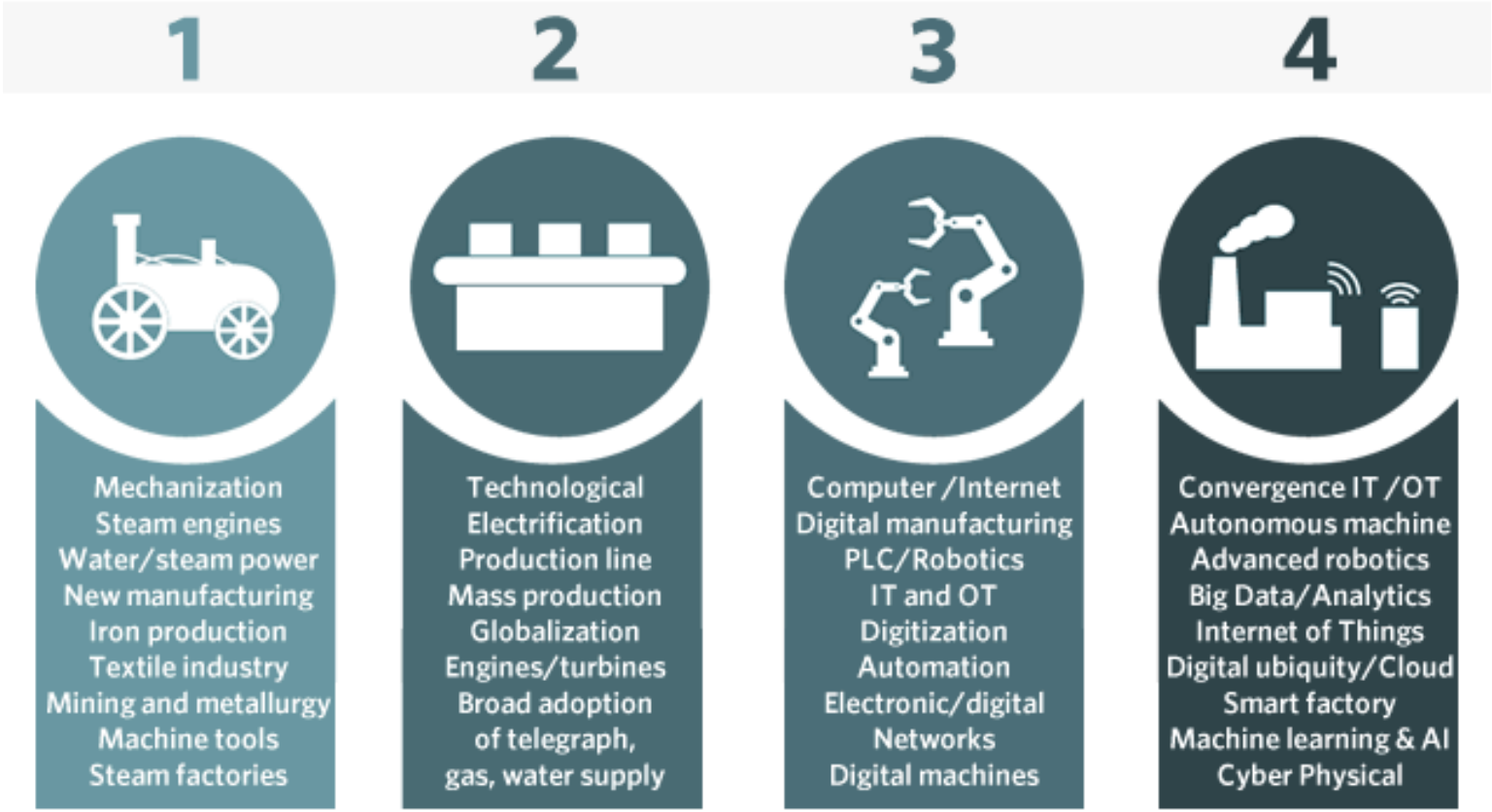
INDUSTRY 4.0 – DEFINITION

Name origin: 2011 Hannover expo

With the definition "Industry 4.0" we mean the trend towards industrial **automation**, the **interconnection** of supplier machinery and the supply chain, the generation and analysis of large amounts of **data**

- This definition is applied only if the subject is a **company**, not a "natural person"
- The first definition of Industry 4.0 was implemented for **manufacturing** industry. Now the concept is extended to every company: the (smart) Factory is **"…the physical place where value is generated"** (Services, vending machines, healtcare field…)

INDUSTRY 4.0: 4TH INDUSTRIAL REVOLUTION



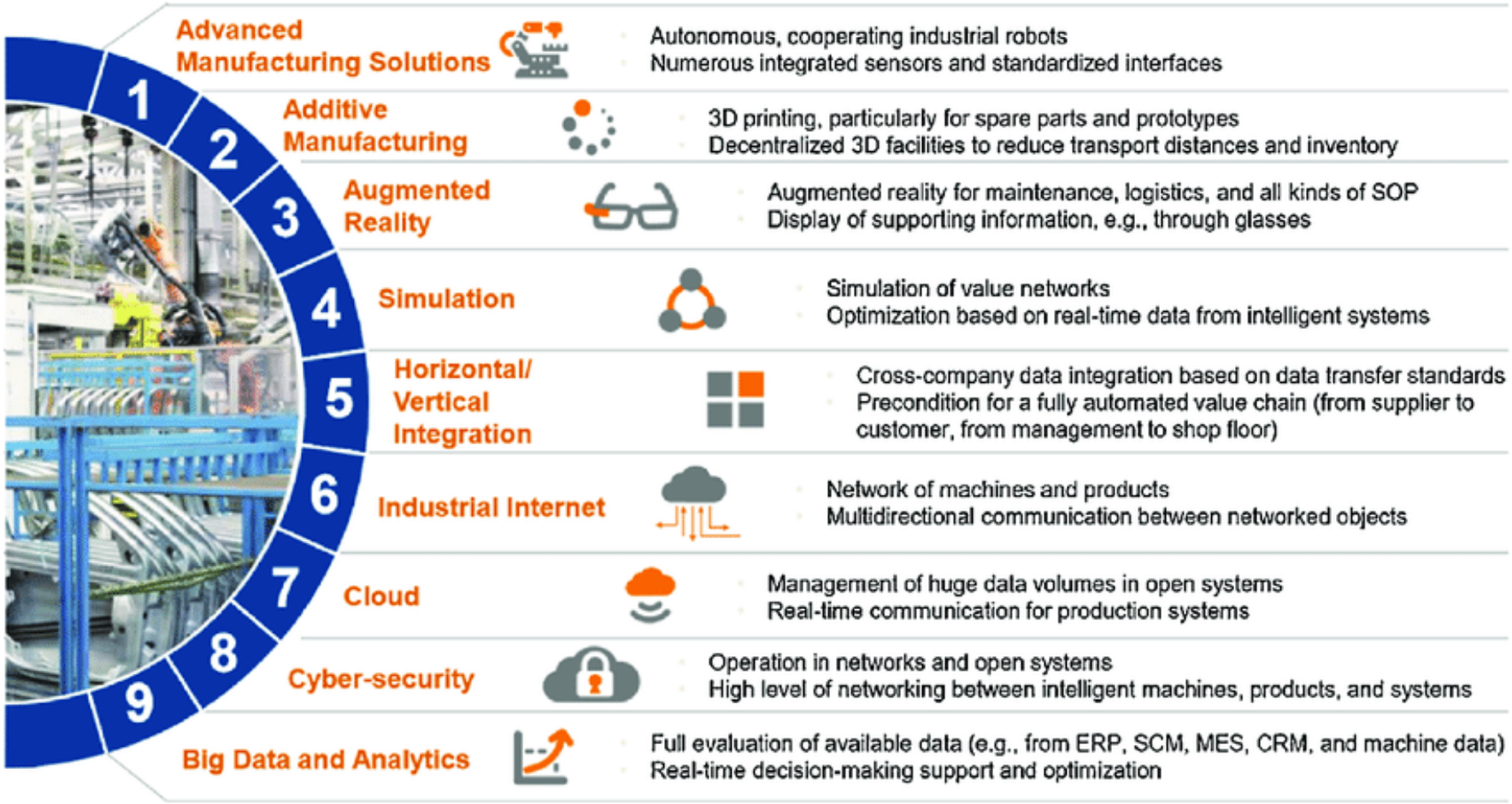
INDUSTRY 4.0: THREE MAIN TECHNOLOGICAL AREAS

1. **Digital data availability and Big Data Analytics:** big data elaborations, low-cost, cloud computing, process virtualization, fast prototyping and AI
2. **Robotics and advanced automation:** costs, production errors and time reduction
3. **High connectivity level:** internet of things application in the value chain

INDUSTRY 4.0 – MAIN TRANSFORMATION GUIDELINES

1. **Interconnection**: asset ability of exchanging information with internal (e.g. ERP, CRM systems, etc.) and/or external (customers, suppliers, partners, supply chain, etc.) systems
2. **Virtualization:** digital twin of a real system for the forecast of the system evolutions through simulations. The combination of the physical components with their digital twins is the cyber physical model which allows costs and time reduction
3. **Decentralization**: Cyber-physical components have self diagnosis strategies
4. **Remote interaction**: devices are remotely accessible. Information on the system behavior can be retrieved and corrective actions can be implemented
5. **Real time elaborations and reactions**: functions for real time data mining and implementation of reactions

INDUSTRY 4.0 – KEY ENABLING TECHNOLOGIES (KET)



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INDUSTRY 4.0 IN EUROPE

Country	Fiscal regulation
Italy	Super-amortization for new assets "Iper"-amortization for industry 4.0 assets
France	Super-amortization for industry 4.0 machineries
Germany	None
Spain	None
Netherlands	Fast amortization

In Italy Industry 4.0 is a **National Strategic Plan**

Italy has the best scenario for Industry 4.0 investments (tangibles/intangibles).

This condition can be interesting also for **re-shoring** strategies

THE ITALIAN SCENARIO – INCENTIVES IN INNOVATION INVESTMENTS

- Credit tax for R&D investments: from 25% to 50%
- Credit tax for investments in innovative SME and start-ups
- "Sabatini law" for investments (3,575% up to 2M€ investments)
- "Patent box", optional tax regime related to exploitation of intellectual property
- Super-amortization: 30% for new assets (tangibles)
- Iper-amortization for industry 4.0 assets (tangibles/intangibles):
  - 170% for investments up to 2.5M€
  - 100% for investments from 2.5M€ to 10M€
  - 50% for investments from 10M€ to 20M€
  - (140% intangibles)

Amortization measures are not tax credits and are incompatible with R&D tax credits

Amortization measure can instead be combined with contributions (POR-FESR measures, Sabatini law, etc)

THE ITALIAN SCENARIO

AMORTIZATION + CONTRIBUTIONS: AN EXAMPLE

Theme: Purchase of innovative machinery for 1M€

Incentive:

- POR FESR 2014-2020 Umbria region investments contributions program: 30% contribution
- Sabatini law: 3,575 % contribution
- Iper-amortization measure: saving on IRES FLAT TAX of 24% on 170%

These two measures are compatible

- POR-FESR contribution: 30%(1M €) = 300 k€
- Sabatini law contribution: 3,575% (1 M€) = 36 k€
- Iper-amortization benefit: 24%(170%(1M€))=24%(1.7M€) = 408 k€

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THE ITALIAN SCENARIO – IPER-AMORTIZATION ASSETS

The assets eligible to iper-amortization are:

1. Instrumentals assets controlled by computers or by sensors and actuators
2. Quality and sustainability systems
3. Devices for human-machine interaction and for the ergonomics and safety improvement

THE ITALIAN SCENARIO – IPER-AMORTIZATION REQUIREMENTS (1)

The assets need to satisfy all the following 5 characteristics in order to be eligible to iper-amortization:

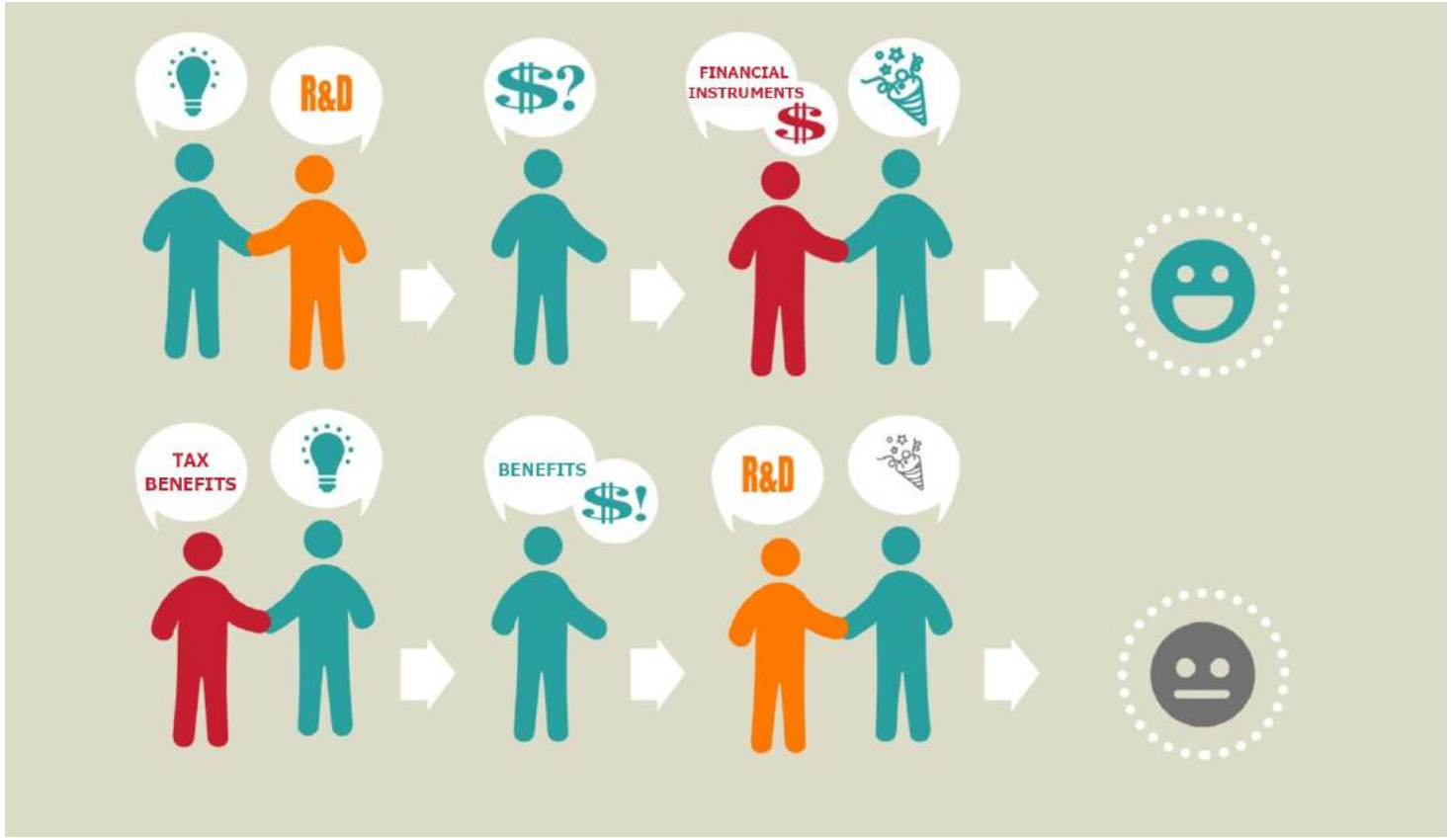
1. CNC (Computer Numerical Control) and/or PLC (Programmable Logic Controller) control
2. Inter-connection to IT systems and possibility of interaction with instructions or part program
3. Automatic integration with logistic system or with supply network and/or with other machines
4. Simple and intuitive frontends
5. High standards in safety, health and hygiene

THE ITALIAN SCENARIO – IPER-AMORTIZATION REQUIREMENTS (2)

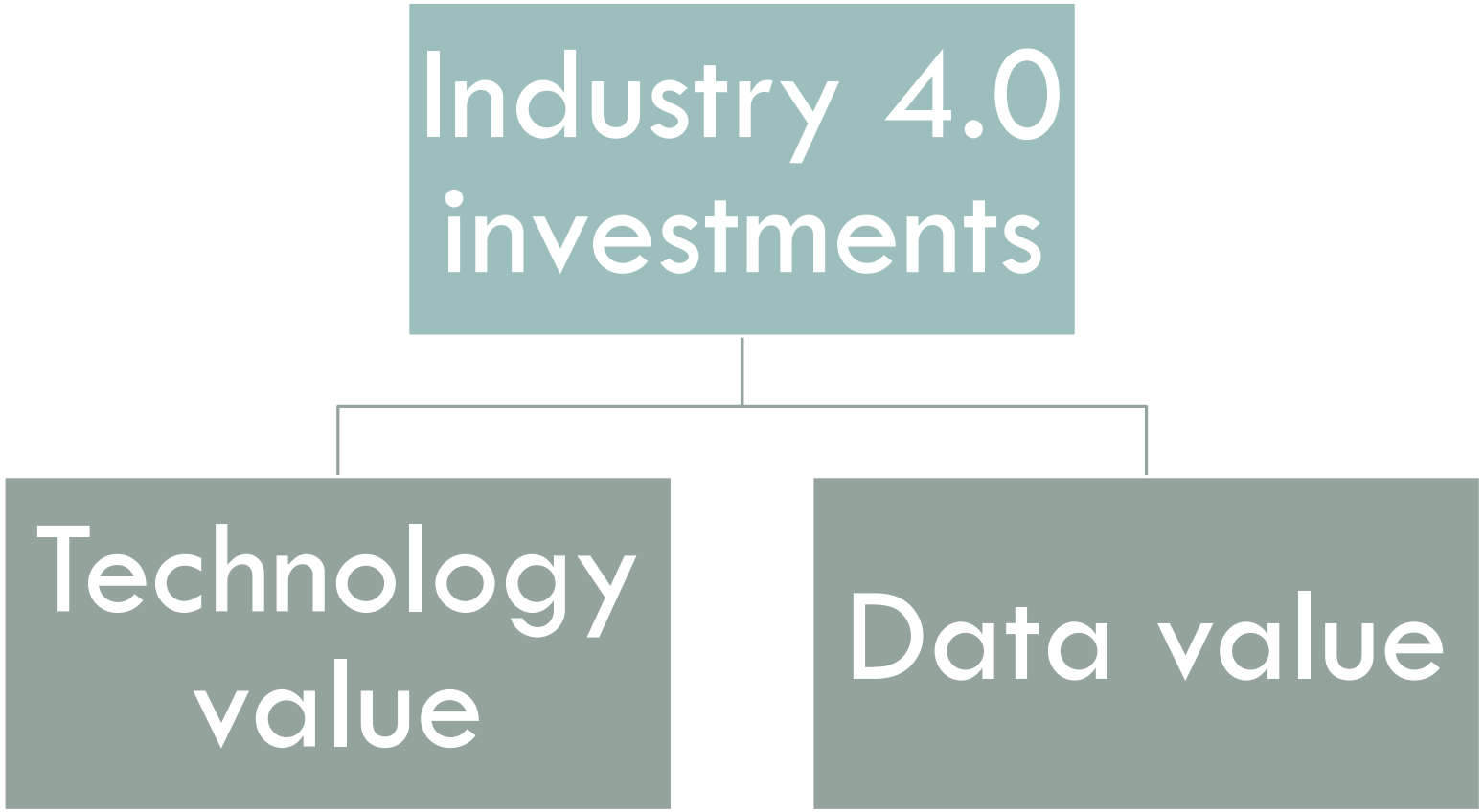
Furthermore the assets need to satisfy at least 2 of the following 3 characteristics:

1. Remote maintenance systems and/or remote diagnosis and/or remote control
2. Continuous condition monitoring through appropriate sensors and adaptivity to the process evolution
3. Cyber-physics systems: integration between physical assets and behavior simulation during process evolution

INDUSTRY 4.0 – VIRTUOUS INVESTMENTS STRATEGIES



INDUSTRY 4.0 – VALUES FOR COMPANIES



INDUSTRY 4.0 – TECHNOLOGY VALUE: OBJECTIVES

With Industry 4.0 technology it is possible to achieve the following objectives:

- **Flexibility**: possibility of small quantities productions with the same costs of large scale production
- **Velocity** in prototyping and mass production with new technologies and low set-up and goto-market time
- **Productivity** through costs and waste reduction (defects and errors detection); reliability and quality increase
- **Integration** of supply chains with logistic and supplying systems improvements
- **Safety**: errors and accident reduction, better ergonomics and work quality conditions
- **Sustainability**: energy, raw materials consumption and polluting emission reduction
- **Product innovation**: new digital technologies allows to develop new business models based on smart products

INDUSTRY 4.0 – TECHNOLOGY VALUE: IMPLEMENTATION

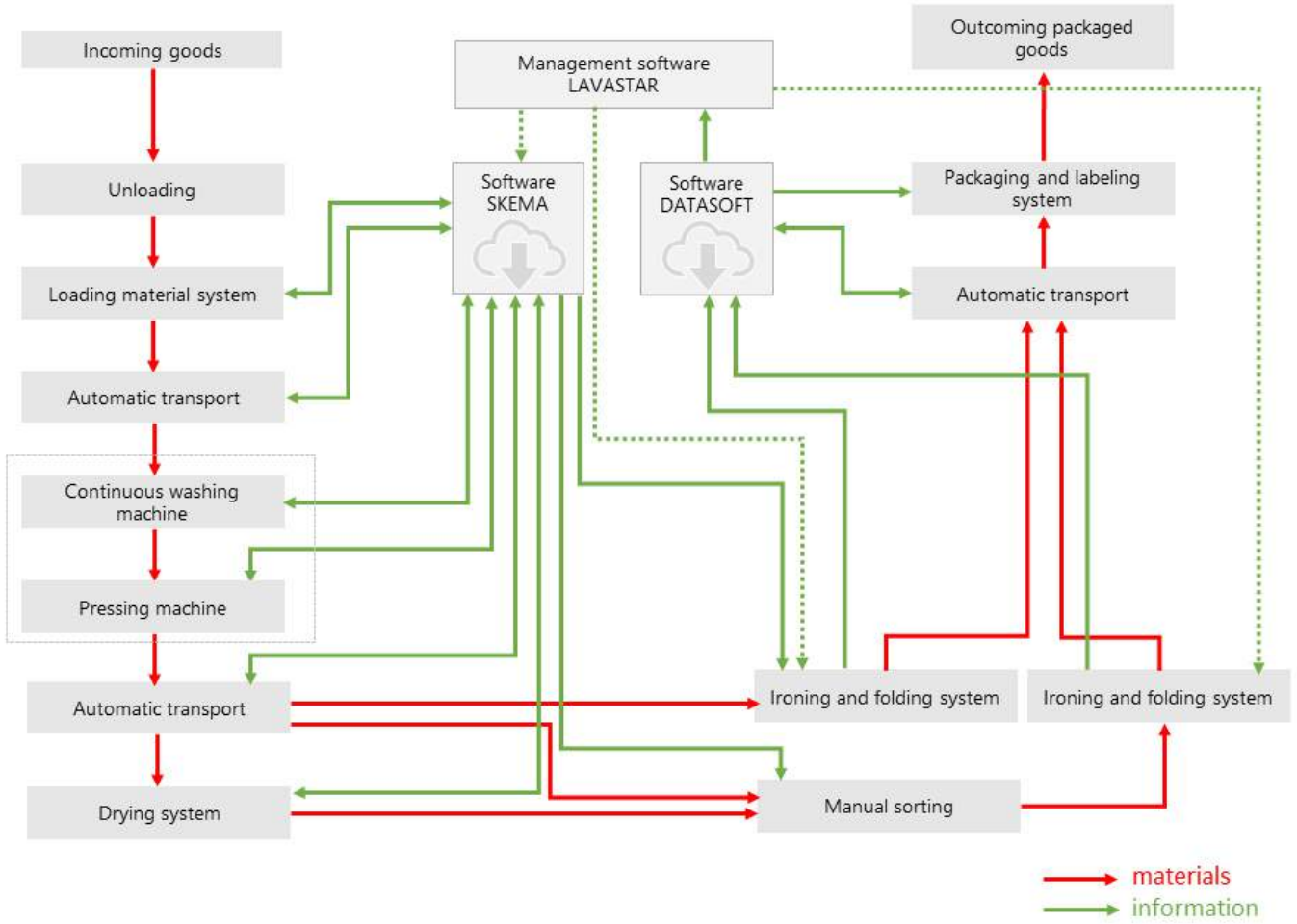
Interconnection system improves the global productivity with the reduction of time to market, error minimization and quality enhancement

Interconnection system can be implemented in two ways:

- **Central software interconnection**: every machine transmit information to the central control software; the material handling is controlled by the central information control
- **Machine-to-machine** (**M2M**) **interconnection**: every machine transmit information to the next machine in the supply chain; the material handling is controlled at every step from information flux between the machines

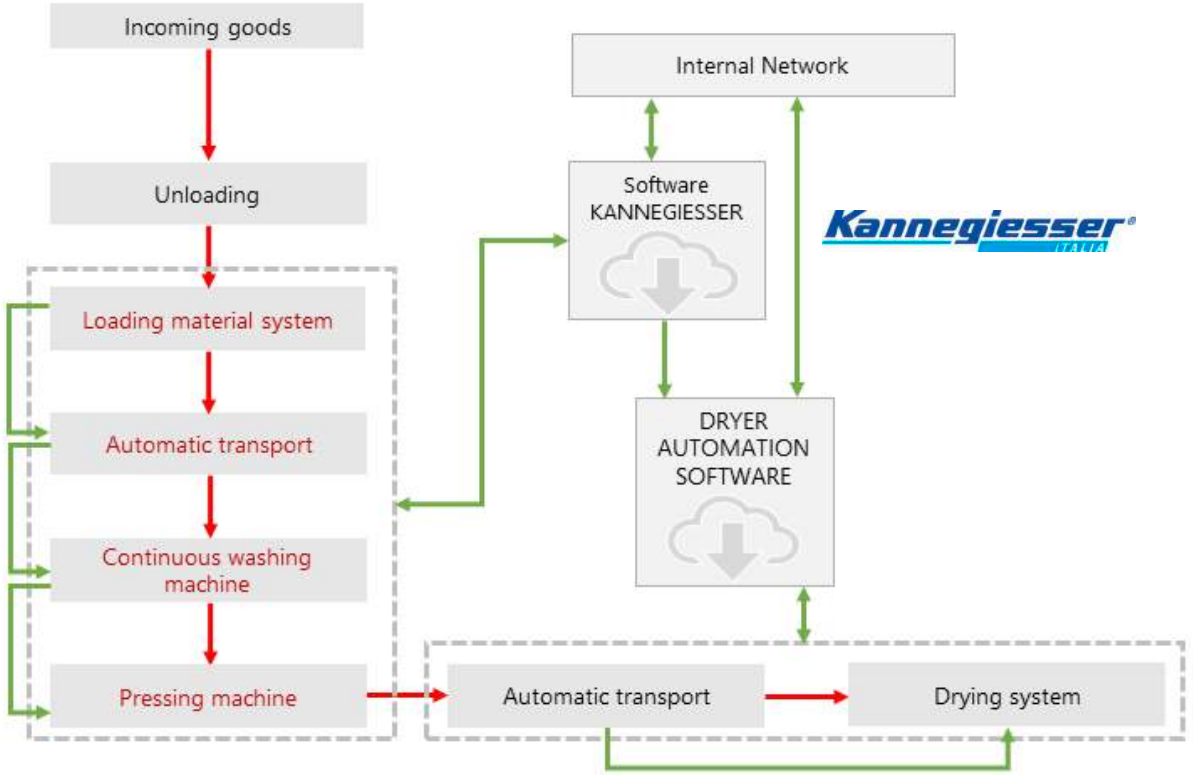
INDUSTRY 4.0 – TECHNOLOGY VALUE: THE LAUNDRY EXAMPLE

CENTRAL SOFTWARE INTERCONNECTION



INDUSTRY 4.0 – TECHNOLOGY VALUE: THE LAUNDRY EXAMPLE

M2M INTERCONNECTION



INDUSTRY 4.0 – TECHNOLOGY VALUE: THE LAUNDRY EXAMPLE

CONTINUOUS WASHING MACHINE

Kannegiesser ITALIA

INDUSTRY 4.0 – TECHNOLOGY VALUE: THE LAUNDRY EXAMPLE

PLC SYSTEM

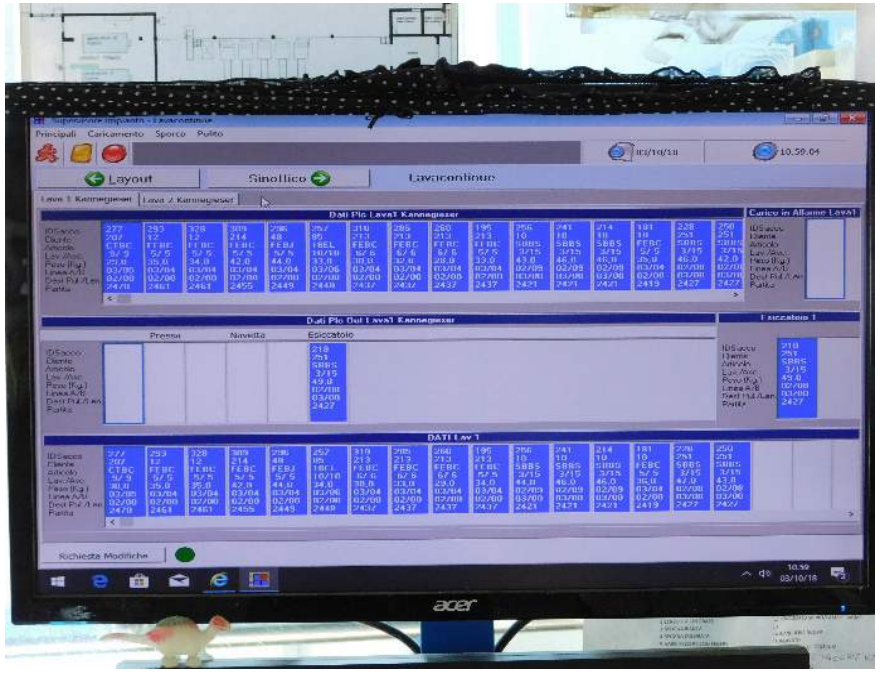
INDUSTRY 4.0 – THE LAUNDRY EXAMPLE

ETHERNET INTERCONNECTION SYSTEM

INDUSTRY 4.0 – TECHNOLOGY VALUE: THE LAUNDRY EXAMPLE

MONITORING

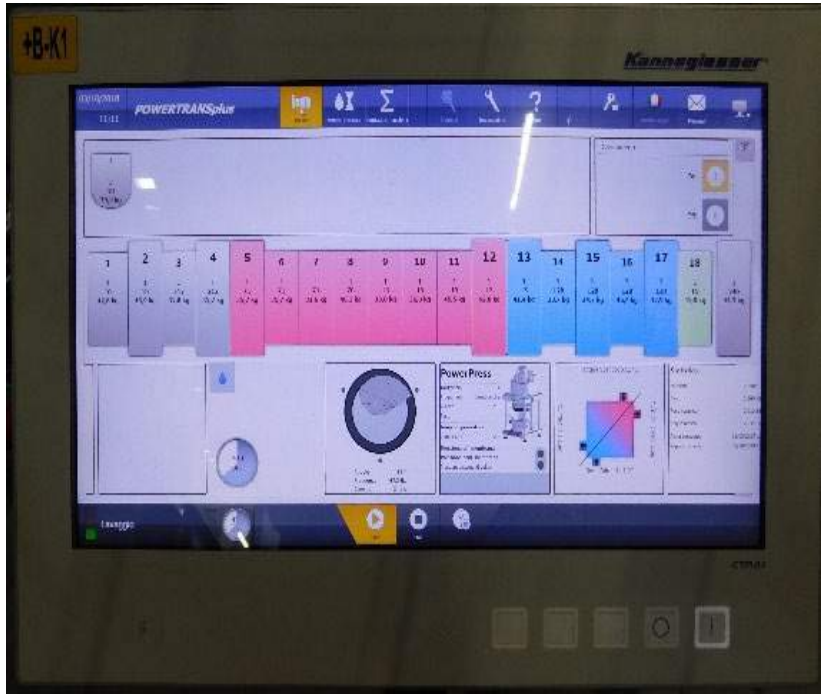
Bag emptying monitoring with software *Skema*



PLC data monitoring

INDUSTRY 4.0 – TECHNOLOGY VALUE: THE LAUNDRY EXAMPLE

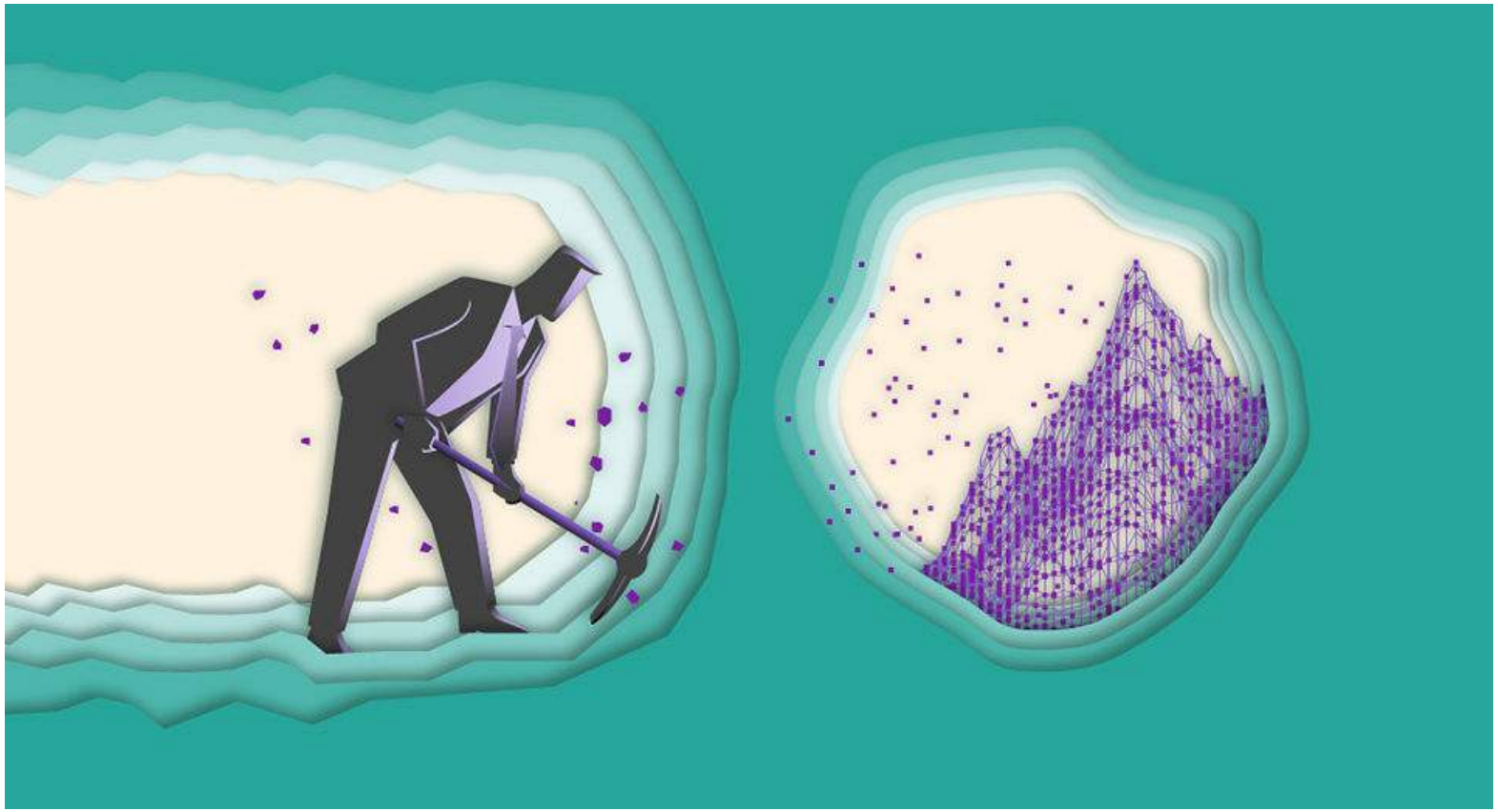
USER INTERFACE



Work process evolution

Work process details

INDUSTRY 4.0 – DATA VALUE



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INDUSTRY 4.0 – DATA VALUE: DSS EXAMPLE

Case study: Wide area with complex orography and high density human presence

The problem: Rainfall and water flux forecast in order to avoid flood

Physical systems: Sewerage system with sensors, pluviometers, water level sensors

Cyber physical system: Hydrological and weather simulations

With data from sensors and simulations is possible to develop a DSS system

INDUSTRY 4.0 – DATA VALUE: DSS EXAMPLE

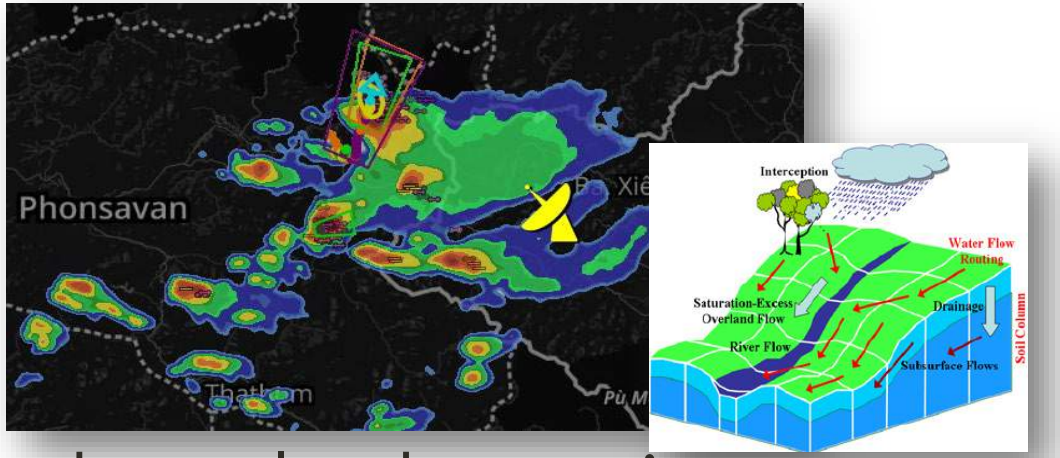
FLOOD CONTROL AND PREVENTION

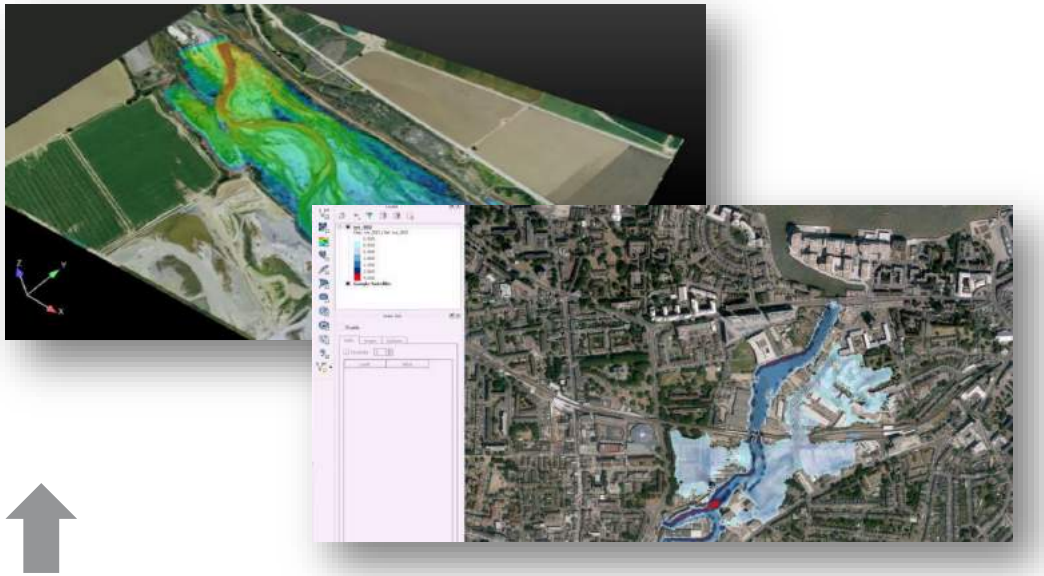
Flood control and prevention

Based on weather monitoring and nowcasting, a combination of physical, black box and GIS models is used to estimate the upcoming discharges and simulate the flooded areas

INDUSTRY 4.0 – DATA VALUE: DSS EXAMPLE

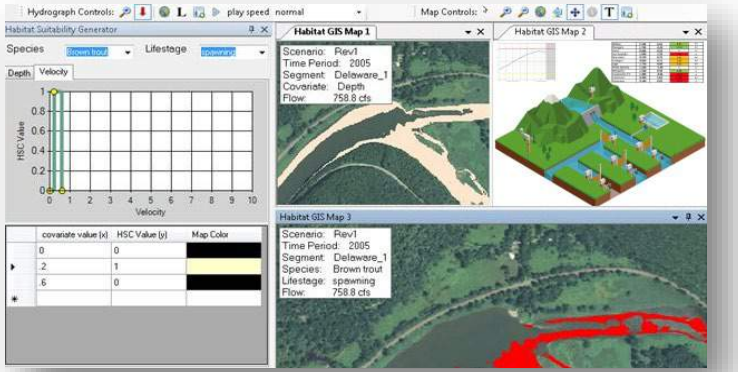
FLOOD CONTROL AND PREVENTION





Flood control and prevention

The data provided by the weather monitoring system and the user's network feed the hydraulic/hydrological models. Following the exceeding of alert levels related to possible flooding scenarios, the DSS suggests the best mitigation strategies (close / open gates, etc.)



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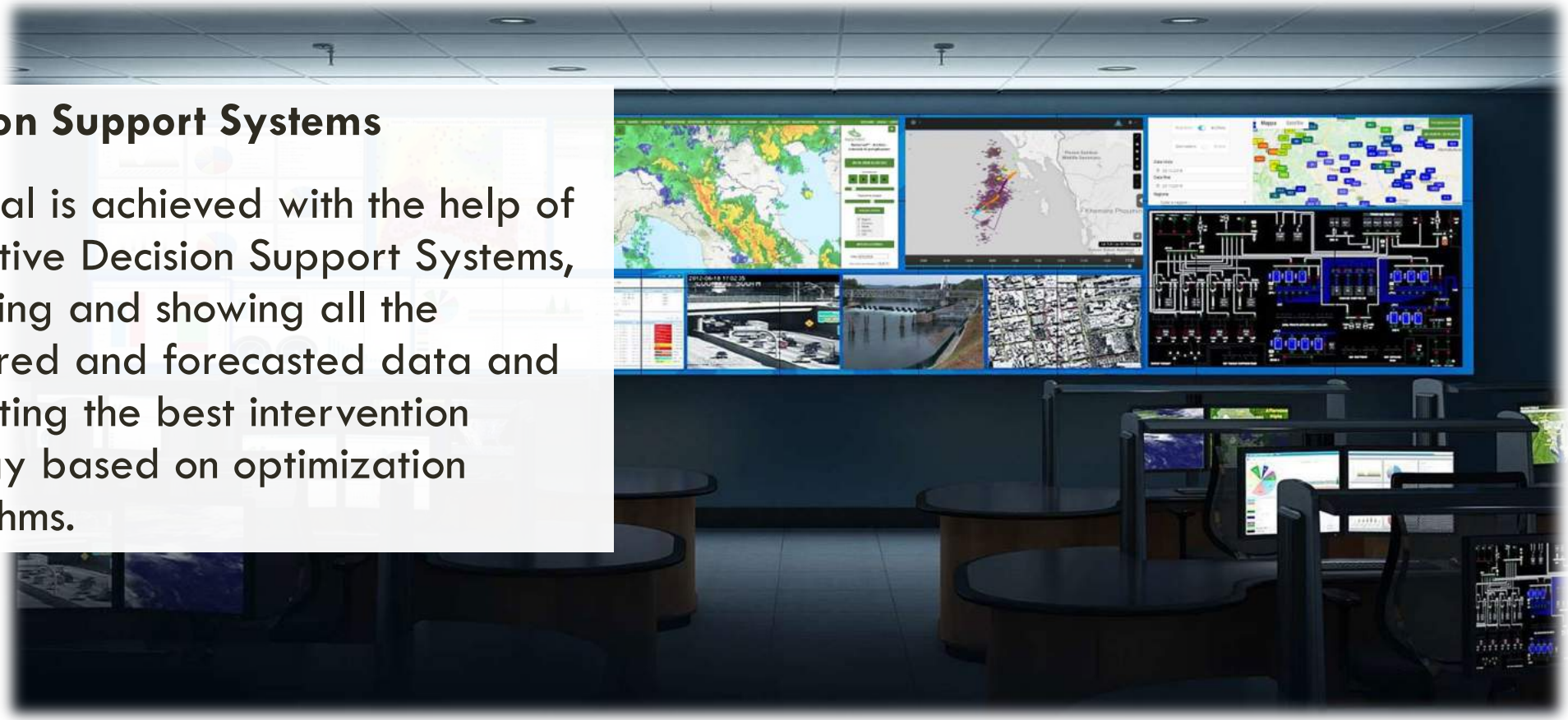
INDUSTRY 4.0 – DATA VALUE: DSS EXAMPLE

FLOOD CONTROL AND PREVENTION



Decision Support Systems

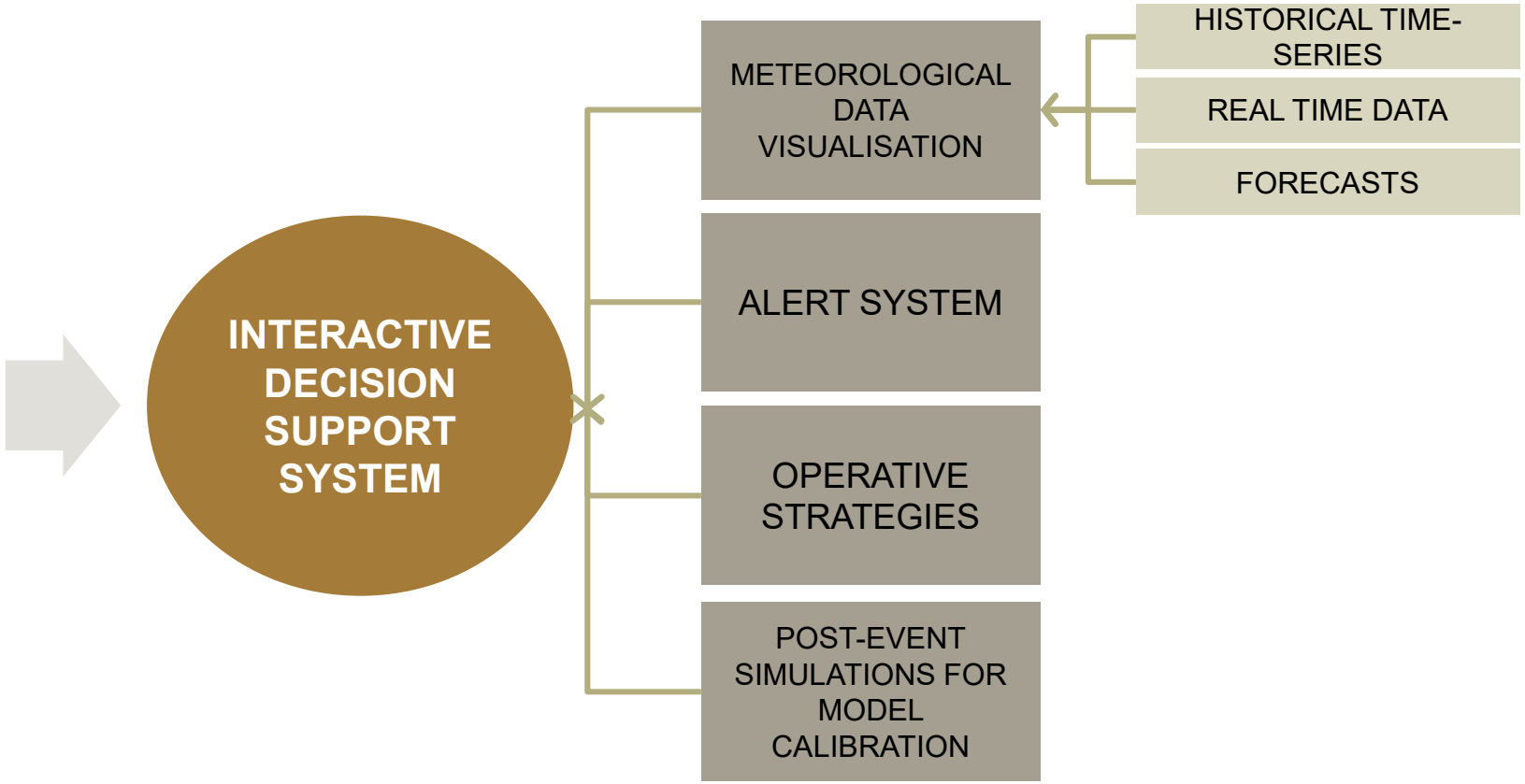
The goal is achieved with the help of interactive Decision Support Systems, receveing and showing all the monitored and forecasted data and suggesting the best intervention strategy based on optimization algorithms.

INDUSTRY 4.0 – DATA VALUE: DSS EXAMPLE

INTERACTIVE DECISION SUPPORT SYSTEM

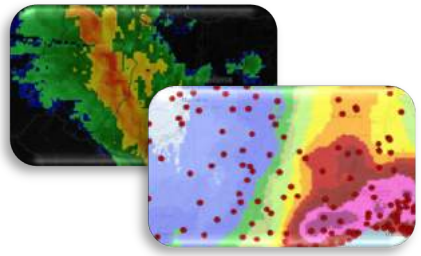
GOALS

- NETWORK/SYSTEM BEHAVIOUR ANALYSIS
- HISTORICAL EVENTS SIMULATION AND REANALYSIS
- AUTOMATED DECISION SUPPORT SYSTEM DESIGN
- REAL TIME STRATEGIES PLANNING BASED ON FORECAST MODELS

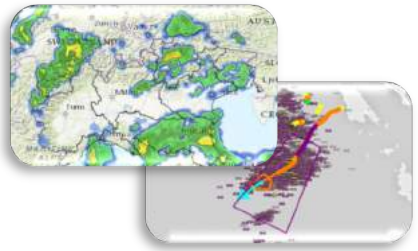


INDUSTRY 4.0 – DATA VALUE: DSS EXAMPLE

OPERATIVE TOOLS



WEATHER DATA COLLECTION FROM GROUND GAUGES AND RADARS

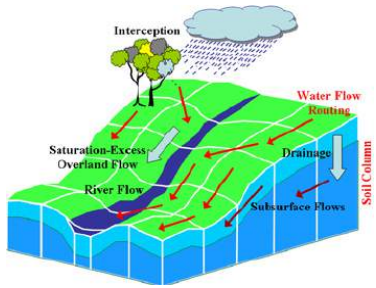


NOWCASTING FROM INNOVATIVE MODELS

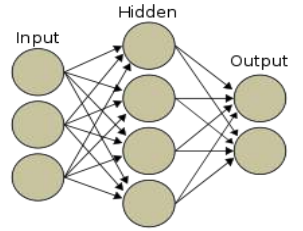
SCADA DATA COLLECTION

DSS

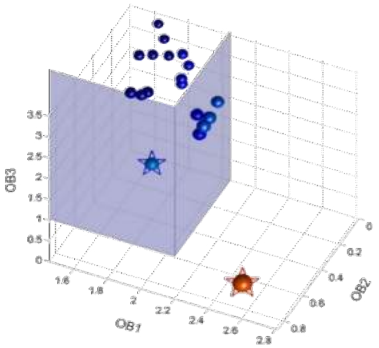
HYDRAULIC/ HYDROLOGICAL MODELS



BLACK BOX MODELS



OPTIMISATION ANALYSIS



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INDUSTRY 4.0 – DATA VALUE: DSS EXAMPLE

APPLICATION FIELDS

FLOOD/ LANDSLIDE RISK MITIGATION & PREVENTION	SEWER SYSTEMS MANAGEMENT	WASTEWATER TREATMENT PLANTS	STORAGE TANKS MANAGEMENT	PRECISION AGRICULTURE / SMART IRRIGATION	SMART URBAN PLANNING	CLIMATE CHANGES ADAPTATION	EMERGENCIES MANAGEMENT
							

STAKEHOLDERS

- CIVIL PROTECTION
- LOCAL ADMINISTRATIONS
- INSURANCE COMPANIES
- UTILITY COMPANIES
- WATER TREATMENT COMPANIES
- GOVERNEMENTS
- DISASTER MANAGEMENT INSTITUTIONS
- WATER MANAGEMENT COMPANIES
- RIVER AUTHORITIES