

MAY 2023

MATTEO ROSSINI

ADJUNCT PROFESSOR OF
OPERATIONS MANAGEMENT

POLITECNICO DI MILANO

INDSIRY40

OPERATIONS MANAGEMENT COURSE

Matteo Rossini

- Management Engineer of Politecnico di Milano (Polimi), Italy
- PHD in industrial engineering at Polimi
 - Investigating Lean Supply Chain
- Lecturer for the business school in MBA courses, executive courses and international masters
- Industrial management LAB tutor
- Member of *Lean Excellence Centre* www.lean.polimi.it
- Head of Lean, Logistic and Digital Twin cluster for MADE competence centre www.made-cc.eu/it/
- Operations management consultant
- Current Research Field:
 - Digital transformation,
 - Lean and I4.0,
 - Cloud Manufacturing;



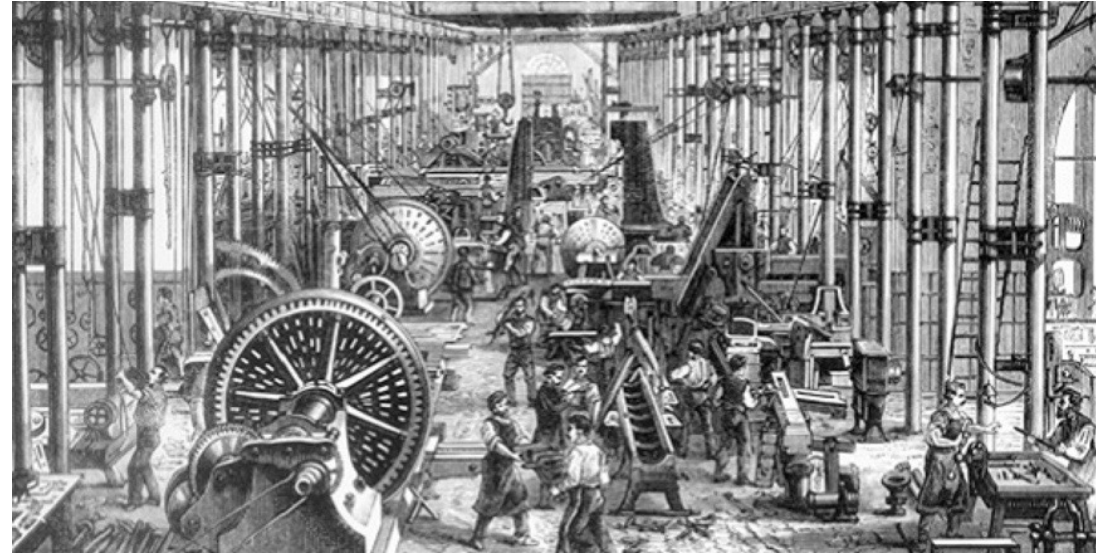
AGENDA

- Industry 4.0
 - What is it?
 - Case implementation
- Digital transformation
 - What is it?
 - How to do it?
 - Case implementation

EVOLUTION OF INDUSTRY

1° industrial revolution,
first idea of a factory

The exploitation of hydraulic energy





1780s

2010s

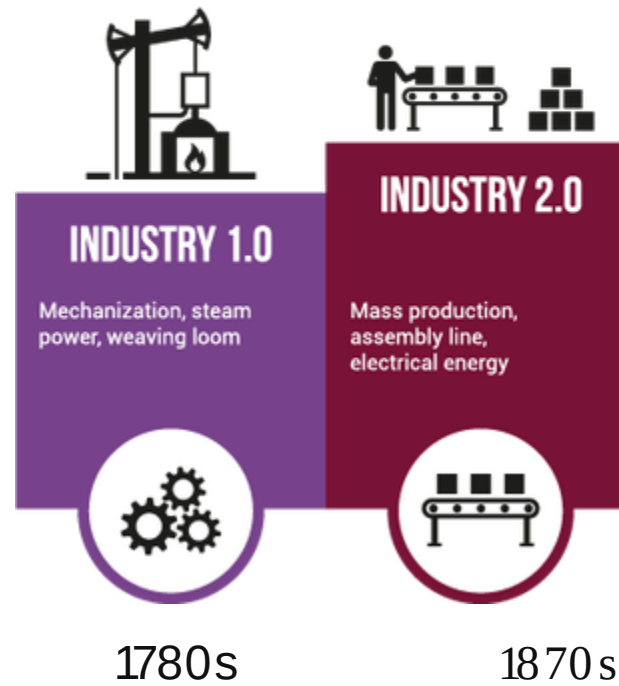
L'EVOLUZIONE DELL'INDUSTRIA – LE RIVOLUZIONI INDUSTRIALI

2° industrial revolution
(1870 – 1914)

Electric energy

Mass production

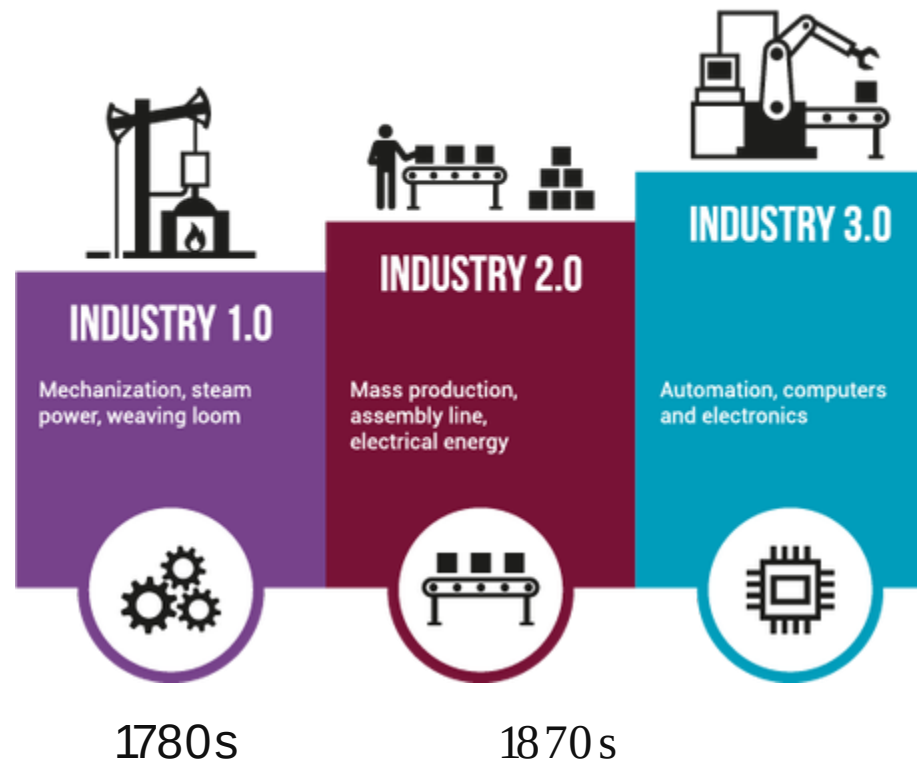




3° industrial revolution
1970s automation
Robots e CNC machines

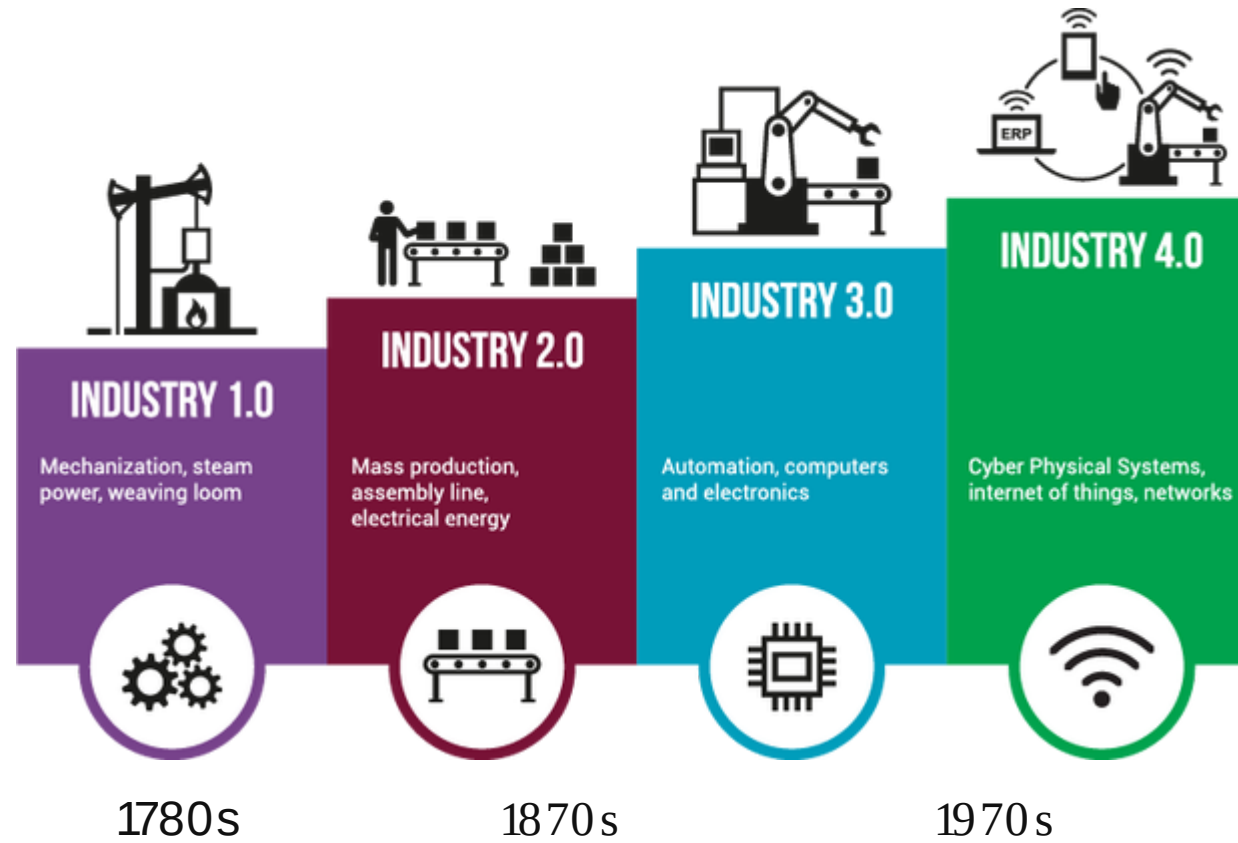


L'EVOLUZIONE DELL'INDUSTRIA – LE RIVOLUZIONI INDUSTRIALI



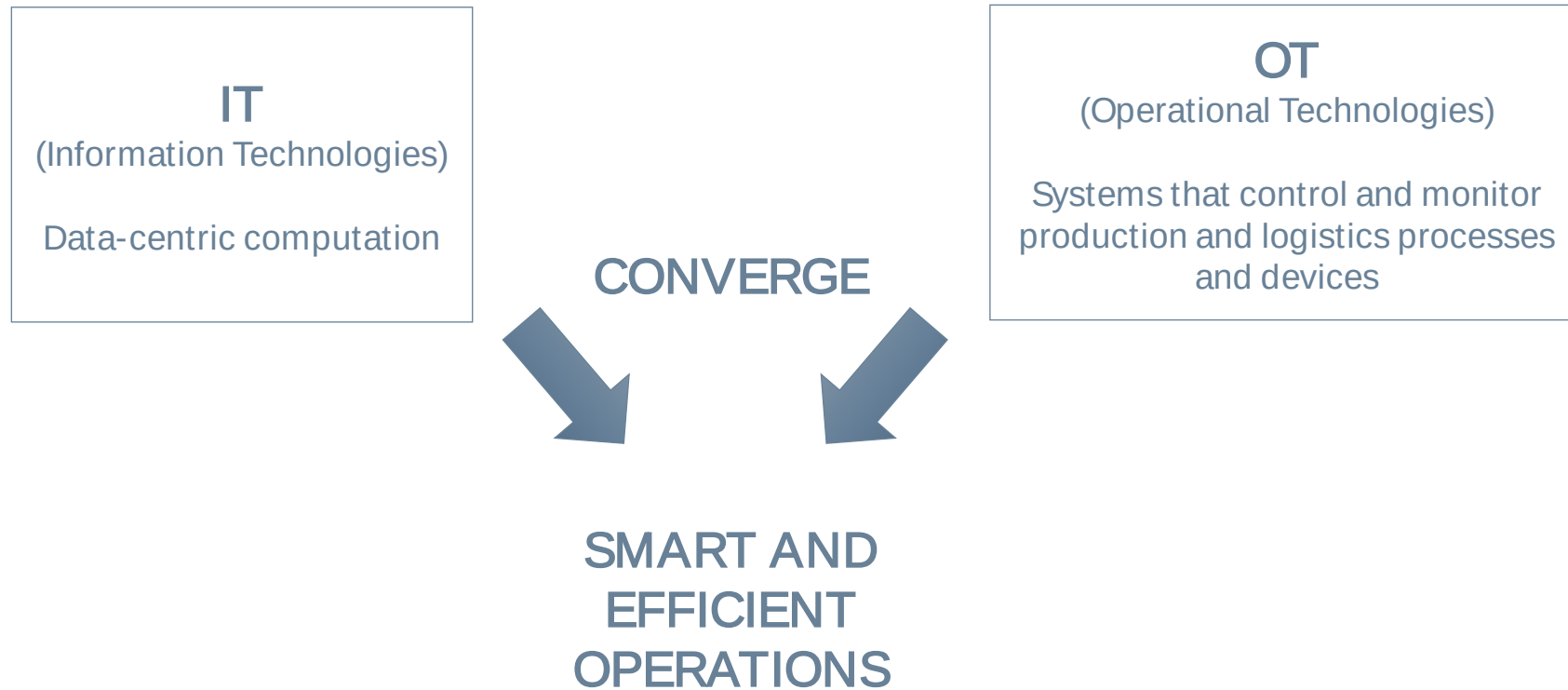
Let's find together the novelties of Industry 4.0!



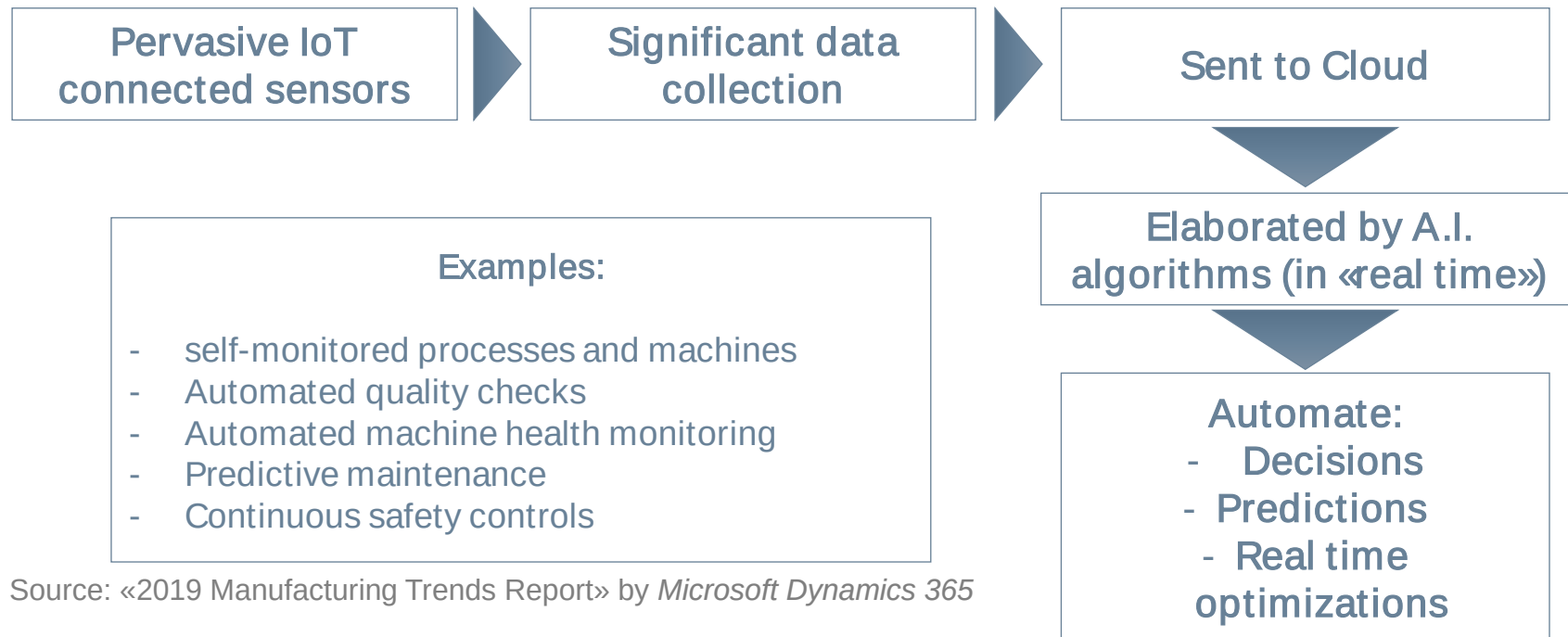


IT-OT CONVERGENCE

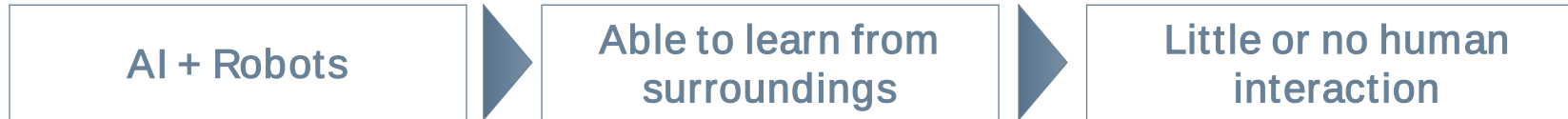
Source: «2019 Manufacturing Trends Report» by *Microsoft Dynamics 365*



It is possible to say that the Industry 4.0 enabling technologies make the manufacturing systems «intelligent».



AUTONOMOUS DEVICES



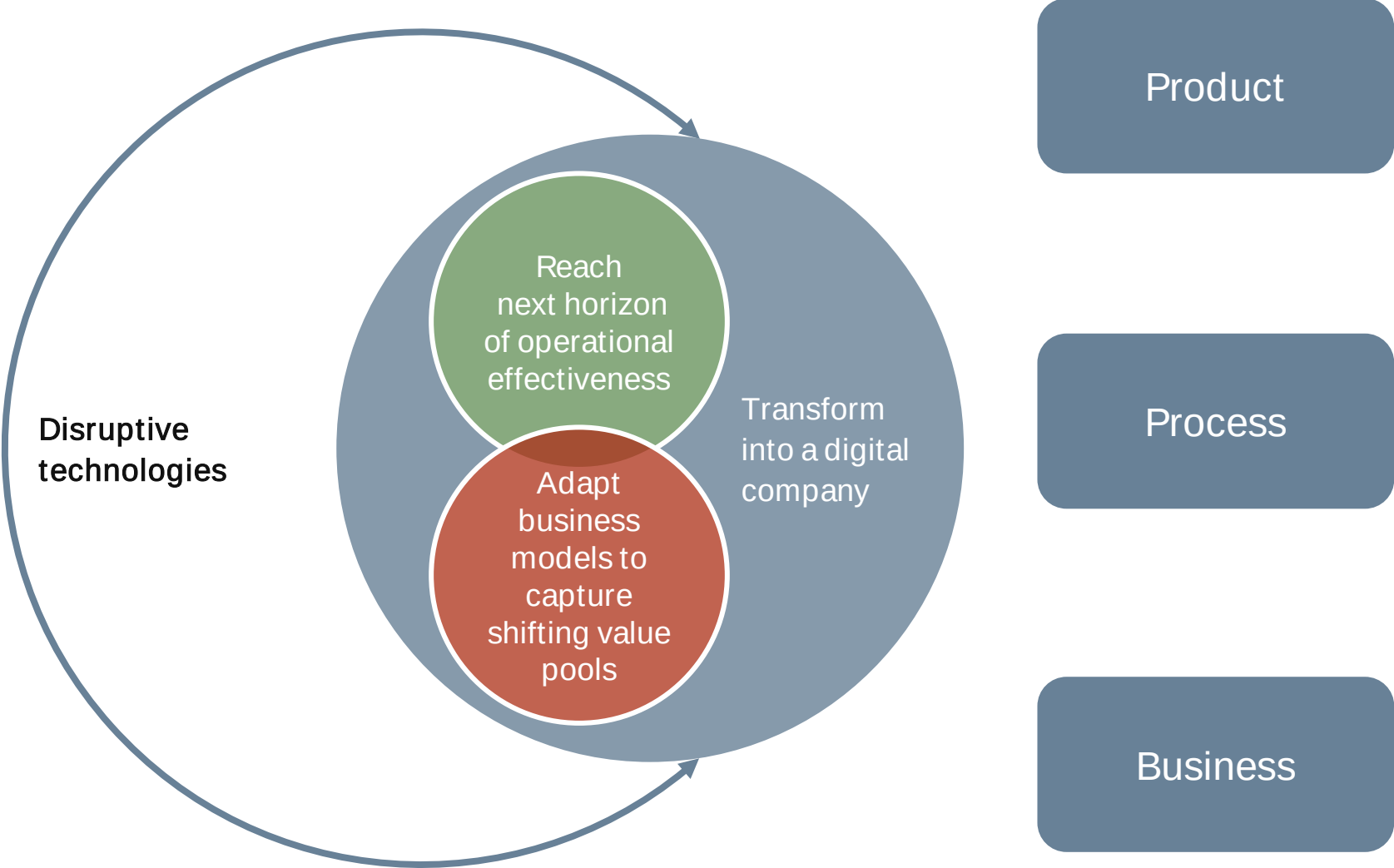
Examples:

- drones that move materials in factory, in warehouse or to customers
- Heat and dirt-resistant robots for extreme conditions (for foundry and forging)
- hygienic, highly precise robots (for food and pharma)
- AGV (automated guided vehicle) for internal logistics

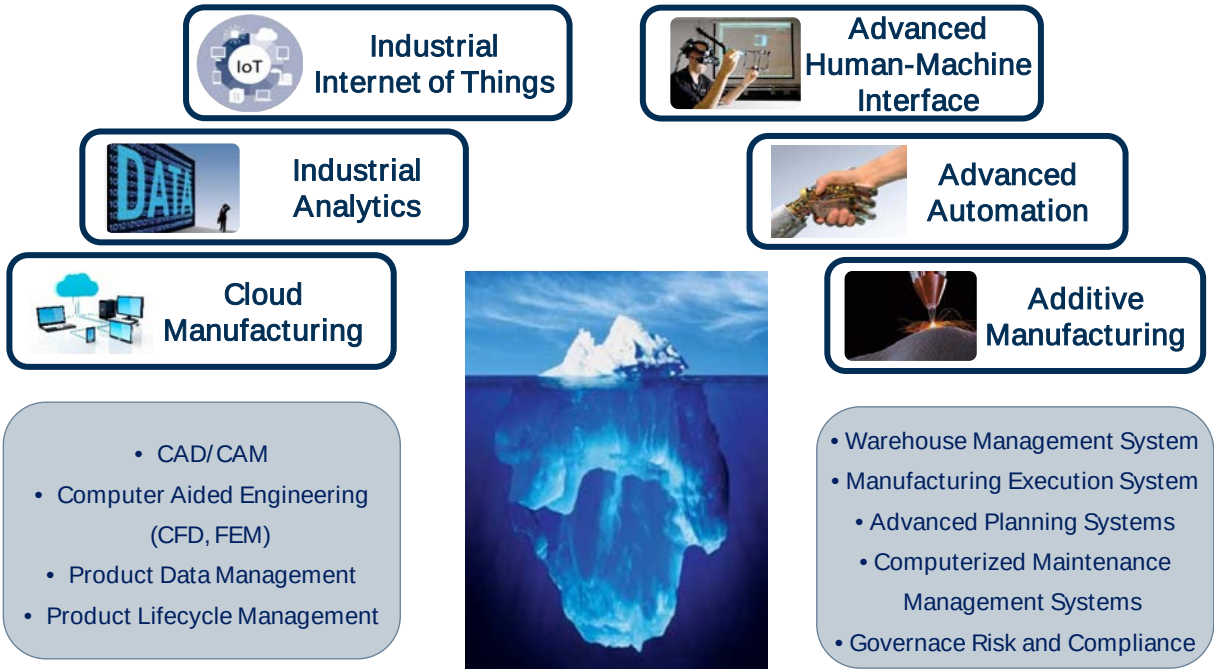


Source:
«2019 Manufacturing Trends Report»
by Microsoft Dynamics 365

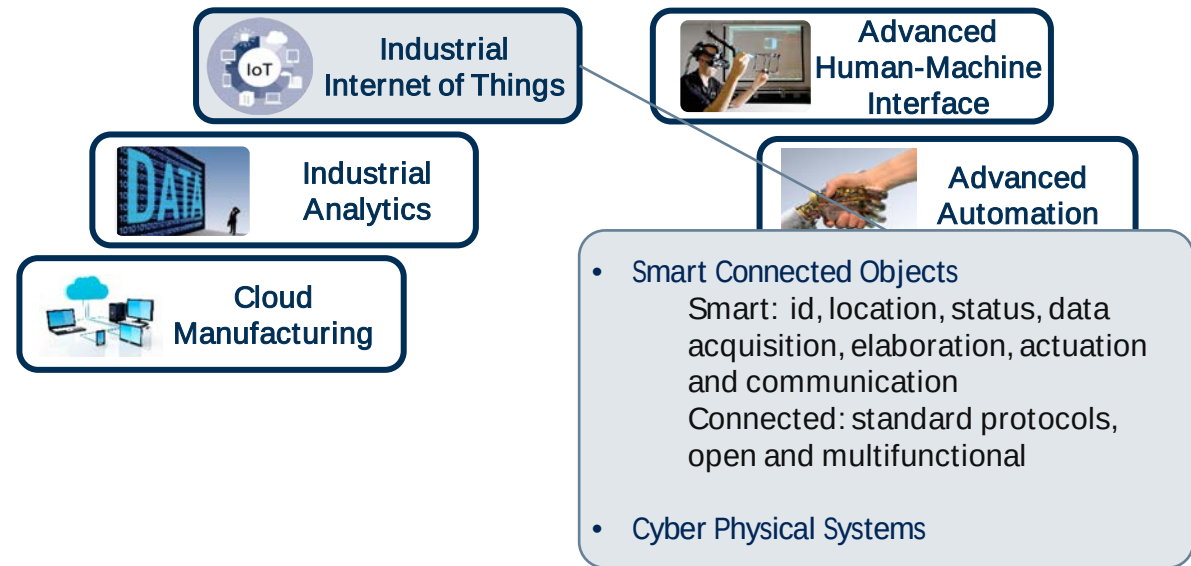
OUR MODEL OF DIGITAL TRASFORMATION



TECHNOLOGIES BEHIND INDUSTRY 4.0

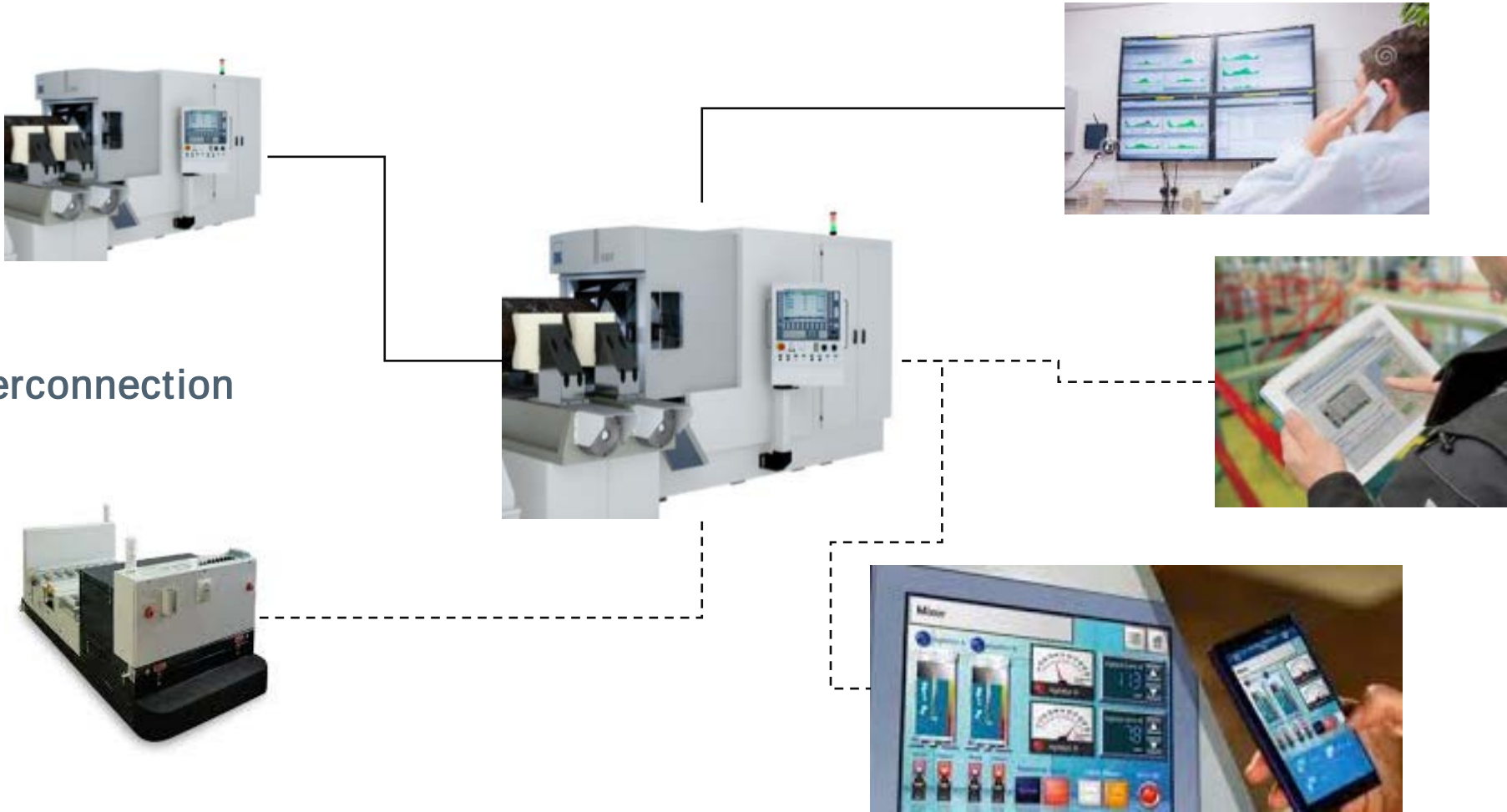


TECHNOLOGIES BEHIND INDUSTRY 4.0



THE INTERNET OF THINGS

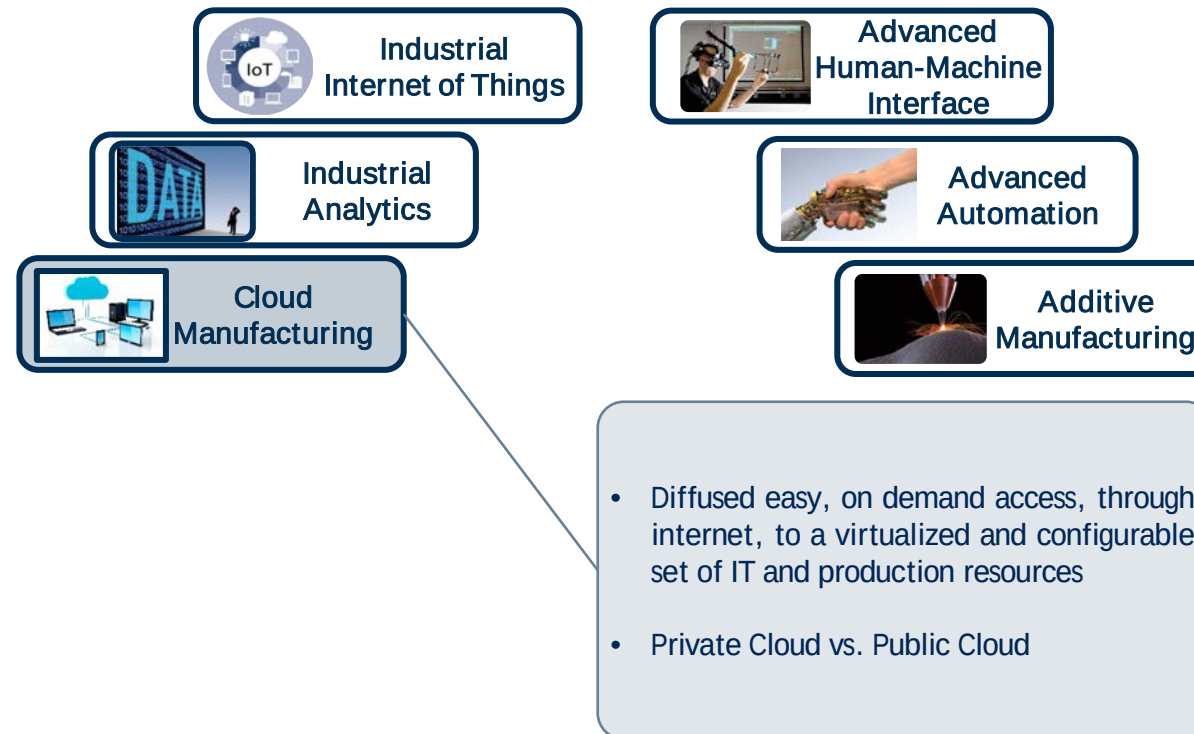
Interconnection



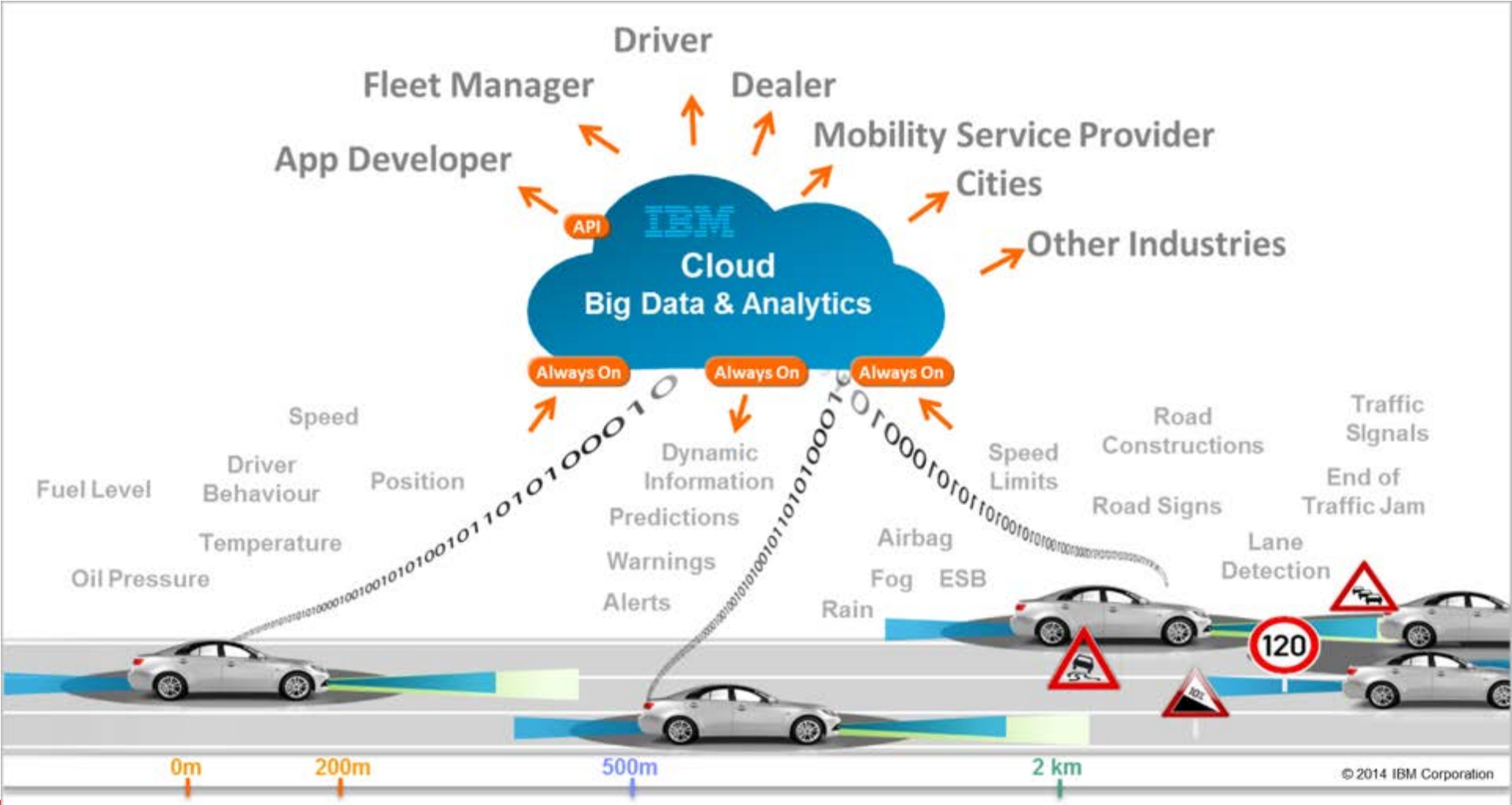
THE INTERNET OF THINGS



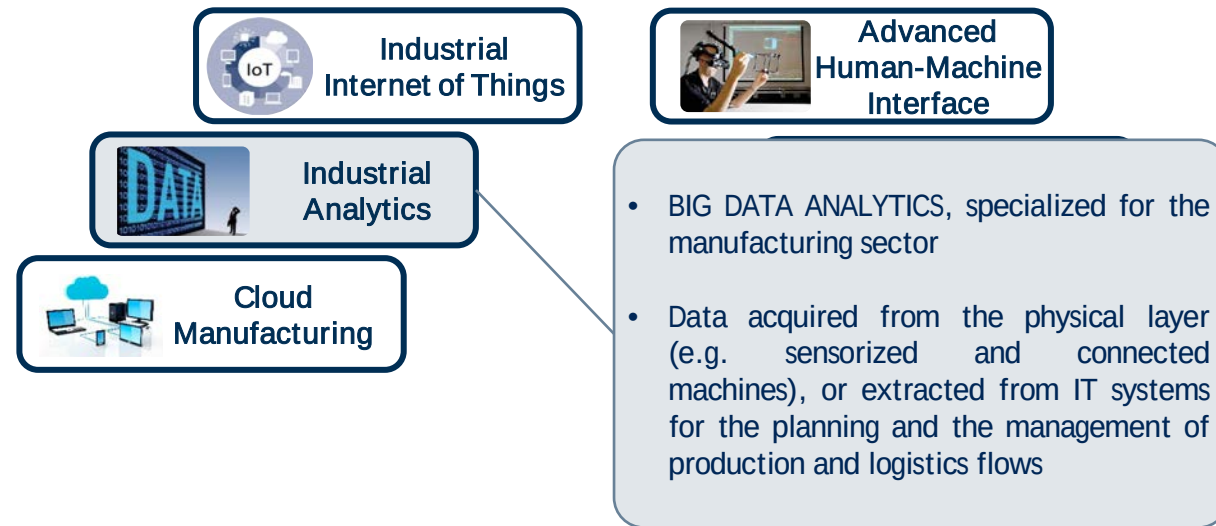
TECHNOLOGIES BEHIND INDUSTRY 4.0



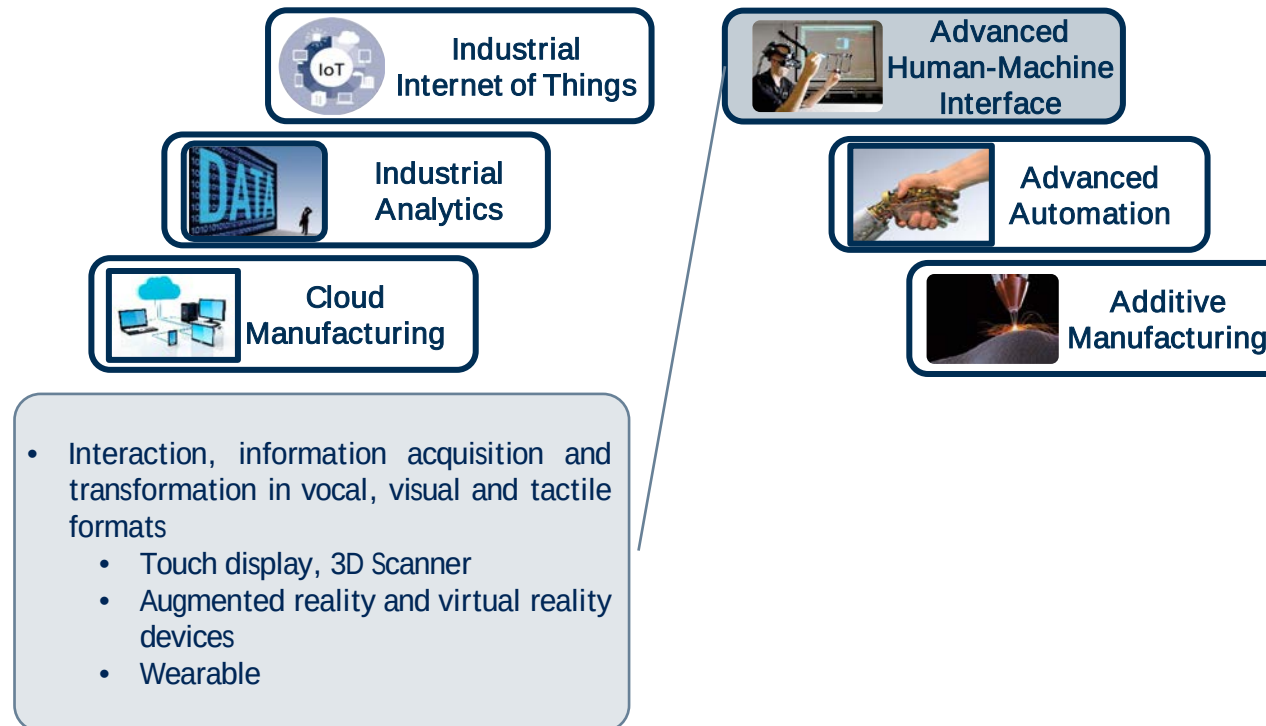
CLOUD MANUFACTURING



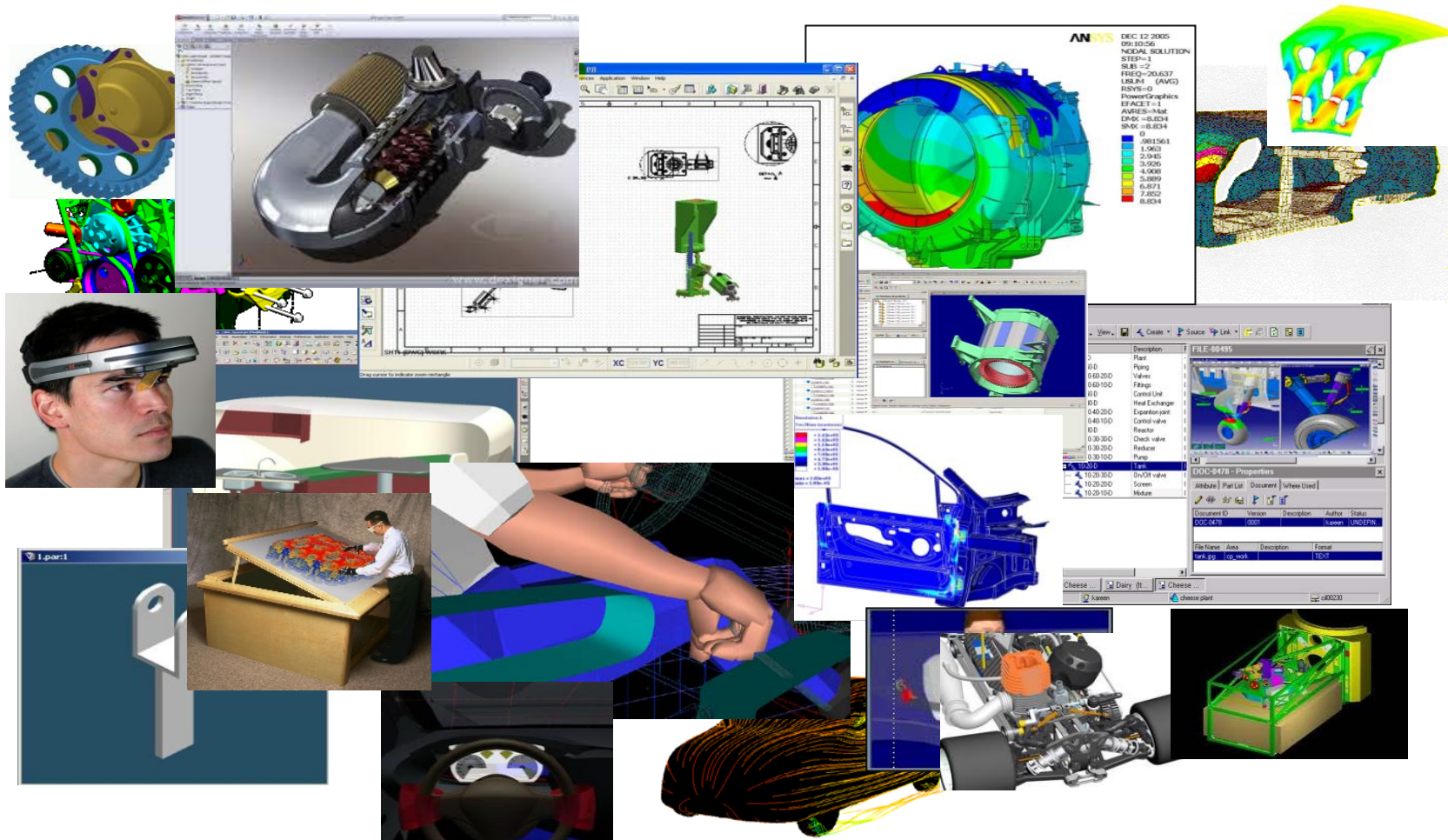
TECHNOLOGIES BEHIND INDUSTRY 4.0



TECHNOLOGIES BEHIND INDUSTRY 4.0



AUGMENTED / VIRTUAL REALITY

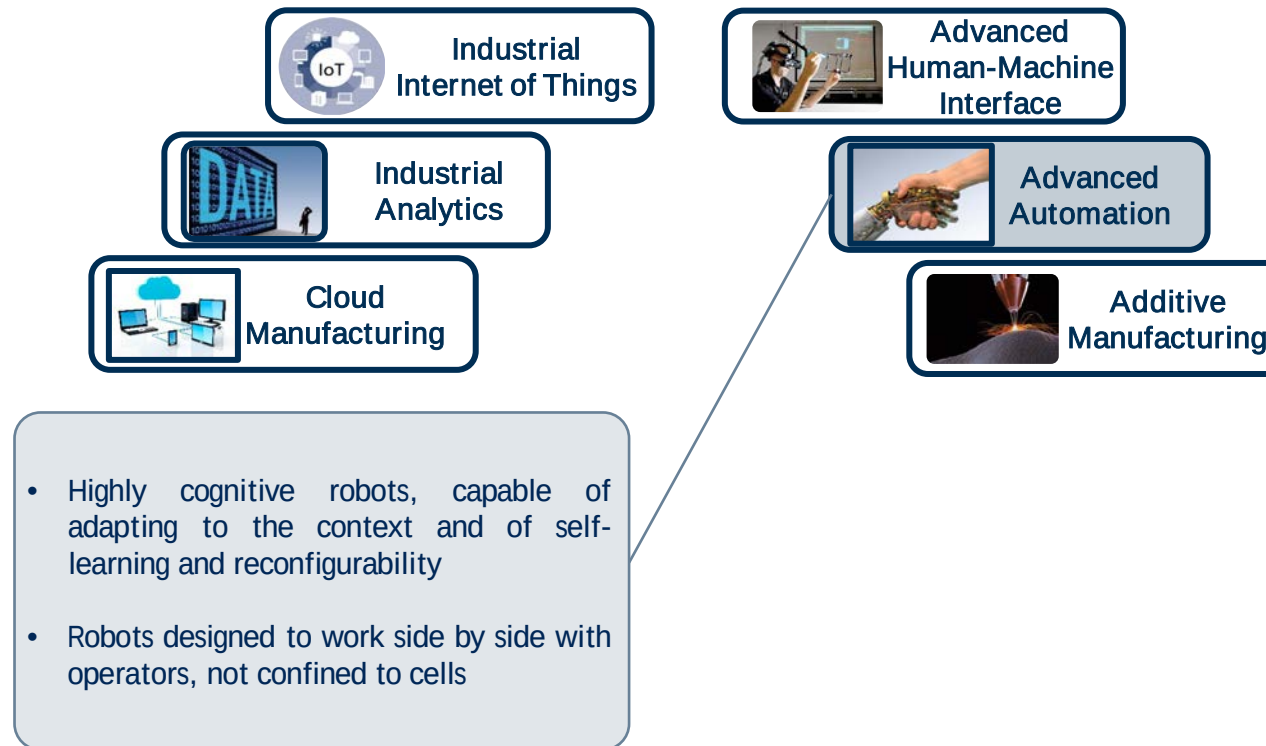




Operator 4.0 – The augmented operator



TECHNOLOGIES BEHIND INDUSTRY 4.0



ADVANCED AUTOMATION

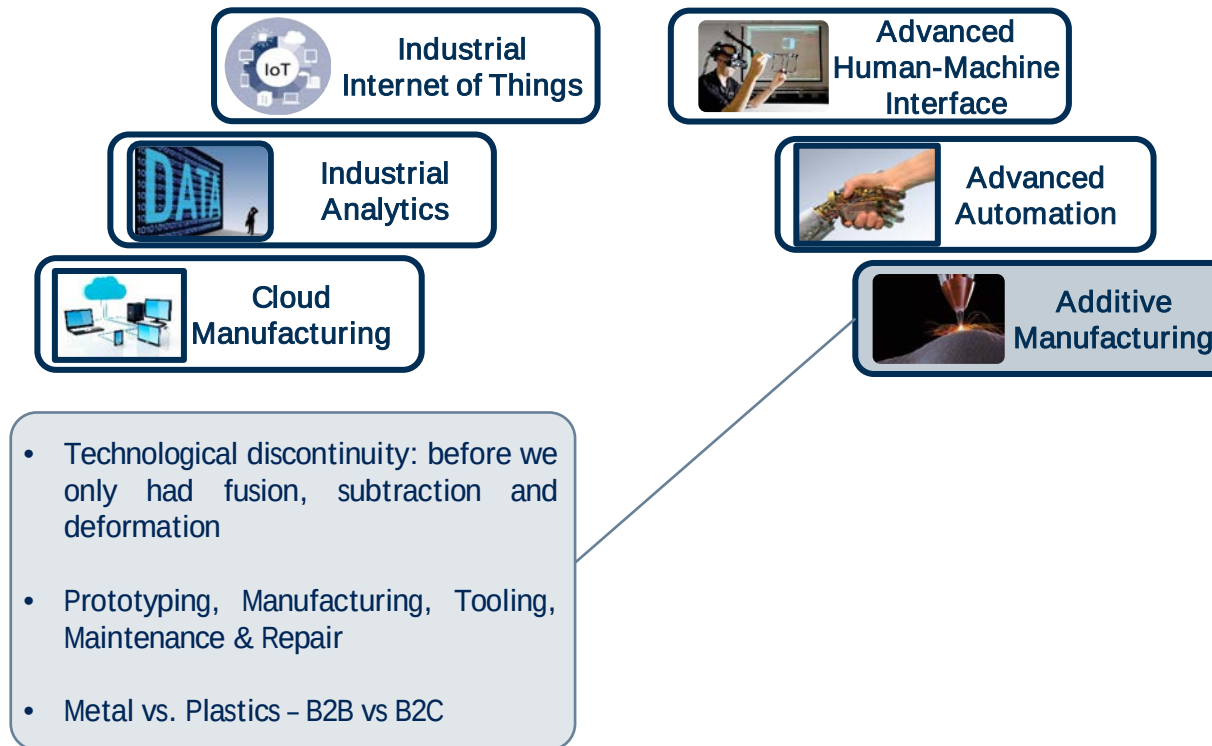
Traditional robots



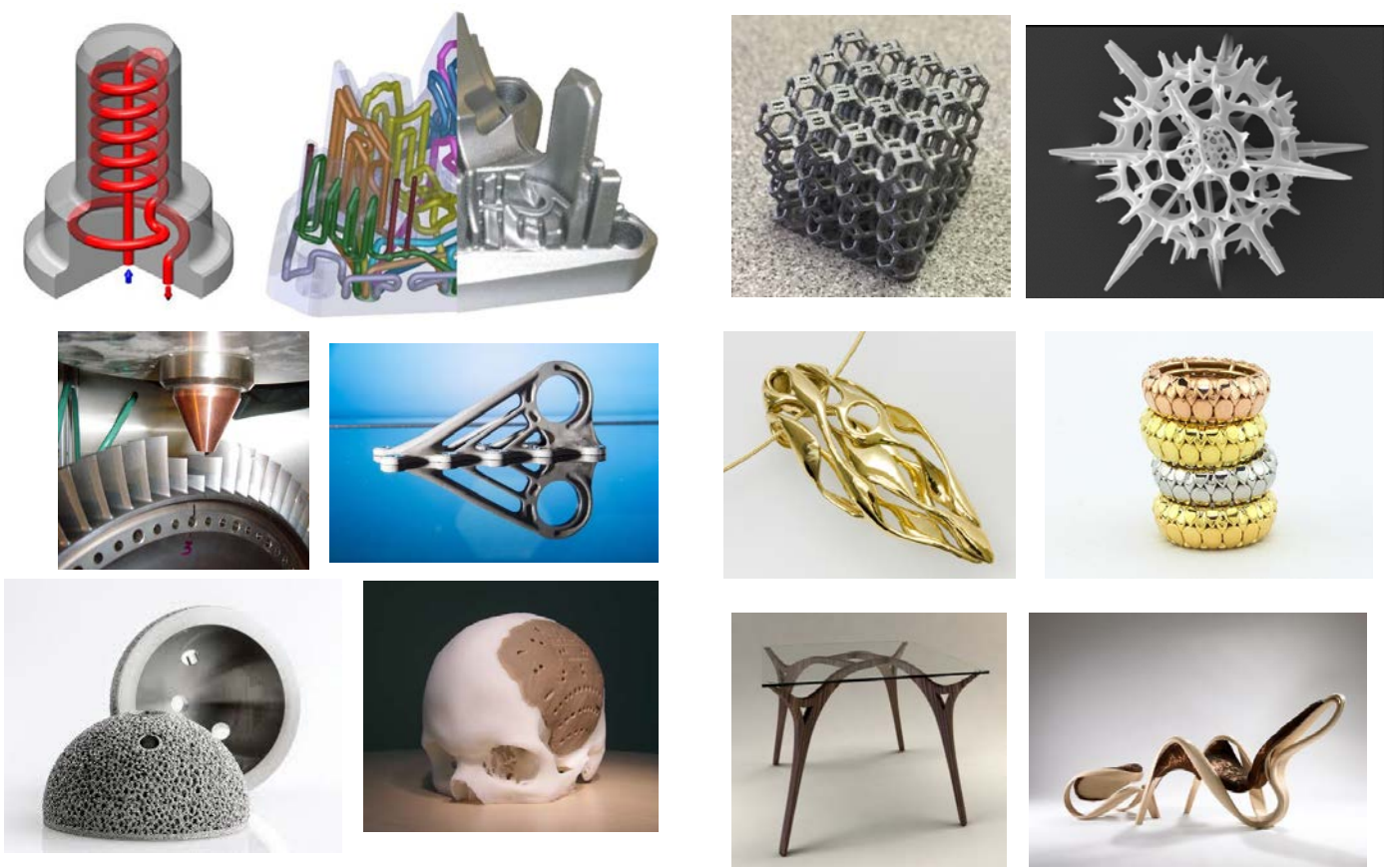
Collaborative robots



TECHNOLOGIES BEHIND INDUSTRY 4.0



ADDITIVE MANUFACTURING



A NUMBER OF DISRUPTIVE TECHNOLOGIES IS ENABLING THE DIGITIZATION OF THE MANUFACTURING SECTOR

Digitization of the manufacturing sector – Industry 4.0

Data, computational power, and connectivity



Big data/open data

- *Significantly reduced costs of computation, storage, and sensors*

Internet of Things/M2M

- *Reduced cost of small-scale hardware and connectivity (e.g., through LPWA networks)*

Cloud technology

- *Centralization of data and virtualization of storage*

Analytics and intelligence



Digitization and automation of knowledge work

- *Breakthrough advances in artificial intelligence and machine learning*

Advanced analytics

- *Improved algorithms and largely improved availability of data*

Human machine interaction



Touch interfaces and next-level GUIs

- *Quick proliferation via consumer devices*

Virtual and augmented reality

- *Breakthrough of optical head-mounted displays (e.g., Google Glass)*

Digital-to-physical conversion



Additive manufacturing (i.e., 3-D printing)

- *Expanding range of materials, rapidly declining prices for printers, increased precision/quality*

Advanced robotics (e.g., human-robot collaboration)

- *Advances in artificial intelligence, machine vision, M2M communication, and cheaper actuators*

Energy storage and harvesting

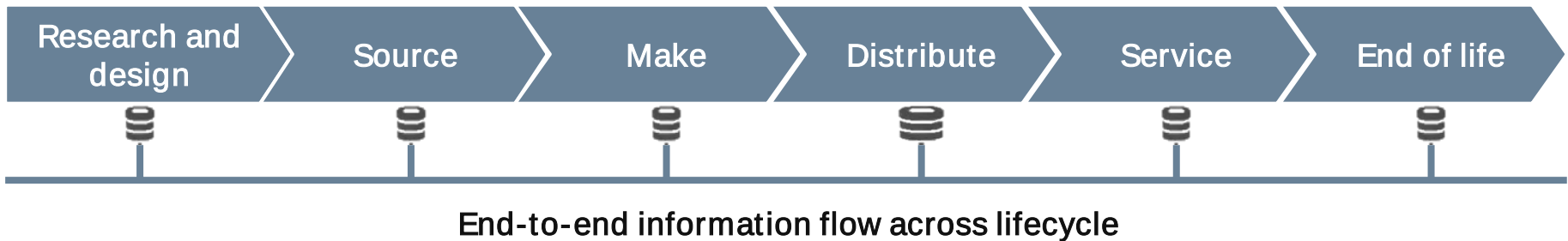
- *Increasingly cost-effective options for storing energy and innovative ways of harvesting energy*

DISRUPTIVE TECHNOLOGIES INCREASE THE VALUE OF DIGITAL INFORMATION ALONG THE ENTIRE PRODUCT LIFECYCLE

The **digital thread** is the digital representation of the physical product lifecycle

Physical product lifecycle

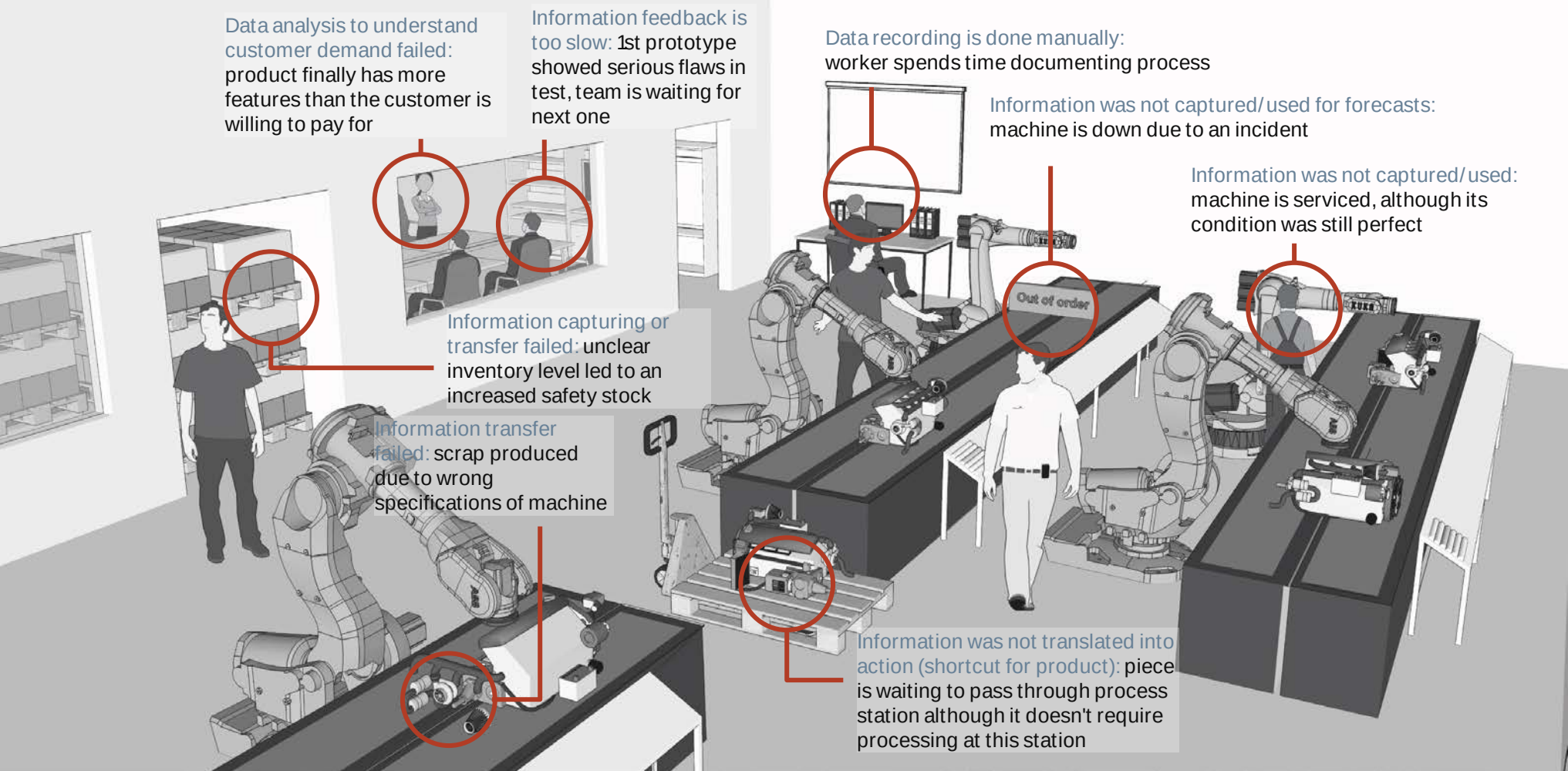
Digital thread



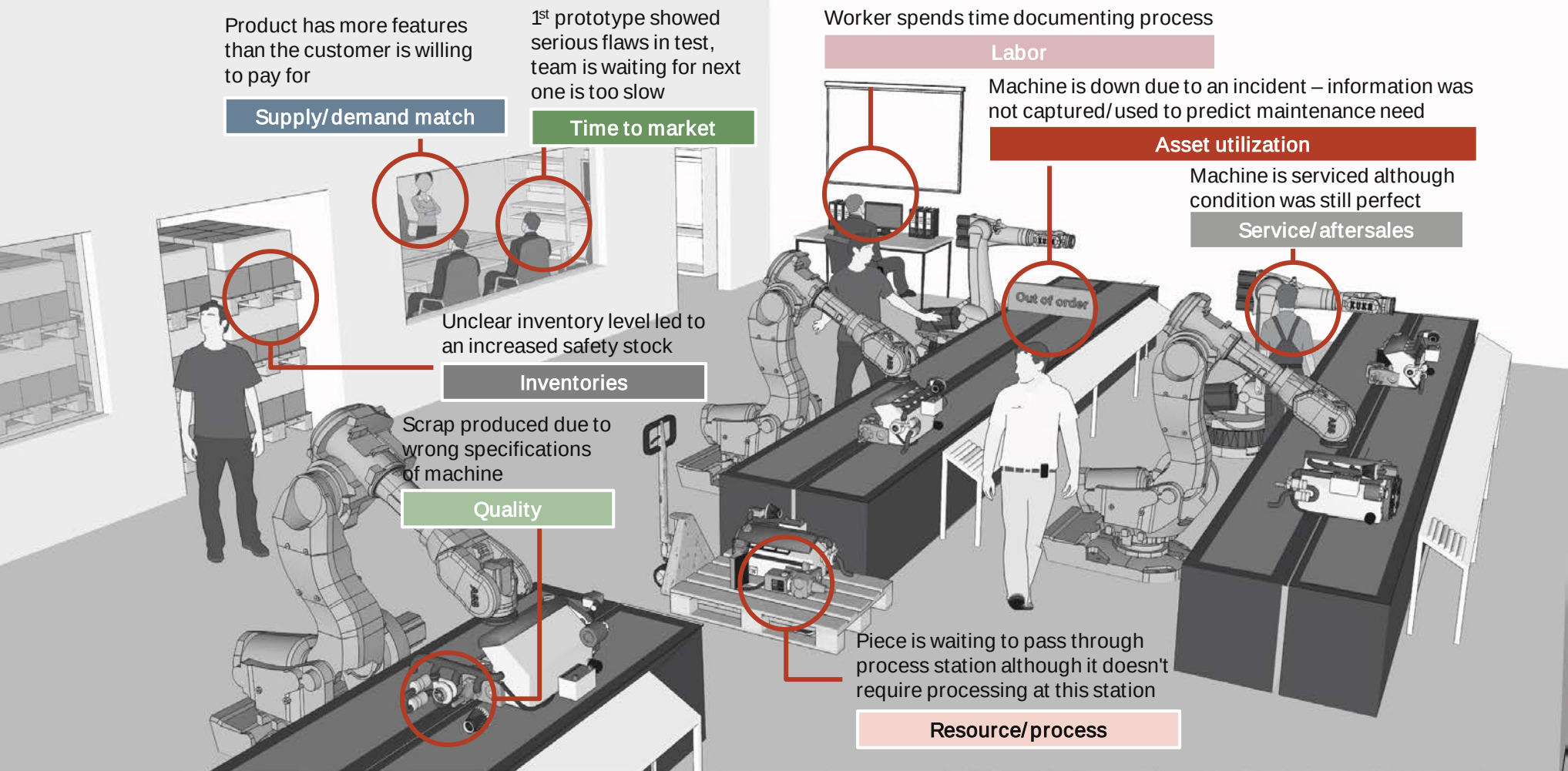
4 activities are required to manage the **digital thread**

Information capturing and recording	• Relevant set of data to prevent information overflow • Automated, real-time capturing via sensors • Recording and storing of both historical and new data in a single information system
Information transfer	• Digitally transfer information across departments, production sites, value chain steps, and company borders
Information analysis and synthesis	• Identification of relevant data and analysis (ideally, automated) • Synthesis of analysis into relevant insights
Turning information into outcomes	• Translation of analysis results into recommendations that suggest actions for workers or automatically trigger actions of machines • Feedback and continuous improvement

INFORMATION LEAKAGES CAUSE DIGITAL INEFFICIENCIES



ELIMINATING THESE DIGITAL INEFFICIENCIES COULD UNLOCK POTENTIAL ALONG 8 DIFFERENT VALUE DRIVERS



DIGITAL TRANSFORMATION

REAL CASE CONSUMER GOODS

COMPANY

WHY DIGITAL TRANSFORMATION IN <CONFIDENTIAL> MANUFACTURING NETWORK?

>Productivity 10-15% conversion
Cost while increasing flexibility



>Sustainability (energy, water,
Material waste reduction)



>People empowerment and
Minimization of the social friction



DIGITAL MANUFACTURING ACCELERATION PROGRAM (DMA)



Upgrading <CPG Company> factories to **Industry 4.0** and beyond, for **efficiency, flexibility and resilience**



Transformation Program, Factory & Impact centric, based on a strong Methodology, People change and Technical expertise



40 factories in Europe have kickstarted their digital transformation and identified a **xxx m€+** pipeline of Productivity oow **yy m€** already under execution



1plant recognised as a **Digital Lighthouse** by “Confidential)

#Connectivity #IToT #DataDriven #SmartAutomation #AI #Cloud #MachineLearning

In Execution



Wave 1



Wave 2



Waves 3-5



Potential

yyy

Launched



Wave A



Waves B,C



Potential

xx m

Future Expansion:



HOW WE DID IT? A RECIPE MADE UP BY 3 INGREDIENTS DEPLOYED TOGETHER

Solution STREAM

- Identify use-cases to deliver value
- Catalogue Solutions, Innovations
- Impact tracking

Technological STREAM

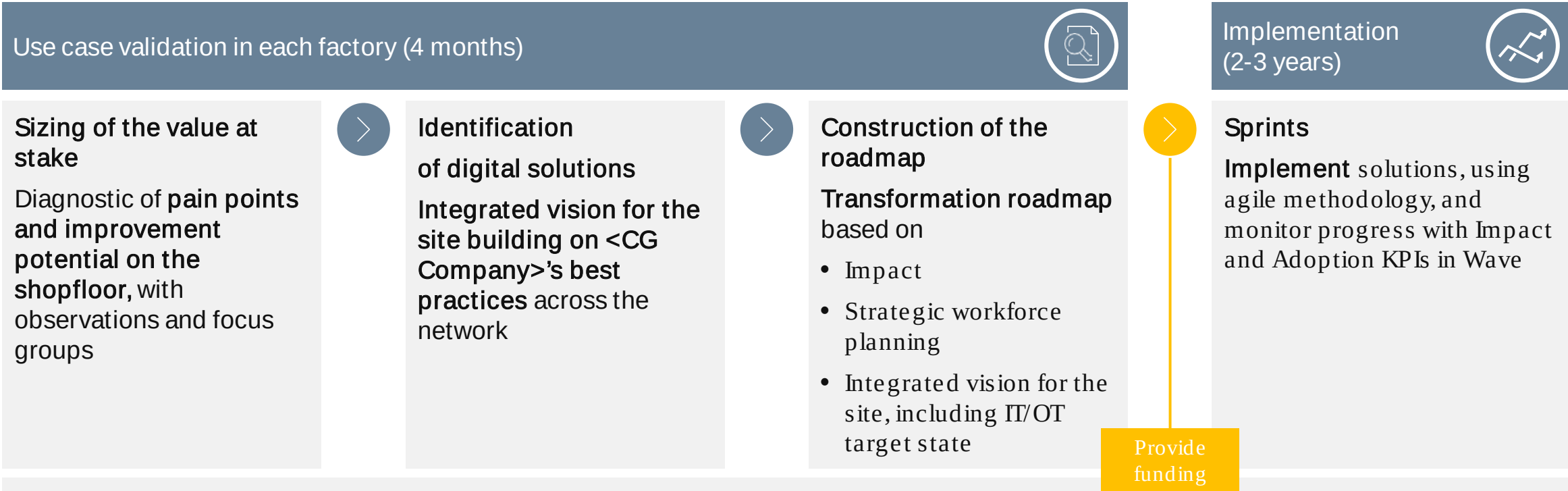
- Standardized future proof technical solutions
- Cyber security
- Enable factories to be independent

Change Management STREAM

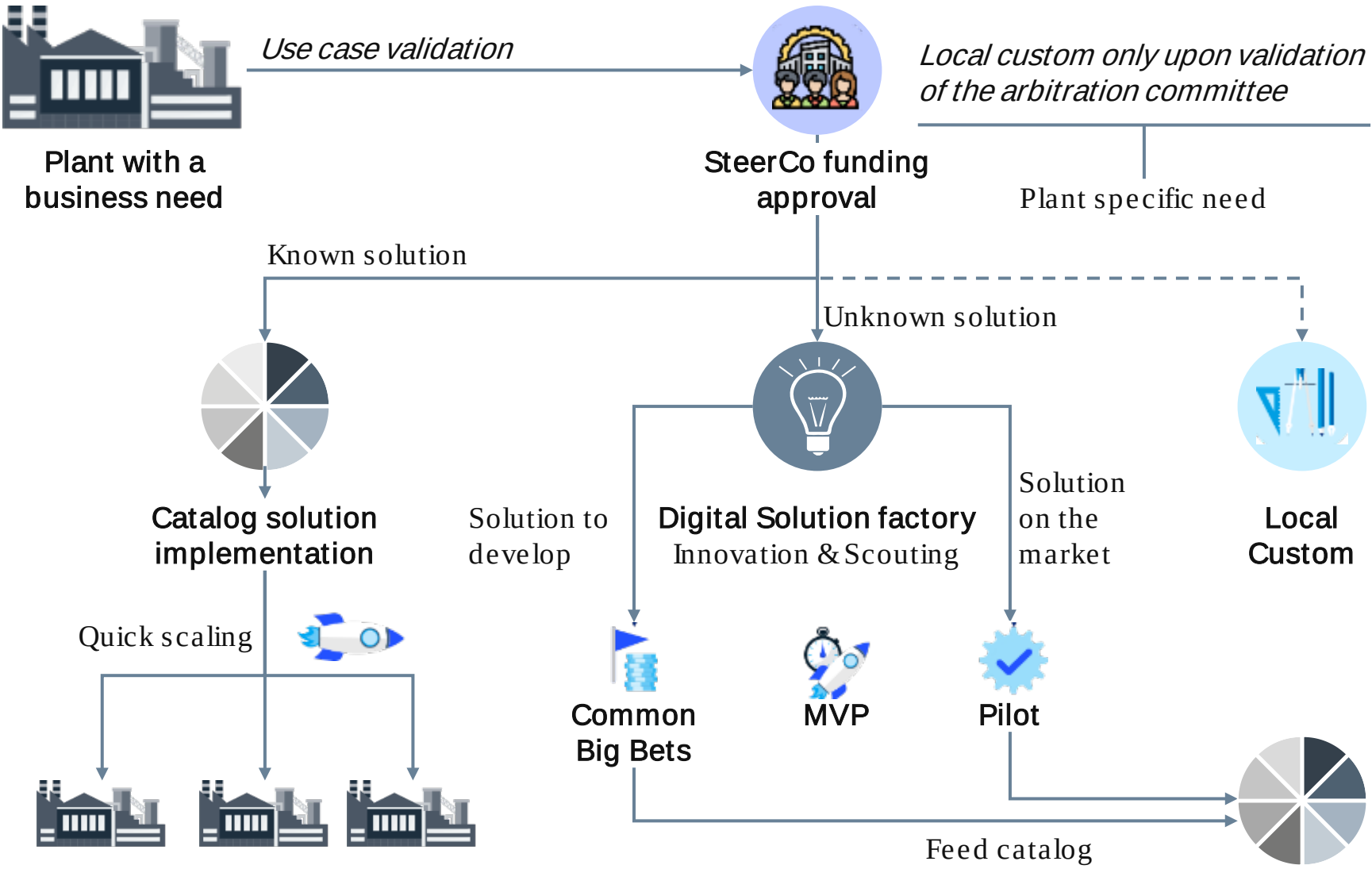
- Upskilling
- Change management along transformation
- Minimize social impact



SOLUTION STREAM EMPHASIS ON SCALING PROVEN METHODOLOGY AND DIGITAL SOLUTIONS THROUGH FACTORY CENTRIC APPROACH...

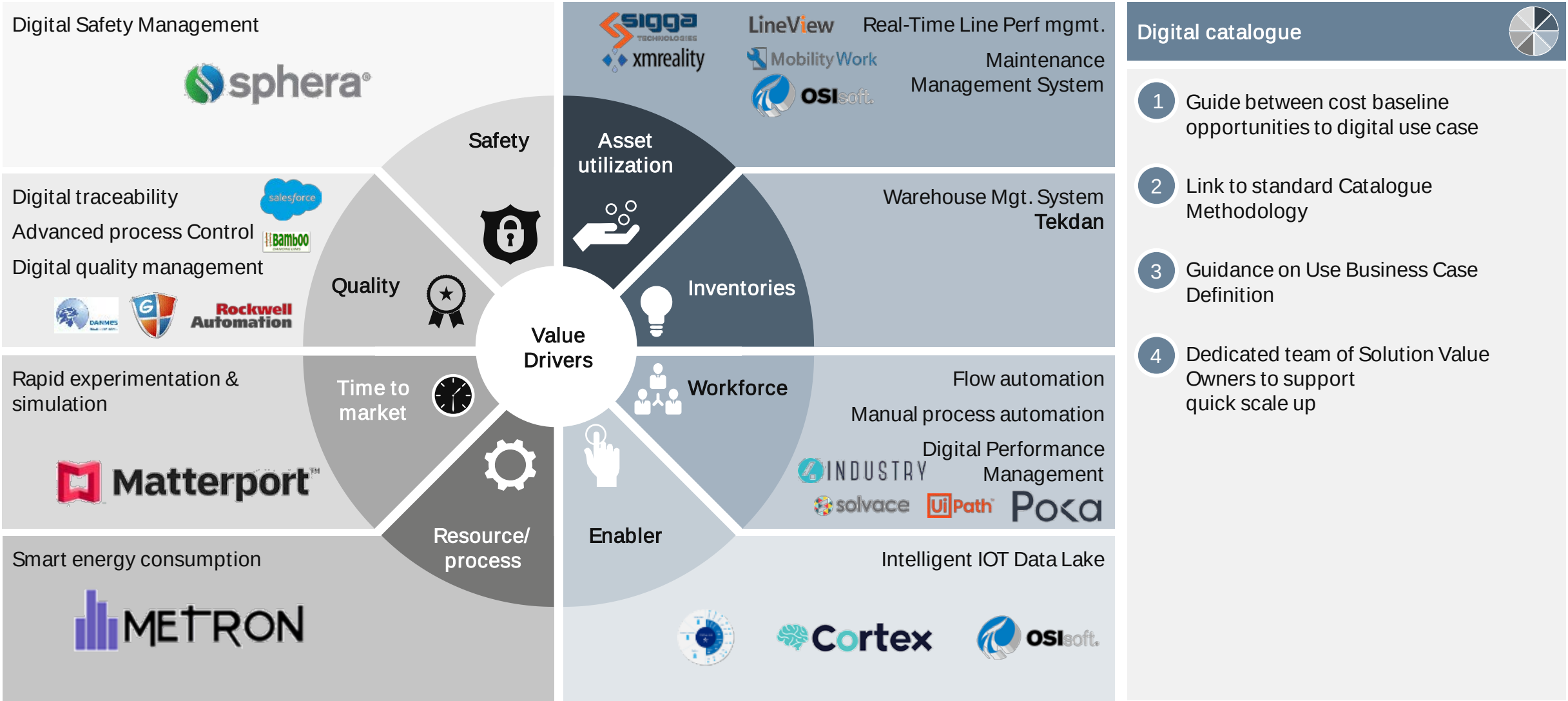


SOLUTION STREAM
THROUGH AN INNOVATIVE APPROACH TO BUILD AND SCALE SOLUTIONS



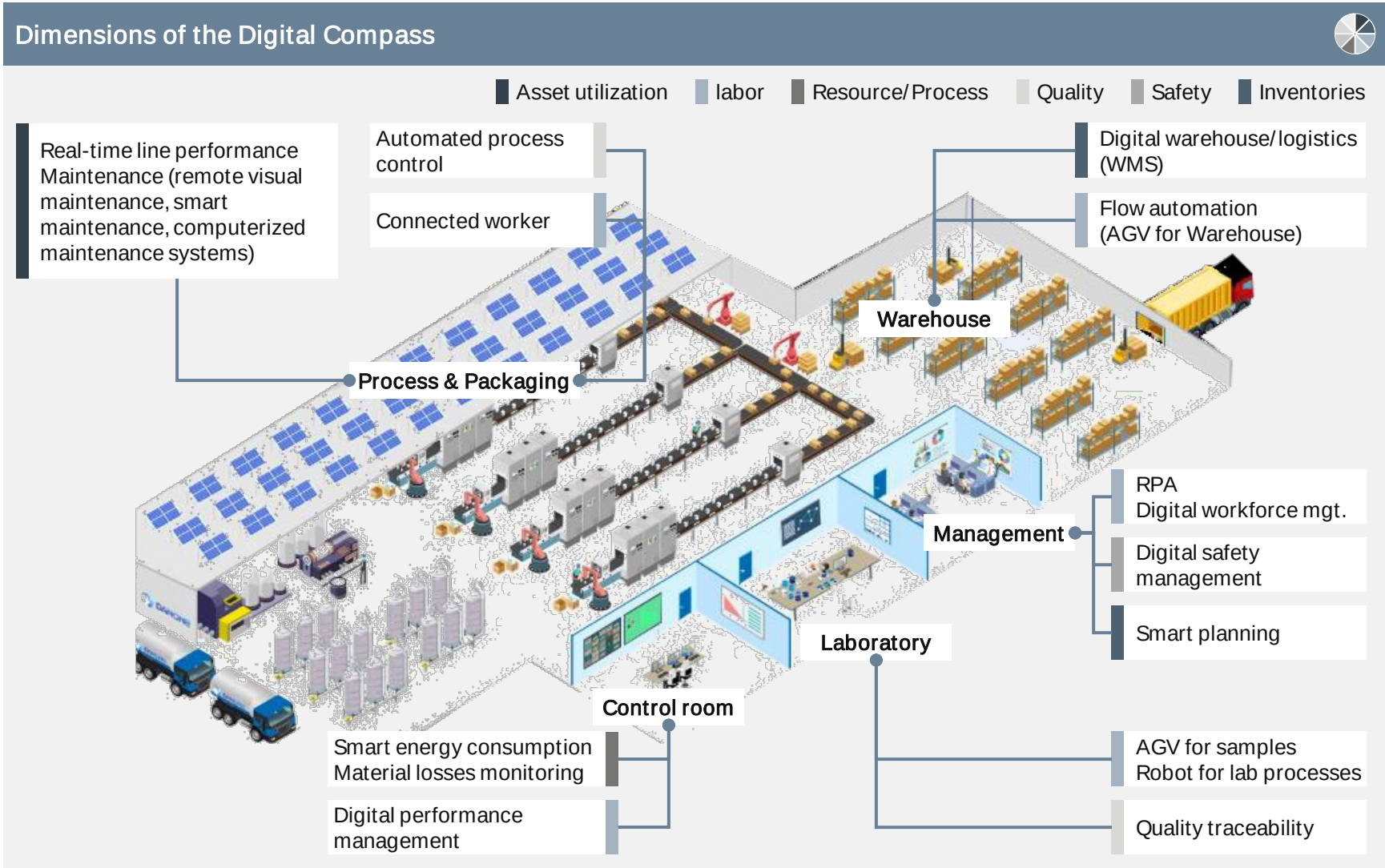
1. Digital catalog solution for all factories to foster synergies, collaboration, and implementation pace
2. Digital solution factory, to industrialize solutions development with agile and fast prototyping and testing

SOLUTION BLUE STREAM
DIGITAL CATALOGUE GUIDE US TO LINK COST BASELINE OPPORTUNITIES TO USE CASES & SOLUTIONS.



THE PROGRAM HAS TO DATE GENERATED A STANDARD CATALOGUE OF 100+ USE CASES
WITH 20 DIGITAL SOLUTIONS APPLIED CROSS BU

NON-EXHAUSTIVE



Majority of use cases are relevant to all three business units

CHANGE MANAGEMENT STREAM

SUPPORT FACTORY TEAMS TO TRANSFORM PEOPLE AND TO CREATE CONDITIONS FOR SUCCESSFUL CHANGE

YELLOW BOOK // Guidebook to lead the change

YELLOW BOOK INTRODUCTION



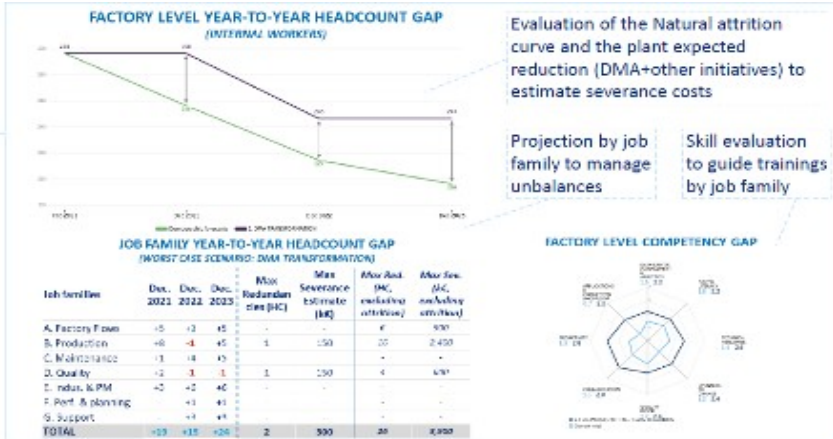
Why ? Managing & monitoring change will be absolutely essential to ensure the transformation is healthy and sustainable. The goal of the yellow book is to help change leaders track progress on key enablers for change, not quickly but consistently.

MONITOR YOUR CHANGE READINESS

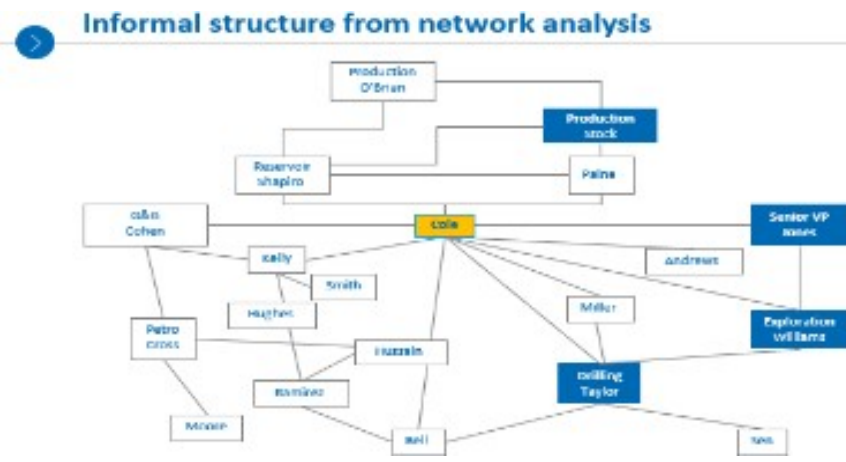
1. Know it is critical to track change readiness. You can't do it if you don't see where you are and what you need.

Category	Objectives	Step	Status
Prepare	Build a solid case for change. Identify people involved and set your project team.	Create a change team. Set the change vision. Work on the change team. Identify key people who will be involved in the change. Build a solid case for change. Identify people involved and set your project team.	☒ ☒ ☒ ☒
Execute	Implement the change. Monitor the change and its impact on the business.	Create a change plan. Implement the change. Monitor the change and its impact on the business.	☒ ☒ ☒ ☒
Improve	Monitor the change. Monitor the change and its impact on the business.	Monitor the change. Monitor the change and its impact on the business.	☒ ☒ ☒ ☒
Sustain	Monitor the change. Monitor the change and its impact on the business.	Monitor the change. Monitor the change and its impact on the business.	☒ ☒ ☒ ☒

STRATEGIC WORKFORCE PLANNING // planning future manning needs



SOCIAL NETWORK ANALYSIS // identifying influential people to rely on



COMMUNICATION // Engage the communication plan

WHAT DOES DIGITAL MEAN FOR YOU?



A DAY IN THE LIFE OF AN OPERATOR



Impact of digital transformation

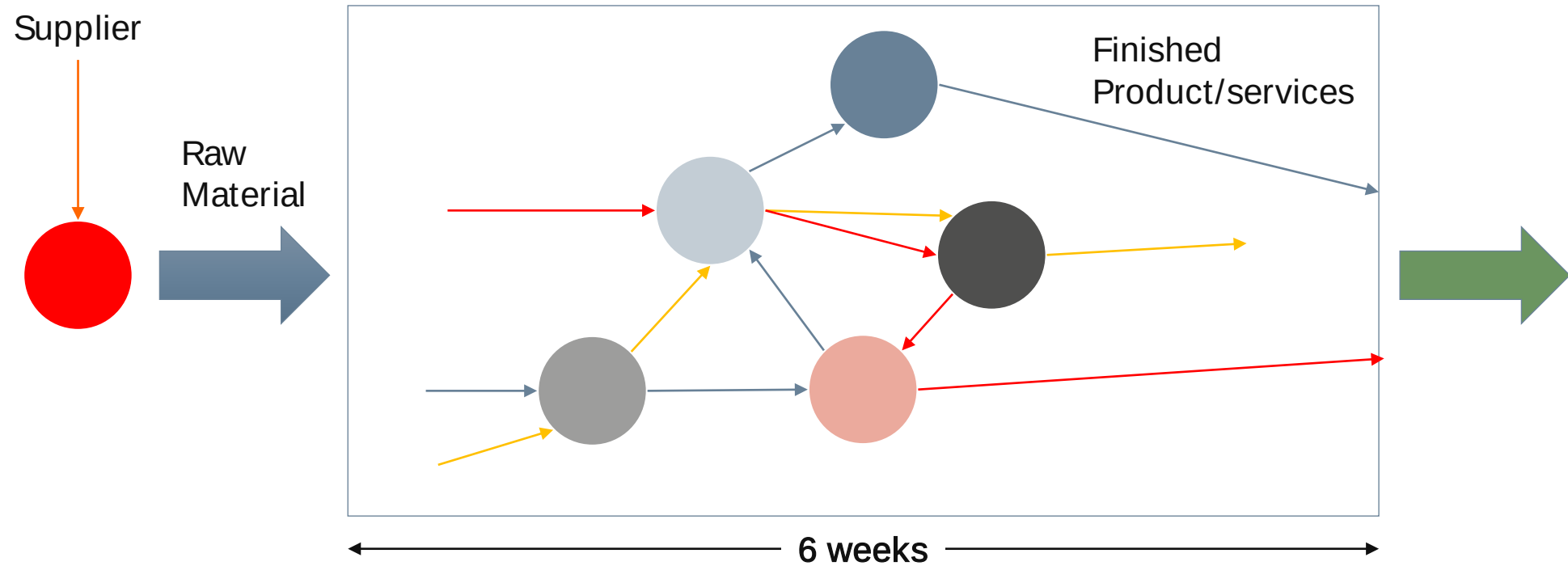


DIGITAL TRANSFORMATION

HOW TO APPROACH IT

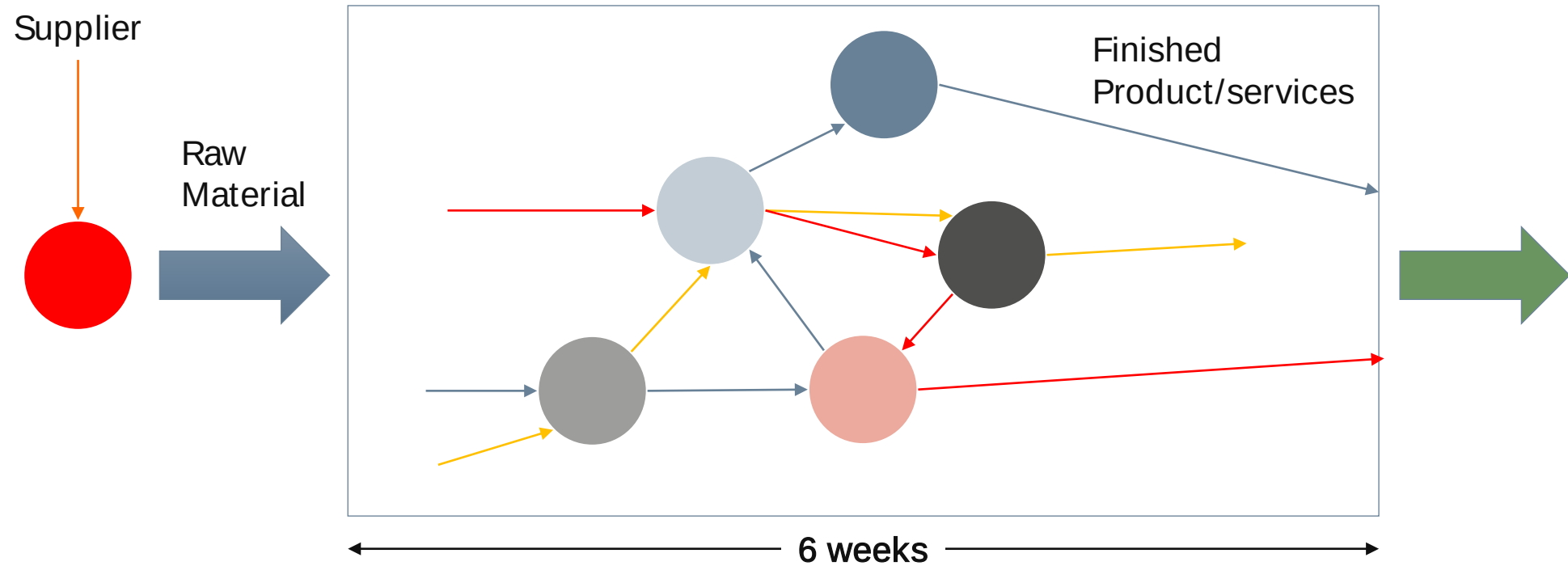
- AdEC is a company producing customised products to order
- Sales have recently increased and they are facing a drop in performances and customer satisfaction, therefore launched a program to analyse present situation and to develop a proposal of a transformation plan to improve AdEC performances.
- New technologies and Industry 4.0 are a wonderful opportunity !

CASE STUDY: ADEC ADVANCED ELECTRONICS COMPANY



- Different Competence/ Technology centers are identified by different colors. Different products follow different routes (see different colors)
- Critical performances
- Long reponse time; unreliable due dates; no idea of the advancement status of customer orders
- Frequent delay in suppliers delivery of purchase orders; high level of unneeded raw material, while needed ones are missing; customers pressure about knowing delivery dates

CASE STUDY: ADEC ADVANCED ELECTRONICS COMPANY



Example of Actions

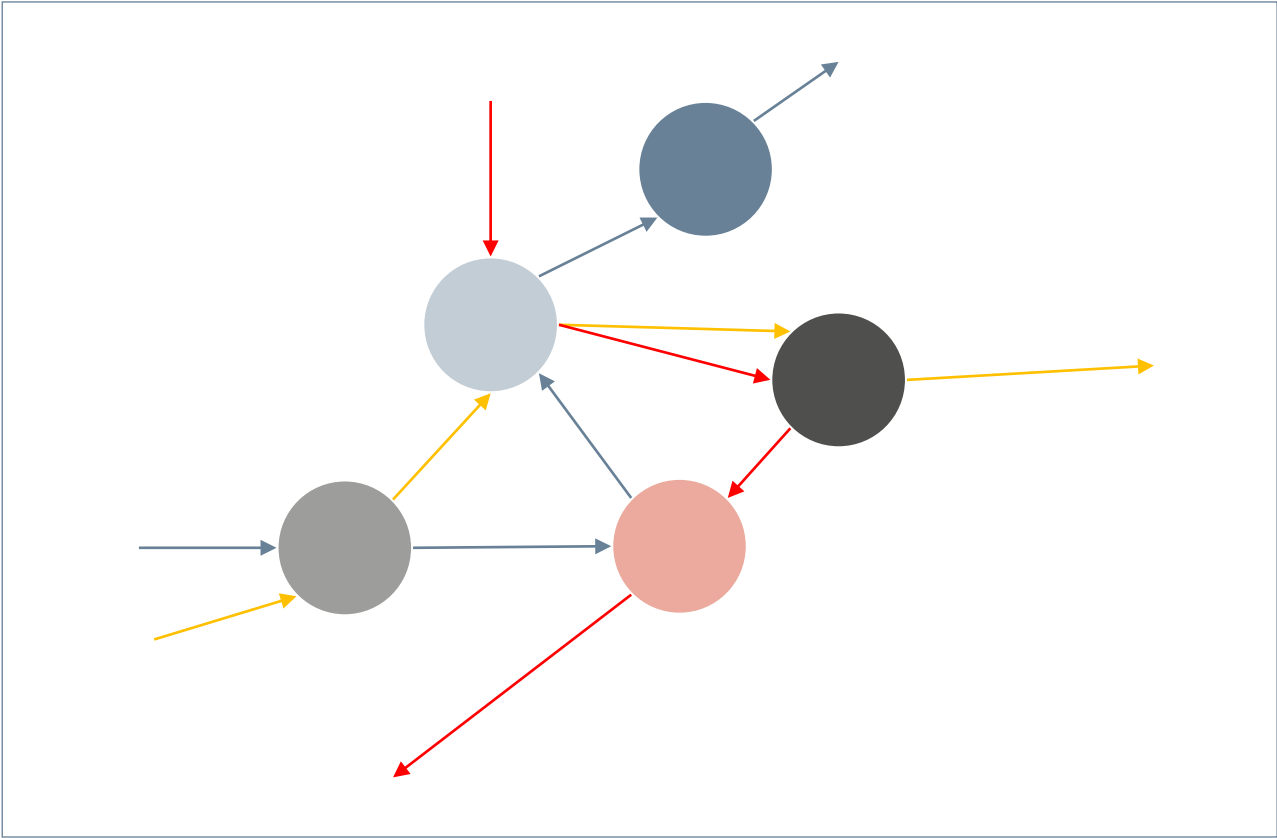
- Real time advancement control; real time priorities management;
- Real time scheduling; real time alternative routings;
- Real time update on expected completion date; quick response recovering plans; etc.
- Supplier visibility on forecasts, orders, and stocks
- Integrated scheduling system with the supplier

LEAN THINKING LEADS INDUSTRY 4.0 INVESTMENTS

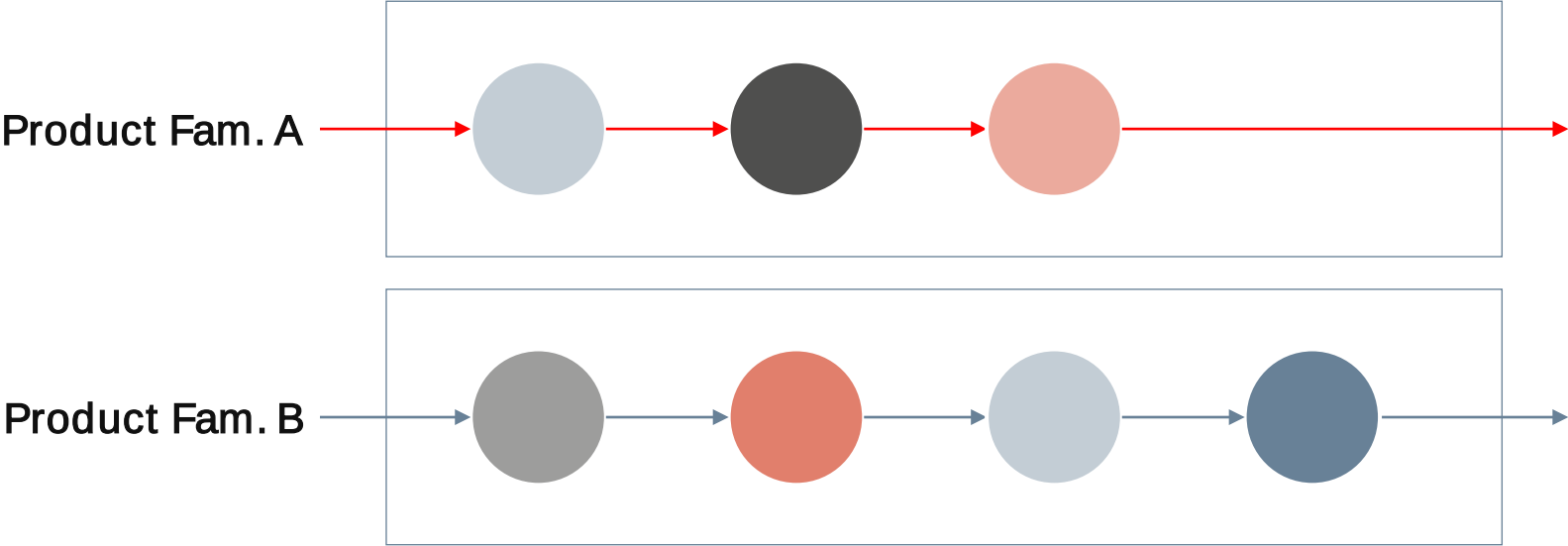
Lean principles are vital to successfully implement Industry 4.0 related projects. And they dramatically affect the type on investments to be done

- Lean principles
- Identify Value
- Map the Value Stream
- Create Flow
- Establish Pull
- Seek Perfection

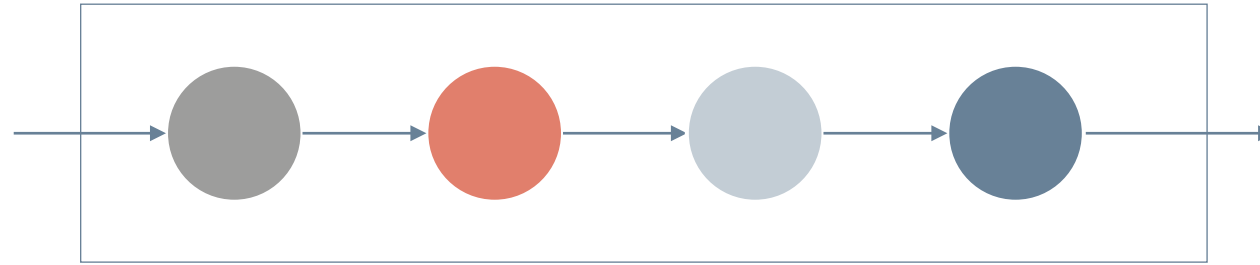
STRUCTURING OPERATIONS ACCORDING TO COMPETENCES/ TECHNOLOGICAL SIMILARITIES



STRUCTURING OPERATIONS ACCORDING TO FLOWS



CREATE FLOW: IDENTIFY WHAT STOPS THE FLOW



CAUSES

- Batching
- Rework
- Breakdown
- Variability
- Missing information
- Different priorities
- Local optimisation
- ...

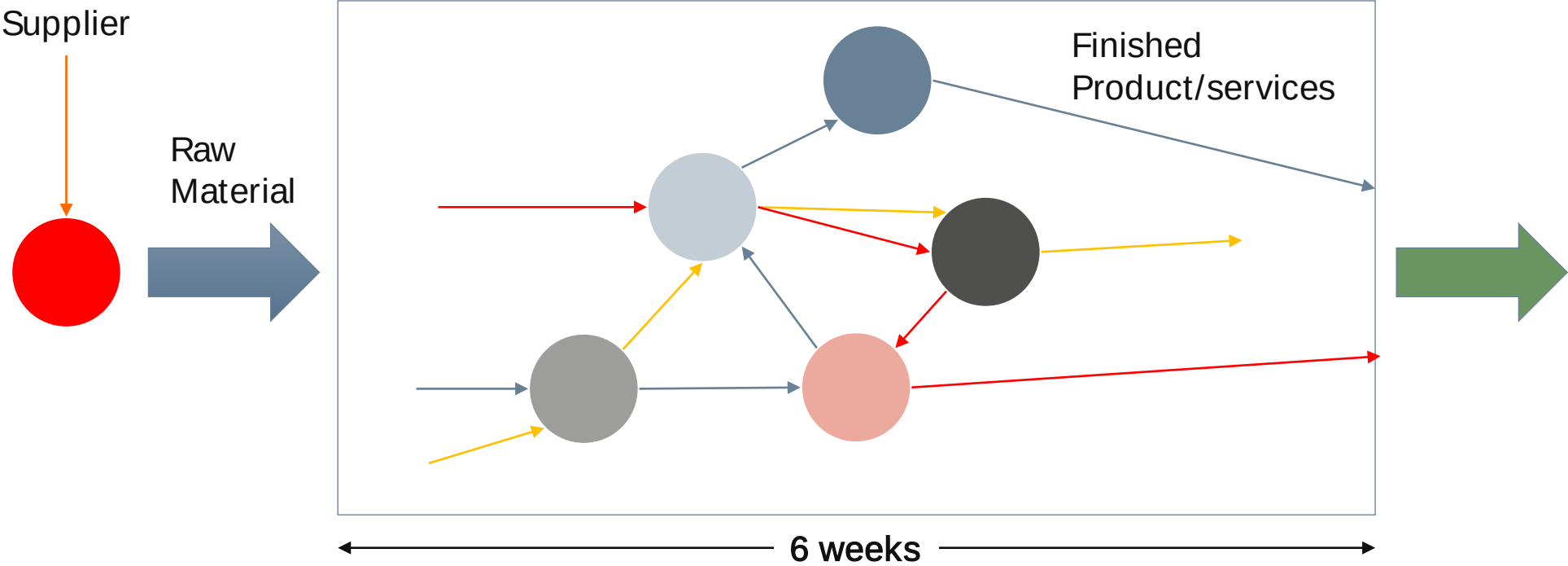


EFFECT
QUEUES / INVENTORIES

- We plan activities to coordinate, synchronise the tasks of different resources
- Planning is based on forecasts. Which are always wrong (by definitions)
- A fast and flexible system can react (to more certain information)

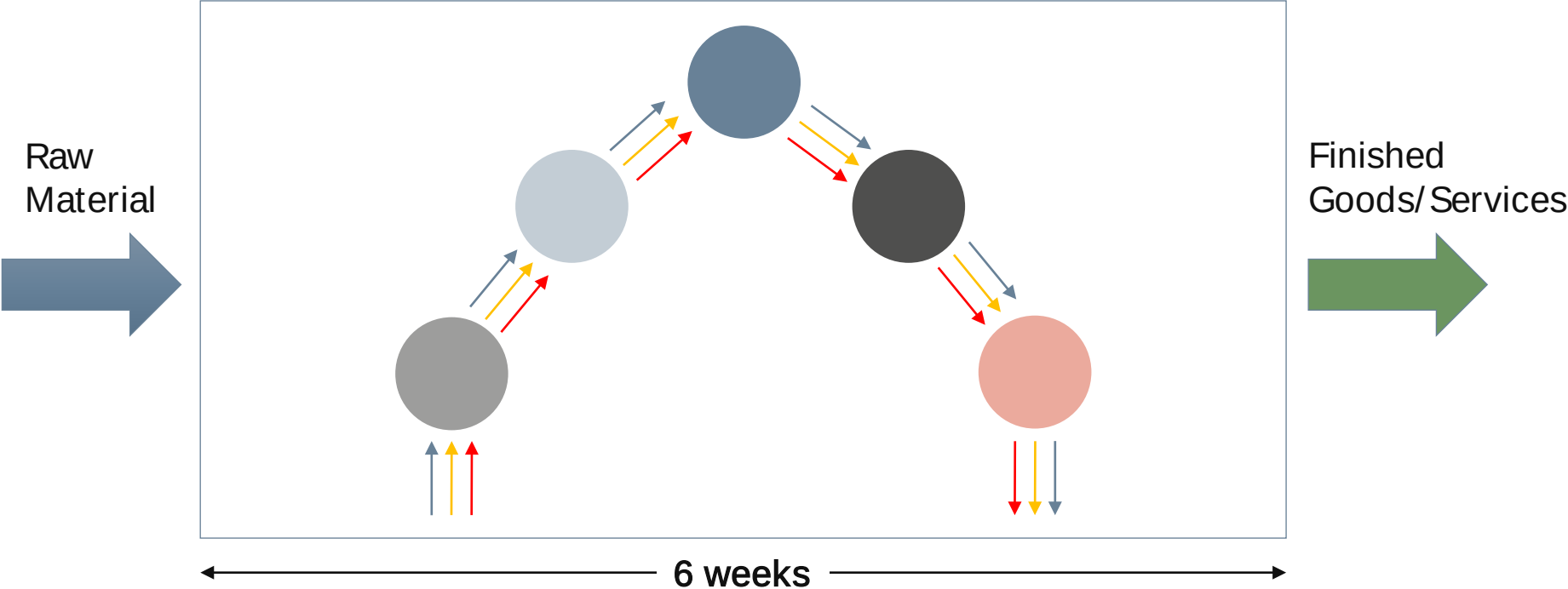
- Keep improving
- Focus on the process, rather than the output

CASE STUDY: ADEC ADVANCED ELECTRONICS COMPANY



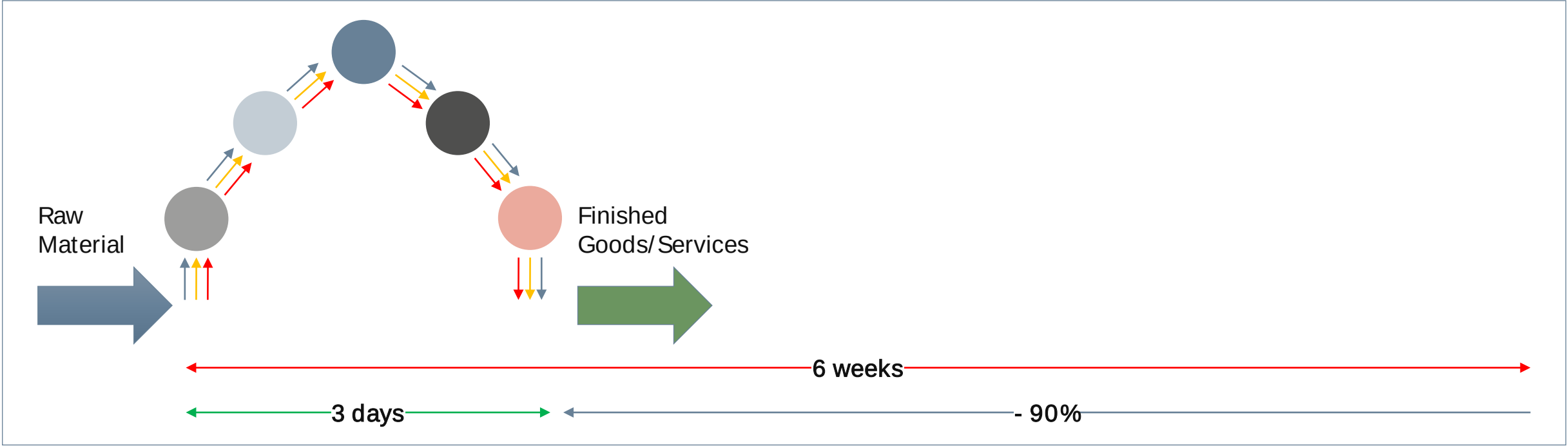
- What would your ideal sistem look like?
- What would you change first?

LEAN THINKING LEADING INDUSTRY 4.0 INTERVENTION
IT IS MAP AND COMPASS



The ideal system is structured in value streams, with resources dedicated to each product family so to have a linear flow

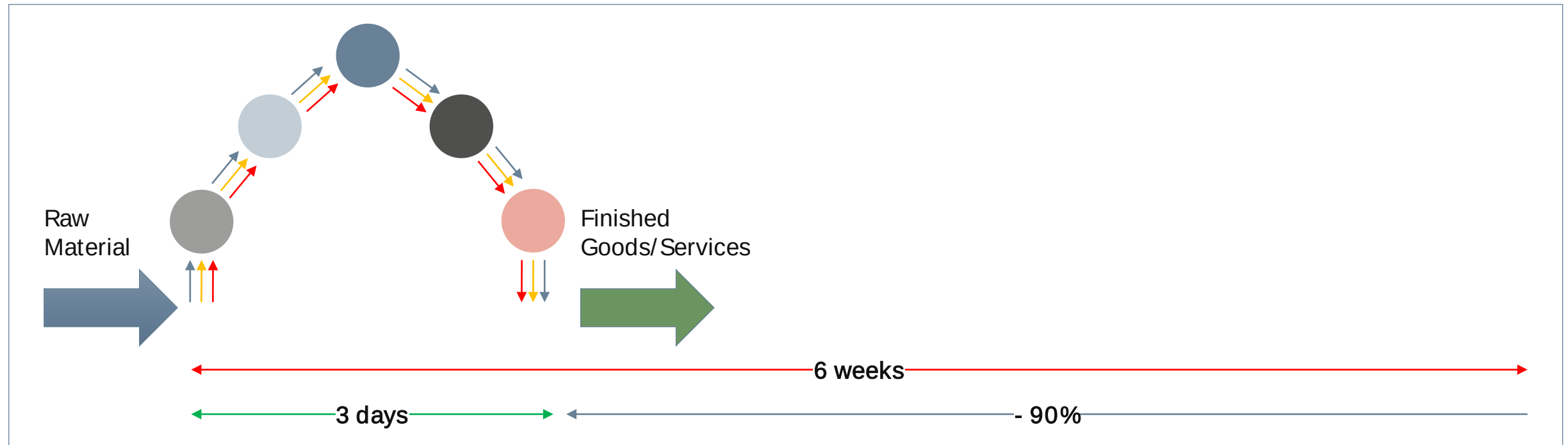
LEAN THINKING LEADING INDUSTRY 4.0 INTERVENTION
IT IS MAP AND COMPASS



The ideal system would remove all elements that stop the flow, thus reducing the lead time from 30 days to 3 days

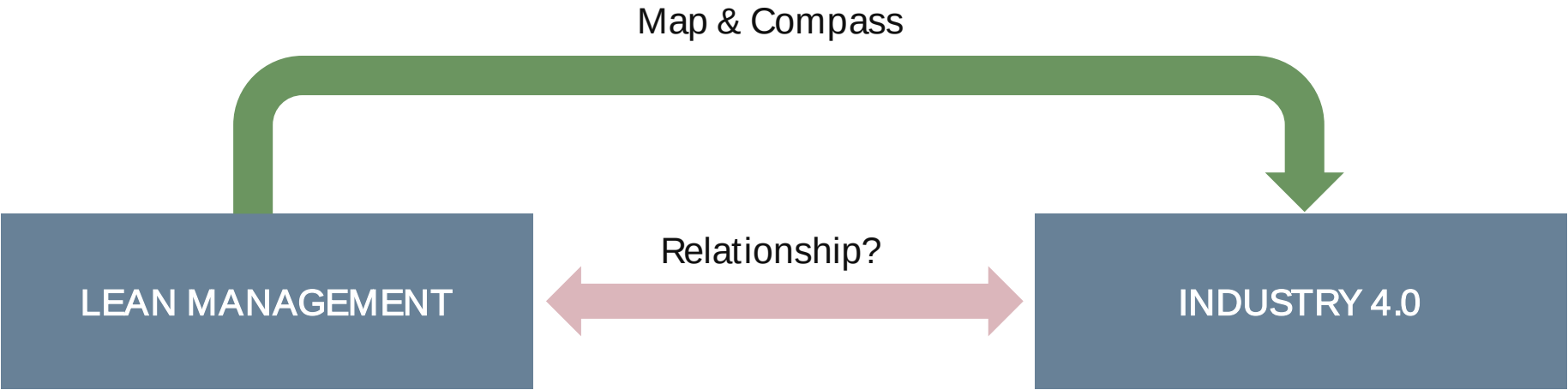
LEAN THINKING LEADING INDUSTRY 4.0 INTERVENTION IT IS MAP AND COMPASS

Two totally different investments



Actions

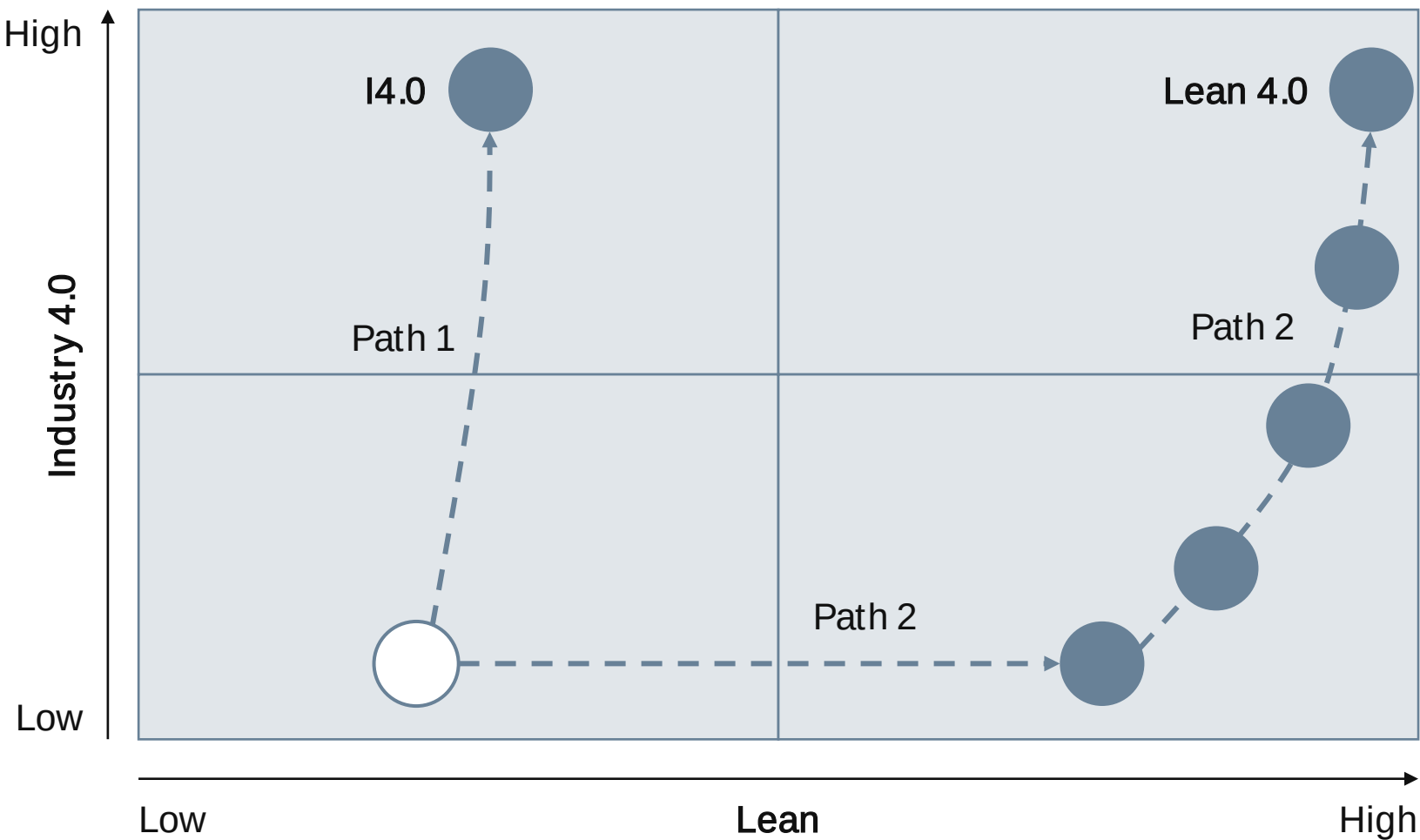
- Increase flexibility (Flexible automation so to process different products, Zero setup time through Electronic setting and adjusting, or new processes, e.g. 3D printing);
- Multi skilled operators (organisational chng. Training. Performance measurement system, etc.)
- Man Machine interaction (making easier for the same person to run differen type of resources)
- Different Management approach. Reduce variability. Reduce breakdown`
- Technology supporting the people, rather than substituting or controlling



LEAN THINKING AND INDUSTRY 4.0 ON PERFORMANCE

Operational performance improvement	Industry 4.0 technologies adoption	Lean Production practices implementation				
		LLP		HLP		Total frequency
		Frequency	Adjusted residual	Frequency	Adjusted residual	
LPI	LTA	32	3.39***	8	-3.39***	40
	HTA	2	-3.39***	7	3.39	9
	Total frequency	34		15		49
HPI	LTA	12	174*	24	-174*	36
	HTA	3	-174*	20	174*	23
	Total frequency	15		44		59

How Lean leads Industry 4.0 implementation

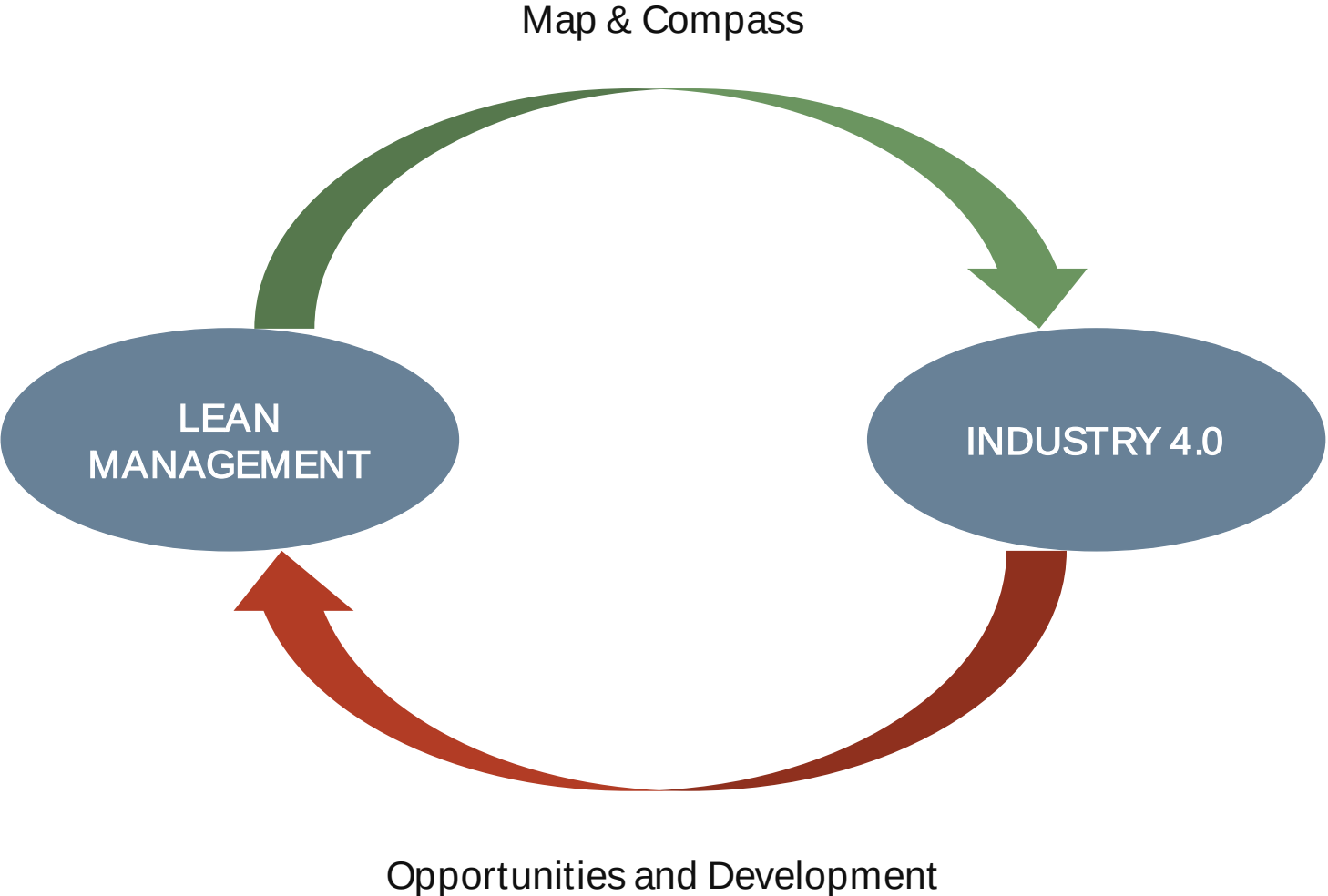


Drivers path-1:

- Productivity
- Production Capacity Increase

Drivers path-2:

- Flexibility
- Flow Improvement
- Pull Production



INDUSTRY 4.0: OPPORTUNITY AND DEVELOPMENT FOR LEAN THINKING

Lean production

- Supplier feedback
- Supplier JIT
- Supplier development
- Involved employees
- TPM
- SPC
 - Involved customer
 - Flow
 - Pull
- Low setup

Industry 4.0

- I4.0 process
- I4.0 product/service

Lean Automation

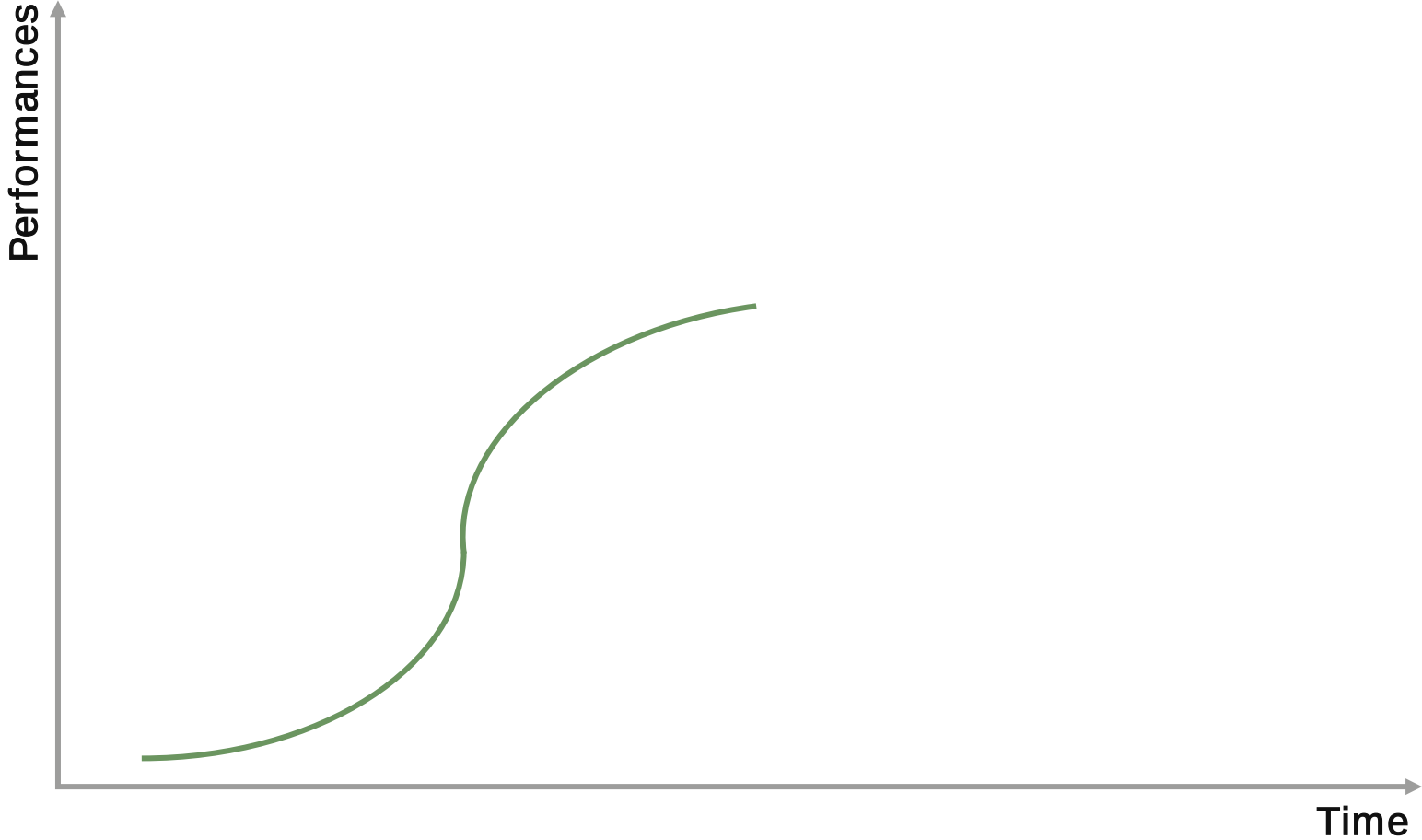
OS Bundle

FtM Bundle

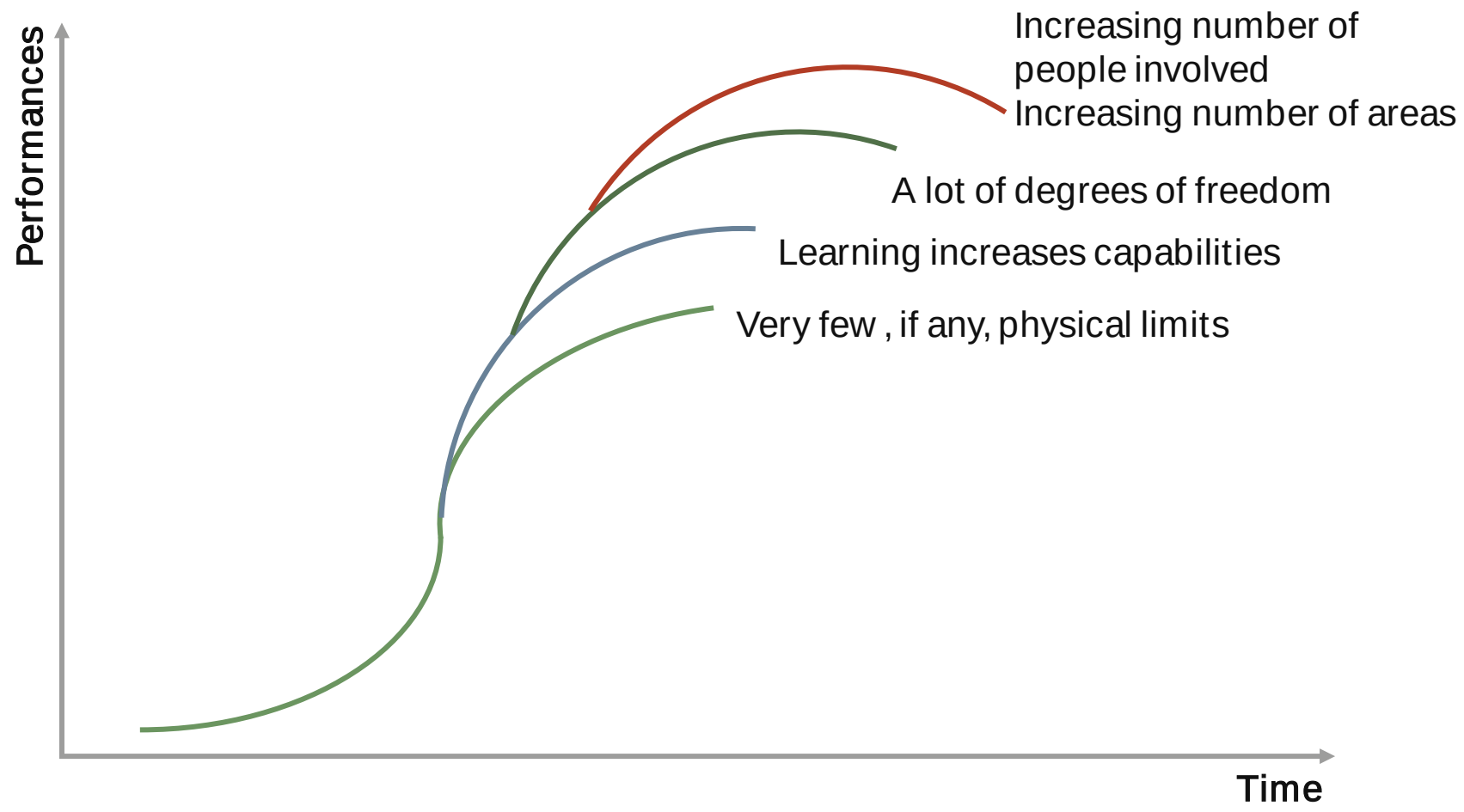
Operational performances

Research conducted on 292 European and south American companies

INDUSTRY 4.0: OPPORTUNITY AND DEVELOPMENT FOR LEAN



INDUSTRY 4.0: OPPORTUNITY AND DEVELOPMENT FOR LEAN



Development and evolution

The heart of LEAN is Problem Solving and Learning

Greater opportunities for diagnosis

Quicker identification of root causes

Greater interventions' areas

.....

What cannot be easily done by machines?

"One day machines will be able to solve any problem, but they will never be able to set one."

Albert Einstein

The Toyota Way 2001

Continuous
Improvement

Respect for People

Challenge

Kaizen

Genchi
Genbutsu

Respect

Teamwork

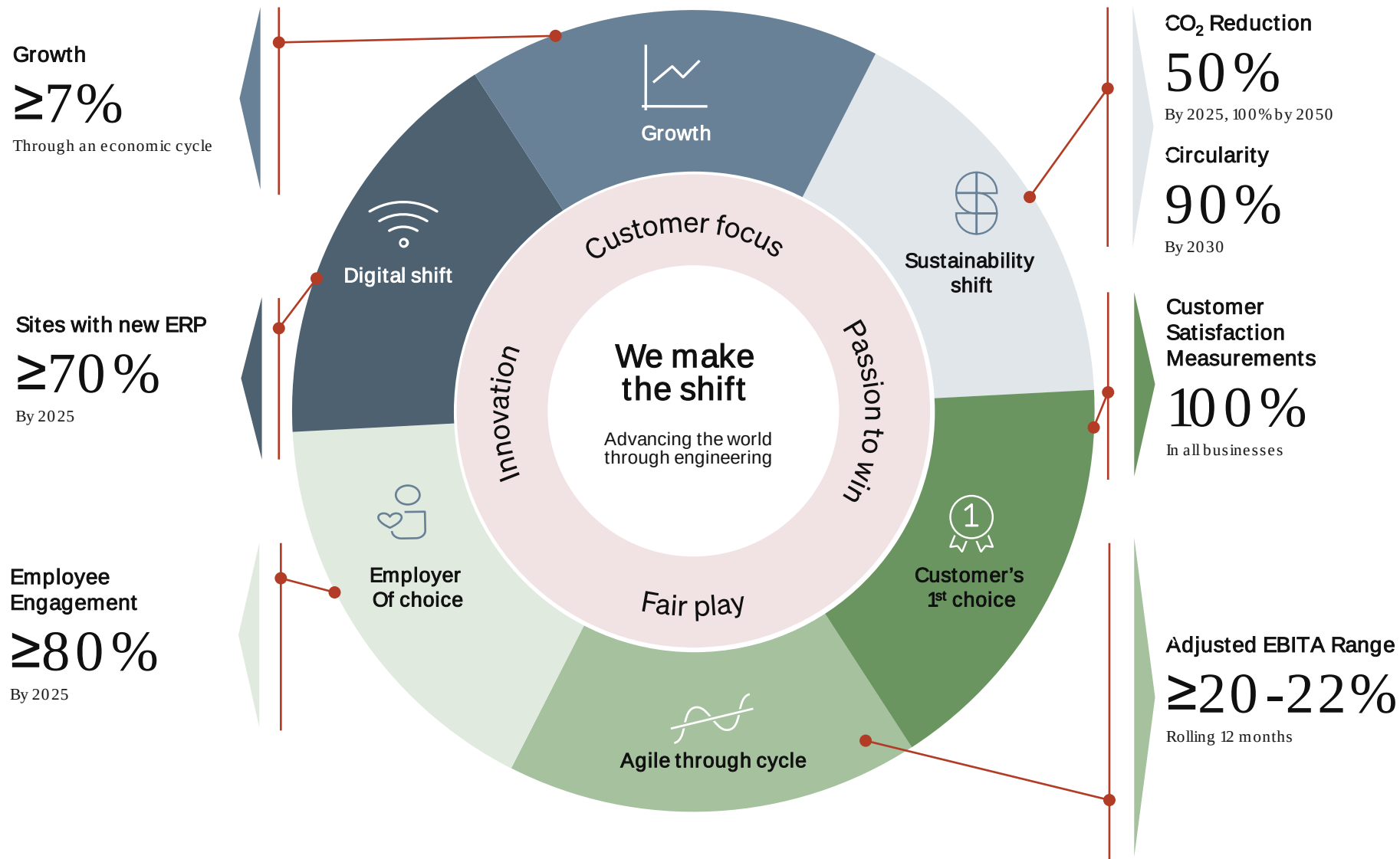
Lean/TPS invests in people
Thinking People System

The most important, and yet the most
underrated resources in a company, are
human being

DIGITAL TRANSFORMATION

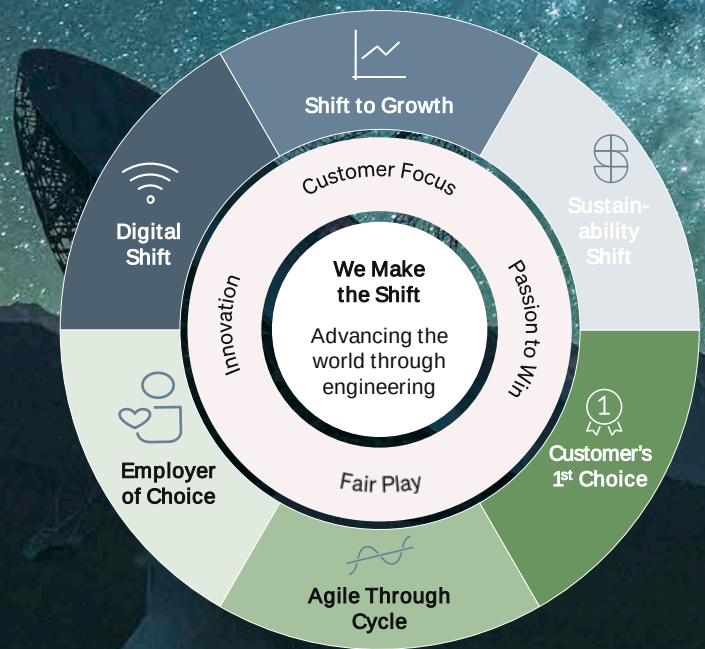
REAL CASE SANDVIK

LE AREE STRATEGICHE ED I TOP KPI...

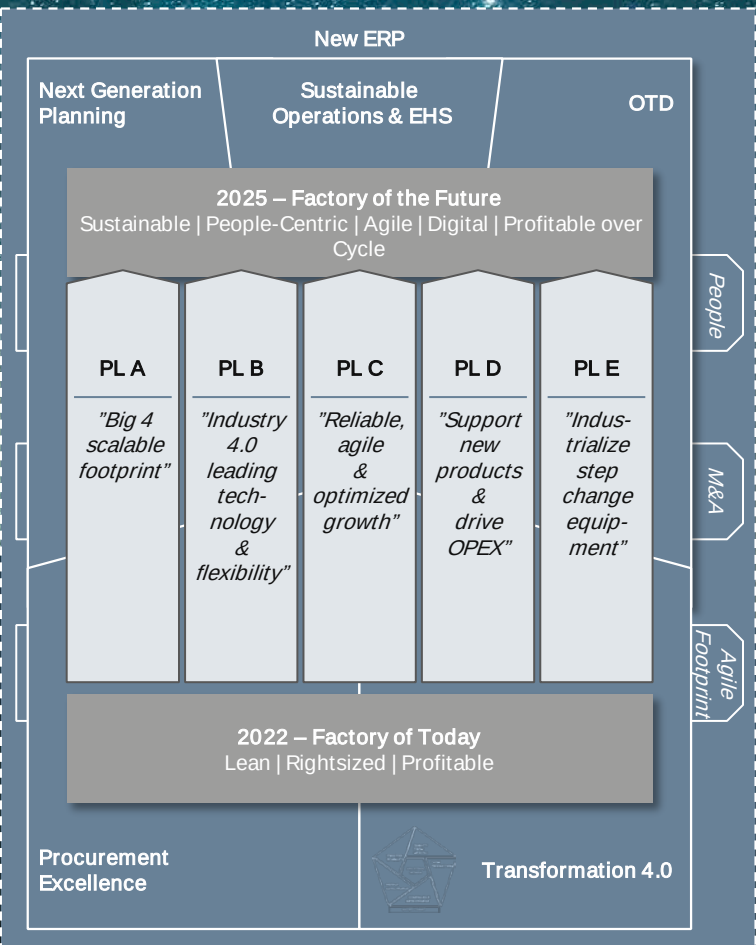


LA STRATEGY DELLE OPERATIONS E L'ALLINEAMENTO BIUNIVOCO CON LA STRATEGY DI GRUPPO E DI BUSINESS

Sandvik
Strategy



Sandvik Coromant
Operations Strategy

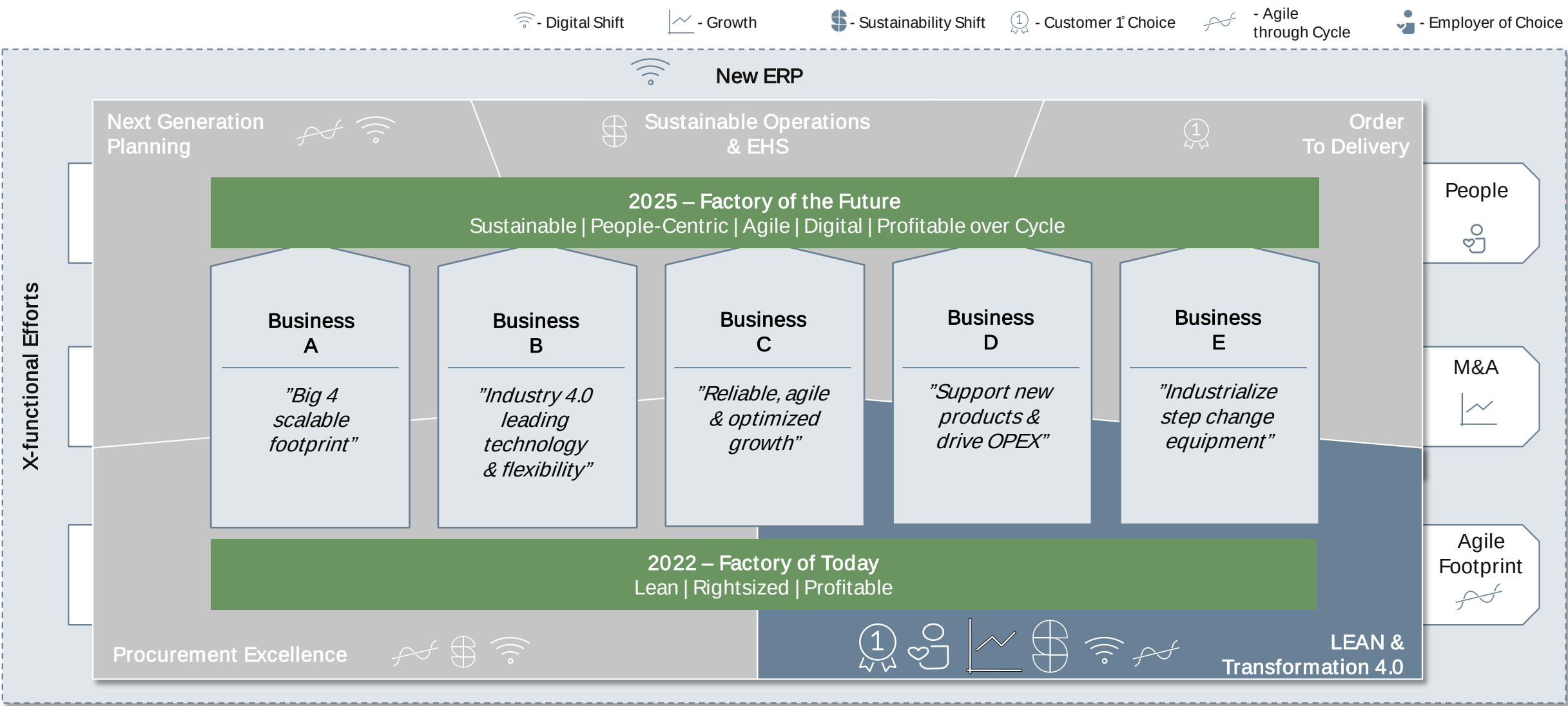


GLI OBIETTIVI STRATEGICI ED I RISULTATI CHIAVE NELLE OPERATIONS

* Highlighted in pink results relevant for Operations

Obiettivi Strategici	Risultati Chiave nelle Operations				
Employer Of choice 	1. We offer Safety, health and wellbeing for all employees 14.0 ☐ →	2. We have engaged and empowered employees ☐ →	3. A learning culture with employees giving their own development 14.0 ☐ →	4. We have Innovative teams ☐ →	5. Increase diversity and inclusion in our workforce 14.0 ☐ →
	1. Increase material circularity ☐ →	2. Reduced CO ₂ footprint 14.0 ☐ →			
	1. Grow the market share ☐ →	2. Acquired business revenue ☐ →	3. Maintain a leading EBIT margin 14.0 ☐ →	4. We operate cost flexibility over business cycle ☐ →	5. Operations transformation: Footprint & Procurement ☐ →
	1. Improved customer experience and impact in all prioritized interactions ☐ →	2. We operate End-To-End processes & platforms for all type of offerings, enabling smooth & VA interactions & superior reliability ☐ →	3. We have expanded our portfolio with a total offer w. outcome-based solutions & relevant commercial models creating customer value ☐ →		
Sustainability shift 					
Agile through cycle 					
Growth 					
Digital shift 	1. Digital Transformation of Operations 14.0 ☐ →	2. EBP Seamless Flow program implementation 14.0 ☐ →			

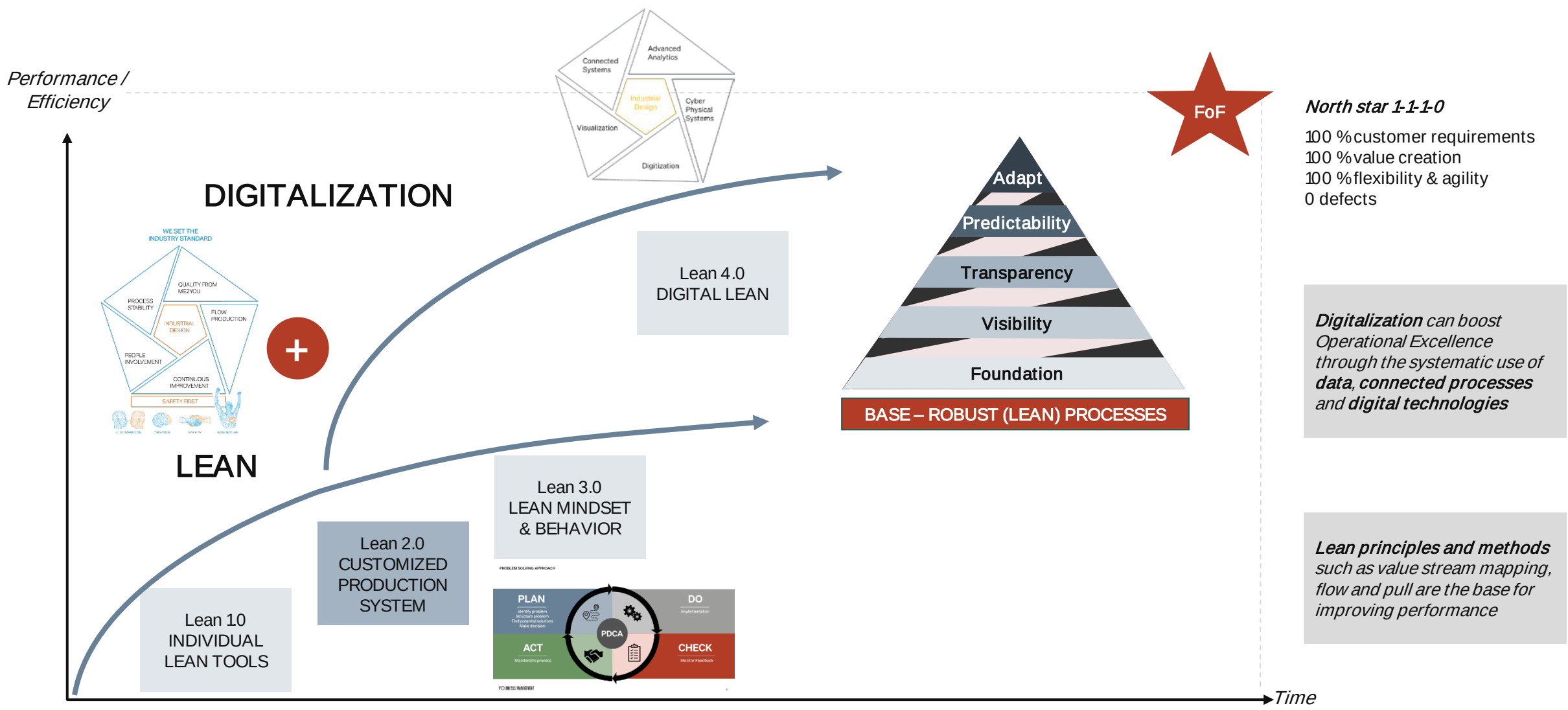
OPERATIONS STRATEGY IN SANDVIK COROMANT - 5X6 APPROACH



DELIVERABLES | THREE DISTINCT DELIVERABLES ARE TARGETED WITH THE TRANSFORMATION 4.0 PROGRAM

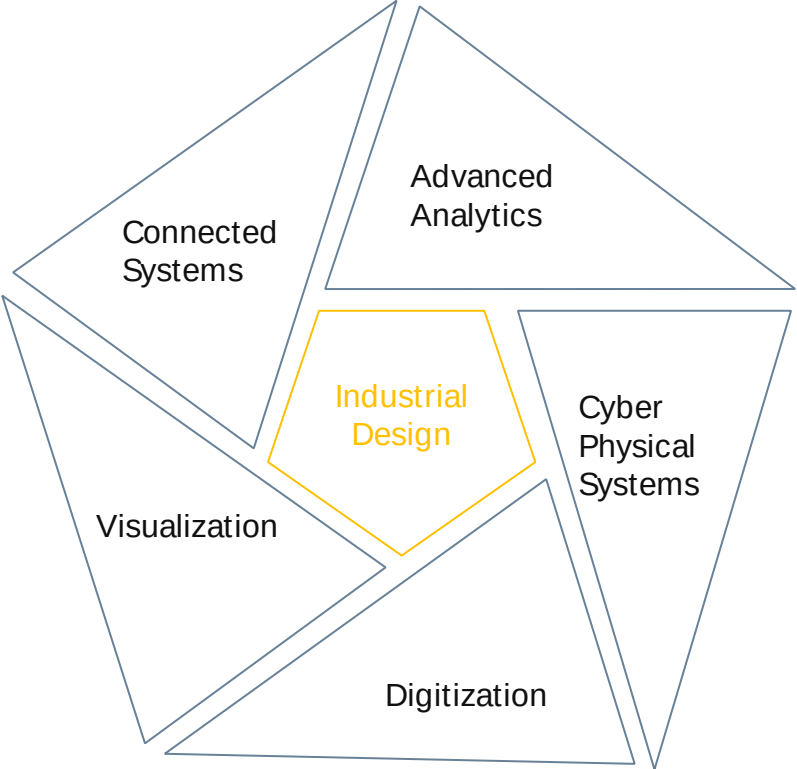
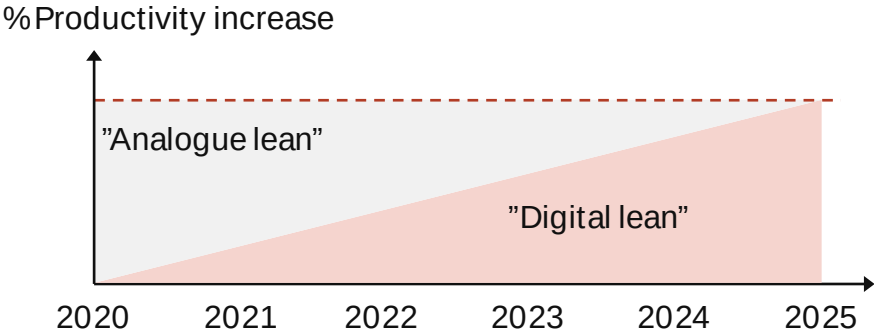
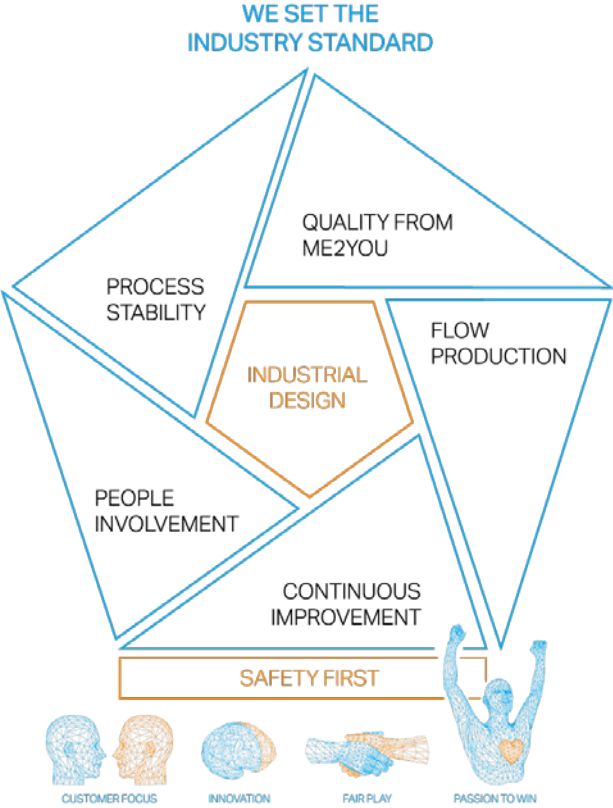
DELIVERABLES		DESCRIPTION
DELIVERABLES LEAN & T4.0	Safeguard x,x VA COGS Reduction	Ensure potential of xxx MSEK in COGS reduction is captured • Capture remaining potential identified through LEAN • Address additional potential through new levers & solutions with Industry 4.0
	Develop industry 4.0 benchmark	Sandvik Coromant PU´s externally recognized as Industry 4.0 benchmark • Coroplus assortment utilized and demonstrated for customers in selected lighthouse facilities • Tools and products used in context of larger production system where value add is fully transparent
	Develop organizational capabilities	Targeted capability building for required capabilities through on-the-job training in orchestrated program • Development of industry 4.0 capable change leaders • Training program for Management teams and leaders in PU´s • Close collaboration with subject matter experts (internal and external)

LEAN AND DIGITALIZATION ARE STRONG DRIVERS FOR T4.0

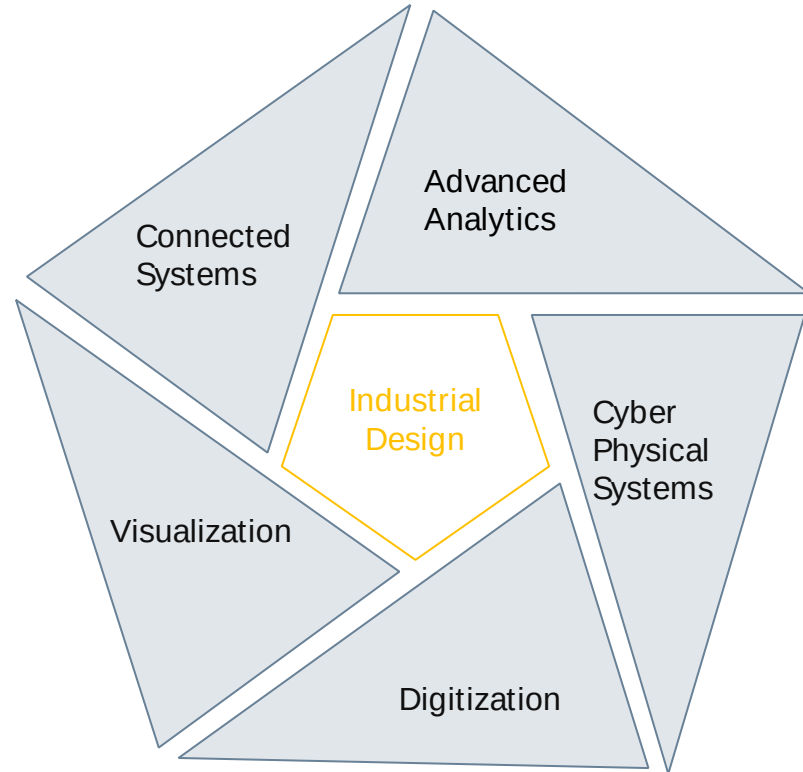


Operational Excellence based on Lean Management ... **►** ..supplemented by digitization of knowledge, real-time transparency and predictive systems ...

TRANSFORMATION 4.0 | WE SEE THE NEED TO STRENGTHEN THE SMS PRODUCTION SYSTEM WITH A “DIGITAL” TOOLBOX



TRANSFORMATION 4.0 | DIGITAL LEVERS IDENTIFIED FROM PRE-DIAGNOSTICS TO INCREASE OPERATIONAL EFFECTIVENESS



Sensors and automated data collection

Machine intelligence, cycle time measurement, quality data collection, machine learning, remote monitoring, digitizing data, wireless connection (5G), Digital Platform (OEE)



Shop floor information

Andon, smart glasses (AR/VR), SOP's, real-time process data, digital dashboards, info tablets, smart phones/watches (call-on-systems)



Digital workflow on order data/information

Barcodes, Radio Frequency Identifier Tags (RFID), e-sign, order tracking/location technology, Poka-Yoke systems, tool-ID



Automation/support of manual labor

Robotics, co-bots, humanoids, intelligent AGV's, (exo-skeletons/EHS)



Machine2Machine/Product2Machine

Seamless design/preparation process, parameter transmittal from P2M, in-line quality control (towards more on process rather than product)



Process intelligence and steering

Production planning optimization, predictive maintenance (health check), autonomous process control and compensation (unmanned production), Simca-On-Line,



Big Data analytics and business intelligence

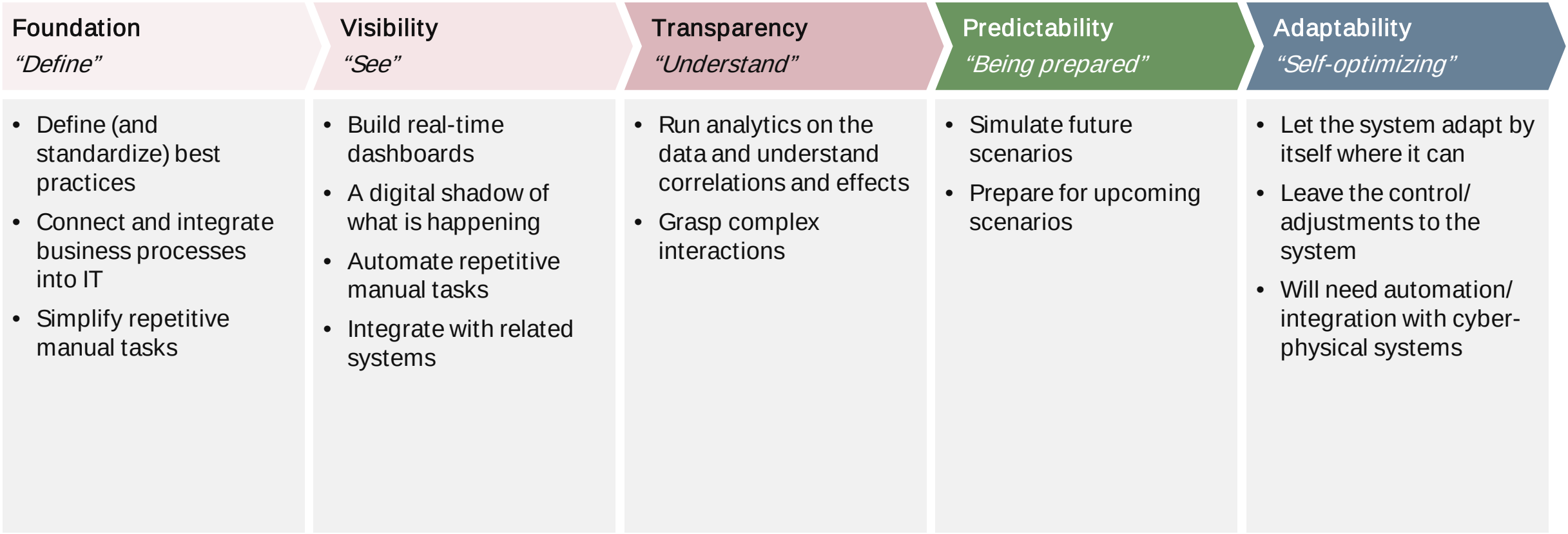
Condition-based maintenance, automation of knowledge work/decision making, analytics cross functions/systems, computational power



Integrated IT infrastructure

E2E IT integration, data lake architecture and IT security,

COROMANT SUPPLY DIGITAL JOURNEY IS SEQUENCED IN 5 MATURITY LEVELS WITH INCREASING DIGITIZATION INTENSITY



From local data files...
From relational databases...
From subjective data analytics...

...to data on the cloud
...to flexible schema, graph databases
...to AI/ML data driven predictions

MANUFACTURING VALUE CHAIN AND RELATED FUNCTIONS

Design 	Automated CAD systems that enables you to turn concepts into designs suitable for manufacturing automation, while maintaining a healthy profit.	Manufacturing 	On-edge systems that are fully integrated with highly automated machinery to continuously monitor, analyze and optimize process parameters to achieve first part correct in real time without human intervention
Process Planning 	Automated CAPP and CAM systems that optimize routings, bill of materials, and manufacturing programs	Quality 	To establish a data driven process that continuously improves the means of preventing non-conformities and their root causes
Operations Planning 	Automated planning systems that optimize asset allocation and people allocation in real-time to continuously achieve and improve on efficiency targets	Maintenance 	Reduce the costs and downtime associated with both unplanned maintenance and preventive maintenance activities
Material Management 	Automated inventory and smart purchasing systems that ensure, Just-in-time material availability while ensuring technical/legal compliance and enabling dynamic supplier management	Sustainability 	To drive sustainable business across our supply chain by integrating the environmental, social and economical aspects of our work

THE FACTORY OF THE FUTURE ROADMAP IS A LIVING DOCUMENT TO VISUALIZE FUTURE GOALS AND POSSIBILITIES

OUR SCALE
MANUFACTURING VALUE CHAIN AND RELATED FUNCTIONS

Design	Automated CAD systems that enable you to turn concepts into physical models for prototyping activities, while maintaining a healthy profit.	Manufacturing	On edge systems that are fully integrated with highly automated manufacturing on the shop floor, enabling you to optimize your production to achieve the best cost and lead time for your customer.
Process Planning	Automated ERP and CRM systems that optimize supply chain visibility, and maximize long programs.	Quality	To establish a data driven process that continuously improves the impact of preventing non-compliance and other risks.
Operations Planning	Automated planning systems that optimize asset allocation and provide allocation in real time to contribute actions and improve efficiency targets.	Maintenance	Reduce the costs and downtime associated with unplanned maintenance and preventive maintenance activities.
Material Management	Automated inventory and order purchasing systems that ensure, but do not replace, visibility, while ensuring accurate, high consistency and enabling dynamic supplier management.	Sustainability	To drive sustainable business across our supply chain by integrating the environmental, economic and social aspects of our work.

Business value increases as you advance. Conversely, some foundational features might not have any business value per se, but are essential to drive future activities

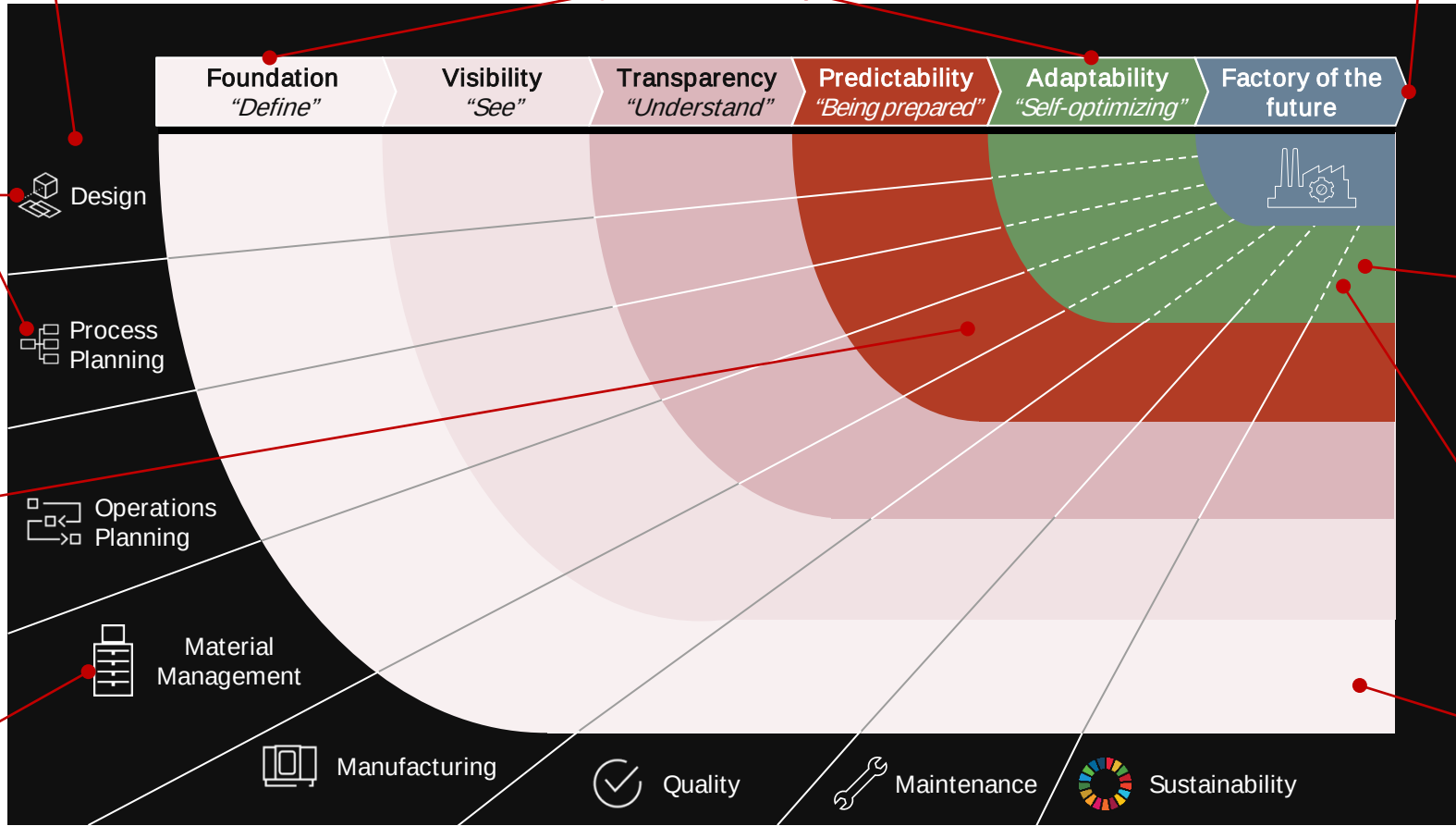
COROMANT SUPPLY DIGITAL JOURNEY IS SEQUENCED IN 5 MATURITY LEVELS WITH INCREASING DIGITIZATION INTENSITY

Foundation "Define"	Visibility "See"	Transparency "Understand"	Predictability "Being prepared"	Adaptability "Self-optimizing"
- Define and standardize best practices - Connect and integrate business processes into IT - Simplify repetitive manual tasks	- Build real-time dashboards - A digital shadow of what is happening - Automate repetitive manual tasks - Integrate with related systems	- Run analytics on the data and understand correlations and effects - Group complex interactions	- Simulate future scenarios - Prepare for upcoming scenarios	- Let the system adapt by itself where it can - Leave the control adjustments to the system - Use next automation/ integration with other physical systems
From local data files... From relational databases... From subjective data analytics...		...to data on the cloud ...to flexible schema, graph databases ...to AI/ML data driven predictions		

Address all functions; and not just the shop floor production

Features in advanced levels might need a combination of features across functions

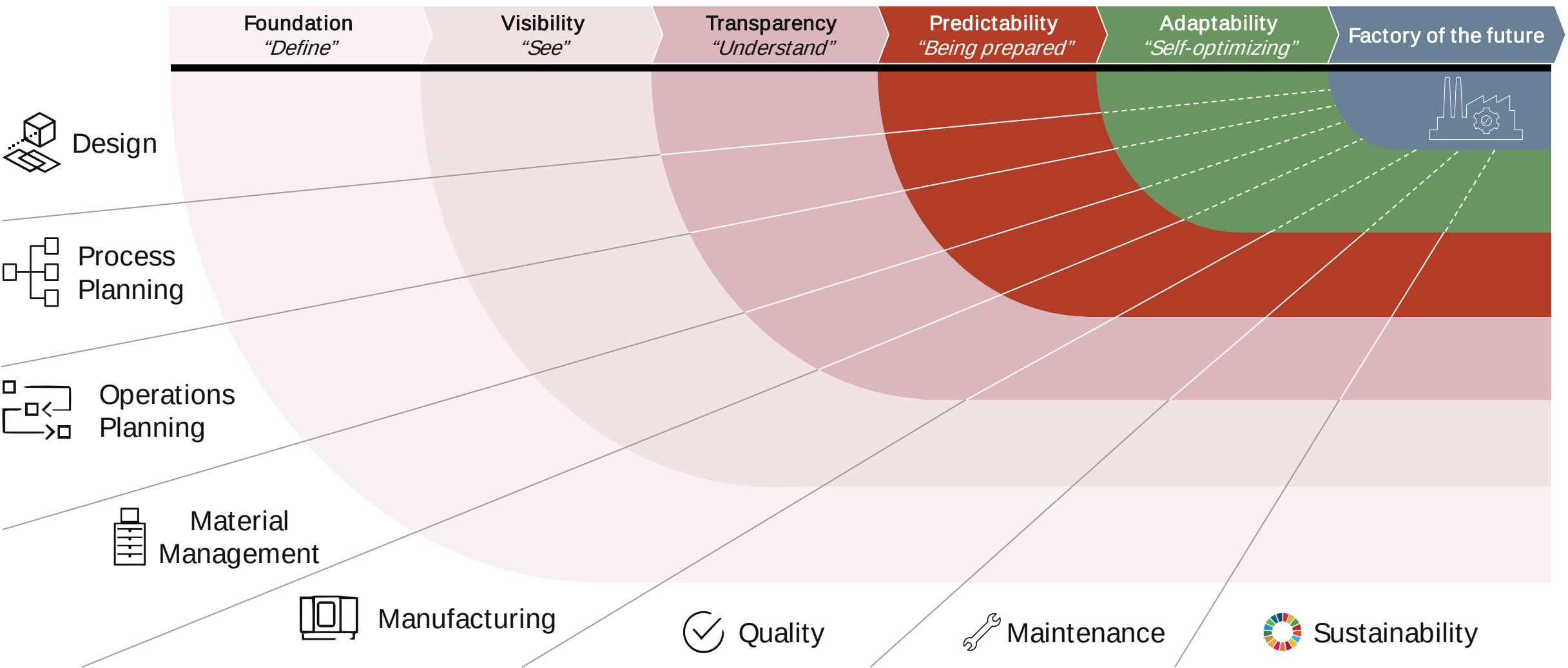
Combines purchasing, inbound logistics and outbound logistics



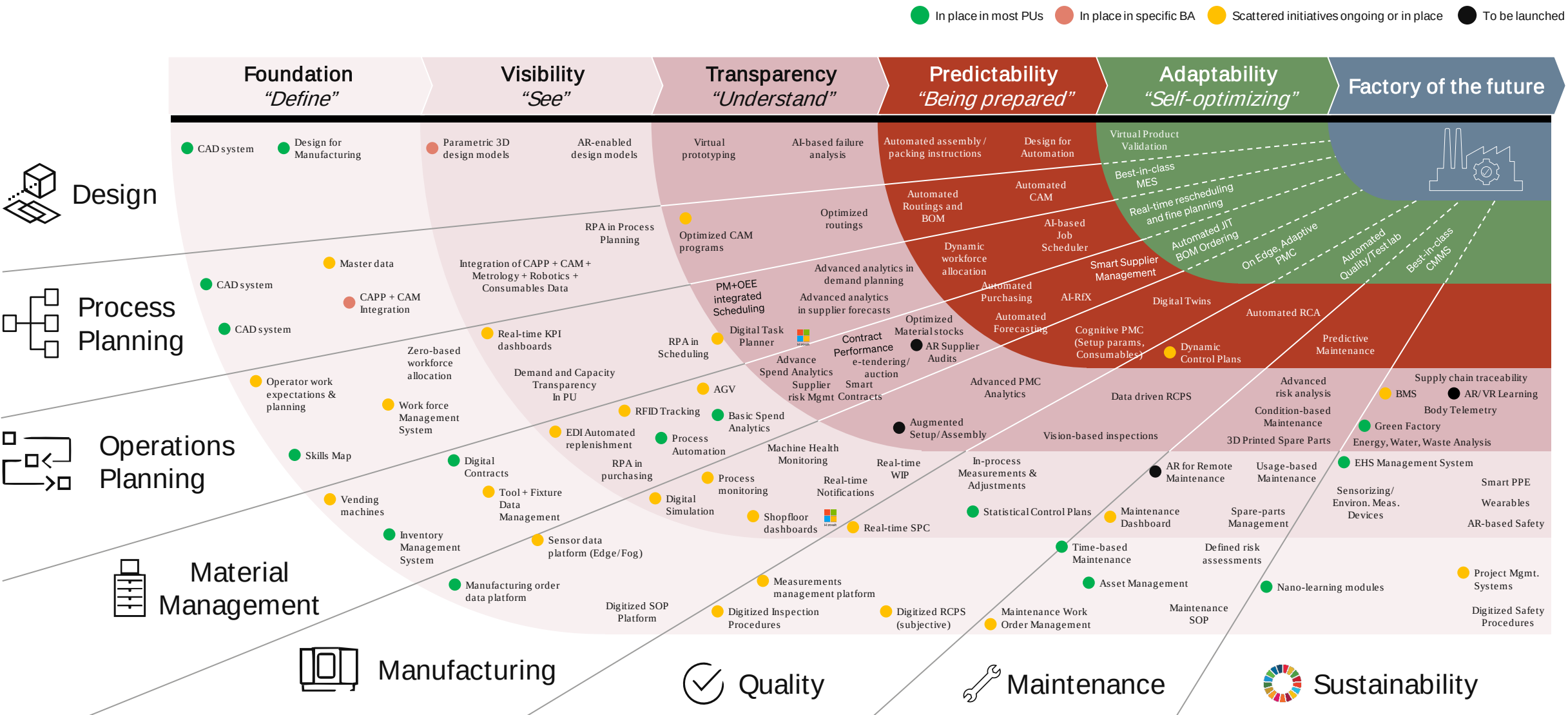
Lines get blurred across functions in the future due to integrated autonomous systems

The terminology used in Adaptability is deliberately unprecise; The intention is to ensure foundation and visibility levels are in place before we agree on a common definition for advanced features.

COROMANT SUPPLY DIGITAL JOURNEY TO THE FACTORY OF THE FUTURE



COROMANT DIGITAL JOURNEY CURRENT STATUS



CREATING A LEARNING CULTURE ON DIGITAL

▾ Academy News & Updates

Welcome to the Sandvik Digital Academy!

Welcome! We are so happy you are here! Supporting our digital shift strategy, this site aims to provide you with ease of access to learning opportunities within digital technology and IT & Software Engineering.

What you'll find here:

Digital Foundational courses for ALL EMPLOYEES that will spark inspiration. Intermediate & Advanced courses to support career growth in Tech and IT. The People and Influencing section offers courses to brush up on your 'softer' side



START HERE! Emerging Technology Foundational Understanding

Sandvik is striving to encourage employees to have a broad knowledge in emerging technologies. Having foundational knowledge increasing conversation level knowledge which inspires, spreads ideas, fosters... understanding and opens minds toward new opportunities. THIS SECTION IS RECOMMENDED FOR ALL EMPLOYEES!

[Watch: Create a self-development plan \(10 mins\).](#)

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- A Smarter Workplace [Intranet]
Tips and updates on MS365 digital tools.
- Don't have a LinkedIn Learning License? Click here
- Platform-specific education on LinkedIn Learning
- GitHub
Welcome to the platform developers love
- SAP Open Training site
Prepare to earn an SAP Certification and become a trusted SAP expert!

Microsoft Learning Sites

- Microsoft Learn
Track your progress and broaden your knowledge with learning paths.
- MS Virtual Training Days
Skill up with Microsoft Virtual Training Days digital events.
- Get Certified for FREE!
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- List of Microsoft Certifications
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