Introduction Industry 4.0

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Picture: Demonstration Factory (INC Invention Center in cooperation with MEXT/MESS) in Istanbul, Turkey

Think about smart devices…

Sensors & Input

Connectivity

Output & HMI

Data Analytics

The Evolution of Industrial Production

Smart i4.0 Navigator

Connectivity

Data Analytics

Sensors & Input

Smart Processes

Smart Networks

Output & HMI

Smart Products

New Digital Business Models

Smart Production

Mindset and Culture

Uniqueness

Application

Enablers

Strategy and Organization

Value

Growth & Revenue

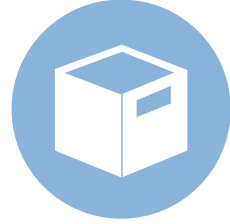Productivity & Efficiency

Focus on Value
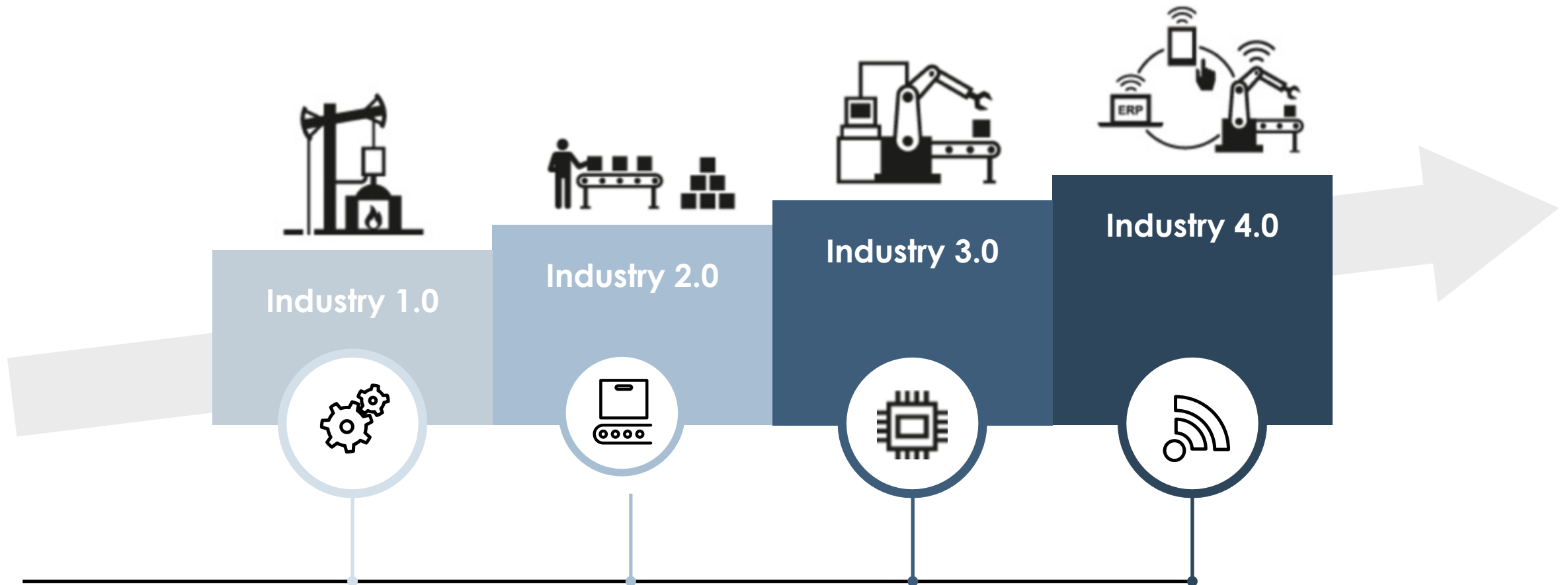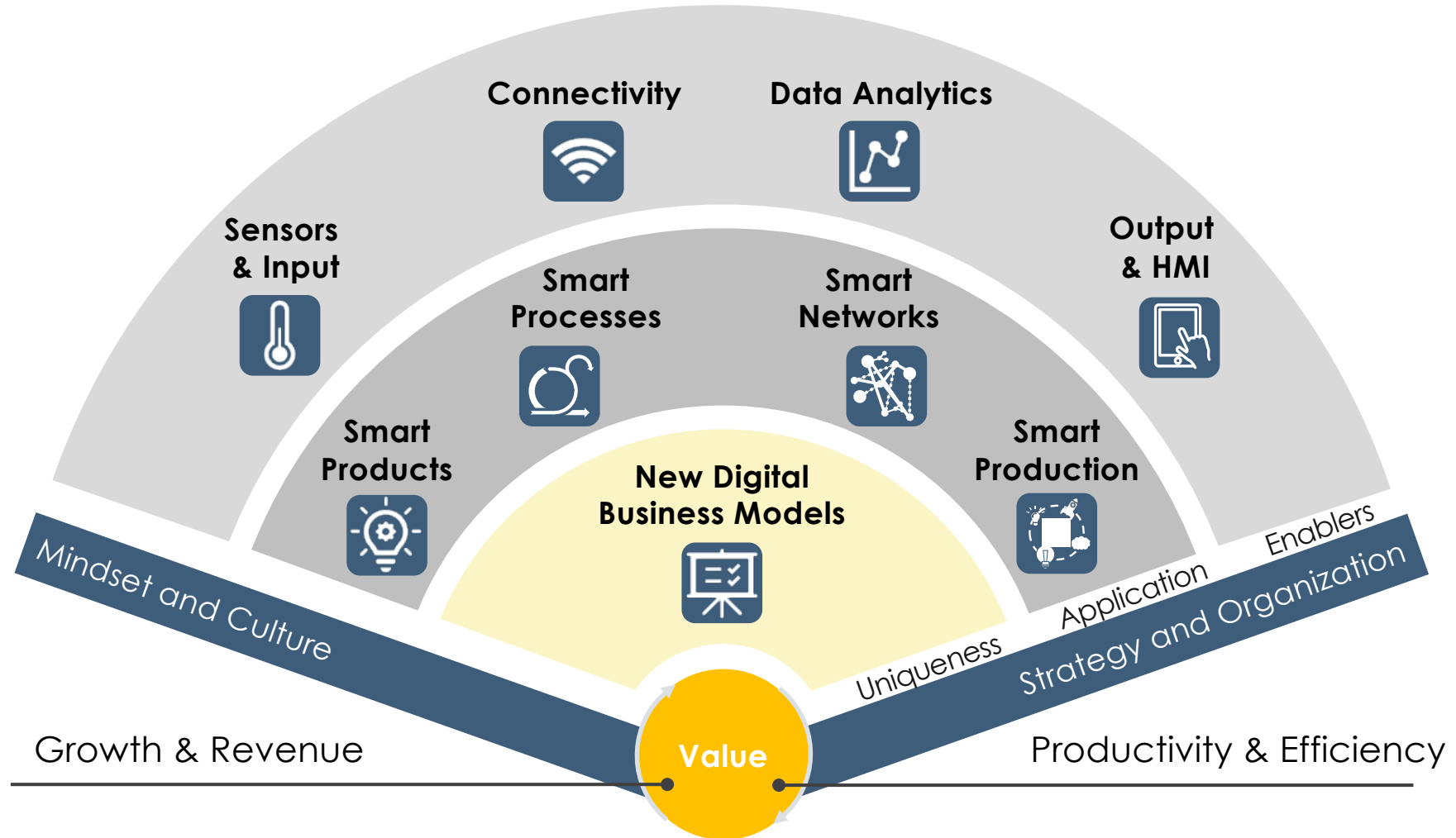
Lean Six Sigma: 8 Wastes

Qualification
Underutilizing people's talents, skills & knowledge.

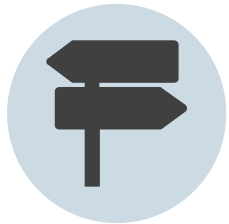### Inventory
Excess products and materials not being processed.

Motion
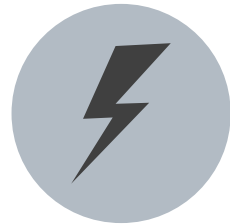Unnecessary movements of people (e.g. walking).

Waiting
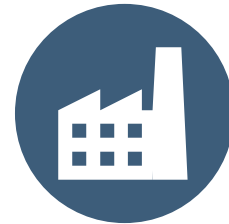Wasted time waiting for the next step in process.

Transportation
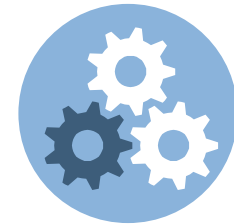Unnecessary movements of products & materials.

Defects
Efforts caused by rework scrap and incorrect information.

Overproduction
Production that is more than necessary or before it is needed.

Overprocessing
More work or higher quality than is required by the customer.

Key principles of Industry 4.0

Value drivers and challenges for a successful implementation

Transparency

What are the most important sources of information that help to create transparency about all relevant shop floor activities?

Prediction

How to evaluate the potentials of data analytics and what are the prerequisites for implementation?

Which architecture supports the exchange of information between IT and OT technologies in the best possible way?
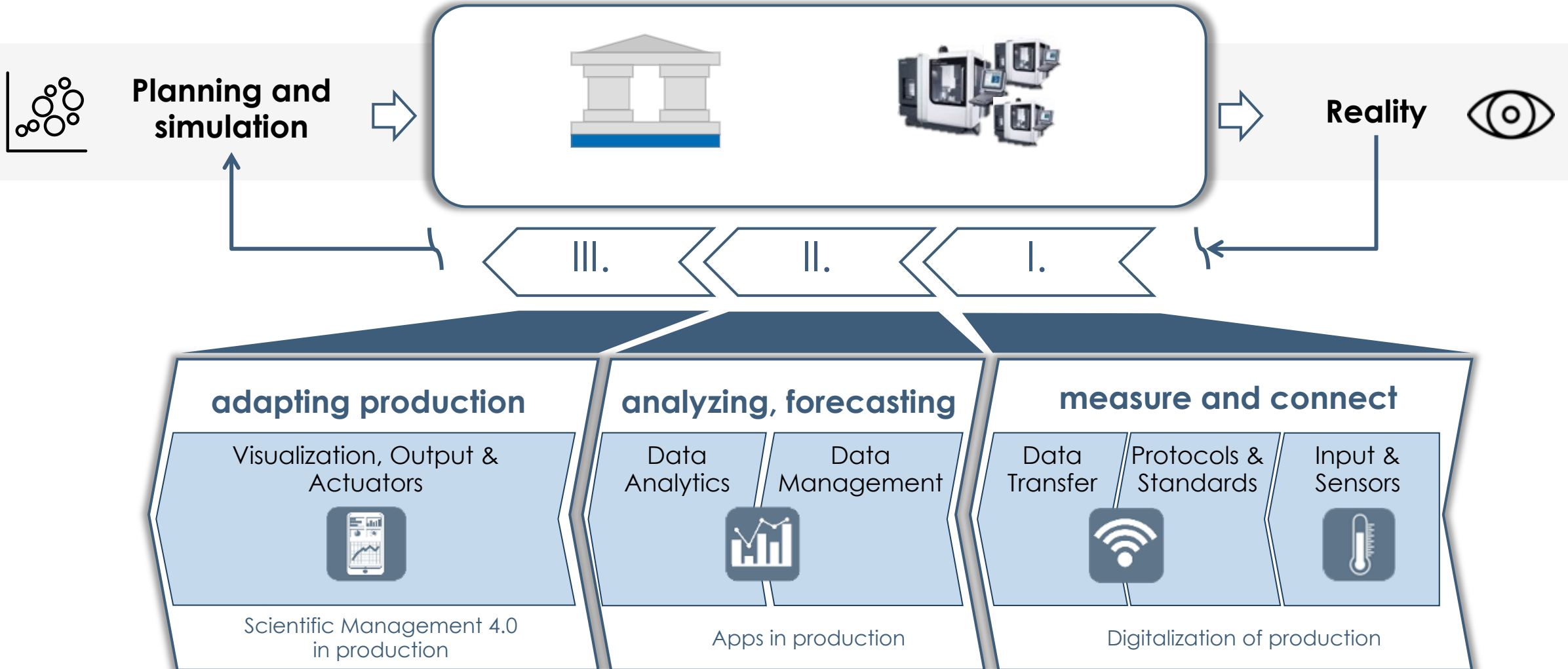
How are people supported in their decisions or how do machines take autonomous actions?

Connection

Action

The "control loop" perspective:

I4.0 solutions can be understood as "controller" with several technological components

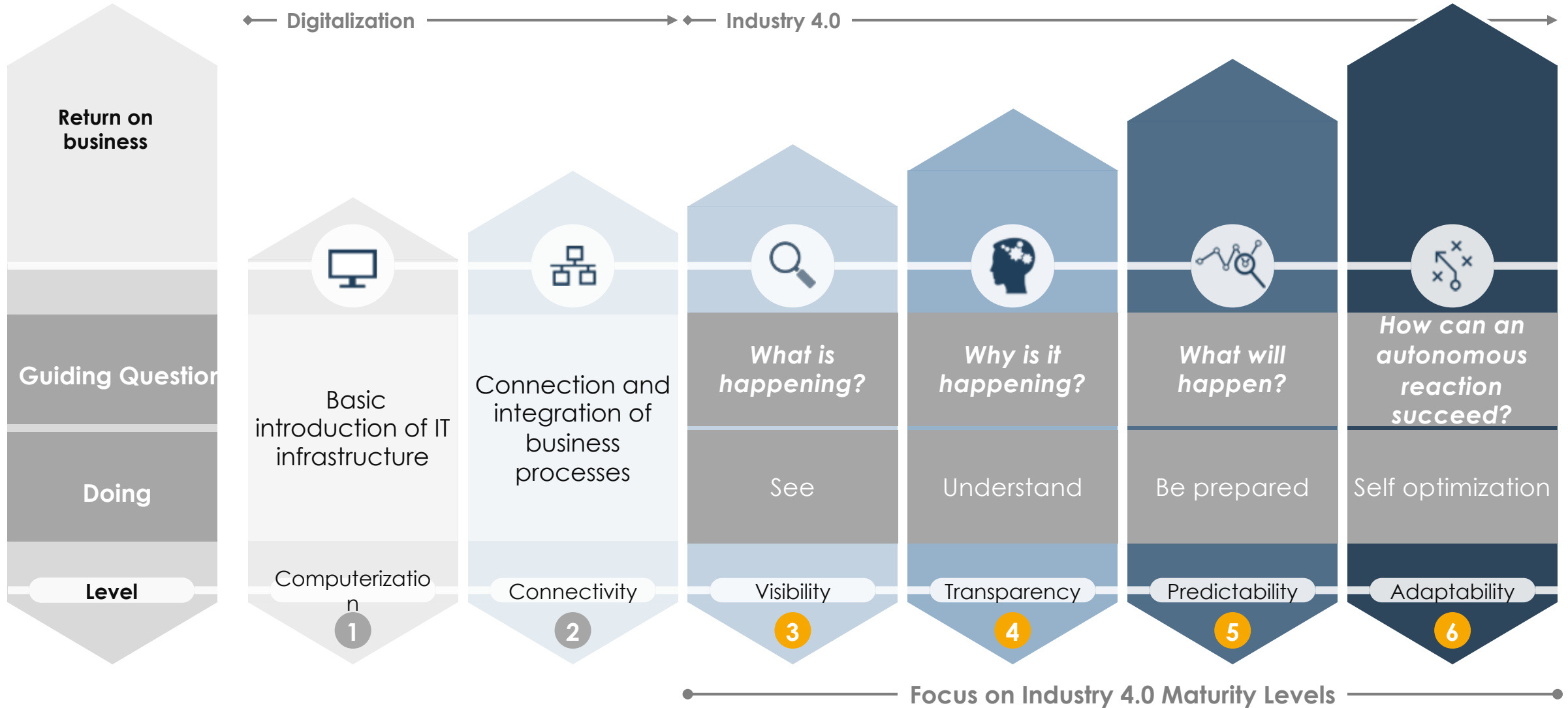| adapting production	analyzing, forecasting	measure and connect
Visualization, Output & Actuators	Data Analytics | Data Management	Data Transfer | Protocols & Standards | Input & Sensors
Scientific Management 4.0 in production	Apps in production	Digitalization of production

How to move towards Industry 4.0

Good infrastructure is important to realize the benefits of advanced technology – also in Industry 4.0

???

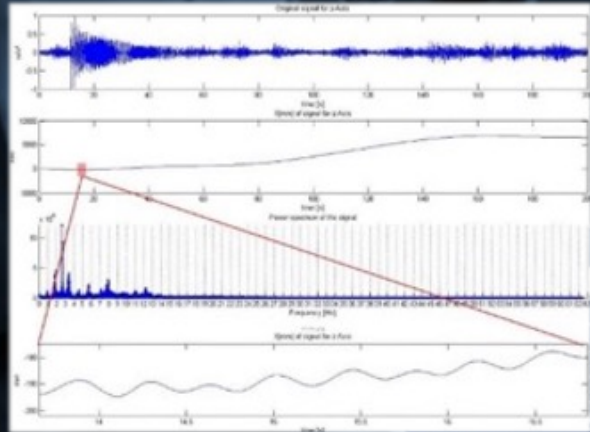# Industry 4.0 Maturity Index

Digitalization ← → Industry 4.0

Return on business

Guiding Question	Basic introduction of IT infrastructure	Connection and integration of business processes	*What is happening?*	*Why is it happening?*	*What will happen?*	*How can an autonomous reaction succeed?*
Doing			See	Understand	Be prepared	Self optimization
Level	Computerization	Connectivity	Visibility	Transparency	Predictability	Adaptability
	1	2	3	4	5	6

Focus on Industry 4.0 Maturity Levels

Visualization - What is happening?

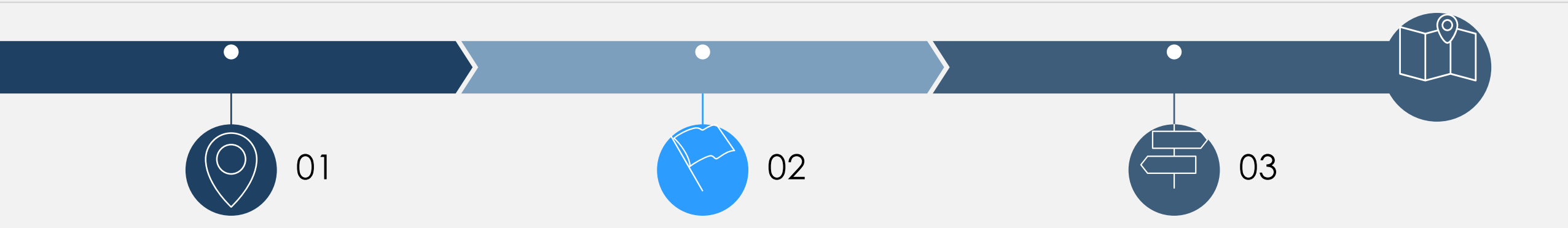Transparency – Why is it happening?

Prediction - What will happen?
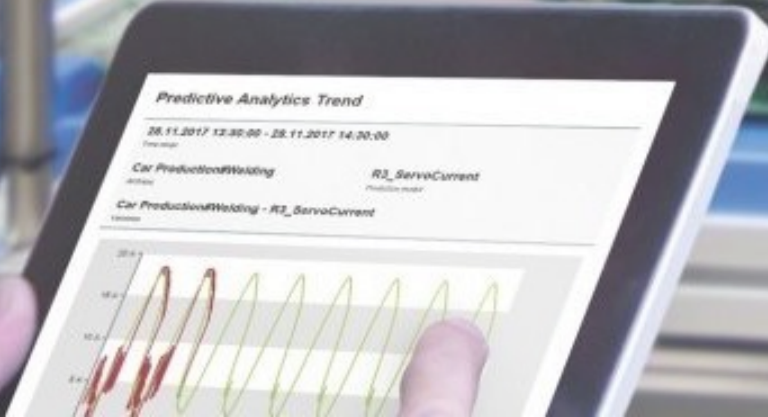
How can an autonomous reaction succeed?
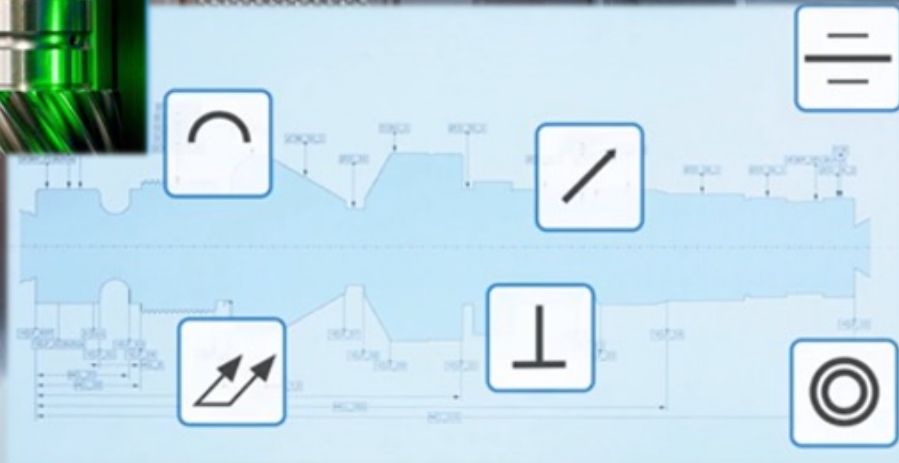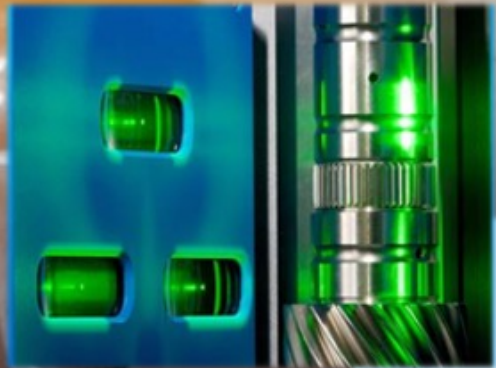
The process of roadmap design

Status Quo

Identification of the current maturity stage through department-based assessment.

01

Target State

Identification of target development stage at the end of the transformation process.

02

Definition of Roadmap

Formulation of initiatives and incorporation into a roadmap based on conclusions from step 02.

03

Existing Capabilities

Gap Analysis

Missing Capabilities
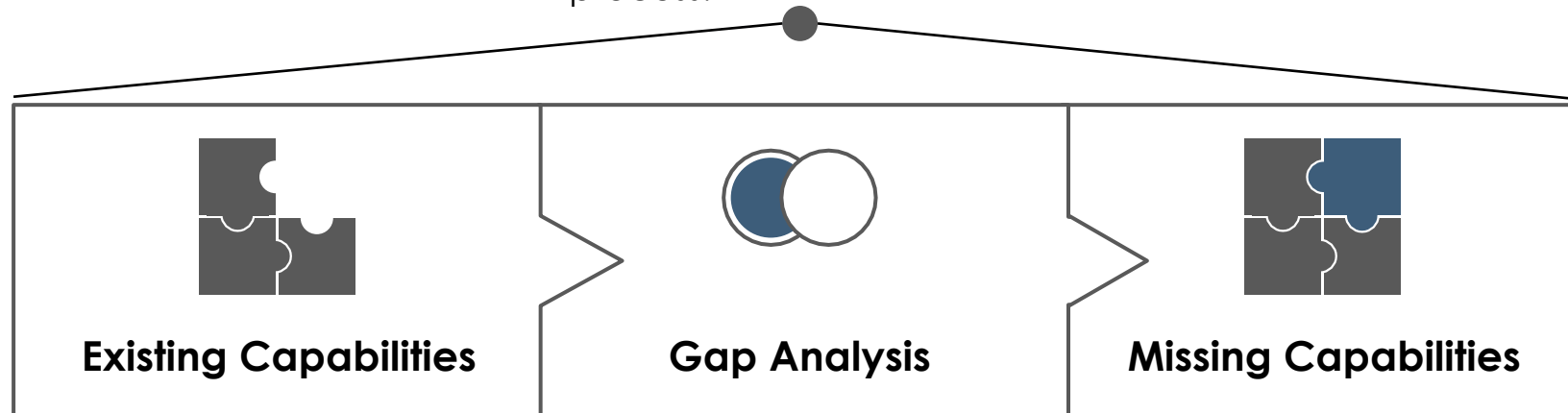
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