Gospodarska zbornica Slovenije

Okrogla miza

KAKO BO INDUSTRIJA 4.0 VPLIVALA NA INOVATIVNOST ZASAVSKIH PODJETIJ?

Uvod v razpravo I² 4

dr. Marjan Rihar, mag. Marko Bohar

Trbovlje,15.6. 2018

SRIPTOP Strateško razvojno inovacijsko partnerstvo TOVARNE PRIHODNOSTI

SRIP KROŽNO GOSPODARSTVO

SRIP MATPRO

REPUBLIKA SLOVENIJA MINISTRSTVO ZA GOSPODARSKI RAZVOJ IN TEHNOLOGIJO

EVROPSKA UNIJA EVROPSKI SKLAD ZA REGIONALNI RAZVOJ NALOŽBA V VAŠO PRIHODNOST

Digital Disruption

Social is Business

86% Stop doing business

94% Will pay more for great experience

26% Post negative comments

Sophisticated Customers

"Engage me everywhere."

"Meet my expectations."

"Know me. Wow me."

"Understand and reward me."

Cloud

2014 **51%** of workloads in the cloud

2020 **1/3** of all data in the cloud

87% of organizations using public cloud

Data Explosion

90% Created within the last 2 years

50X Growth by 2020

2012
9 Billion Internet Devices

2020
50 Billion Internet Devices

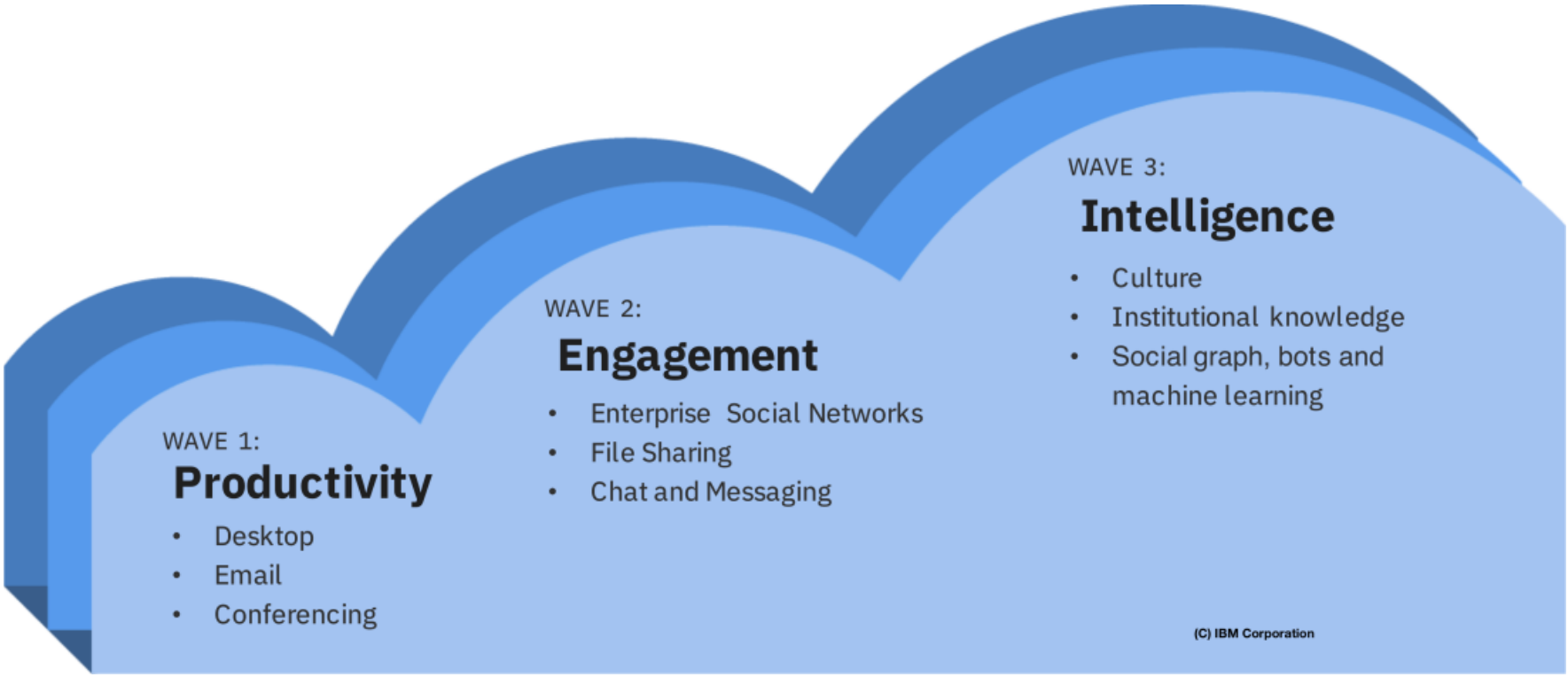
Rise of Mobility

50.3% of ecommerce traffic coming from mobile

78% Mobile Data Growth

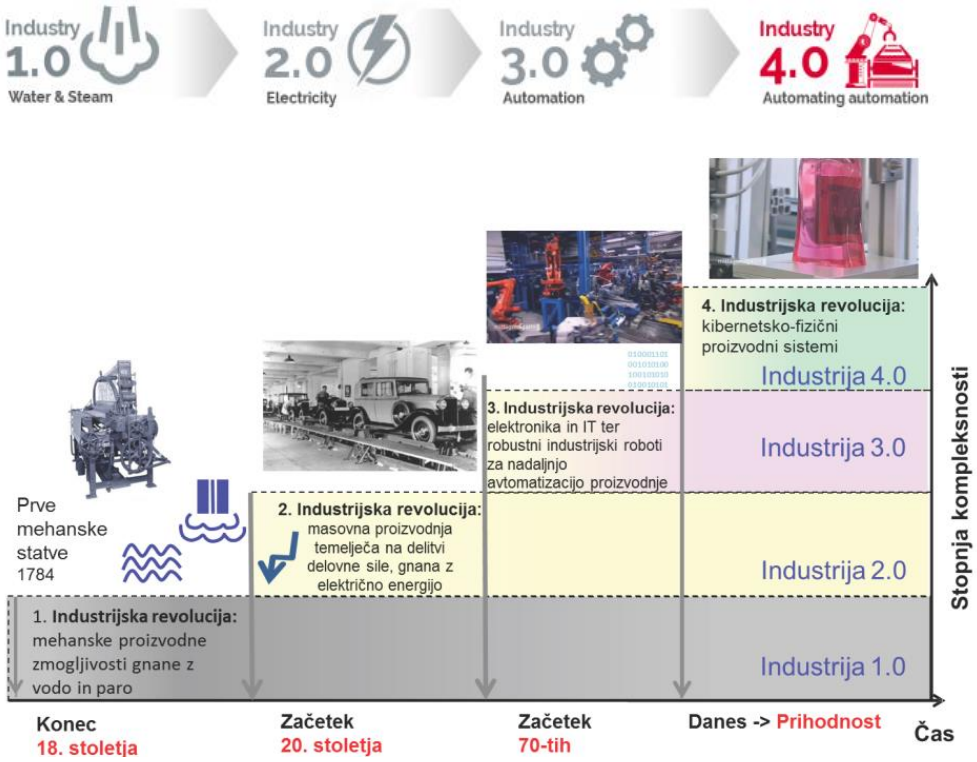
20-Year-Old Legacy Applications

ORACLE

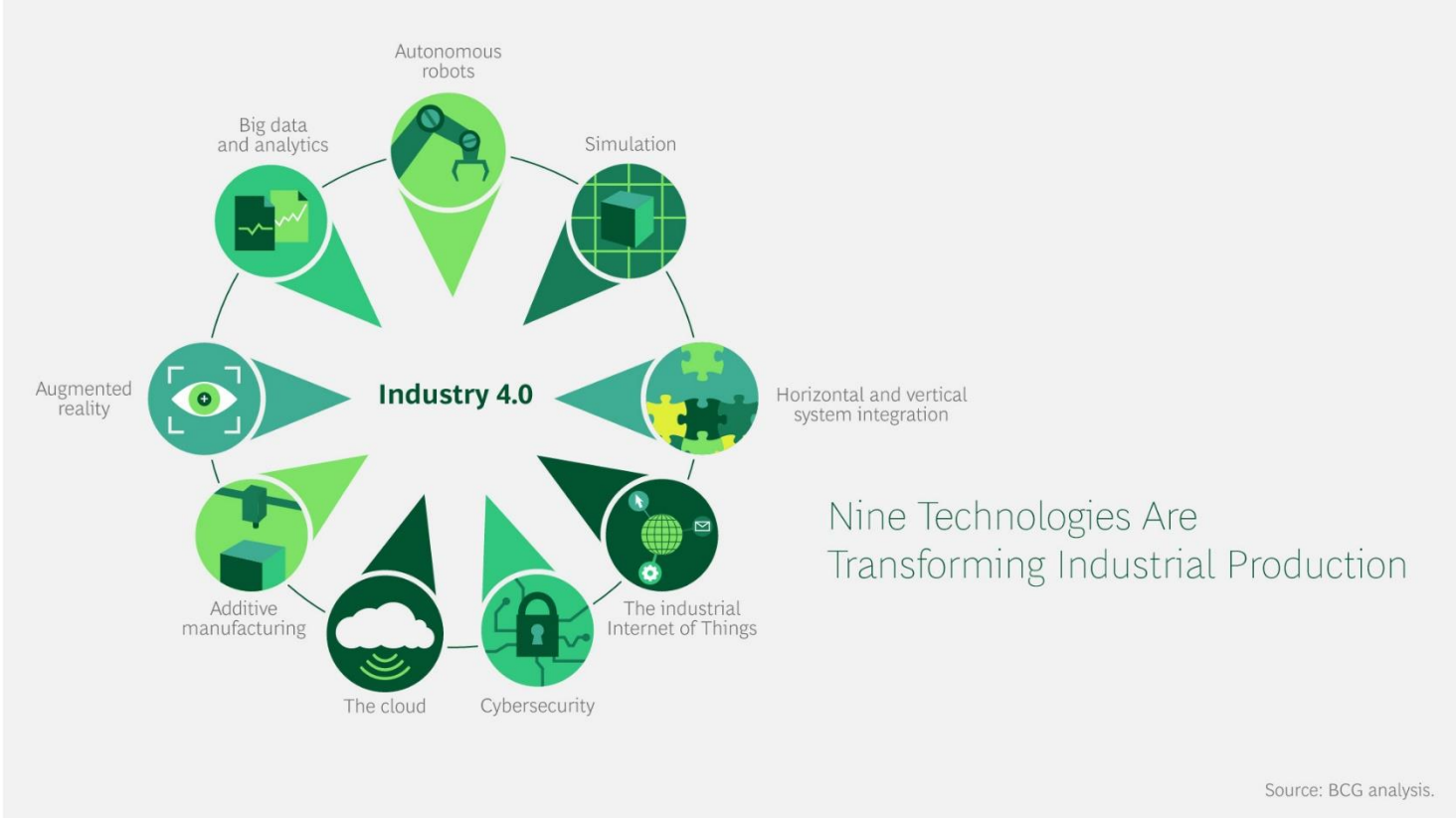

WAVE 1:
Productivity
• Desktop
• Email
• Conferencing
WAVE 2:
Engagement
• Enterprise Social Networks
• File Sharing
• Chat and Messaging
WAVE 3:
Intelligence
• Culture
• Institutional knowledge
• Social graph, bots and machine learning
(C) IBM Corporation

Od 1. do 4. industrijske revolucije

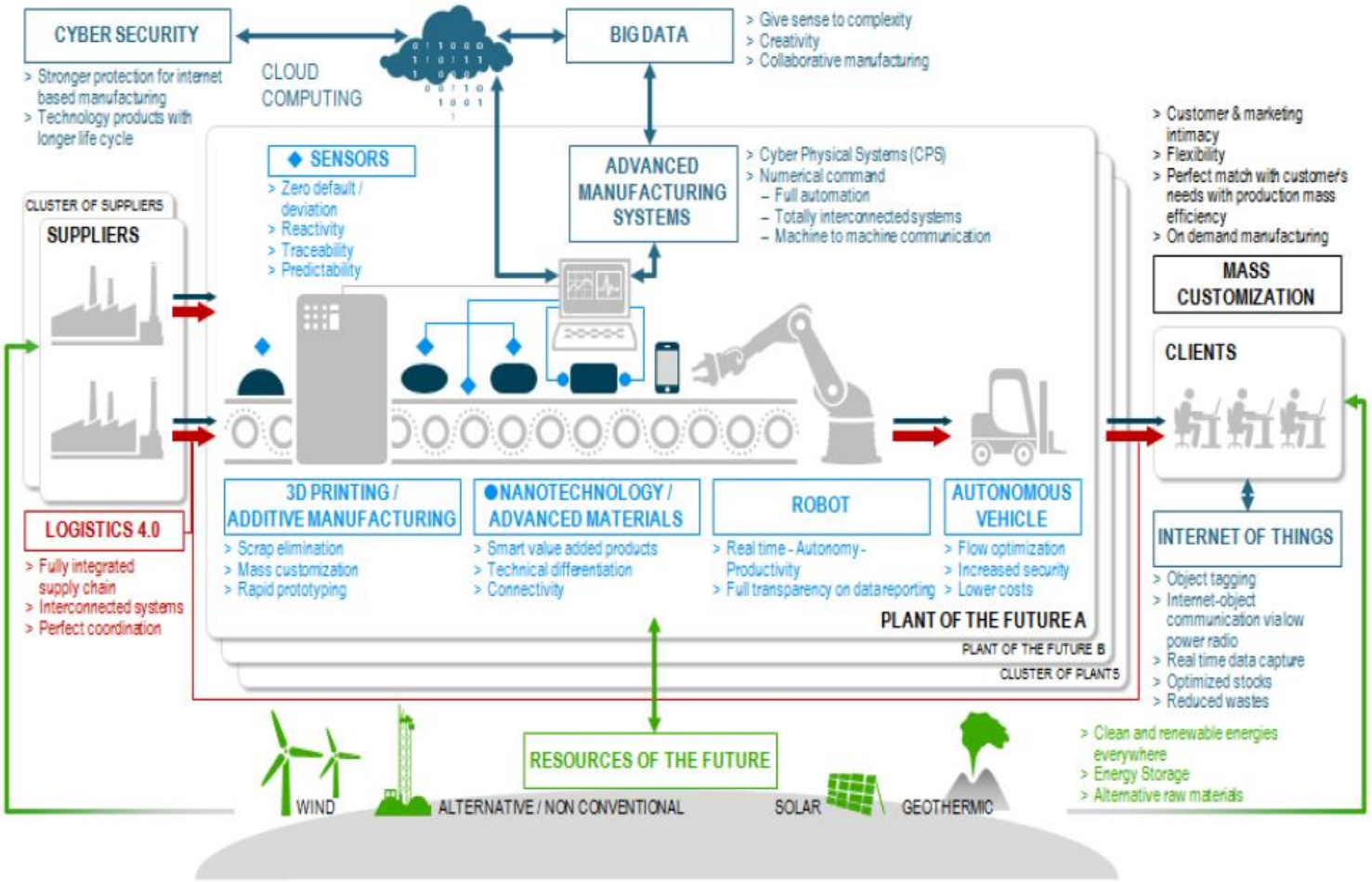
- celovita digitalizacija proizvodnje
- nov nivo organiziranosti in upravljanja celotne vrednostne verige
- kibernetsko-fizični proizvodni sistemi (CPS
- sposobnost (samostojnega) komuniciranja



9 ključnih digitalnih industrijskih tehnologij



Ekosistem industrije 4.0



Številne koristi industrije 4.0

Increased productivity
… e.g., through a higher level of automation that reduces production time, enables better asset utilization and inventory management

Increased quality
… of products via sensors and actuators that monitor the current production in real time and quickly intervene in case of errors

Increased flexibility
… e.g., manufacturing flexibility through machines and robots that can execute the production steps for a large number of products

Increased speed
… from the first product or factory idea to the finished product through consistent data and, e.g., new simulation opportunities.

Manufacturing conditions

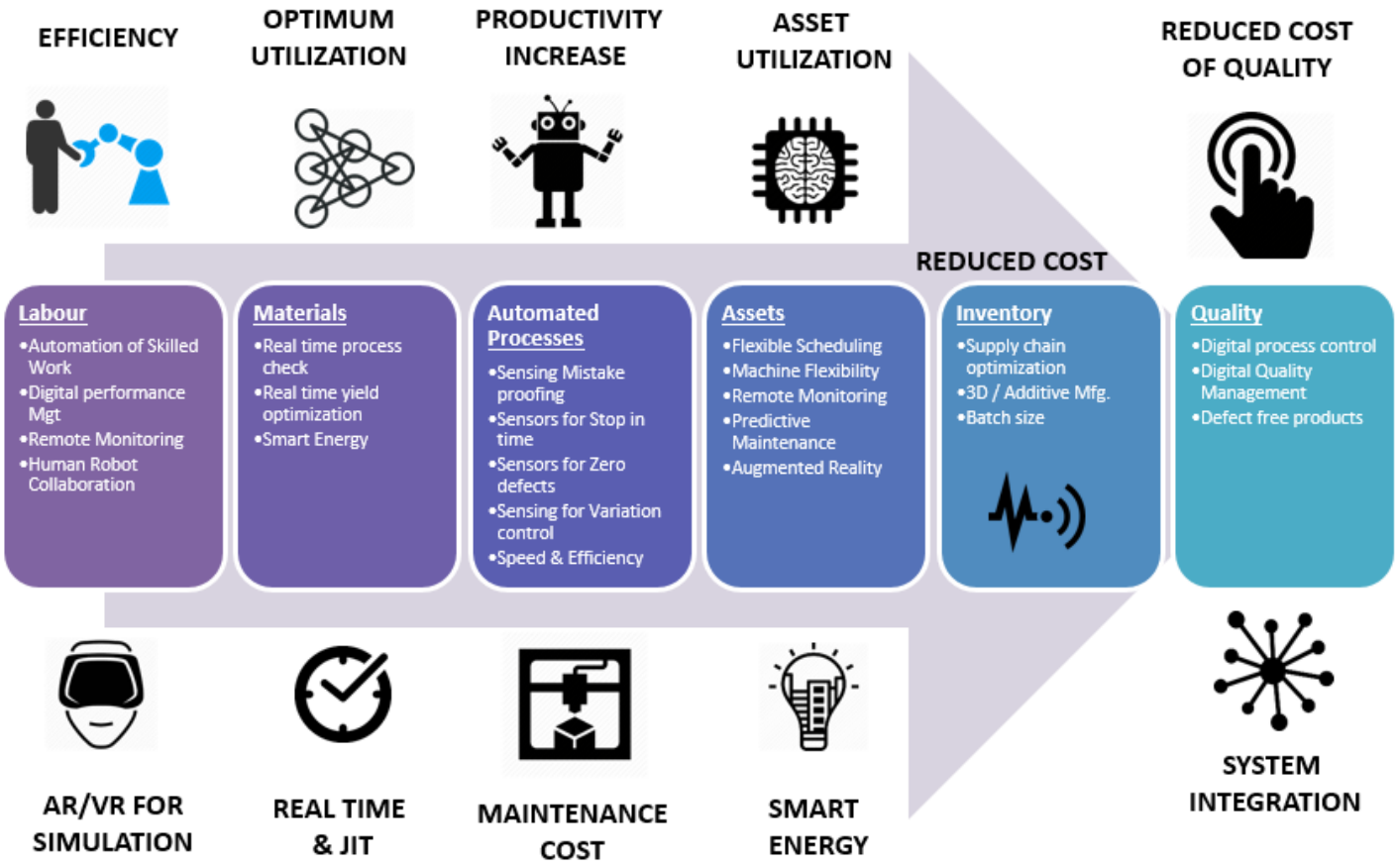
Safety	Working conditions	Training & Collabo-ration	Environm. protection	Innovative capability
More occupational **safety** through increased automation	Better **working conditions** through ergonomically adapted workstations	Increased **collaboration** in the production network through consistent data availability	Better **environment protection** through optimized use of resources (e.g., more energy-efficient operation of machinery)	Increased **innovative capability** through new technological possibilities in manufacturing

Pametna tovarna - definicija

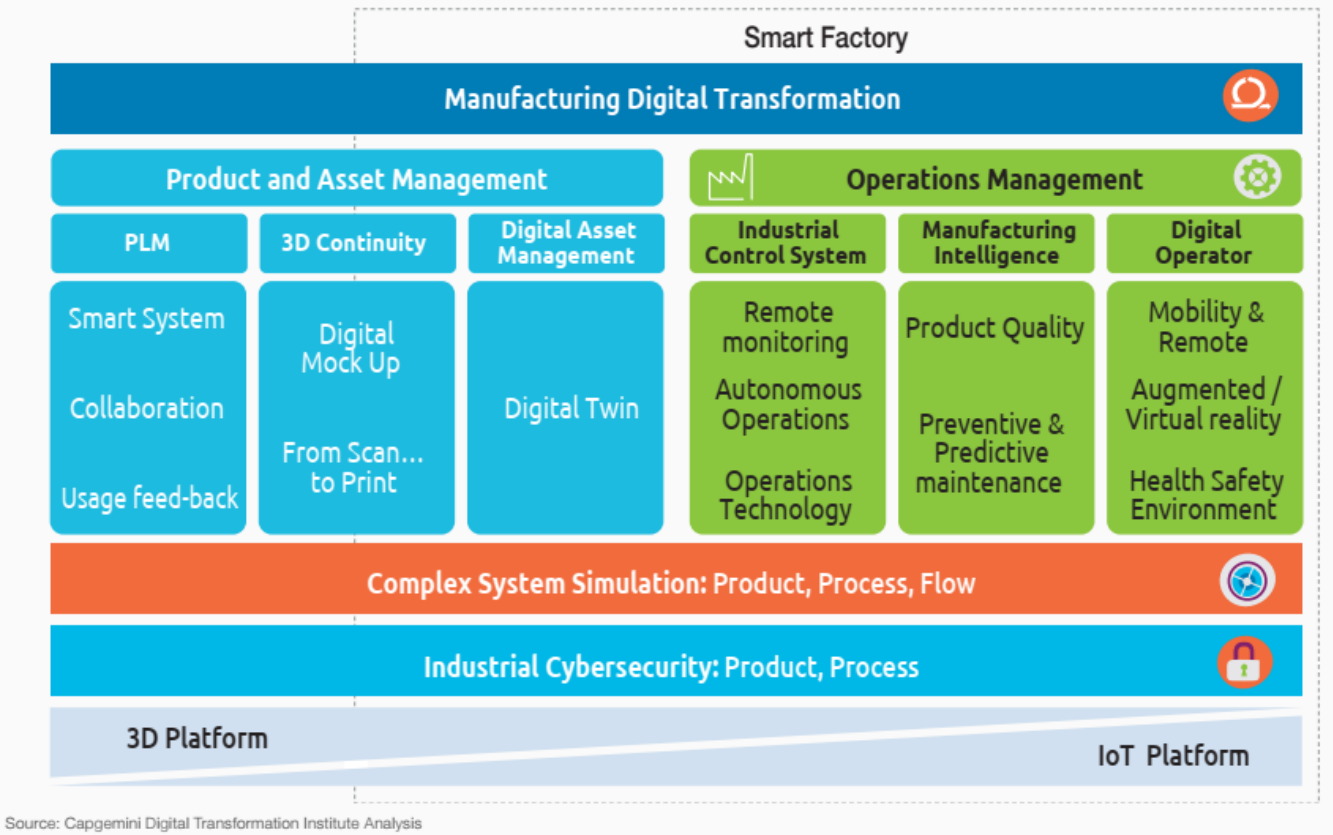
The smart factory is a **flexible system** that can **self-optimize performance** across a **broader network**, **self-adapt** to and **learn** from new conditions **in real or near-real time**, and **autonomously** run entire production processes

'Smart Factory' – Technology Road Map

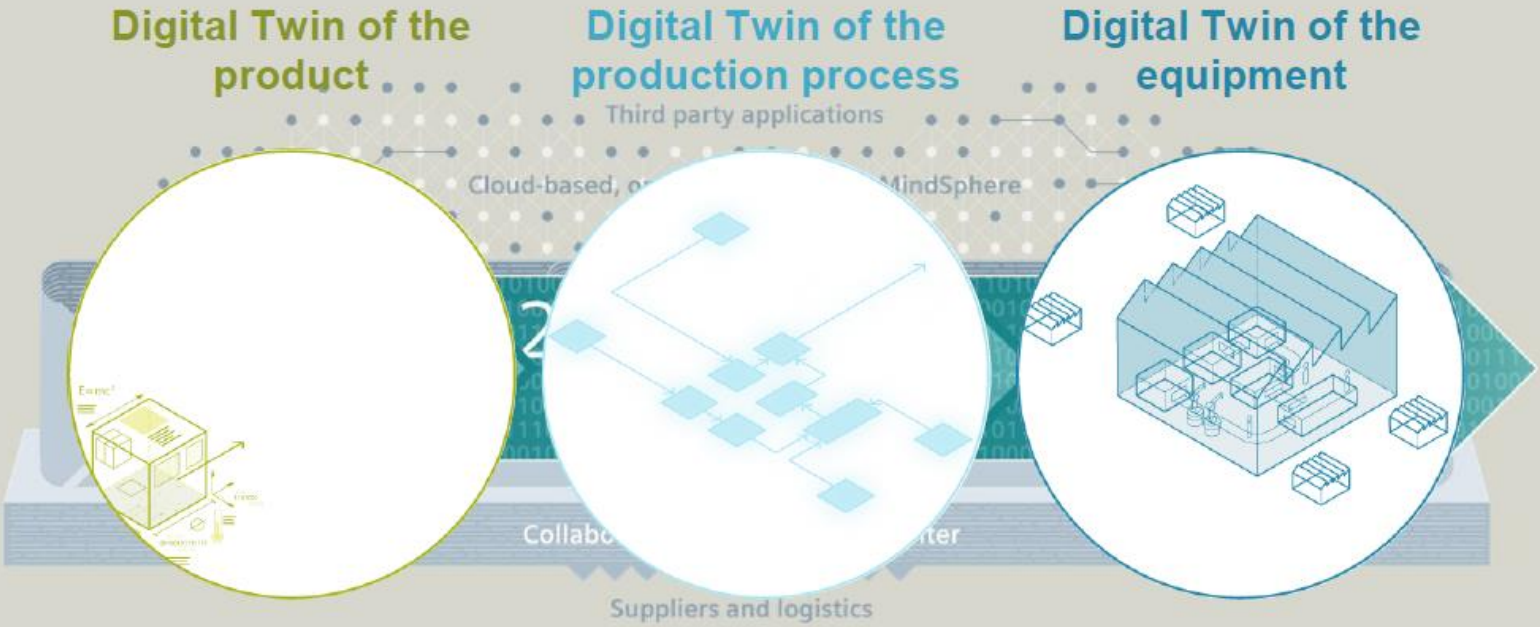
Target: 10 to 30% direct cost reduction of value drivers



Pametna tovarna

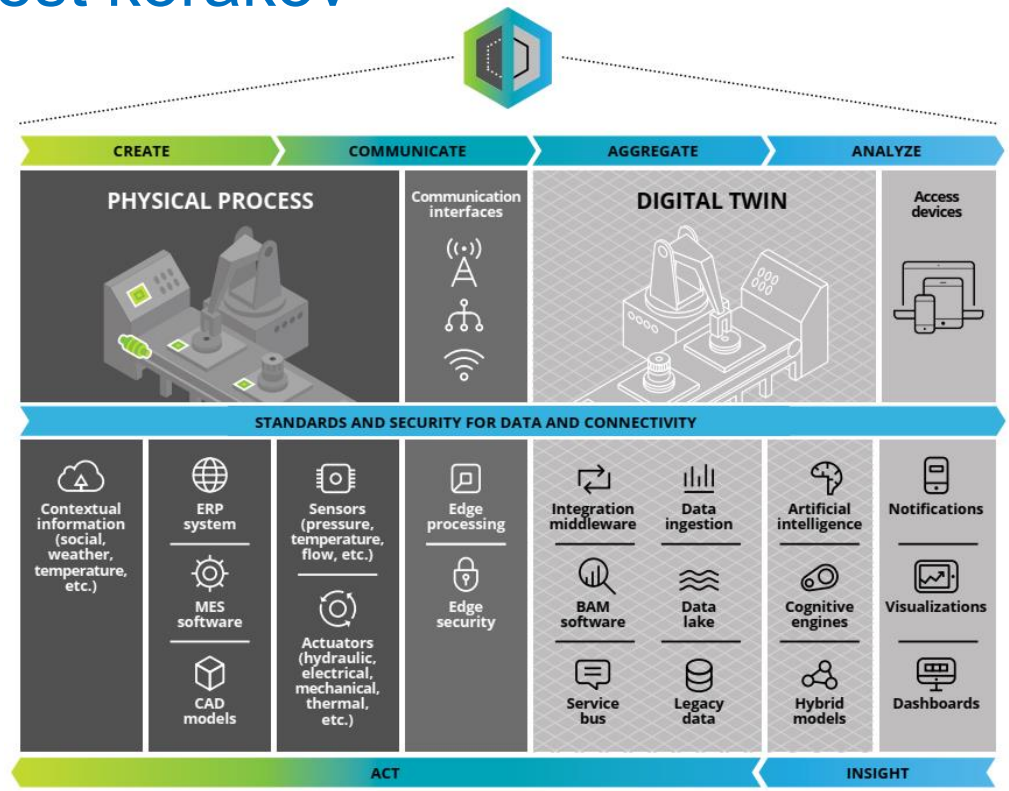


Source: Capgemini Digital Transformation Institute Analysis



Konceptualna arhitektura digitalnega dvojčka – šest korakov

1. **Create**: encompasses outfitting the physical process with myriad sensors that measure critical inputs from the physical process and its surroundings
2. **Communicate**: helps the seamless, real-time, bidirectional integration/connectivity between the physical process and the digital platform.
3. **Aggregate**: supports data ingestion into a data repository, processed and prepared for analytics. The data aggregation and processing may be done either on the premises or in the cloud
4. **Analyze**: data is analyzed and visualized
5. **Insight**: insights from the analytics are presented through dashboards with visualizations

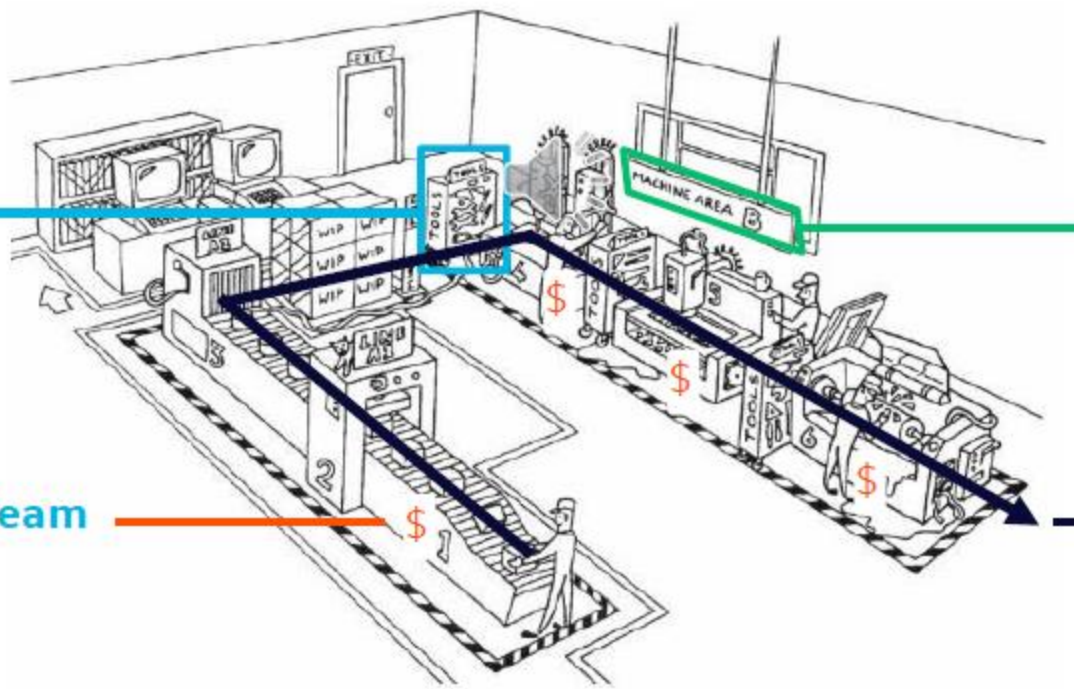


Source: Deloitte University Press.

Deloitte University Press | dupress.deloitte.com

Lean – Six principles

Simplification + Kaizen



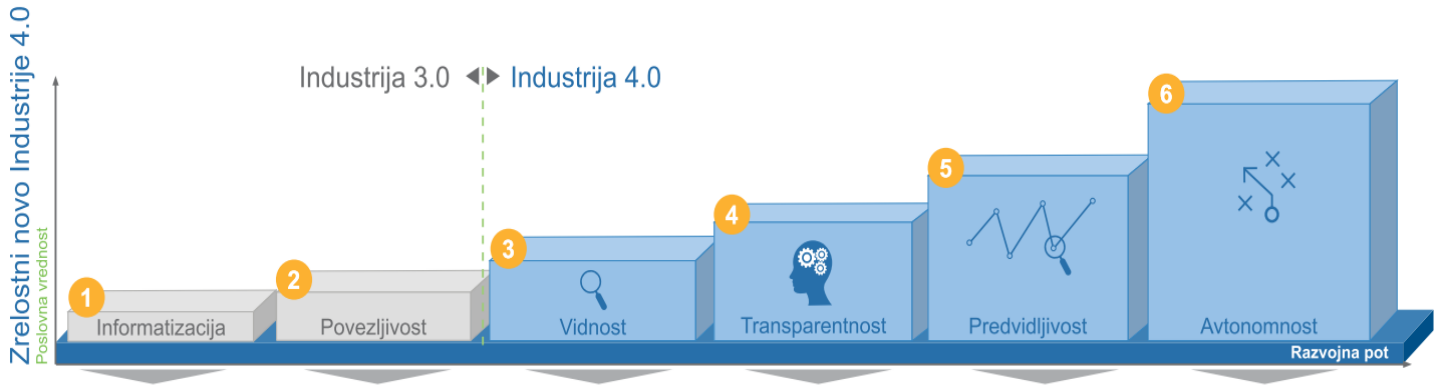
5S 5S

Visualization

Value stream

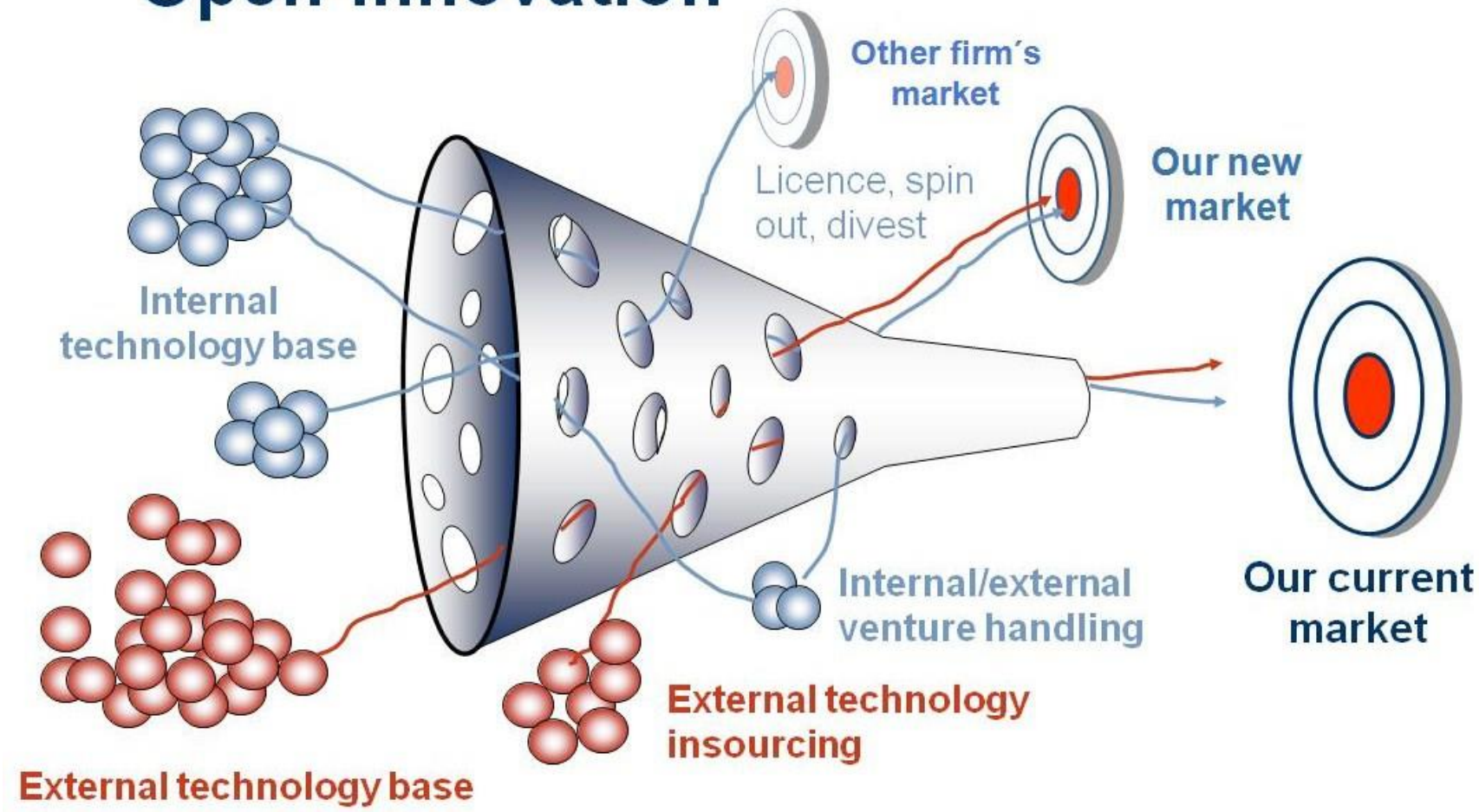
Pull /
One piece flow

Razvojne stopnje pametne tovarne



		Kaj se dogaja?	Zakaj se dogaja?	Kaj se bo zgodilo?	Kje in kako je možna avtonomnost?
Posamezne aktivnosti so podprte z informacijskim sistemom Zaposleni v večini ne izvajajo več ponavljajočih se ročnih aktivnosti	Sistemi za obdelavo podatkov so strukturirani in povezani. Vsi ključni procesi so podprti z ustreznimi IT sistemi	Podjetja, z zbiranjem podatkov v realnem času, ustvarijo z **digitalno senco** transparenten vpogled v celoten proces dodane vrednosti. Sprejemanje odločitev na podlagi zbranih informacij.	Podjetja razumejo, na podlagi zbranih preteklih in trenutnih podatkov, zakaj prihaja do določenih dogodkov. V ospredju je razumevanje celote in ustvarjanju **celovite transparente slike proizvodnega procesa v realnem času**	**Pametni podatki** s seboj vedenje o bodočih trendih. Sprejemanje odločitve na podlagi realno simuliranih scenarijev..	Avtonomni odzivi na spreminjajoče se pogoje proizvodnega okolja. Ne gre zgolj za pogoje, ki se jih je sistem naučil iz preteklih dogodkov ampak gre za **metode samostojnega agirana in prilagajanja**, ki omogočajo odzive tudi na popolnoma nove okoliščine.

Open innovation




Smart services
Condition monitoring
Predictive maintenance
Remote control
Smart machine
Online services
Remote maintenance
Circular economy
I 4.0
Smart factory
Central computer MES
Intelligent user interfaces
Virtual machines
Traceability
Smart production
Data exchange
Self-optimising
Individualisation

Gospodarska zbornica Slovenije

Zbornica elektronske in elektroindustrije

Hvala za vašo pozornost

Mag.Marko Bohar

Samostojni svetovalec

Koordinator gozda Pametne tovarne

SRIPTOP
Strateško razvojno inovacijsko partnerstvo
TOVARNE PRIHODNOSTI

T: 01 5898 121
F: 01 2302 258
M: 041 834 325
E:
marko.bohar@gzs.si