

IoTWeek

Dublin — June 20-23, 2022



Cognitive Digital Twins for Optimized Manufacturing Operations

Kostas Kalaboukas

Head of Innovation Management and New Solutions Development

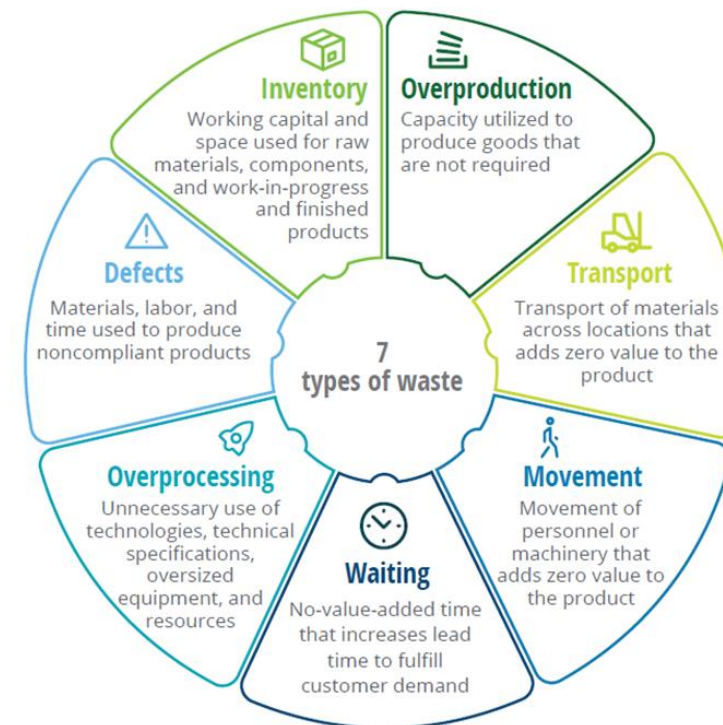
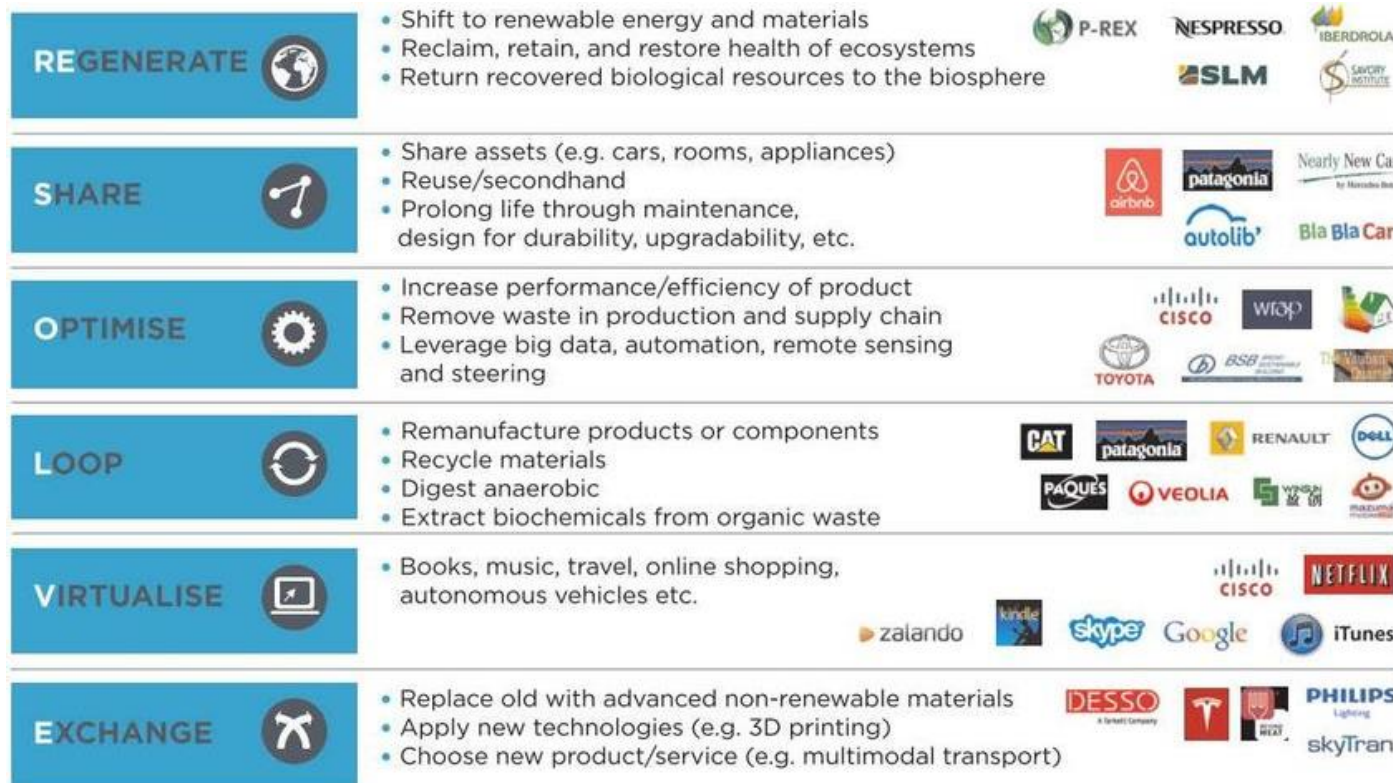
Gruppo Maggioli - Greek Branch

GLOBAL VISION:

IoT TODAY AND BEYOND

IoTForum

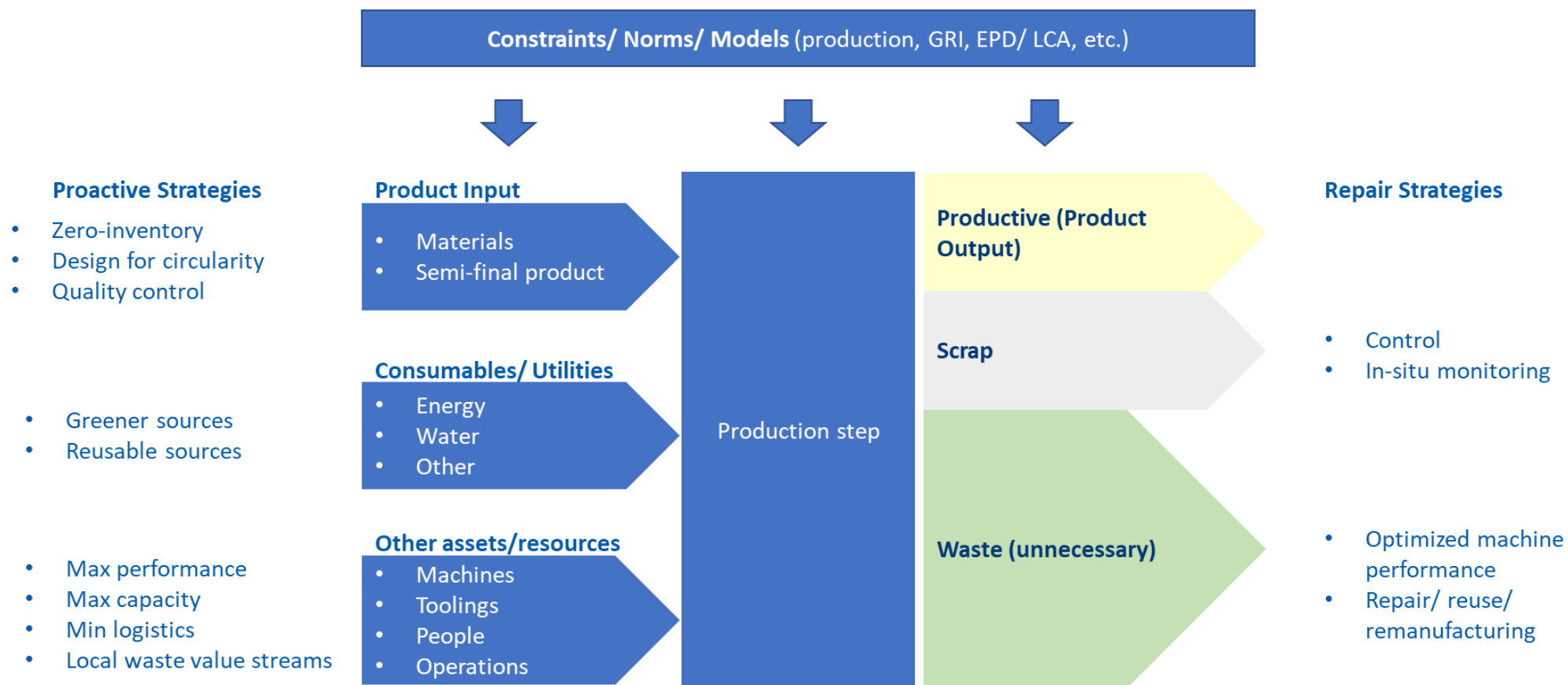
Waste reduction and treatment



- 1) McKinsey, *The circular economy: Moving from theory to practice*, 2016
- 2) Dwek, Mauricio. (2017). *Integration of material circularity in product design*.

https://www2.deloitte.com/content/dam/insights/us/articles/6515_CIR-Digital-lean-DSN/DI-Digital-lean-DSN.pdf

CDTs supporting circularity



A deployment approach to circularity

Model the
Supply Value Chain



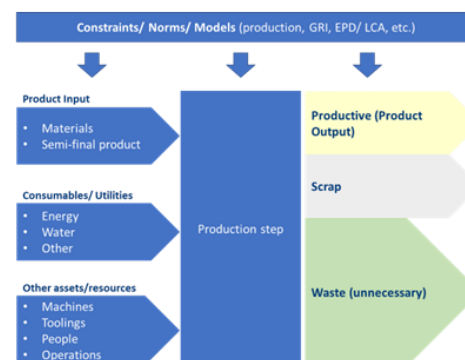
Elaborate on
manufacturing process



Define **waste/scrap**
circularity strategies



Define
Consumables/Utilities
circularity strategies



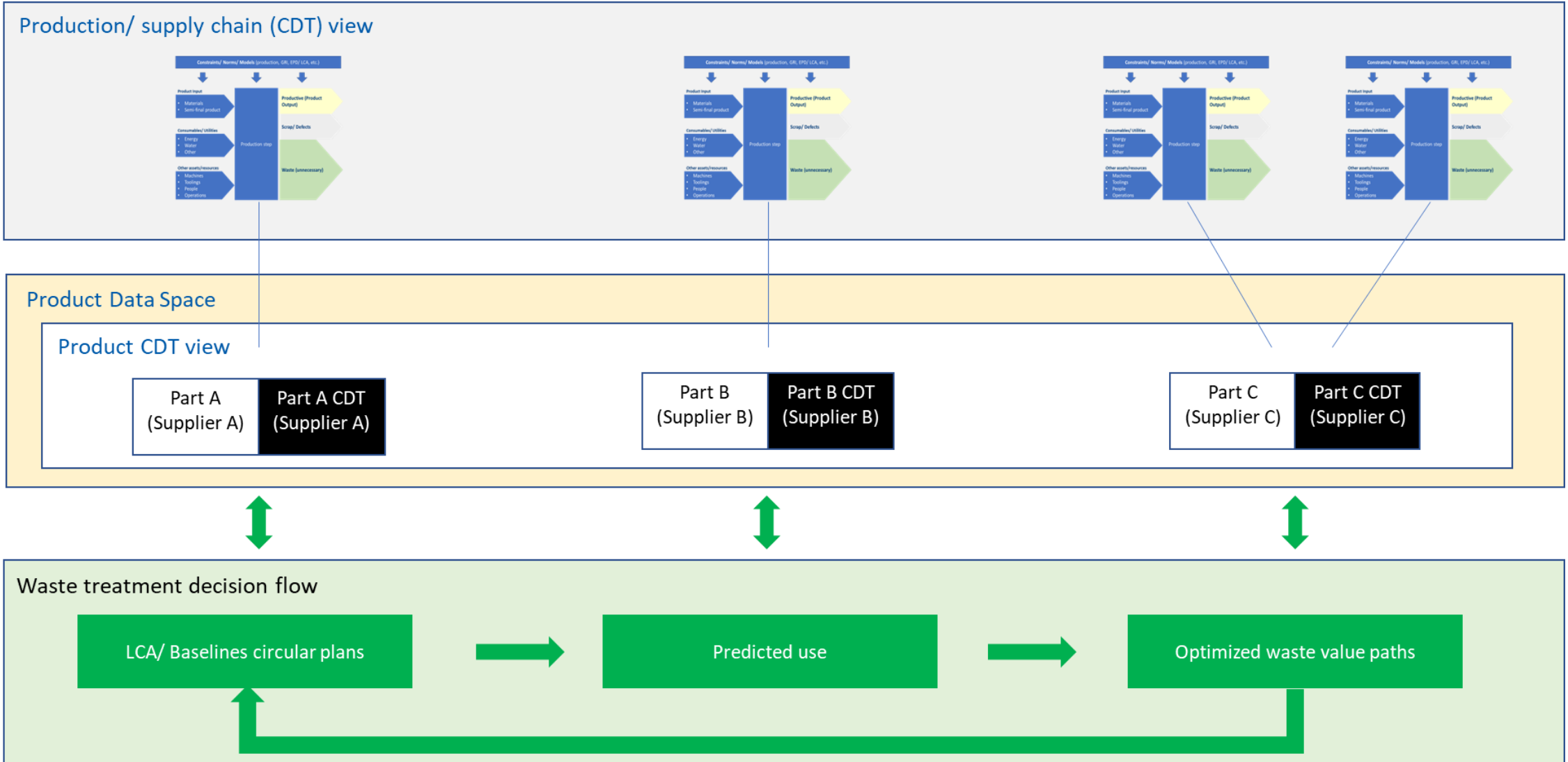
- Define stakeholders/ roles
- Define paths for scrap/waste
- Define process phases/owners for internal manufacturing
- Initial KPIs

Scrap/ Waste	Potentials for Circularity				
	Maintain	Reuse	Refurbish/ Re-manufacture	Recycle	Exchange (CbD)*
Material	X				
(semi-) Final Product				X	X
Toolings		X	X		

* CbD: Circular by Design

Scrap	Potentials for Circularity			
	RES	Energy Recovery/ reuse	Water Treatment	Share/ Reuse ...
Energy	X			
Water			X	X
Oil		X		
Other...				

Data spaces as enabler for circular supply chains



MIRA platform for digital twins

Create your **digital twin of an asset/operation** (factory, equipment, process, building)



Real-time monitoring with data from different information sources

Visualizations and views on top of the digital twin



Simulation and **predictive analytics**



What-if scenarios and **assess impact**

Optimization scenarios (scheduling, planning, etc.)

Reference cases



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Energy and Process/Production Optimization



Optimized LPG production
Location: Izmit, Turkey



Virtual Production Line and Energy Efficiency
Location: Timisoara, Romania



Optimized operation in waste-to-fuel plant
Location: Ljubljana, Slovenia



Energy-based production scheduling
(fabric factory)
Location: Piacenza, Italy

Water monitoring and reuse



Reduce water by Reuse and digital smart control
Locations: Terneuzen, Netherlands, Böhlen, Germany



Water Treatment and Re-Use within
Peroxide Production Units
Location: Livorno, Italy



Antwerp harbor and Albert canal quality monitoring
Locations: Antwerp, Belgium
Water reuse and cooling water tower process optimization
Locations: Antwerp, Belgium



Waste to fuel water reuse
Location: Ljubljana, Slovenia



Optimized Water Use in Meat Production
Location: Timisoara, Romania



Water Treatment and Re-use within Refinery
Location: Izmit, turkey



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Demo

Optimized production scheduling in spinning machine (fabric factory)

Location: Piacenza, Italy

- Digital twin of a spinning machine
- Production scheduling optimization based on energy consumption
- Focus on optimizing idle status of the machine (currently 30% energy wasted due to inefficient scheduling)





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Thank you!

Find more:

Kostas Kalaboukas

Head of Innovation Management and New Solutions Development
Maggioli S.p.A - Greek Branch

Tel: +30 210 0083 985

www.linkedin.com/in/kostas-kalaboukas-4044b7a/

Kostas.Kalaboukas@maggioli.gr

GRUPPO

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