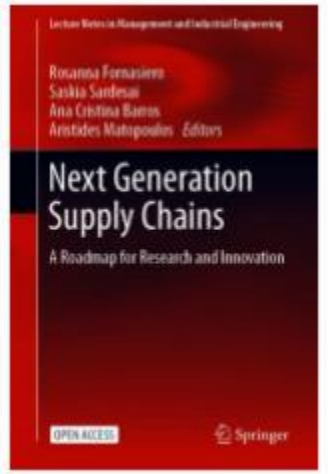
IPIC 2021 | 8th International Physical Internet Conference

IPIC 2021

Biointelligent Supply Chain



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Next Generation Supply Chains: A Roadmap for Research and Innovation

IPIC 2021 – 8th International Physical Internet Conference

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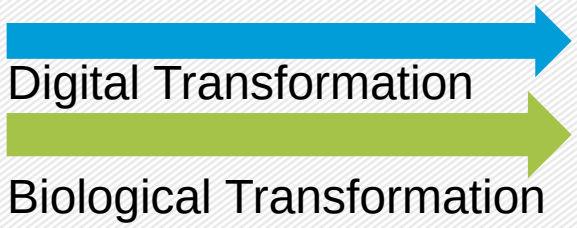
Horizon 2020
European Union funding
for Research & Innovation

Extract of trends towards biointellingence

- Different companies, especially start-ups, experiment with **bio-based production**
- Rise of do-it-yourself entities and small, innovative start ups enforce the **concept of prosumer** – each consumer acts as a provider of resources
- European Commission plans to reduce the GHG emissions by 40% in 2030[1]
- New concepts with AI technologies enable **decentral and autonomous** planning.
- New strategies to couple simulation and AI enable an **ad-hoc re-planning** of supply chain structures based on scenario management



Requirement

A re-design and re-planning of supply chains is needed that respects an ad-hoc re-allocation of resources within a multi-partner network and ensures ecological neutrality.

1 Jäger-Waldau et al., 2020, How photovoltaics can contribute to GHG emission reductions of 55% in the EU by 2030

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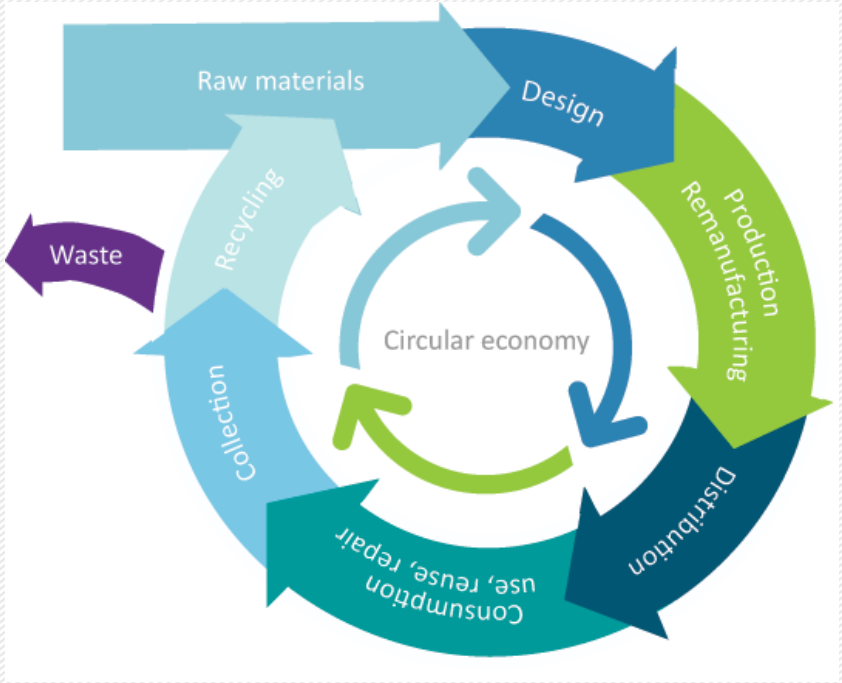
Circular Economy and Hyperconnected Supply Chains are a requirement to enable a Biointelligent Supply Chain.

Ressource Efficient / Cirular Economy



The concept of circular economy neglects essential aspects of manufacturing and industry.

Hyperconnected SC

Digitisation as an enabler, but not as a process for sustainable economy.

Biointelligent Supply Chain Strategy

- Parallel developments of circular economy practices and digital transformation.
- Concepts to mirror nature to derive further systemic solutions and technical systems to manage production and logistics.
- Ecological goal: implementation of green concepts enabling emission neutral SC processes.
- Efficiency goal: imitating concepts from nature for decentralised settings and self-configurations of the SCs.

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Challenges

- *Efficient reuse of resources*
  New concepts need to be developed.
- *Resource Management*
  The underlying concept of circular economy requires a 100% resource efficiency
- *Collaboration in a decentralised environment*
  A biointelligent integrates highly interconnected de-centralised units. This includes new actors like prosumer and companies for disaggregation or amendment of products.
- *Flexible, highly agile SC*
  Request for production-on-demand requires a highly flexible and agile SC.
- *Technological Integration for seamless connections*
  Real-time communication, interoperability between devices and IoT systems, communication between autonomous devices require a respective technological architechture.

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Research and innovation topics for Biointelligent Supply Chain

RIT_BIOSC.1: Organisational change towards a ***new taxonomy*** for biointelligent SCs

RIT_BIOSC.2: Nature inspired ***symbiotic*** SC models

RIT_BIOSC.3: ***Ecosystem*** for biointelligent SC

RIT_BIOSC.4: New SC processes to realise biointelligent SC paradigms

RIT_BIOSC.5: Coordination and decision making within biointelligent SCs

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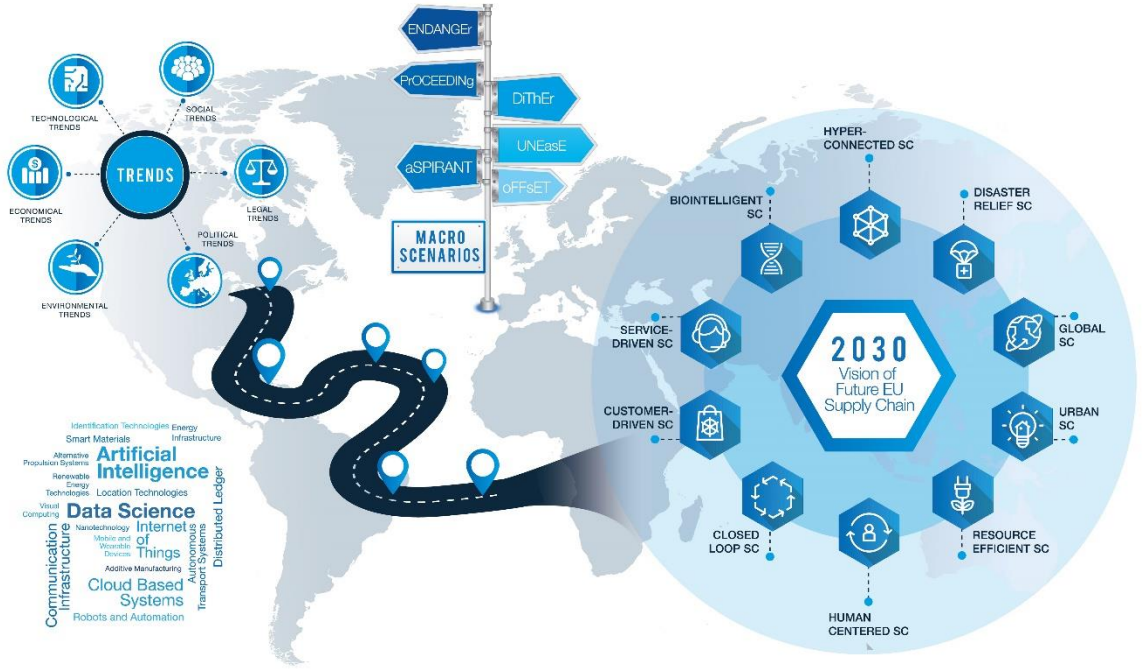

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Next Generation Technologies for Networked Europe

Thank you

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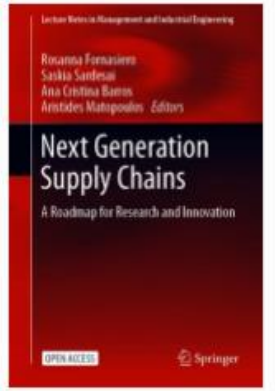

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