



IPIIC 2021 | 8th International Physical Internet Conference

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Next Generation Supply Chains: a roadmap for research and innovation

 nextnet

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Next Generation Supply Chains: A Roadmap for Research and Innovation

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Horizon 2020
European Union funding
for Research & Innovation

Where to take Supply chain ?



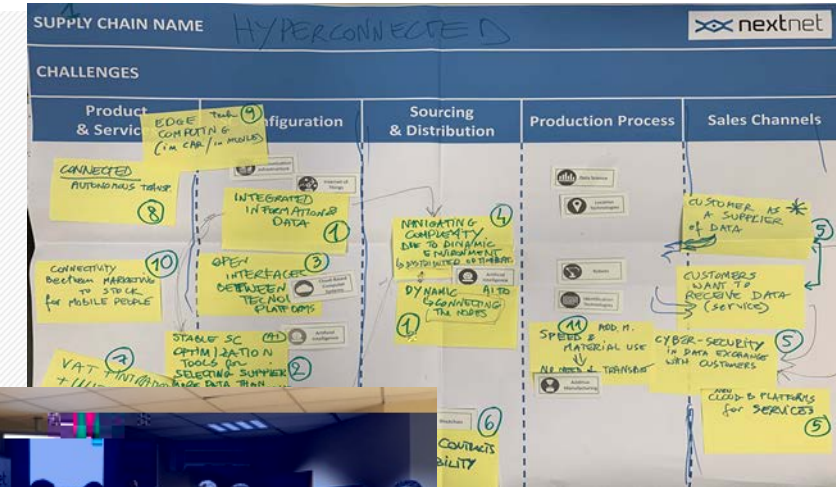
PARTICIPANT ORGANIZATION
CNR-STIIMA (Coordinator)
PNO Innovation
Zaragoza Logistics Center
Fraunhofer -IML
INESC TEC
Aston University

Methods and tools

- PESTLE analysis
- Desk research
- Future scenario generation
- Cross-impact matrix
- Technology scouting and assessment
- Technology roadmapping
- Workshops and Focus groups
- Online surveys
- Consultation
- Direct interviews
- ...

Numbers:

- More than 300 papers analysed
- Consultation with more 100 experts
- More than 10 EU workshops
- More than 150 consultation forms collected
- 20 case studies



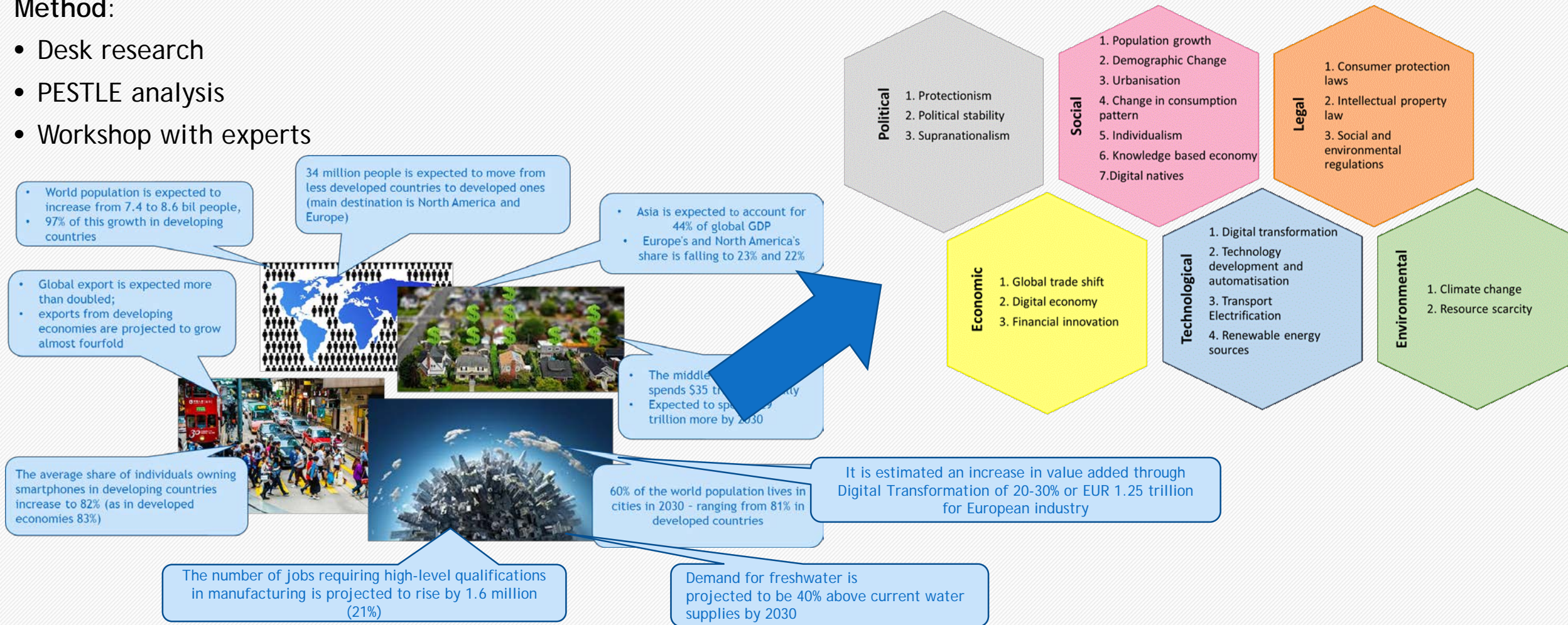
Consultation with Experts is Open, lets participate and help NEXTNET project to define the Supply Chain of the Future

Participate in the Consultation

1 Mapping Trends and Megatrends

Method:

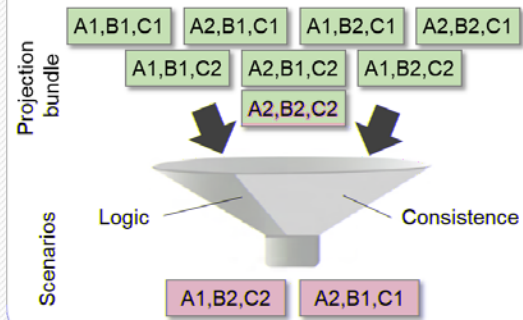
- Desk research
- PESTLE analysis
- Workshop with experts



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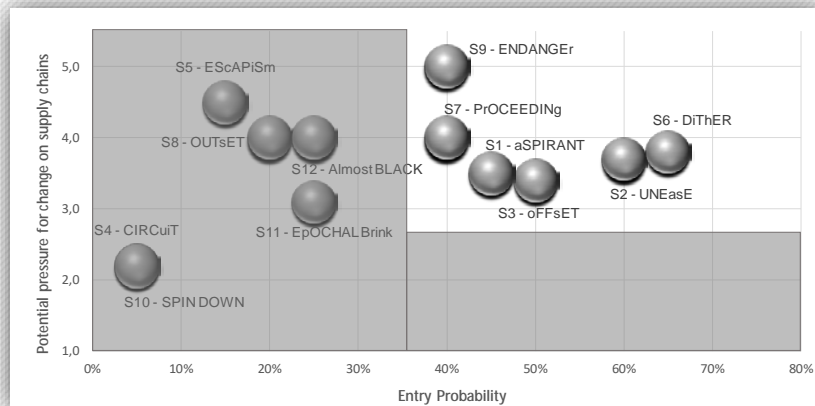
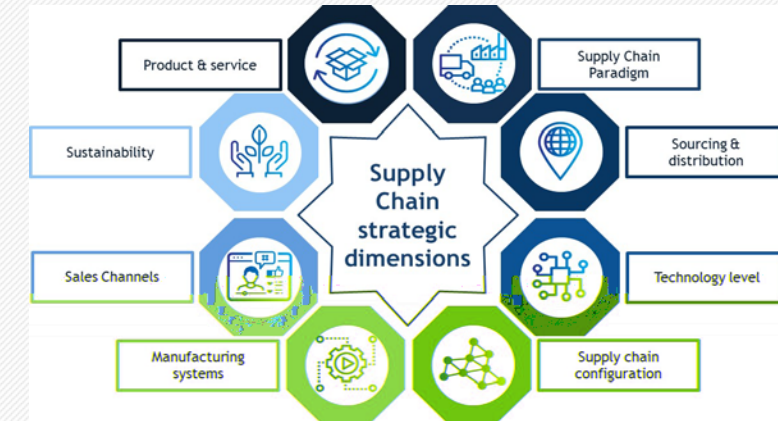
Future scenario generation

Descriptors	Projections	
A: Trade Policies	A1: Protectionism	A2: Free Trade
B: Capability to be innovative	B1: High capacity	B2: Only few new ideas
C: Digital Economy	C1: Digital Transformation	C2: Digital Impediment



- Political concord in EU; widespread free trade; stable alliances
- US and EU as global trade leaders; digital platform economics; tech-giants dominate financial sector; globalised companies benefit
- Sustainable consumer behaviour; social balance; adjusted labour market; living in smart regions
- Digitalisation, Industry 4.0 and „green systems“ far advanced; predominantly large enterprises push disruptive developments
- Legislative keeps pace with technological development
- Climate protection successful; resource wastage curbed

Scenario 1



- Constant development in EU; free trade; instable alliances
- Asia drives economic development; global companies act local; tech-giants dominate financial sector
- Social balance; adjusted labour market; „much-and-cheap“ consumption influenced by social media; living in smart cities
- Digital transformation is slowing down due to cost and retention; autonomous systems are only occasionally successful; coexistence of conventional systems; further efforts for electrification and alternative energies
- Legislation falls behind technological development; heterogeneous regulations and low levels of trust in data privacy and market regulation
- Climate protection targets are not achieved; strong pollution; scarcity of resources

Scenario 2

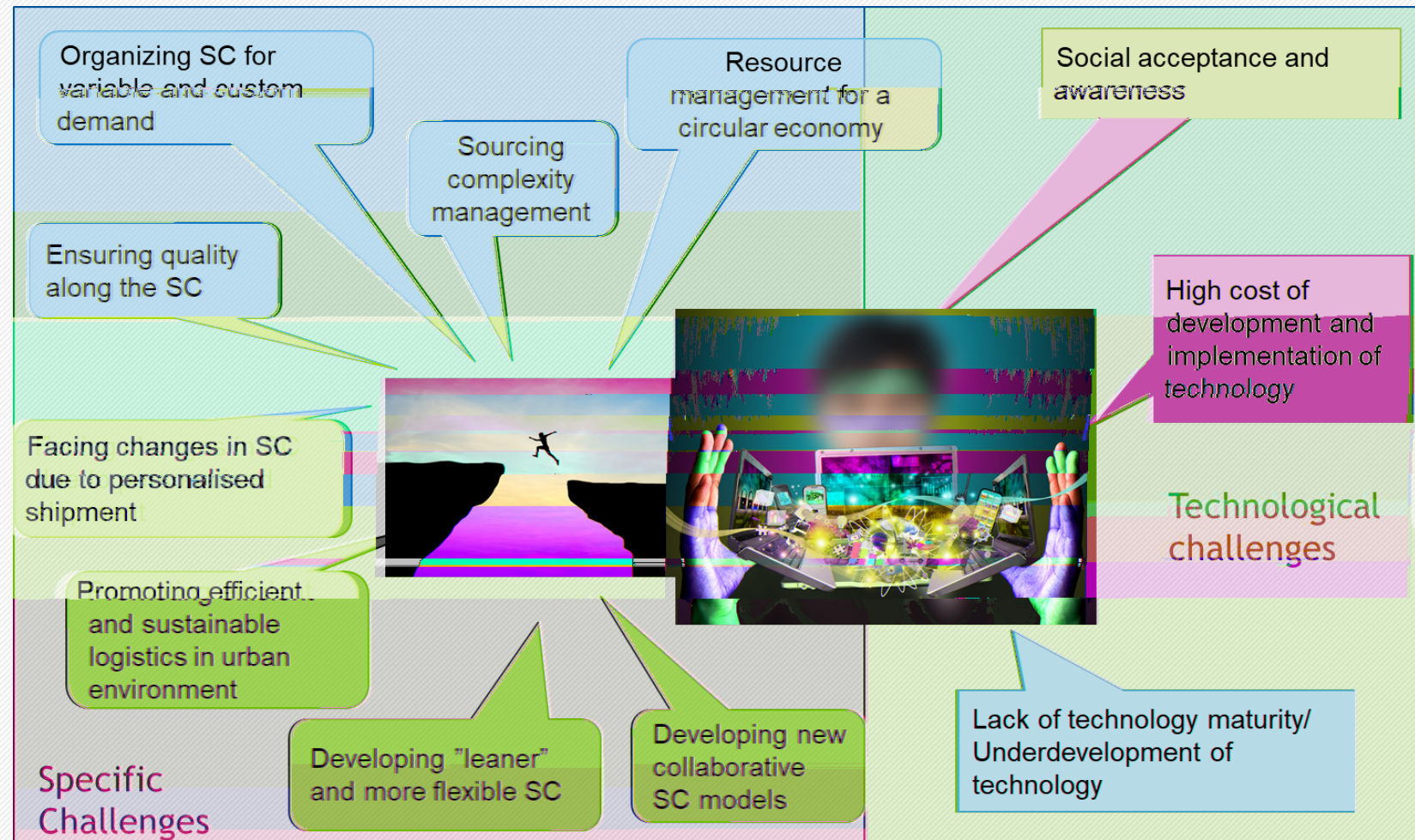
3 Specific Challenges for Supply Chain

Method:

- Desk research
- Workshop with texperts

Results:

- Supply Chain Challenges
- Technological Challenges



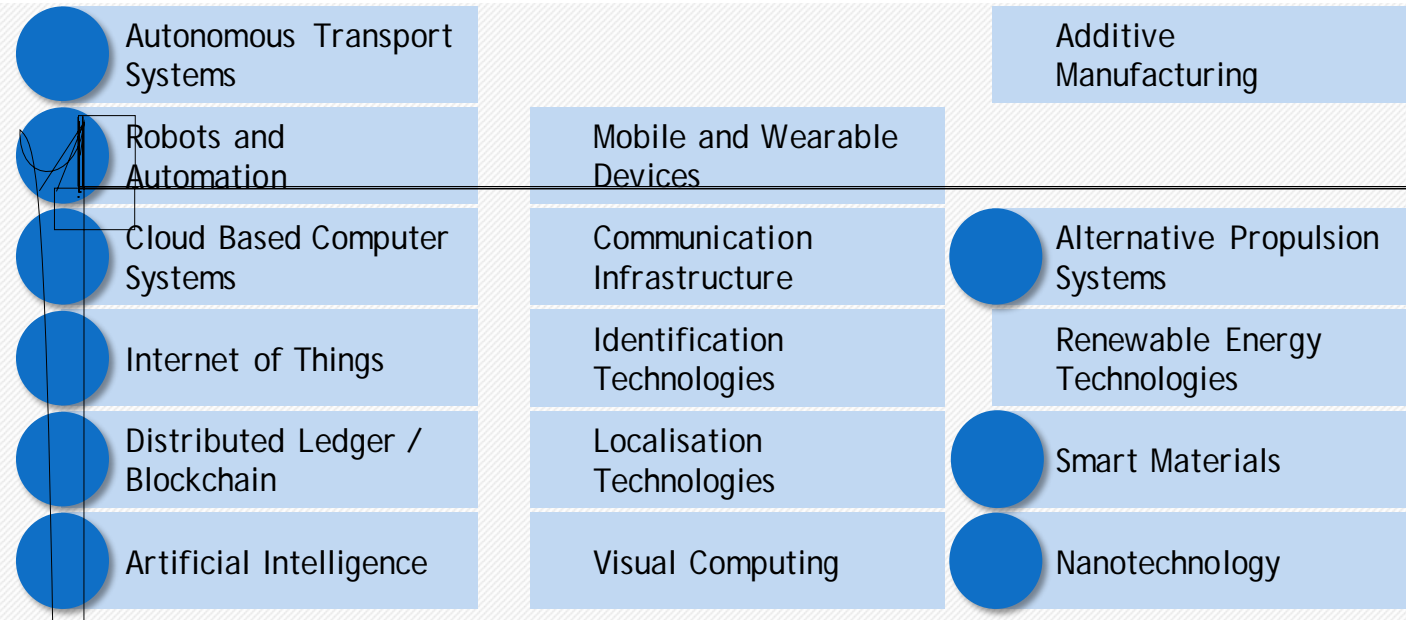
Mapping Enabling Technologies

Method:

- Technology scouting and evaluation of:
 - TRL
 - Industrial Applicability Scoring
 - Implications on Supply Chain Performance
 - Technological Gaps
 - Implementation challenges

Results:

- Map of Enablig technologies
- Assessment of technologies within industrial sectors



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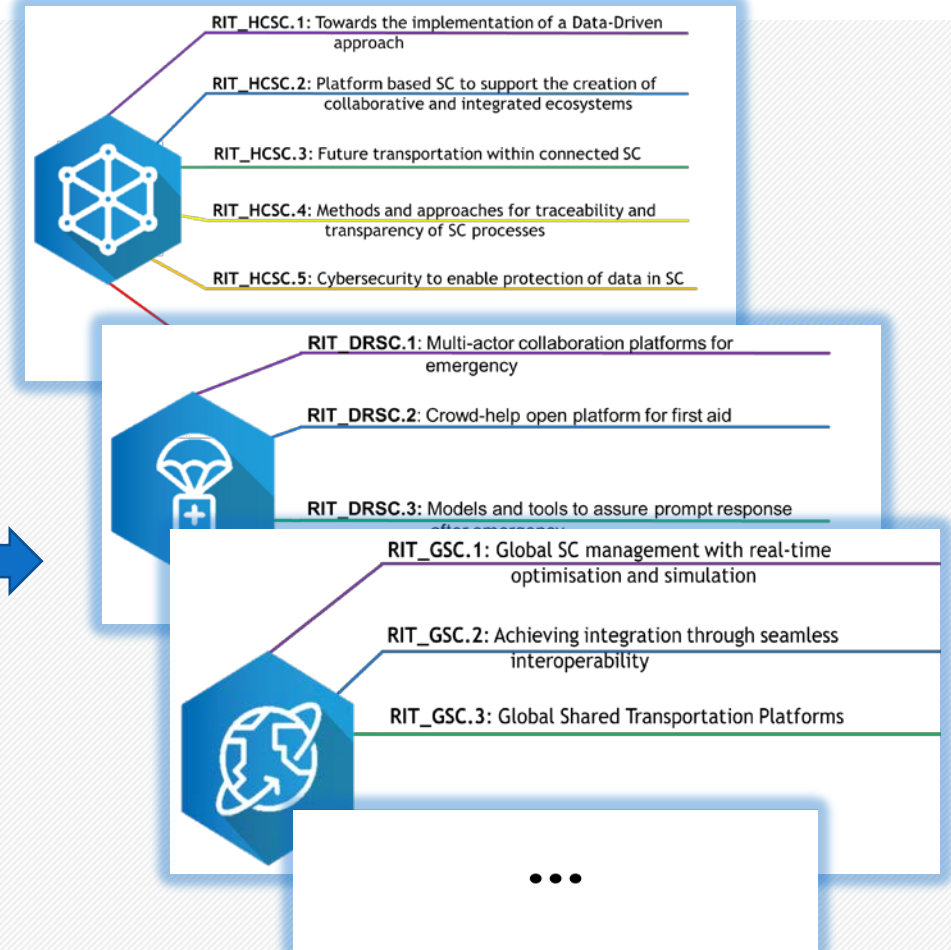
Development of research and innovation topics

Trends and Scenarios



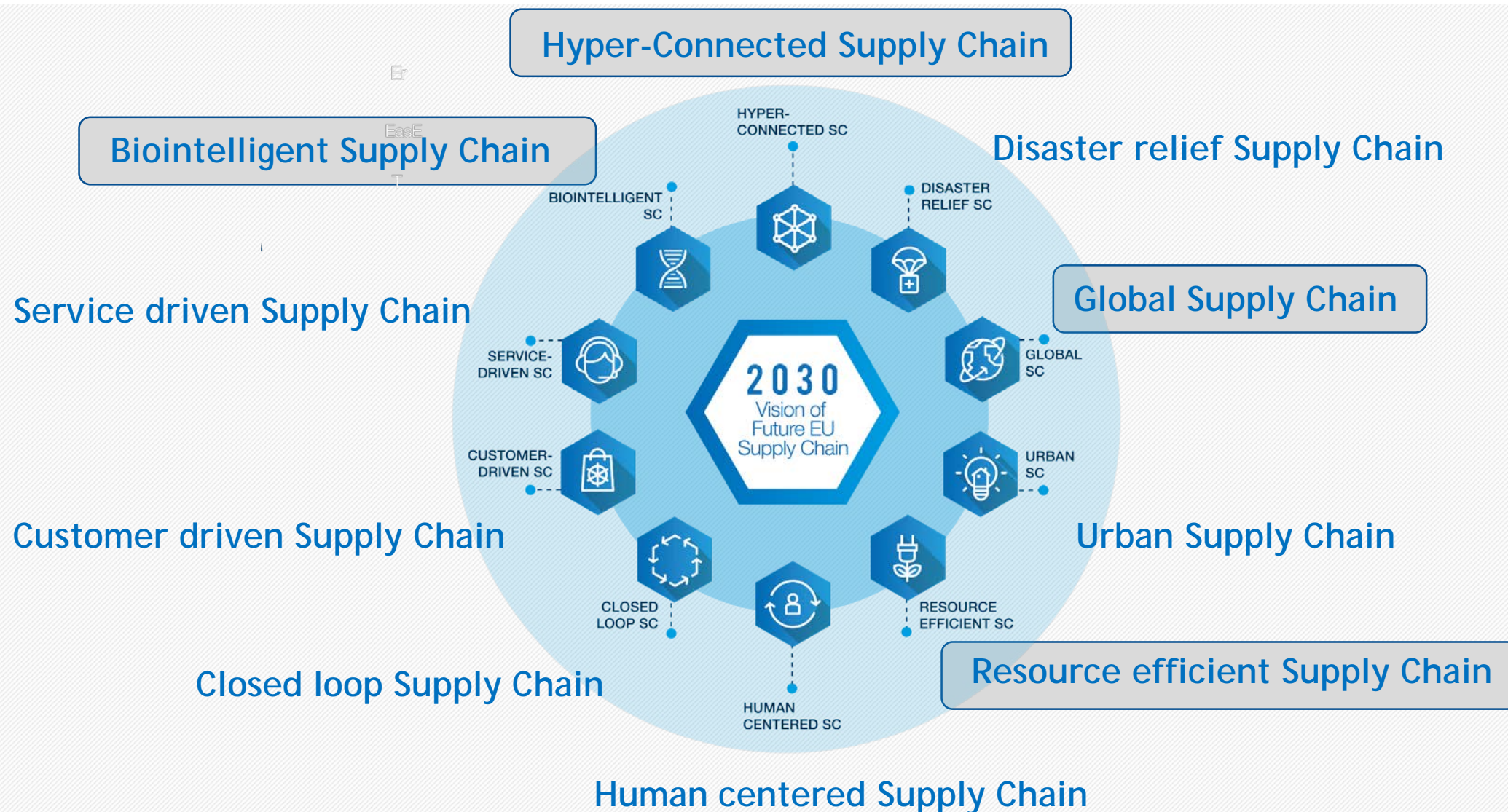
Enabling technologies

Supply chain
Strategies



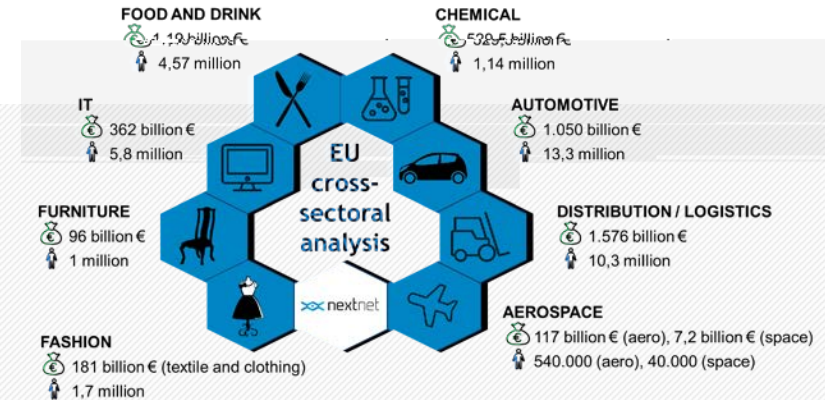
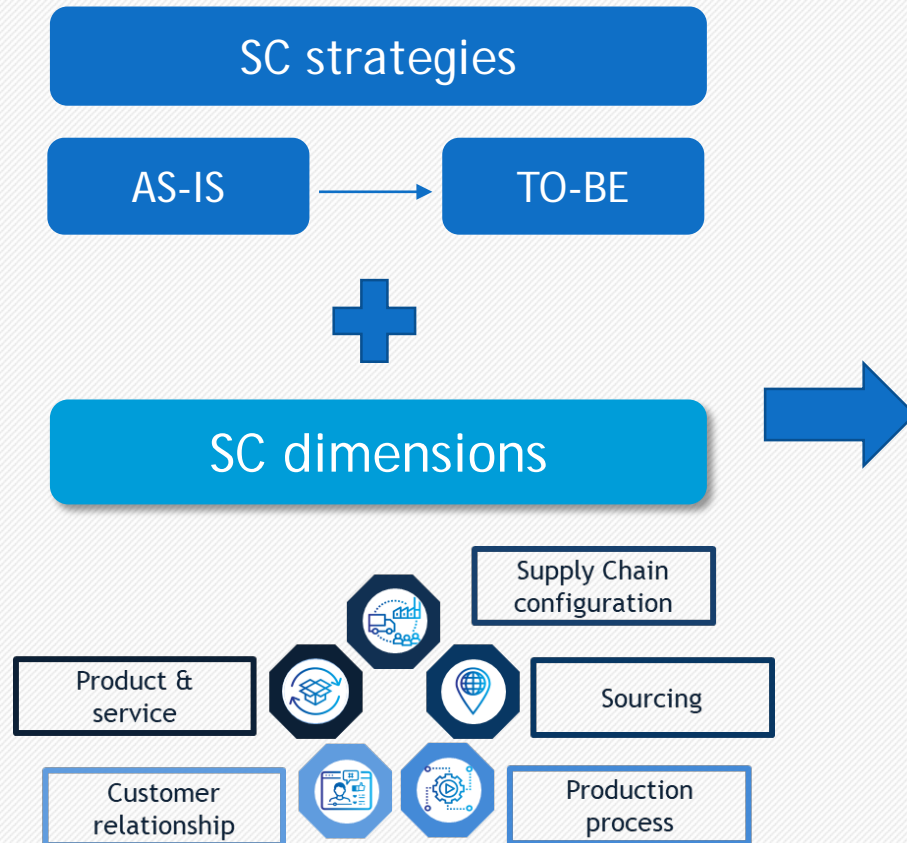
Research and innovation topics

6 Strategic research and innovation agenda



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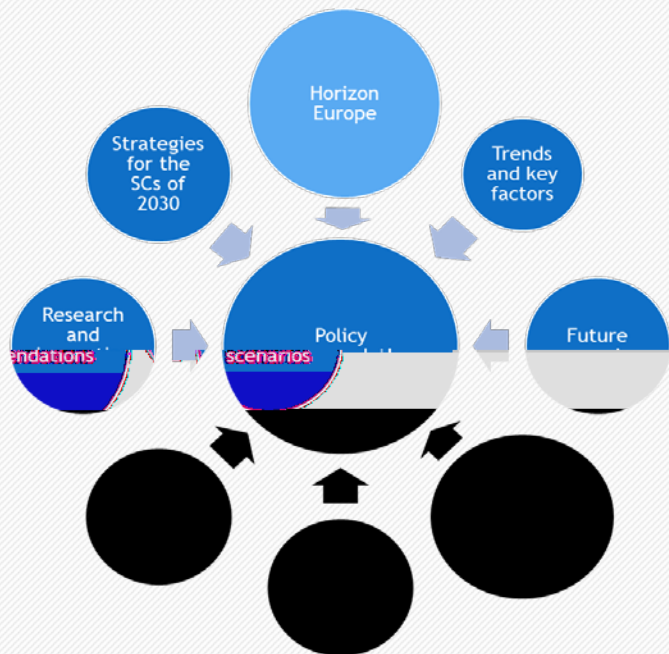
Cross-case analysis on European SCs



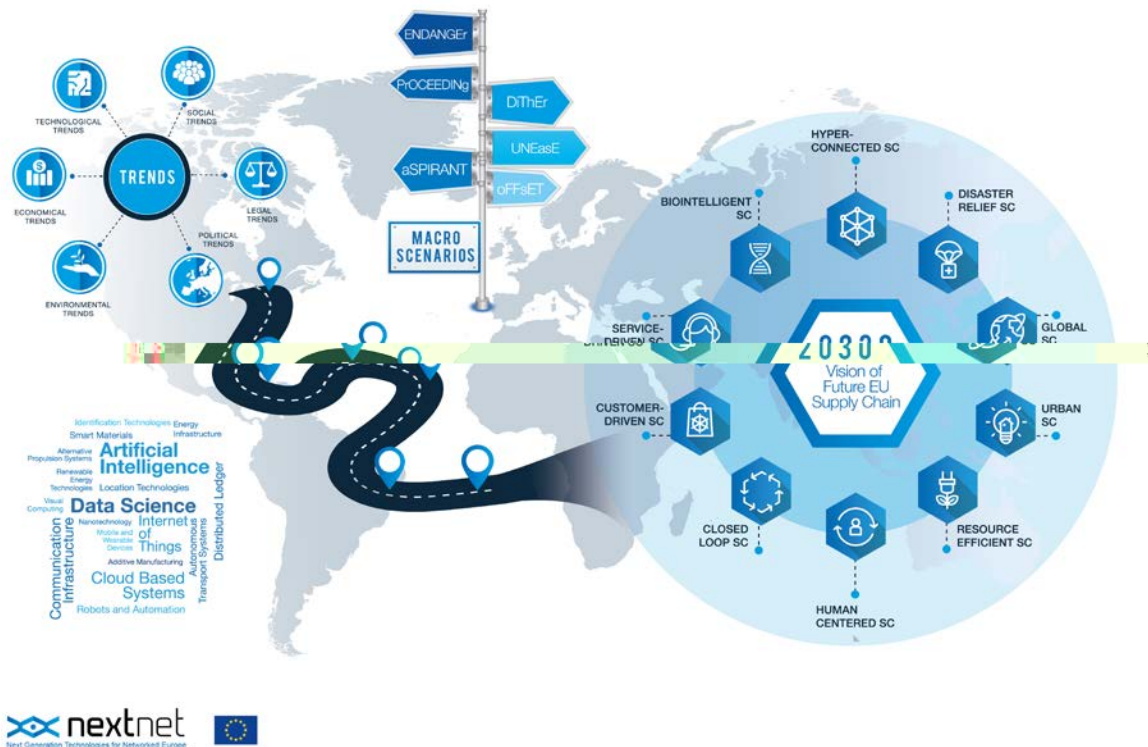
PRACTICES of European Supply Chains

PRODUCTS AND SERVICES		
Defining products and services portfolio	<ul style="list-style-type: none"> High diversity / wide assortment in product / service portfolio On-demand 	
Outlining value chain and strategy	<ul style="list-style-type: none"> Focus on single products and markets Strategies and products or markets 	
Digitalization in products and services	Introduction of new technologies or new materials -> smart products or services	
Sustainability in products and services	Products/services environment circular economy	
Processes supporting products and services development	<ul style="list-style-type: none"> Scan of global trends and market opportunities Continuous investment in process innovation and development 	
SOURCING		
Supplier selection and evaluation	Supplier rating and selection based on several KPIs	
Defining kind of relationship with suppliers	<ul style="list-style-type: none"> Different kinds of relationship sourcing strategies Long-term partnership with suppliers Co-creation of products and services with suppliers Vertical integration: own production with them 	
Digitalization in sourcing	Real-time data sharing, monitoring and supporting integration in production	
Cultivating relationships with suppliers according to specific priority areas	<ul style="list-style-type: none"> Strict supplier audit / certification (sustainability) / certification Supplier award 	
PRODUCTION PROCESS		
Design of production lines	<ul style="list-style-type: none"> Co-development of production technologies with providers Full customization of production lines for product category 	
Digitalization in production processes	<ul style="list-style-type: none"> (Full) automation of production lines Automation limited to some production lines / phases Real time data exchange between machines and informative systems to monitor the shop floor Partially digitalized data collection from shop floor for monitoring 	
Sustainability and efficiency in production processes	<ul style="list-style-type: none"> Sustainability practices in production (wastes, renewable energies) Lean manufacturing / just-in-time 	
Cultivating excellence in operations according to specific priority areas	<ul style="list-style-type: none"> Investments in both training and technologies for operational excellence Integration of production and logistics operations for scale advantages Pursuing trade-off between flexibility and full-capacity utilisation 	
SC CONFIGURATION		
Defining kind of relationship with distributors / logistics providers	Long-term relationships with wholesalers and / or transportation companies	
Digitalization in SC configuration	<ul style="list-style-type: none"> Automation of warehouses logistics and internal transportation Integration (informative / digital management systems) for real-time data sharing in outbound logistics 	

6 Policy recommendations



Policy Recommendation Topics		Policy Briefs	
1	Assuring appropriate standards and legislation for European SCs of the future	1.1	Fostering harmonisation of legislation and standards on European SCs
		1.2	Facilitating and boosting multimodal transportation
		1.3	Disseminating standards among European SC stakeholders
2	Educating and training professionals for the future SCs	2.1	Developing the workforce for the SCs of the future
3	Drafting of international agreements aiming at future European SCs	3.1	Implementing calls for bi- and multi-lateral agreements considering an overall SC perspective
		3.2	International Agreements for advancements and dissemination of SC-related topics in R&D networks
4	Supporting and fostering incentives and funding schemes	4.1	Enhancing collaboration based on European Projects results: creation of a platform for data repository
		4.2	Prize creation to support and spread best practices in the SC
		4.3	Creating synergies between public and private sectors in funding
5	Promoting reference bodies for European SCs	5.1	Creating a European SC knowledge hub for sustainable, resilient and inclusive SCs
6	Establishing infrastructure for fostering of future European SCs	6.1	Upgrading infrastructures for low-emission supply chains
		6.2	Promoting 5G and autonomous vehicles (AVs) to improve urban supply chains



Thank you



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