Business Models for Flexible and Sustainable Manufacturing

- Reference of the call: SPIRE-06-2016
- Start/end date: 1/09/2016 – 31/08/2018
- Partners:
Objectives

INPIRE analyses how business models in the process industry may change in the upcoming decennia, as a result of several trends:

• **Technological innovations** (such as process intensification, 3D printing, biotech etc.)
• Increased **customer orientation** of the process industry
• Need to increase **resource efficiency** through recycling and industrial symbiosis
Project Case Study

1. The EU/ SPIRE needs

Global competitiveness of the European process industry by:
- increased flexibility
- resource efficient production
- sustainable solutions
- secure local (EU) sourcing

2. The Project Solution

4-5 new Business Models for the manufacturing industry, based on emerging innovations that:
1. Dramatically increase flexibility in production
2. Enable full circularity
3. Attract or retain process industries in Europe

3. Value to Customers

- More flexible value chains (e.g. containerized movable production)
- Increased customization of products (e.g. 3D printing of process equipment)
- Fully circular production (e.g. industrial symbiosis)
- Local raw material sourcing and security (e.g. recycling of critical raw materials, local feedstock sources)

4. How will this happen?

Promote and replicate the new Business Models to multiple EU industries to:
- > 50 industrial parks
- > 100s of related stakeholders
Workplan

WP1: Stakeholder Community and case studies
- 20-30 case studies: Emerging more flexible supply chains
- Interviews: Medium and long term trends, drivers and (perceived) bottlenecks

WP2: Flexibility enabling technologies and their impact
- 30-15 enabling technologies: select from modularity, process intensification, equipment, ICT, recycling based on case studies
- Impact analyses: impact on types of flexibility, business value, sustainability, critical success factors on specific case studies

WP3: Supply Chain reconfiguration and Business Models
- Supply Chain configurations: Based on trends, and impact re-design supply chain configurations (flaxes, roles, geographical constraints)
- 4-5 main business model types: Describe business models changes in business canvas and map on business model literature (4-5 types and descriptions e.g. rigid, modular etc)
- 4-5 End-user validation Workshops: Present and validate new supply chain configurations, their business model descriptions and impacts on flexibility, business value, sustainability, critical success factors. Involve relevant stakeholders from case studies

WP4: Future scenarios, research needs and impact tool
- Forecasting and research needs: roadmapping (in time) of bottlenecks and related research needs from 4-5 new supply chain configurations and business models
- Impact matrix and tool: develop practical tool for users (industries, parks) to 1) assess potentially relevant future business model, 2) understand impact on flexibility, business value, sustainability, critical success factors and location design

WP5: Dissemination & Exploitation
- Trends & first outline of impact on supply chains
- 4-5 new supply chain configurations and business model descriptions
- Research roadmap
- Impact matrix and tool

July 2017
November 2017
August 2018
### Relevant for INSPIRE:
- BM innovation
- Impact on (de)localization
- Flex & sustainability
- Process industry
- Replicability

### Some 1st results
From 100 -> 24 Cases

1st scoring on 10 criteria

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<thead>
<tr>
<th>N°</th>
<th>Business Cases used to evaluate</th>
<th>BM archetype</th>
<th>Technology driven</th>
<th>Impact on Supply Chain</th>
<th>Impact on Business Model</th>
<th>Delocalisation relevance</th>
<th>Discrete manufacturing linked with Process industry</th>
<th>Customisation</th>
<th>Flexibility relevance</th>
<th>Sustainability relevance</th>
<th>Potential to upscale, replicability</th>
<th>Spire relevance</th>
<th>TOTAL SCORE</th>
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24 selected relevant cases, in 9 clusters

- Mass customisation of consumer goods
- Process industry to customise small scale batches
- CRM recycling
- Bio-based materials
- Re-use and Local sourcing / pre-treatment of waste
- Chemical leasing
- Remote process control of decentralised production = ICT driven
- Local modular / containerised prod.
- Decentralised production - industrial symbiosis

#### Criteria
- N° Business Cases used to evaluate
- Technology driven
- Impact on Supply Chain
- Impact on Business Model
- Delocalisation relevance
- Discrete manufacturing linked with Process industry
- Customisation
- Flexibility relevance
- Sustainability relevance
- Potential to upscale, replicability
- Spire relevance
- TOTAL SCORE
Expected sustainability impacts of INSPiRE

Five macro forces that impact business models in the production chain

1. Modularise the Value Chain
   - Digitalise all
   - Less waste and CO2 impact through Industrial Symbiosis and re-use

2. Digital Manufacturing (3D printing)
   - Core functions
   - Close the material loop through Extended Producer Responsibility

3. Customise (faster)
   - Better serving clients (including eco-design and production)

4. Servitise Value Chain functions

5. Resource Optimise (use & reuse)
   - More efficient production (less resources) by process intensification + Less transport by local sourcing
4 Business Model Archetypes

1. **Decentralised or modular production** covers industries that decentralize their manufacturing and split their production processes into various locations or regions.

2. **(Mass) customisation** combines the personalization and flexibility of custom-made business manufacturing with the traditional principles of mass production;

3. **Servitisation of the process industry** considers deliver functionality, rather than ownership;

4. **Reuse and sustainability** focusses on mechanism for a more sustainable and competitive industry through improvements in resource and energy efficiency;
What outputs or learning from INSPIRE have value for other SPIRE projects

- **Deliverable D3.2 Innovative business models**: detailed descriptions of 4 – 5 future business models, and their impacts on supply chain configuration + flexibility

- **Deliverable D4.2 implementation of Business models in Future Scenarios**: description of bottlenecks and challenges to implement the new Business models

- **Deliverable D4.3 Research needs Roadmap**: description of research needs to deploy the new Business Models

- **Deliverable D4.4 Guideline for Business models Selection**

Input for SPIRE projects

- business plans
- exploitation strategies
- research agenda’s
- Tool for Industrial Parks and industries
Making the European Process Industry the most flexible and agile sustainable production system in the world delivering on-demand the most advanced high-tech materials as the backbone for this society
Contact

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