Manufacturing sector map at transnational level

A multilevel description of FoF competences and technologies along manufacturing value chain and main innovation actors in AS region.

BIFOCAlps’ main objective is to increase collaboration and synergies among the main actors of the Alpine Space region for a sustainable, smart and competitive development of the manufacturing value chain towards the FoF.
Methodology steps

- Definition of FoF manufacturing framework
- Survey of FoF practices along manufacturing supply chain
- Manufacturing sector maps

Definition of FoF manufacturing framework
Analysis of local initiatives for the implementation of the FoF in the AS

Analysis of Smart Specialization Strategies

Regions
- Baden Württemberg
- Bavaria

Specialization areas
- Baden Württemberg: automotive electronic, engine electronic and software, advanced communication and navigation systems
- Bavaria: Additive manufacturing, Augmented reality

Priority themes
- Baden Württemberg: satellites for scientific missions, earth observation systems, electro mobility, autonomous driving
- Bavaria: Micro-mechatronics, Adaptronics, automatization robotisation of production

Enabling technologies
- Baden Württemberg: automotive electronic, engine electronic and software, advanced communication and navigation systems
- Bavaria: Additive manufacturing, Augmented reality
Survey on FoF practices

**Aims**
- Investigate the current state of awareness and adoption of Factory of the Future (FoF) solutions in the manufacturing companies of the Alpine Space region
- Highlight main strategic, organisational, managerial and technological issues linked to FoF in the manufacturing environment
- Build national manufacturing sector maps (Austria, France, Germany, Italy, Slovenia) and transnational manufacturing map

**Structure**

<table>
<thead>
<tr>
<th>COMPANY</th>
<th>STRATEGY</th>
<th>ORGANIZATION</th>
<th>MANAGEMENT</th>
<th>TECHNOLOGY</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUPPLY CHAIN</td>
<td>Readiness</td>
<td>Organizational culture</td>
<td>Supply chain</td>
<td>Readiness</td>
</tr>
<tr>
<td>MANUFACTURING SECTOR</td>
<td>Technology use level</td>
<td>Human Resources</td>
<td>Customer Operations</td>
<td>Enablers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Man-Machine relationship</td>
<td></td>
<td>Weaknesses</td>
</tr>
</tbody>
</table>

**Examples**

**STRATEGY**
Which statement is valid for your company’s strategy towards FoF?

- We have clear business goals set with KPIs: 31.1%
- We have an overall FoF strategy in place: 24.4%
- We have a clear roadmap for implementing FoF: 12.2%
- We have assigned clear responsibilities for FoF: 7.8%
- We have not a strategy yet: 24.4%

**ORGANIZATION**
How would you classify your company’s organisational structure?

- Highly centralized: 45.0%
- Highly decentralized: 17.9%
- Somewhat decentralized: 13.1%
- Collaborative: 13.1%
- Do not know: 15.5%

**MANAGEMENT**
Which new players are you planning to introduce in your SC in the next 5 years?

- Suppliers of automation systems: 50.5%
- Suppliers of specialised SW and systems for adv. manufacturing planning and execution: 61.0%
- Suppliers of connectivity: 31.5%
- Suppliers of data storage and management: 49.0%
- Suppliers of cyber security products: 26.0%

**TECHNOLOGY**
Do you think your company’s actual IT infrastructure is appropriate for the switch to Factory of the Future?

- We have appropriate HW: 39.3%
- We have appropriate SW: 13.1%
- We have appropriate network infrastructure: 13.1%
- We have appropriate metaware: 15.5%
- We lack any appropriate IT infrastructure: 17.9%

- We have an appropriate IT infrastructure: 39.3%
Manufacturing sector maps in AS
- Manufacturing sector maps at national level
1 map per country with data from FoF Framework analysis, survey results and other main sources

ITALY

Company organisation:
Now: highly centralised
In 3-5 years: collaborative

Survey results

Most important skills:
Problem solving
Ability to collaborate
Computer based

MECHANICAL ENGINEERING
- 306,000 employees, 55,000 engineers
- 6 billion Euro sales
- 70 universities and almost 100 research institutes, Allianz Industrie 4.0 initiative
- Main challenge: globalise enterprises

AUTOMOTIVE INDUSTRY
- 219,000 employees, 113 billion Euro turnover
- Global players: Daimler, Porsche and Bosch
- 8 billion Euro annual investment in R&D
- Excellent research institutes (Fraunhofer Inst.)
- Cluster Automotive
- Main challenge: electromobility and lightweight design

MEDICAL TECHNOLOGY
- 46,000 employees, 11.7 billion Euro turnover
- Global players: Roche, Boehringer Ingelheim and Aesculap
- Cluster MedizinTechnik
- Great innovative power, excellent research institutes (Fraunhofer Inst.)

National level initiatives:
National Industry 4.0 Plan
- Public investment of about 20 billion euros
- Super and hyper amortisation of 140% and 250%
- 50% tax credit on R&D investments
Incentives on investments in start-ups and innovative small businesses

Research & Innovation Roadmap
- Systems for personalised production
- Strategies, methods and tools for industrial sustainability
- Factories for humans
- High-efficiency production systems
- Innovative production processes
- Evolutionary and adaptive production systems
- Strategies and management for next-generation production systems
Supply chain in 5 yrs:
59% Suppliers of specialized SW
and system for Advanced Manufacturing
43% Suppliers of automation systems

Company FoF strategy:
29.7% have not a strategy yet
24.3% have a clear roadmap
24.3% have clear business goals with KPI

AEROSPACE
- 15,000 employees, 4.5 billion Euro turnover
- global players: EADS
- Aerospace Forum Baden-Württemberg,
  excellent research institutes (Fraunhofer inst.)
- Main challenge: improve visibility of
  small-size German enterprises

ELECTRICAL ENGINEERING & ELECTRICAL INDUSTRY
- 160,000 employees, 36 billion Euro sales
- 33 institutes/specialist areas and centers at the
  universities as well as six specialist universities
- Robert Bosch Center for Power Electronics
VDE Association for Electrical, Electronic & Information
Technologies
- Main challenge: electro mobility (to find new ways
to make a sustainable energy future possible)
Manufacturing sector maps in AS
- Policies and Smart Specializations
A comparison of national policies and Smart Specializations area matching research priorities and enabling technologies

1. Comparison of national initiatives

2. Mapping of Smart Specialization Areas

3. Comparison of priority themes and enabling technologies
- A transnational perspective: practices
An example of operations
An overview of FoF practices along the manufacturing supply chain in the AS according to the four main domains analysed in the survey.

- AGGREGATED LEVEL

- COUNTRY LEVEL

1° most used

<table>
<thead>
<tr>
<th>Flexibility</th>
<th>Flexibility</th>
<th>Automation Rate</th>
<th>Flexibility</th>
<th>Flexibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product range modularisation</td>
<td>Product range modularisation</td>
<td>Energy Efficiency</td>
<td>Energy Efficiency</td>
<td>Automation Rate</td>
</tr>
</tbody>
</table>

2° most used

| Automation Rate | Energy Efficiency | Product range modularisation | Automation Rate | Component range stand |

3° most used

| Automation Rate | Energy Efficiency | Product range modularisation | Automation Rate | Component range stand |
PROJECT’S INFO

START DATE: 1st November 2016
END DATE: 31th October 2018
Project coordinator: Massimiliano Bertetti
Pordenone Technology Centre
E-Mail: massimiliano.bertetti@polo.pn.it       Phone: 0039 0434504415
Partnership: 11 partners from Italy, France, Germany, Austria and Slovenia
Project cost: € 1,619,250.00

THIS PROJECT IS CO-FINANCED BY THE EUROPEAN REGIONAL DEVELOPMENT FUND THROUGH THE INTERREG ALPINE SPACE PROGRAMME

UPDATES

Follow the project on its website and social media channels.
www.alpine-space.eu/projects/bifocalps/en/home

PARTNERS