

SWOT – Bits and Pieces

As part of Road4FAME Project, a SWOT analysis has been developed. A SWOT is a structured planning method used to evaluate the strengths, weaknesses, opportunities and threats involved in a project or in a business venture.

This SWOT was based on the information collected in previous Road4FAME deliverables, in particular deliverable “D1.2 Preliminary Overview Technology Push”, “D1.3 Overview on Technology Push and Application Pull regarding Architectures and services” and “D2.3 Report on Socioeconomics Developments”. All these documents are public and are also free available on Road4FAME website, within the “resources” section (<http://road4fame.eu/resources/>). Industrie 4.0, SMART Industry and Catapult are initiatives which have been taken into account in this analysis, too.

The work done in this SWOT, eleven strengths, eleven weaknesses, nine opportunities and seven threads were identified. After the analysis of all these factors, the Road4FAME consortium identified seven strategies which will use the strengths of manufacturing industry in Europe in order to take advantage of the new opportunities:

- Industry 4.0 recommendations: The Industry 4.0 recommendations emphasized the idea of digitization and link of all productive units. For that purpose it is necessary to increase the research and projects implementation in digital services platforms for using virtual plants and products to prepare the physical production and use simulation services and design tools across the entire value chain. The digital services and platforms are supported in reference IT architectures (CPS integration in production lines) that reduce the effort need for integration of new equipment and tools and reduce start-up and maintenance times. Industry4.0 recommendations also propose to research on supply chain networks that are dynamically restructured for optimal performance and smart products that can reconfigure the production line according their individual design. Furthermore, it promotes the research in agile manufacturing solutions where the customers can initiate on-demand creation of products providing digital specifications. The basic concept is from idea to product: think-design-crete-sell without the need to own production facilities.
- Knowledge as key enabler of the new Economy of Data: The EC has initiated Big data PPP to support research initiatives and vertical demonstrators in Big Data; industrial requirements have been also taking in consideration. Road4FAME SWOT analysis has identified that it would be necessary to support research and innovation projects for developing algorithms and models for data-drivers decision environments, data gathering and analysis from social networks, research in analytics and visualisation to extract and manage value of huge volume of data and develop technologies and solutions for collaborative data sharing in order to improve the use of resources and energy efficiency in manufacturing networks and supply chains. In the Economy of Data, new business models are emerging and will require research in platforms of multi-side markets. These markets will monetarise data

appropriately not only for selling but also for developing new services around data ecosystems.

- Cyber Physical Production Systems & intelligent components: There are a large number of actions to be taken to enhance the CPS in industry, between these actions, the following ones should be remarked:
 - Project research and development on production automation, self-X, secure connected networks in order to break the silos.
 - Investigate in advances in wireless sensor technologies, M2M communication and ubiquitous computing.
 - Support of development of platforms and standards of CPPS to connect open global networks, sophisticate marketplace offerings based on app stores model. Creating and developing new markets for CPS technologies and products.
 - Supporting initiatives for education in CPS.
 - Promote initiatives that support new service providers such as suppliers of sensors, IT companies and software developers which will become Tier 1 on cyber-physical world.
- Total customization & ad-hoc production networks: There will be an increasing demand by customers for individualized and high configurable products. These trends will punch companies to design and manufacture tailored products which are segment-to-one customer. This will require three actions:
 - Investigate in 3D printing technologies and 3D modelling technologies.
 - Investigate on flexible and reconfigurable production systems. Dynamic digital environments.
 - Provide services that tracks and analyses data
- High supply chain and production environments flexibility: Investigate new technologies for flexible and customisable distributed manufacturing will be necessary to research and develop technologies for plug and play configurable systems; this will facilitate that products can reconfigure the production line according their individual design and customers can initiate on-demand creation of products providing digital specifications; this will also facilitate the development of solutions for supply chain networks that are dynamically restructured for optimal performance. For these purposes it is necessary to implement research in cloud manufacturing technologies for product lifecycle management in the supply chain.
- Manufacturing servitization: There is a great opportunity for manufacturing companies to provide manufacturing as services and product-service solutions. For this purpose it is necessary to investigate and develop new technologies and business models that lower the barriers for making business in manufacturing. Research and development of solutions for manufacturing service provider models are also important; one company could be a "one-stop-shop" and provide full services such as assembly or for testing new products. Investigate in rapid prototyping for mass-production and solutions for urban production

that allow flexibility and personalized productions closer to the demand. On the other hand, it is necessary to do research on real time data analysis, solutions for network factory monitoring and tracking in order to facilitate real time monitoring and maintenance services development.

- Additive manufacturing and 3D printing technologies: Manufacturing companies should take advantage of new 3D printing technologies; it is crucial to research and promote pilots for showing the potential of the 3D printing in order to encourage manufacturers to use it. Moreover, research on low cost 3D printing technologies and demonstrators is now viable. An open market is emerging around 3D printing, not only for directly manufacturing using these techniques, but also researching on offering new services to support this 3D printing implementations.
- Finally, it is important to highlight the necessity of promoting innovation in urban living labs. This should be an opportunity to close urban factories to customers.
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