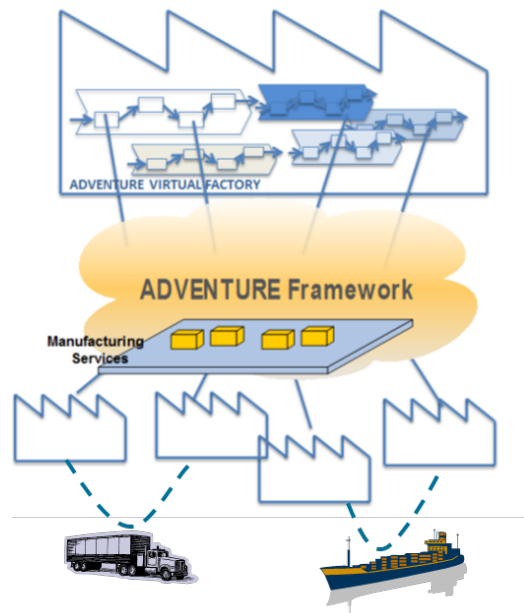# ADaptive Virtual Enterprise ManufacTURing Environment

This document serves as brief introduction to the EU-Project ADVENTURE (ADaptive Virtual ENterprise ManufacTURing Environment) and aims to outline the main features and advantages of using the ADVENTURE platform.

ADVENTURE – The Plug and Play Virtual Factory

ADVENTURE aims at enhancing and facilitating the collaboration between manufacturing companies, especially those that are SMEs. These companies describe their manufacturing capabilities, products, and services as "Manufacturing Services" using the ADVENTURE platform. These are represented by the rectangle boxes in the diagram opposite. One company (acting as a broker) might for instance want to produce a complex product, which it cannot produce on its own. Thus, it models graphically corresponding manufacturing processes (indicated at the top of the picture) and enriches the description of corresponding process steps with additional data. Based on this additional data, a matchmaking will be carried out, which finds and proposes the broker matching "Manufacturing Services". From these propositions, the broker assigns to each step of these processes a partner providing the matching "Manufacturing Service" based on their manufacturing capabilities.

Those "Manufacturing Services", as stated before, refer to manufacturing capabilities, products, and services of companies are integrated into the companies' internal systems (e.g. ERP, CRM, etc.). This way, collaboration between those companies is established essentially producing a single Virtual Factory. The whole process of finding appropriate partners is facilitated by ADVENTURE. In addition, when they start collaboratively producing the complex product, monitoring information (stemming from various integrated stationary and mobile sensors) about the current production status is shared among the collaborating partners in the Virtual Factory.

All this is supported and achieved by tools and components provided by ADVENTURE – *The Plug and Play Virtual Factory*.

What does "Plug and Play Virtual Factory" mean?

- What is a Virtual Factory
  - Multiple "real" factories that are "closely" collaborating (with integrated ICT systems) form a "virtual" factory
- What is the plug
  - Connecting the own (custom) ERP/CRM/etc. system to ADVENTURE (via an ADVENTURE gateway) and describing the capabilities
- What is the play
  - Modelling and executing (cross-organizational) manufacturing processes using (multiple) ADVENTURE components (such as the ADVENTURE Process Designer, the ADVENTURE Smart Process Execution Engine, the ADVENTURE Process Monitoring)

ADVENTURE's Competitive Advantages

What does ADVENTURE aim to achieve?

- Increased flexibility
  - Adaptation of business processes in real-time
  - Dynamic factory selection achieving on-the-fly collaboration
- Enhanced Innovation
  - Creation of manufacturing processes based on (required) functionalities/capabilities
- Improved efficiency
  - Optimizing manufacturing processes by proposing best partner factories & services
  - Simulation of manufacturing processes providing forecasted information
- Facilitated collaboration
  - Integration of ICT-systems
  - Real-time monitoring of whole supply chain combined with tracking of goods

ADVENTURE's Features/Building blocks

What can ADVENTURE do for me?

- Partner finding (see more details below)
  - Provide/register offered/supplied manufacturing capabilities/products/services
  - Specify required manufacturing capabilities/products/services
  - Matchmaking is carried out and "matching" partners will be identified and shown
- Optimized manufacturing process (see more details below)
  - Optimize Partner/Factory selection
  - Optimize Process Structure
  - Simulation and Forecasting
- Integration of ICT & Holistic Monitoring (see more details below)
  - Message Transformation
  - Message Routing
  - Real-time monitoring of whole supply chain with tracking of goods
- Dynamic Adaptation (see more details below)
  - Alerts in case of unexpected events
  - Adapt process models due to alerts

Partner finding:

ADVENTURE increases your visibility. It enables you to describe and promote your manufacturing capabilities, products, and services at a platform where other companies from the manufacturing domain can see and recognize your capabilities. How is this done? You need to register at the ADVENTURE platform and specify your manufacturing capabilities, products, and services.

ADVENTURE supports you in finding appropriate partners or partner factories that provide the manufacturing capabilities, products, or services, you need. How is this done? You need to specify and describe the manufacturing capabilities, products, or services, you need. Afterwards, ADVENTURE carries out a search for matching partners based on your specified needs and proposes corresponding partners or partner factories to you.

Optimized Manufacturing Processes

ADVENTURE enables you to model manufacturing processes based on skill and technical requirements. For this, it provides you with a browser-based graphical process model editor for modelling your manufacturing processes, i.e., for modeling corresponding gateways and activities. Further, ADVENTURE enables you to specify needs and preferences regarding non-functional aspects such as the required delivery time or a maximum cost level. According to your these needs and preferences, ADVENTURE will optimize your manufacturing processes by proposing a set of partners and an optimized process structure. In addition, using ADVENTURE you can simulate the process and get forecasted information about your manufacturing process. The final decision with which partners to collaborate self-evidently lies with you.

ICT Integration & Holistic Monitoring

ADVENTURE provides you with a holistic monitoring. It enables you to monitor the whole supply chain for producing a manufacturing good. Thus, you are not restricted to the parts of the supply chain, you are active in. For this, you have to configure a gateway which connects ADVENTURE to your custom ERP/CRM/etc. system. Having done this, ADVENTURE is taking care on data format conversion and message routing between your system and the systems of the partners, you are collaborating with. This way, ADVENTURE provides your (and your system) with real-time monitoring information on your collaborative (cross-organizational) manufacturing processes. For sure, only the data and information you want to share will be exchanged.

Dynamic Adaptation

ADVENTURE offers advanced controlling features for your manufacturing processes. In case of unexpected events putting your collaborative (cross-organizational) manufacturing processes at risk, ADVENTURE will trigger alerts and provide you with corresponding information. Furthermore, ADVENTURE will enable you to dynamically adapt your process models in case of events. For instance, it will route your manufacturing requests for the production of a certain pre-product to another supplier if the previously selected one fails. For sure, the final decision how to adapt will lie with you.

SUMMARY

ADVENTURE enhances the collaboration of companies, especially SMEs. This is achieved by providing tools and methods for supporting and facilitating partner finding, by integrating ICT systems of the collaborating partners, and by enabling holistic monitoring providing real-time information about the whole manufacturing processes which enables early process adaptations in case of events. Making use of its optimization capabilities, ADVENTURE assists in achieving optimized, cross-organizational manufacturing processes.

Finally, ADVENTURE increases the visibility of companies that describe their manufacturing capabilities and products at the ADVNETURE platform as they can be found automatically and advertised for participation in cross-organizational manufacturing processes.