

# DynAMiCS: Support for the implementation of Additive Manufacturing

The implementation of Additive Manufacturing (AM) in infrastructure and processes poses major challenges for companies. In the “DynAMiCS” project, methods and tools were developed to support companies in economic use of the technology. Starting from the identification of relevant product segments, suitable products and services are identified and new or extended business models are evolved. The developed methods and tools for the identification of AM potentials were validated in cooperation with DMRC partner companies such as Stükerjürgen Aerospace Composites GmbH & Co. KG, Krause DiMaTec and Parker-Hannifin.

## 1. Objectives

Methods and tools for implementing AM must comply to a wide range of requirements in order to meet the characteristics of manufacturing technology. Even though companies generally recognize the main benefits of AM, they are often unable to derive and quantify the specific benefits of the technology for their business. Previous studies on the utility potential of AM are rather unstructured or heuristic in many companies. In addition, the identification of potentials is primarily concerned with a few technology experts. In the research project “DynAMiCS” methods and tools for future industrial users of AM processes were developed.

## 2. Results

In the first phase of the project, a framework for companies with little knowledge of AM was developed. Their goal is to obtain a first impression of which benefits AM could provide for their business. To identify potentials, applications fields (in terms of market segment and product category combinations) were determined and assessed with regard to their respective AM potential. As a consequence, the DMRC is going to be equipped with a tool to answer the question “Which potentials could AM yield for me”

In the second phase of the project, a framework for product discovery was developed. Once a company decides to apply AM (for either production or service provision), it will be confronted with the challenge “Which products and services could I offer by using AM”. The main task is not to find creative product ideas, but rather to select the right ones. The DMRC can draw on the technical know-how of its engineering staff. On the other hand, product ideas have to be auspicious with regard to a company’s business of the future. The project will yield a framework to generate and select promising, feasible product ideas.

As a matter of fact, there is more to AM than the plain production of parts – it changes value chains,

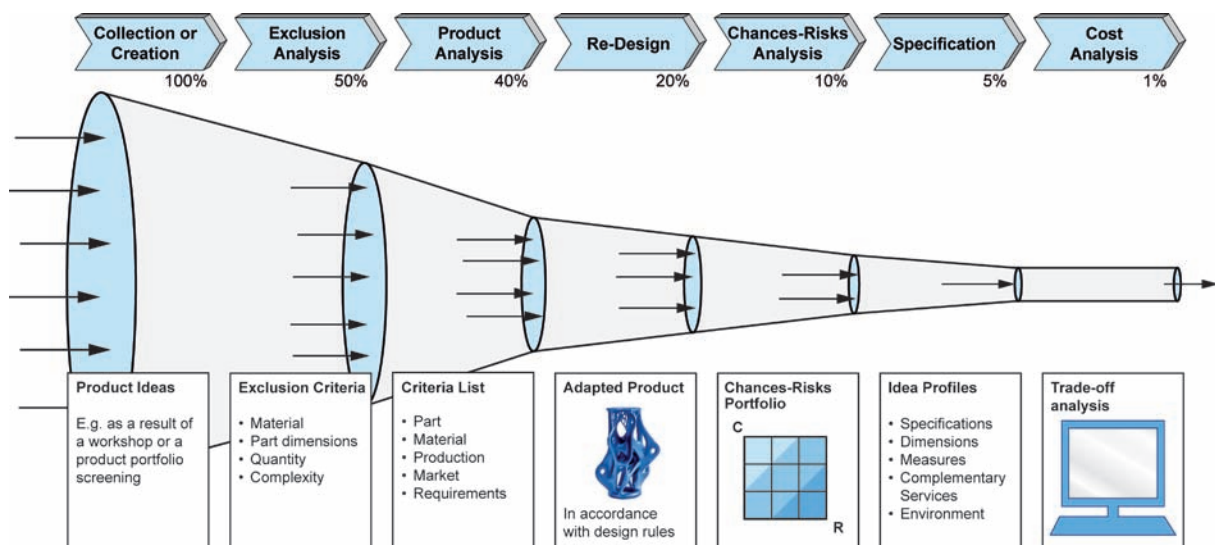


Figure 14: Idea funnel of Innovation

manufacturing complexity, competitive relationships and will drastically alter a company's competence base. Therefore, in a third step a guideline for the generation of AM-business models was developed. A business model is an abstract representation of a company's way to create value for the customer and make money. Recently, the concept of business models has gained ample attention among scholars. We extended the current understanding of business models and enabled the DMRC to develop specific AM business models.



Figure 15: DMRC BMC Workshop

Depending on the level of experience of companies with AM, different questions need to be answered to identify the specific potential of AM. For example, a company at the beginning of its investigation of the technology has to identify appropriate application fields. The key functions of AM and methods for the analysis of the business segments of a company identified in "DynAMiCS" help determine appropriate fields of application. On the basis of the selected business segments, it is necessary to identify suitable products and services with which the potential of AM can be developed. Through creative and/or deductive approach this task can be solved efficiently. In the last step to the implementation of the technology in companies, suitable business models are developed. The entirety of the phases for the identification of the potential, the selection of suitable components and the development of viable business models will enable the DMRC to support the decision in favor of the use of AM and to identify customer-specific potentials.

### 3. Outlook

The created results of "DynAMiCS" provide possibilities to support companies being at the beginning of AM investigations. The DMRC takes the role of a consultant possessing a collection of methods and tools to support companies for their specific AM product, services and business ideas. In bilateral projects the DMRC provides different service offers as a result of DynAMiCS.

**Project Manager**                      *Prof. Dr-Ing. Iris Gräßler*

**Scientific Associate/s**            *Patrick Taplick, M.Sc., Martin Kage, M.Sc., Xiaojun Yang, M.Sc.*