

Research Strategies for Additive Manufacturing



Stefan Peter

Additive Manufacturing is a disruptive technology progressively permeating diverse markets. It is capable to trigger major upheavals reshaping supply chains and business models over the next decade. Many industries are seeking for opportunities how to capitalize on the benefits AM provides; new industries progressively draw their attention to AM's potential. As well, global research initiatives funded by different governments spark new impulses in the research landscape. Established and newly founded re-

search centers, e.g. in the UK, the US or Germany are continuously striving to close research gaps and to transfer the research results into tangible outcomes for the industry. Therefore, demand-oriented research strategies are needed.

Additive Manufacturing Research Map

To deduce the need for research activity, the AM research landscape was analyzed. As a result, the AM Research Map was created (fig. 1-1), revealing the

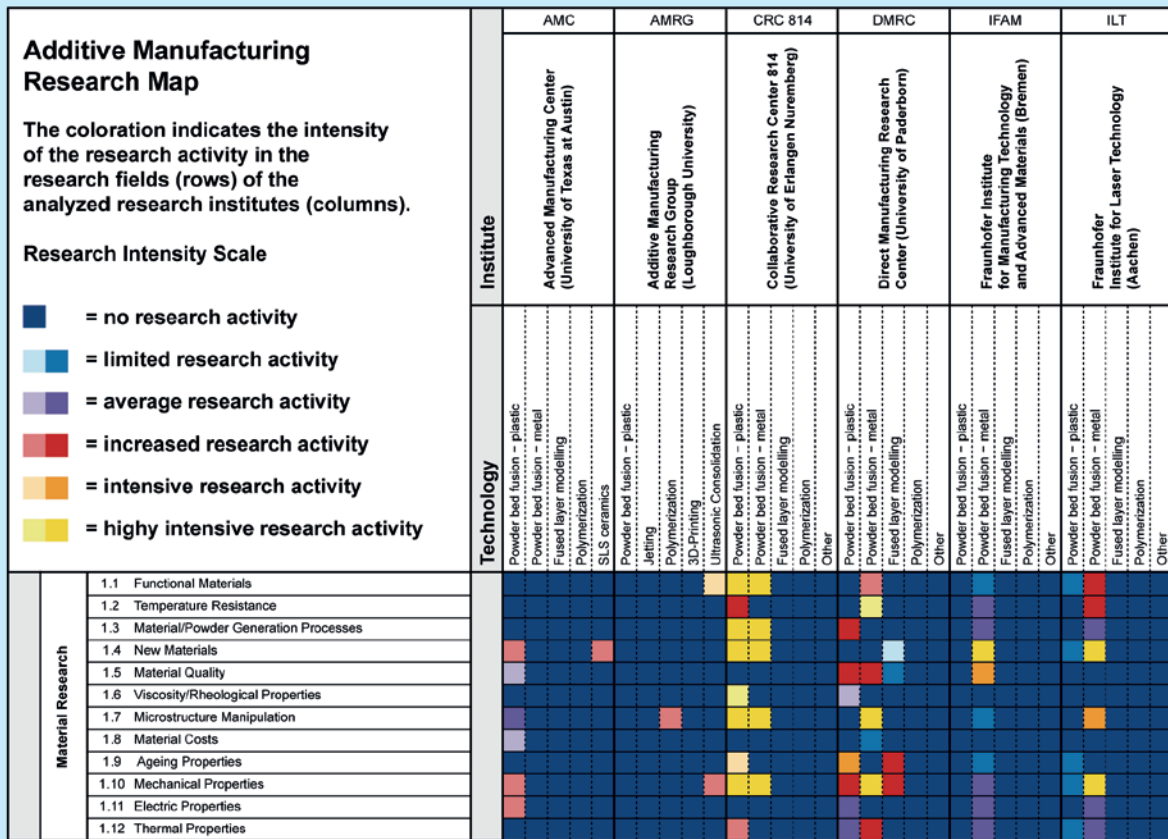


Figure 1-1: Excerpt from the Research Map, indicating the research intensity in different research fields (rows) for selected institutes/technologies (columns)

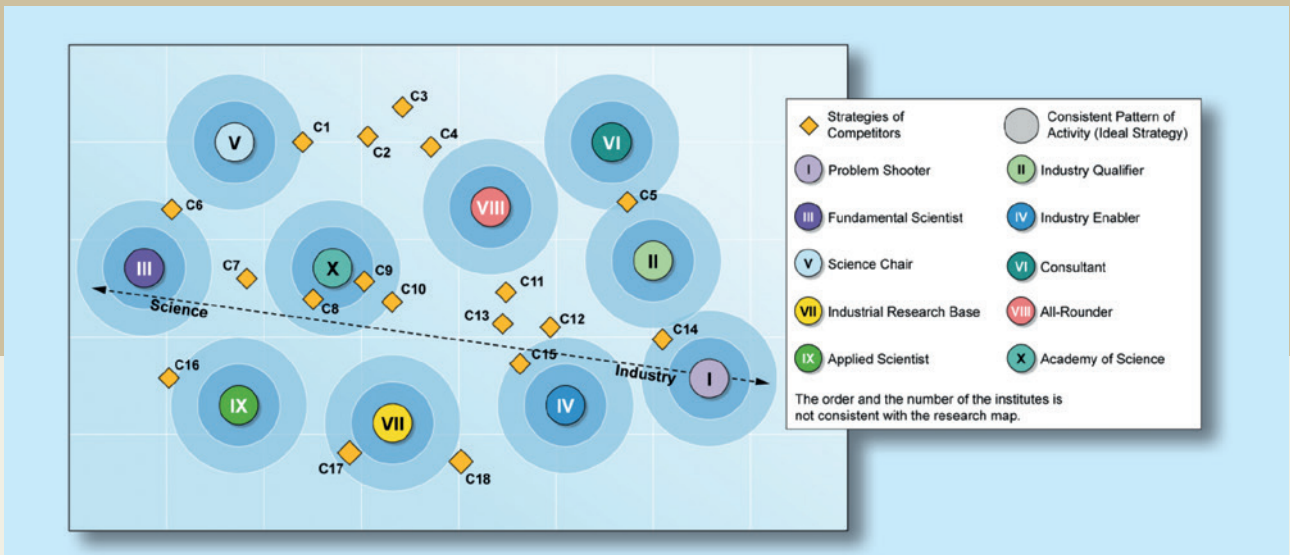


Figure 1-2: Strategy Map: Visualization of developed strategy variants and the current strategies in the research landscapacing the re- search intensity in different research fields (rows) for selected institutes/technologies (columns)

research intensity of the analyzed re- search institutes.

For instance, just a few institutes fo- cus on cross-technological research fields, e.g. the development of design rules; the research intensity is medi- um; others, e.g. material research, are intensively investigated. An outstand- ing research intensity is prevalent in e.g. mechanical properties, new mate- rials, material quality, microstructure manipulation. Research fields with a rather low research intensity are e.g. supply chain optimization and process automatization. Concurrently, conclu- sions emerge for technology-specific research intensity. The highest and low- est research activity distributed over all research fields are indicated for Powder Bed Fusion Metal and Polymerization Technologies, respectively.

Additive Manufacturing Strategy Map

To identify crucial levers for future re- search strategies, white spots need to be revealed. Therefore the research activity and intensity were contrast- ed with the future relevance of the re- search fields. Process automatization and design rules were determined as white spots and should be considered as levers in future strategies. Research fields such as new materials are impor- tant as well. Here however, the research intensity is already high. Based on the white spots, success factors enabling

the levers were deduced. Hence, AM re- search could significantly benefit from e.g. a stronger interconnection of in- stitutes within the research landscape and a closer integration of companies along the value chain.

These aspects were taken into consid- eration to develop consistent strate- gies. The result are ten consistent strate- gy variants, ranging from a Funda- mental Scientist to a Problem Shooter. Contrasting the developed strategies with the strategies the institutes cur- rently pursue, a Strategy Map is result- ing (fig.1-2). All deduced conclusions are considered for the development of a coherent strategy for the DMRC.

Strategy Lab

For regular strategy controlling and up- dating a Strategy Lab was developed. By combining internal and external per- spectives, the Strategy Lab ensures a comprehensive view on the institute's current situation. This includes its po- sition within the research landscape and crucial success factors. Contrast- ing these to the institute's goals and measures reveals required changes in the strategic focus. In a regular review meeting, this focus will be discussed and consequential measures and re- search topics can be deduced. Thus, it can be ensured that a strategy is aligned with actual and important influ- ences on the institutes business.