

An Evaluation Model for Enhancing Flexibility in Production Systems through Additive Manufacturing

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Abstract : Additive manufacturing processes have entered large parts of the industry and their range of application have progressed and grown significantly in the course of time. A major advantage of additive manufacturing is the innate flexibility of the machines. This correlates with the ongoing demand of creating highly flexible production environments. However, the potential of additive manufacturing technologies to enhance the flexibility of production systems has not yet been truly considered and quantified in a systematic way. In order to determine the potential of additive manufacturing technologies with regards to the strategic flexibility design in production systems, an integrated evaluation model has been developed, that allows for the simultaneous consideration of both conventional as well as additive production resources. With the described model, an operational scope of action can be identified and quantified in terms of mix and volume flexibility, process complexity, and machine capacity that goes beyond the current cost-oriented approaches and offers a much broader and more holistic view on the potential of additive manufacturing. A respective evaluation model is presented this paper.

Keywords : additive manufacturing, capacity planning, production systems, strategic production planning, flexibility enhancement

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