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Method for Evaluating the Monetary Value of a Customized Version of the Digital Twin for the Additive Manufacturing

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Abstract : By combining the additive manufacturing (AM)- process with digital concepts, like the digital twin (DT) or the downsized and basing concept of the digital part file (DPF), the competitiveness of additive manufacturing is enhanced and new use cases like decentral production are enabled. But in literature, one can´t find any quantitative approach for valuing the usage of a DT or DPF in AM. Out of this fact, such an approach will be developed within this paper in order to further promote or dissuade the usage of these concepts. The focus is set on the production as an early lifecycle phase, which means that the AM-production process gets analyzed regarding the potential advantages of using DPF in AM. These advantages are transferred to a monetary value with this approach. By calculating the costs of the DPF, an overall monetary value is a result. Thereon a tool, based on a simulation environment is constructed, where the algorithms are transformed into a program. The results of applying this tool show that an overall value of 20,81 € for the DPF can be realized for one special use case. For the future application of the DPF there is the recommendation to integrate especially sustainable information because out of this, a higher value of the DPF can be expected.

Keywords : additive manufacturing, digital concept costs, digital part file, digital twin, monetary value estimation
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