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Smart Data Hub: Retrofit solution to acquire process-inherent knowledge

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Abstract

Within the paper, a profound understanding of complex and up to now not assessable data, which ensure more resource-efficient production processes, will be given. Focal point is the description of the development of a retrofit-solution, named Smart Data Hub (SDH). This industry integration device serves as an easy to use enabler for smart production, even in overaged production systems.

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Keywords: Industry-driven innovation; smart data; knowledge management; complexity management; learning organization.

1. Introduction

Rising complexity in a more and more complex world nowadays force even Small and Medium-sized Enterprises (SME's) towards more transparent production and service processes. Overall, environmental issues, as energy and resource efficient value creation and an increasing request for a green economy, demand for suitable solutions.

Within the paper, we will learn how a profound understanding of complex (and up to now) not assessable data ensures more resource-efficient production processes. Focal point is the description of an enabling-device, named

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Smart Data Hub (SDH). This modern industry integration device serves as retrofit-solution and as an easy to use enabler for a smart production, even in overaged production systems.

First industrial use-case was an SDH-equipped and upgraded high performance blow mould tool (12 cavities). The main innovative feature of this and further applications is the capability to measure internal signals like pressure, temperature, viscosity and many more, within the pressurized tool itself. Now a high measurement frequency and precision is achievable without provoking any imprints on the fabricated product itself and a real-time process management is possible.

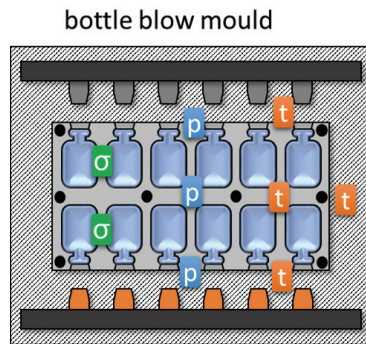


Fig. 1. inner-cavity of an extrusion blow mould

2. Smart Data Hub

2.1. Resource based efforts in production

A cost structure analysis of the German manufacturing sector shows that in 2014, on average, about 43% of all efforts was spent on material and just about 2% were energy induced [1]. As illustrated in Fig. 2, the cost ratio regarding resources clearly exceed often discussed labor costs, which are only about 18% [1]. This trend is quite comparable to most European countries, although between the years 1960 and 2000 Europe's specific energy usage was reduced by 64% [2]. The given numbers mirror the situation of whole sectors, conjoining different fields of industry. Due to this more detailed data for each branch of industry, highly specific measures can be derived, e.g. the production of special machinery for packaging. SMEs in Europe represent 99.8% of all businesses and account for 57.6% of the economic added value and 66.5% of employment in EU 28 [3].

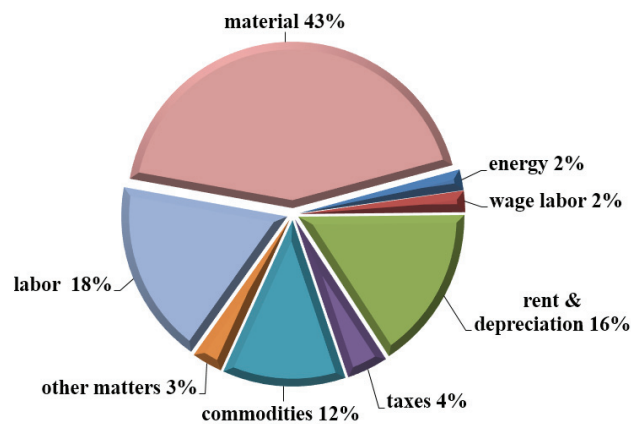


Fig. 2. cost structure of the German manufacturing industry in 2014 [1]

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