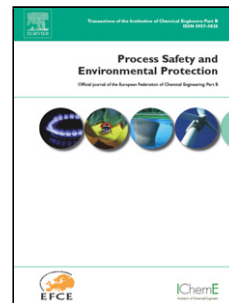


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Authors: Tim Stock, Michael Obenaus, Sascha Kunz, Holger
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Industry 4.0 as Enabler for a Sustainable Development: A Qualitative Assessment of its Ecological and Social Potential

Tim Stock¹

Research Associate

Chair for Sustainable Corporate Development, Technische Universität Berlin
Berlin, Germany

Michael Obenaus

Research Associate

Fraunhofer Institute for Production Systems and Design Technology IPK
Berlin, Germany

Sascha Kunz

Student Researcher

Chair for Sustainable Corporate Development, Technische Universität Berlin
Berlin, Germany

Holger Kohl

Full Professor

Chair for Sustainable Corporate Development, Technische Universität Berlin
Berlin, Germany

¹ Corresponding Author

T. Stock

stock@mf.tu-berlin.de

Highlights

- State-of-the-art for value creation in Industry 4.0
- Primarily positive impacts of Industry 4.0 for ecological sustainability expected
- Positive and negative impacts of Industry 4.0 on social sustainability estimated

ABSTRACT

In 2015, the General Assembly of the United Nations adopted the Agenda 2030 which counts 17 indivisible and self-sustaining goals. These so-called Sustainable Development Goals are intended to serve as a foundation for a transformation of the global economies towards a sustainable development. This transformation process should be built on an economic development in accordance with social equality and within ecological boundaries. As essential stakeholders for a global sustainable development, industrial organizations have to shift towards a novel paradigm which puts an emphasis on sustainable value creation. Industrial value creation has gone through radical changes during the last years. Since the 2010s, the so-called fourth industrial revolution (Industry 4.0) can be observed. The state of the art in research and technology for Industry 4.0 and sustainability is outlined. The potential for sustainable value creation in Industry 4.0 is qualitatively assessed for a macro and micro perspective based on a literature review and expert interviews. The assessment unfolds that the value creation might positively contribute to a sustainable development in many cases. Critical areas with expected negative contributions related to the quantity of materials used, primary energy consumption,

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