PLATTFORM INDUSTRIE4.0

VISION

2030 Vision for Industrie 4.0

Shaping Digital Ecosystems Globally

Imprint

Publisher
Federal Ministry for Economic
Affairs and Energy (BMWi)
Public Relations
11019 Berlin
www.bmwi.de

Editorial responsibility
Plattform Industrie 4.0
Bertolt-Brecht-Platz 3
10117 Berlin

Design
PRpetuum GmbH, Munich

Last updated
October 2019

Printed by
Druck- und Verlagshaus Zarbock GmbH & Co. KG, Frankfurt

Picture credits
Geschäftsstelle Plattform Industrie 4.0/InfographikPro

This publication as well as further publications can be obtained from:
Federal Ministry for Economic Affairs
and Energy (BMWi)
Public Relations
Email: publikationen@bundesregierung.de
www.bmwi.de

Central procurement service:
Tel.: +49 30 182722721
Fax: +49 30 18102722721

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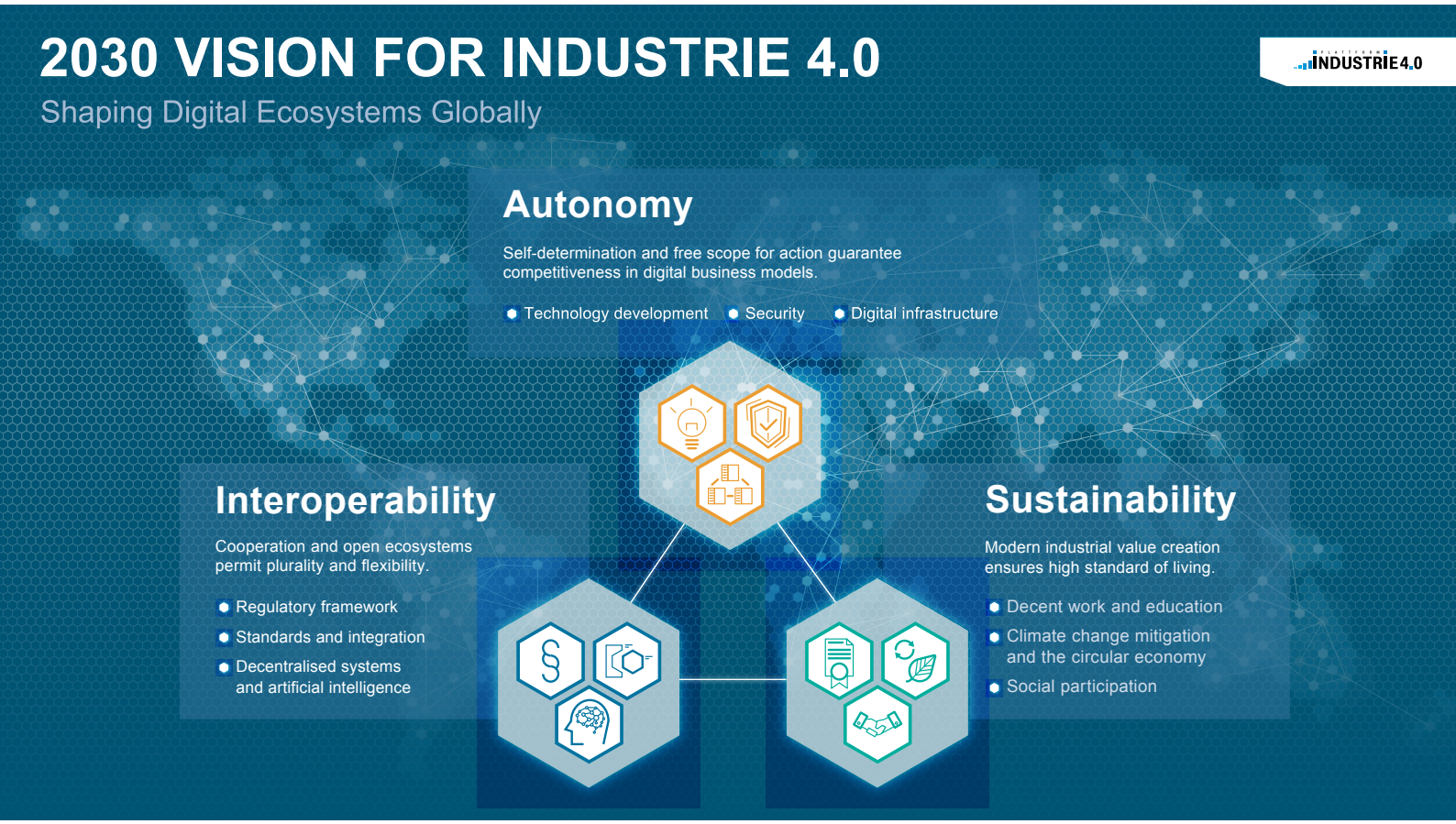

Industrie 4.0 describes a fundamental process of innovation and transformation in industrial production. This transformation is driven by new forms of economic activity and work in **global, digital ecosystems**: today's rigid and strictly defined value chains are replaced by flexible, highly dynamic and globally connected value networks with new forms of cooperation. Data-driven business models prioritise the benefit to the customer and solutions, replacing the focus on the product as the prevailing paradigm of industrial value creation. **Availability, transparency and access to data** are key factors for success in the connected economy and largely determine competitiveness.

In this 2030 Vision, the stakeholders of Plattform Industrie 4.0 present a holistic approach to the shaping of digital ecosystems. Working from the specific situation and established strengths of Germany's industrial base, their aim is to create a framework for a future data economy in line with the requirements of a social market economy: **emphasising open ecosystems, diversity and plurality and supporting competition between all the stakeholders on the market**. The Vision is primarily addressed to industry and commerce in Germany, but explicitly highlights the importance of openness and a willingness to work together with partners in Europe and around the world.

The **strength of German industry** is rooted in a system of innovation and commerce driven by **heterogeneity, diversity and specialisation**. In combination with commercial freedom, data and information security, and the protection of individual personal rights, these are the central pillars of the European industrial society. A decentralised system of open and flexible ecosystems is built on this structure, and offers the best preconditions for shaping the digital economy within the set of values of a free and social market economy.

Three closely interlinked strategic fields of action are crucial for a successful implementation of Industrie 4.0: **autonomy, interoperability** and **sustainability**. The stakeholders on Plattform Industrie 4.0 commit jointly to these fields of action as guiding principles for the coming decade of the incipient scaling-up of Industrie 4.0 in Germany, Europe and globally. In a dialogue with all the stakeholders in the industrial society, the aim is to establish a framework for action so that – building on the current outstanding position of German industry in global terms, the digital transformation of German industry can take place in a sustainable manner, and Industrie 4.0 can be successfully established throughout a flourishing German Mittelstand.

Autonomy

The principle of autonomy underpins the freedom of all stakeholders on the market (companies, employees, scientists, individuals) to take self-determined, independent decisions and to interact in fair competition – from the defining and shaping of the individual business model to the individual's decision to make a purchase within the I40 ecosystems.

Autonomy in the global Industrie 4.0 ecosystem requires:

Digital infrastructure

The permanent dynamic configuration of value networks between different companies requires a powerful, autonomous infrastructure for digital industrial value creation. **This infrastructure must be equally accessible for all participants and available without restriction**. It defines access to the ecosystems of Industrie 4.0 and guarantees pluralistic action and market diversity. As a strategic asset, a resilient infrastructure brings together all the overarching requirements and services needed for the cross-border and cross-sectoral collection, exchange, analysis and use of data.

Safety and security

Data protection, IT and information security are a firmly established principle in our industry and society. They are a basic precondition for Industrie 4.0 and for cooperation within digital ecosystems. In the face of all the challenges, they have established the **basis for the high level of global confidence in Industrie 4.0**. Companies, employees and private individuals will in future increasingly need to be able to rely on their data being protected, on the use of it being transparent, and on their being able to decide autonomously what use they permit, what use they do not permit, and when they wish to deploy their "right to be forgotten".

Technology development

Autonomy in Industrie 4.0 requires technology-neutral research, development and innovation in the core areas of digital industrial value creation. In addition to **the leading role played by the developments in technology, it is also particularly important to implement data protection and security by design**, as well as sustainability and interoperability. Finally, dynamic integration into the applications and digital business models ensures that all participants in the ecosystem participate in and benefit from the advances in technology.

Interoperability

The flexible networking of different stakeholders to form agile value networks is one of the core building blocks of digital business processes in Industrie 4.0. The interoperability of all stakeholders is a key strategic element in the shaping of such complex, decentrally organised structures. A high level of interoperability – to which all the partners commit and contribute equally – is required to ensure the direct networking of operations and processes across companies and sectors. In the other direction, interoperable structures and interfaces give both manufacturers and customers an unrestricted possibility to participate in digital value networks and thus to shape new business models. In this way, interoperability also boosts autonomy.

Standards and integration

The outstanding global position when it comes to the **integration of individual solutions to become Industrie 4.0 systemic solutions** is largely rooted in the intensive and long-standing efforts to develop standards. This considerably facilitates integration and thus represents a basis for interoperability. This core competence needs to be used and developed further in accordance with the needs of digital ecosystems. Not least due to cross-sectoral reference architectures and the establishment of an administration shell as a digital image of the real world, new approaches are now available and are being underpinned and developed to form a "USB standard for Industrie 4.0".

Regulatory framework

In order to ensure networking, exchange and cooperation in **open ecosystems with fair and equal conditions for all stakeholders**, a regulatory framework is required – at the national, European and also international level. This entails the anchoring of governance rules and the development of the innovation system, as well as the reflection of aspects of data autonomy and security, and the interests of employees and individuals in general.

Decentralised systems and artificial intelligence

Decentralised, autonomous systems with embedded intelligence are of far greater significance in the digital ecosystems of industrial value creation (B2B) than in the B2C sector. The **cooperative and transparent use and interconnection of various types of machine and user data** in a well integrated ecosystem based on a standardised architecture permits the development of new solutions and business models through the use of artificial intelligence in a variety of ways. When it comes to the beneficial use of AI at the various levels of industrial practice (edge, premises, cloud), a key role alongside **Big Data** is played by the collection and use of **Smart Data**.

Sustainability

Economic, environmental and social sustainability is a fundamental pillar of the values of our society. This works in two directions: firstly, this sustainability is being embedded in Industrie 4.0, and secondly, Industrie 4.0 permits substantial progress on sustainability. For example, the prosperity and quality of life of each individual largely depends on a forward-looking and competitive industrial sector. The ecosystem of innovation and the implementation of Industrie 4.0 thus create a fertile environment in which sustainability can result from Industrie 4.0 and Industrie 4.0 itself can be sustainable – and thus make a key contribution towards maintaining the standard of living of our society.

Decent work and education

By placing the human being at the centre, Industrie 4.0 is making significant contributions towards a further improvement in working conditions. In view of our innovative equipment manufacturers and an internationally competitive user industry, **Industrie 4.0 is helping us to maintain a high level of employment**. Multiplier and spill-over effects extend the impact to other sectors. The **outstanding level of education of the workforce** offers a stable basis for life-long learning, and the numerous further training opportunities offer needs-oriented possibilities to deliver this. This should be used and promoted proactively in order to respond to the ongoing skills shifts.

Social participation

Industrie 4.0 stands for a process of transformation which embraces the whole of society, entailing far-reaching changes for the stakeholders. The overarching goal is that the **industrial and social innovations generated by Industrie 4.0** should not only create challenges for these stakeholders, but also and in particular new opportunities. This process of societal change requires not only close cooperation at corporate level, but also participation and co-determination by all stakeholders: starting from a dialogue between the social partners in the individual enterprise to cross-company and cross-sectoral aspects of cooperation and issues embracing the whole of society in terms of the use of digital technologies and artificial intelligence in our day-to-day lives.

Mitigating climate change

Industrie 4.0 makes it possible to leverage additional potential for resource efficiency. A combination of design-based and process-based approaches can create closed material cycles throughout the entire product lifetime. Service-oriented business models make products the basis for services and thus keep them under the care and maintenance of the manufacturer, meaning that the latter can build a more sustainable design into its product. **This means that Industrie 4.0 is a key enabler for the circular economy, and for environmental protection and climate action in general**.

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