Sino-German Cooperation on Industrie 4.0

MIIT's Development Plan for Intelligent Manufacturing

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After the publication of the 14th Five Year Plan during this year's two sessions, the detailed development plans of different sectors are subsequently released by each ministries or responsible bureaus. On 14 April the Ministry of Industry and Information Technology (MIIT) has published the "14th five-year plan for Intelligent Manufacturing development" for public commenting until 13 May[1].

Development goal for Intelligent Manufacturing

According to the draft, companies with a revenue of above 20 million yuan (approx. EUR 2.6M), shall fully achieve digitalisation, while "leading companies" shall complete the intelligent transformation by 2035.

By 2025 the following phased targets shall be reached:

- **Digital transformation and upgrading**
  - Above 50% of enterprises shall reach level 2 (of 5 levels) of the Intelligent Manufacturing capability maturity.
  - Manufacturing companies should sharply increase their production efficiency, product yields and resource utilisation
- **Supply capability**
  - The technological level and market competence of Intelligent Manufacturing equipment and industrial software shall significantly improve. The goal is to produce 70% of the equipment and 50% of the industrial software domestically.
- **Supportive infrastructure**
  - Over 200 national/industrial standards in the area of Intelligent Manufacturing shall be set or amended. At least 120 Industrial Internet platforms with regional influence or within its industry shall be built.

Main tasks for the next five years

Speed up the systematic innovation

- Achieve breakthroughs in various key core technologies

  These include basic technologies (for example, hybrid modelling and design simulation), advanced process technologies (development of additive manufacturing), generic technologies (human-machine collaboration, supply chain coordination) and industrial adaptable technologies (AI, 5G, Big Data, Edge Computing).
- Foster system integration technologies to meet the integration requirements for data transfer and business models across platforms and sectors

[1] Notice from the State Council, 14 April 2021 (CHN): http://www.gov.cn/xinwen/2021-04/14/content_5599585.htm

- Accelerate the construction of an innovation network

  Through better knowledge transfer, technical inventions should be put into practical application more quickly and innovations should be promoted. A network with a number of research innovation centres, platforms for testing and verification shall be built. The goal of this network is the research of generic technologies and to serve as an incubator for trial application.

Further upgrade the industry and promote applications

- Bring application models into full play
  - Construct over 2000 application scenarios with applications of new technologies such as Digital Twin, AI and Blockchain
  - Build over 1000 smart workshops with connected data, flexible production processes and digitised management
  - Build over 100 smart factories that set benchmarks and lead in the development of their respective industry
  - Select and foster 100 smart supply chains in areas like automotive, rail transit, medical equipment and integrated circuits
- Further transformation, digitalisation, and connectivity of manufacturing enterprises with the goal to significantly improve production efficiency and energy resource utilisation
- Encourage regions to explore their own development paths to foster the digitalisation

  Authorised local governments, industrial organisations and leading enterprises are encouraged to cooperate and support the construction of pilot areas.

Strengthen the self-sufficiency and capability of industrial ecosystem

China will further develop Intelligent Manufacturing equipment, software products and system solution concepts relying on strong domestic market.

- Develop 1000 advanced Intelligent Manufacturing equipment components, specifically:
  - Basic “bottlenecks” components (for example, intelligent numerical control systems, positioning devices for industrial use)
  - General/dedicated Intelligent Manufacturing equipment (for example, intelligent 3D warehousing, Near Net Shape manufacturing techniques e.g. for automotive engines)
  - New equipment integrating with new technologies (for example, intelligent industrial control systems and collaborative robots integrated with the application of Digital Twins, Big Data, AI and other new technologies)
- Achieve breakthroughs in the research and development of industrial software. Namely design software, industry-specific software and control execution software; develop new software on international level
- Encourage suppliers of system solutions to strengthen the interaction with their customers to develop joint innovations

Lay a solid foundation of supporting systems

Standards, information infrastructure and security are the supporting foundation of the development.

- Build a standard system for the industrial application in different industries including textile, automotive, electronic equipment, steel and nonferrous metals. Select over 100 companies for piloting the implementation of these standards, set/revise over 200 national or industrial standards
- Speed up the construction of new network infrastructure such as Industrial Internet, Internet of Things, 5G and Gigabit Optical Network
- Deepen the application of cryptographic technology
- Improve cybersecurity and the classification and grading of industrial data; promote the governance of industrial data

Support from national level

Implementation of a coordination mechanism between MIIT and the other relevant ministries and departments (the plan has listed the names of NDRC, MOE, MOST, MOF, MOHRSS, SASAC and SAMR[1]). Moreover, the collaboration between central and local governments is described as indispensable for the further development of Intelligent Manufacturing. The government will guide the integration of different resources together.

Financial Support
As a safeguard measure, the financial support will be strengthened. The focus here will mainly be on major science and technology projects, research and development programs and other projects with relevance for core competences. The incentive policies will be optimised. Different kinds of development funds will be encouraged to increase the investment in the field of Intelligent Manufacturing.

Training Talent
A forecast report on talent demand that highlights the areas of talent shortage will be compiled regularly. An industry standard for practitioner competencies will be introduced. More training bases for practical skills will be built to strengthen the training of digital skills.

International Cooperation
Deepening open cooperation is equally indispensable. International exchanges with foreign countries, regions and organisations on technology research, standards setting, demonstration of application, testing and certification as well as talents training shall be further encouraged. These activities should be based on existing and other cooperation mechanisms such as the Belt and Road Initiative, BRICS and RCEP. Multinational companies and foreign research institutes are encouraged to build intelligent manufacturing R&D centres, demonstrative factories and talents training centres.

[1] Abbreviation of the involved ministries:

NDRC: National Development and Reform Commission

MOE: Ministry of Education of the People's Republic of China

MOST: Ministry of Science and Technology of the Republic of China

MOF: Ministry of Finance of the People's Republic of China

MOHRSS: Ministry of Human Resources and Social Security of the People's Republic of China

SASAC: State-owned Assets Supervision and Administration Commission of the State Council

SAMR: State Administration of Market Regulation

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