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**Submissions from entities in the United Nations system and elsewhere on
their efforts in 2018 to implement the outcome of the WSIS**

Submission by

United Nations Industrial Development Organization

This submission was prepared as an input to the report of the UN Secretary-General on "Progress made in the implementation of and follow-up to the outcomes of the World Summit on the Information Society at the regional and international levels" (to the 22nd session of the CSTD), in response to the request by the Economic and Social Council, in its resolution 2006/46, to the UN Secretary-General to inform the Commission on Science and Technology for Development on the implementation of the outcomes of the WSIS as part of his annual reporting to the Commission.

<p>DISCLAIMER: The views presented here are the contributors' and do not necessarily reflect the views and position of the United Nations or the United Nations Conference on Trade and Development.</p>
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UNIDO contribution to the follow-up to the World Summit on the Information Society

Executive Summary

Disruptive technological innovations in production and leaps forward in industrial production, referred to as the new industrial revolution (also as Industry 4.0 and the Fourth Industrial Revolution), are affecting our lives today and will shape societies in the future. With the Fourth Industrial Revolution proceeding at an exponential pace, UNIDO assists countries in embracing the associated economic, social and environmental opportunities and overcoming the associated challenges, such as lack of ICT infrastructure, government regulations and policies, standards for interoperability, technical know-how and a skilled labor force.

UNIDO's role is pivotal in building awareness of Industry 4.0's potential to bring about inclusive and sustainable industrial development (ISID) and achieve the Sustainable Development Goals (SDGs). It does this by using its convening power to discuss and promote the development of new norms and standards, carrying out research to support policy advice, building knowledge sharing platforms and developing the appropriate technical cooperation for UNIDO Member States. Innovation, knowledge sharing and exchange and the development of strategic partnerships are vital to realizing the potential of Industry 4.0 technologies for achieving ISID and the SDGs.

UNIDO's technical cooperation programmes address Industry 4.0 and realizing material resource efficiency and effectiveness, including energy efficiency and circular economy; Agriculture 4.0; smart mining and manufacturing; as well as cross-cutting issues such as training and reskilling and learning-by-doing; reforming regulatory and addressing standards for interoperability in Industry 4.0; Industry 4.0 ensuring industrial safety and security; providing guiding tools for Industry 4.0 uptake by micro, small and medium-sized enterprises (MSMEs); the use of E-commerce; digital innovation ecosystem building for fostering Industry 4.0 technological learning and innovation; and fostering partnerships across the UN-system, South-South cooperation, as well as with leading private sector companies that are major providers of new technologies driving the Fourth Industrial Revolution.

C.3 Access to information and knowledge

Enabling developing countries' access to modern technologies is crucial in times of convergence of advance technologies and exponential technological changes, which are blurring the differences between economic sectors and scientific disciplines and questioning traditional pathways of economic development. UNIDO utilizes its convening power in collaboration with its partners to generate awareness and the conditions to enable countries to smoothly transition to Industry 4.0 by organizing conferences and Expert Group Meetings, including follow-up reports and recommendations, and site visits to pilot factories for policymakers and experts; producing guiding tools on Industry 4.0 uptake; providing trainings to policymakers and representatives of the private sector and academia; and establishing knowledge sharing platforms on the opportunities and challenges brought about by this exponential technological change for different geographical regions and with special focus on least developed countries.

UNIDO has organized different global and regional fora events on Industry 4.0, sharing the associated opportunities and challenges, as well as its impact on specific regions, including:

- An event during UNIDO's 50th Anniversary in 2016: *Opportunities and challenges of the New Industrial Revolution for developing countries and economies in transition*;
- An event during the World Summit on the Information Society (WSIS) forum in 2017: *Preparing for the 4th Industrial Revolution*.
- Events during the 2nd and 3rd BRIDGE for Cities events in 2017 and 2018: *The belt and road initiative – Industry 4.0 in sustainable and smart cities*; *Urban Issue Hub (II) – Smart City: Smart Productivity and Trade – focusing on Industry 4.0 implementation in Shanghai*.
- An event during the 17th Session of the UNIDO General Conference in 2017: *Industry 4.0 - the opportunities behind the challenge*.
- An event organized in collaboration with the Brookings Institute with a regional focus on Africa in 2018: *Industry 4.0 and Africa*.
- An event during the Science, Technology and Innovation (STI) Forum at the UN Headquarters in New York in 2018: *Industry 4.0 and Digital Strategies- Challenges and Opportunities to achieving SDGs*.
- *The First Regional Conference on Industrial Development – Unlocking the potential of Industry 4.0 for Developing Countries* held in Bali, Indonesia in November 2018. Organized by UNIDO, and the Ministry of Industry and the Ministry of Foreign Affairs of Indonesia. The conference encouraged knowledge sharing to raise awareness about the challenges and opportunities of Industry 4.0, and discussed the role of multilateralism and regional cooperation in preparing countries in Asia and Pacific for smooth transition to Industry 4.0.
- *The Global Forum on naturally based and convergent technologies* held in Sochi, Russia in September 2018. Organized by UNIDO and Russia's National Research Centre Kurchatov, in cooperation with the Russian Ministry of Industry and Trade, around 500 participants discussed topical issues concerning the development of nature-inspired technologies and convergent technologies (nontechnology, biotechnology, information technology and cognitive and social sciences-NBICS) driving the new industrial revolution, and the risks and challenges associated with exponential development of these technologies including the marginalization of some countries from these processes. The event stressed the importance of having coherent Science, Technology and Innovation Strategies and industrial strategies and monitoring of these processes so that no one is left behind.

UNIDO has further devised a comprehensive strategic framework for policymakers to leverage the benefits of advance technologies in establishing smart parks and economic zones, as spatial policy instrument for advancing regional economic development and economic integration.

C.4 Capacity building

UNIDO provides capacity building through the provision of trainings to policymakers at the micro, meso and macro levels to enable governments to better understand the challenges and opportunities brought about by the Fourth Industrial Revolution and to formulate strategies, policies and programmes to address them.

Moving to advanced technologies requires reforming underlying education and vocational schemes, which is often difficult to achieve in the short term. Knowledge sharing and vocational schemes

facilitated by UNIDO and other international partners aim to overcome the skills gap, especially in the application of digital technologies and to facilitate learning by doing.

UNIDO and ITU are partnering up for the development of innovation policies, broadband Internet infrastructure and to enhance countries' strategies towards the digital transformation connecting the “unconnected”. Under the UNIDO–ITU Joint Declaration, signed in 2017, key areas of cooperation include the development of international ICT standards, facilitation of interoperability, and reduction of the digital divide. Within the framework of the joint declaration, a centre for Industry 4.0 was envisaged to be established in South Africa to promote the best practices of innovation, new technologies and the transformation to Industry 4.0.

UNIDO has also partnered with the China International Centre for Economic and Technical Exchanges (CICETE) to coordinate the Intelligent Manufacturing Technology project with an aim to improve the penetration rate of ICT in small and medium-sized enterprises (SMEs). UNIDO will transfer its knowledge and experiences gained from similar interventions and adopt successful practices.

Leapfrogging is a promising opportunity for developing countries adopting advanced technologies. Mobile payments and algorithms making in Africa; artificial intelligence research in Chinese smart cities; and additive manufacturing in South East Asia, all illustrate that there are significant opportunities for developing countries in the digital transformation process. Coherent and concrete strategies, along with adequate resources dedicated to their implementation, will enable developing countries to garner the benefits of cutting edge technological development. UNIDO's analytical work and policy advice enables its Member States to leverage opportunities from Industry 4.0 for industrial upgrading and modernization and to catch up.

Ensuring compliance with international standards and market requirements, pursuing partnerships for knowledge and technology transfer, networking, impact investment and industrial cooperation are essential factors to advance economic competitiveness, based on the diverse needs of developing countries. Under UNIDO's programmes for advancing economic competitiveness, UNIDO's value chain approach supports the development and upgrading of local supply chains and their linkages with regional and global value chains for accelerating export-led economic growth and realizing ISID. These programmes promote product, process, and value chain upgrading and innovation using Industry 4.0 technologies and business models; and build business and innovation ecosystems for encouraging SME and entrepreneurship development, innovation and investment in Industry 4.0.

UNIDO organized a conference on shifting from lean management to Industry 4.0 in Belarus in October 2018 during which moving to “Digital Kaizen” and synergies between lean management and Industry 4.0 were debated. The technical cooperation project on lean management and Industry 4.0 , executed by UNIDO and launched in March 2018, focused on practical shop-floor interventions in pilot companies as well as on awareness-raising events for the whole industrial sector, including on issues related to lean management, Kaizen and Industry 4.0. The two phases of the project resulted in cutting costs of USD 4 million in total and rising productivity by more than 50 per cent.

An ongoing UNIDO projects aims at improving the business environment for innovative and modern enterprises in Middle East, Africa, and Asia by building a National System of Innovation.

C.6 The enabling environment

UNIDO is engaged with its partners in digital innovation ecosystem building and encourages improvements in the regulatory environment to provide incentives for competitive entrepreneurial activities in the formal sector, including through broad-based curriculum development programmes for entrepreneurship education, at secondary and vocational training institutions, and for the alignment of industrial skills development with the skills required for Industry 4.0.

Industrial digital technologies, emergence of knowledge ecosystems, platform economies and the transformation of global innovation and production networks create new opportunities for MSMEs, both as adopters of new technologies and inventors and suppliers of new technological solutions and business models. E-commerce and the sharing economy are some examples of digital platforms that open diverse opportunities for MSMEs to offer their products and services, internationalize and transition to micro-multinationals. Despite these positive trends there are some common E-commerce barriers in developing countries, such as the development of coherent E-commerce regulations, improvement of logistical and ICT infrastructure, promotion of digital payment technologies and implementation of standards on E-commerce platforms.

UNIDO co-operates with interested Member States, MSMEs, think tanks and industry associations and relevant E-commerce stakeholders through its E-commerce interventions. The E-commerce Good Governance Framework (GGF) and International E-commerce Industry Alliance (IEIA) are two products that have been prepared to promote the establishment of national and cross border E-commerce partnerships that will lead to the development of new E-commerce initiatives and projects.

Moreover, UNIDO's E-commerce training programme has been designed to provide MSMEs with a strong foundation in E-commerce concepts and promote the development of skills. UNIDO also published the 'BRICS+ E-commerce Development Report' in 2018 to share the latest E-commerce trends in industrialized economies with the international community.

Industry 4.0 has the potential to improve productivity and competitiveness, increase energy and resource efficiency and effectiveness and, subsequently, to protect the environment. It could further enable the transition to a circular economy in which end of life products are reused, remanufactured and recycled. Given that many of UNIDO's projects already address various building blocks of a circular economy—for example, supporting cleaner manufacture of products, helping to develop safe, easy-to-recycle products with longer lifetimes, and handling the recovery or safe disposal of resources at the end of a product's life—UNIDO is positioned to further advance circular economy models with Industry 4.0, in particular in developing economies as well as to control for rebound effects from Industry 4.0 and to ensure circular economy in the ecosystem of Industry 4.0-enabling technologies.