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UNIDO activities related to Digital Transformation and Innovation

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Report by the Director General

The present note provides an overview of the activities conducted by UNIDO in the area of digital transformation and innovation.

I. Introduction

1. The convergence of the digital and manufacturing sectors and its spill-over effects has been provoking considerable public debate in the past decade. UNIDO has been prominent in international discussions concerning innovation, digital transformation and the fourth industrial revolution (4IR) ever since.
2. Moreover, the Abu Dhabi Declaration adopted by the eighteenth UNIDO General Conference in November 2019 recognized the transformative and disruptive potential of such technologies, and encouraged the formation of a global private sector alliance for inclusive and sustainable industrial development (ISID) under the auspices of UNIDO.
3. UNIDO has been cooperating closely with its Member States and other partners to bring this vision to fruition, most notably through the establishment of the Directorate of Digitalization, Technology and Agri-Business in 2020, which spearheads and mainstreams the Organization's 4IR actions across its core functions.
4. UNIDO's role of upscaling technological capacities is especially challenging given the national, regional and global heterogeneity in this respect. UNIDO's Industrial Development Report 2020 attests to this complex international landscape, finding that while ten economies account for over 90 per cent of advanced digital production patents and 70 per cent of related exports, 88 developing countries play

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little or no role in this sector. There are also considerable differences with respect to capacities, priorities and needs between developing countries. Context oriented advisory services are needed, which take into account such factors as the relevant level of income (e.g. least developed countries, middle-income countries), the geographic region in question (e.g. Africa, Asia, Europe, Latin America) and the needs of specific groups (e.g. small island developing states, economies in transition).

5. While advanced innovations hold immense potential to achieve the Sustainable Development Goals, there are also downside risks to technological progress, particularly in terms of potentially widening the digital divide or leaving sometimes marginalized groups, such as women, youth and migrants, behind. Under the guidance of its Member States, UNIDO is developing a strategic framework for the fourth industrial revolution which will permit the Organization to, inter alia:

- (a) Work more strategically with Member States and development partners;
- (b) Develop global programmes and tailored interventions for advancing 4IR;
- (c) Provide more comprehensive support to Member States;
- (d) Enable an expansion of funding to scale up solutions;
- (e) Reinforce UNIDO's analytical, policy and normative activities;
- (f) Ensure that post-COVID-19 recovery activities promote inclusive and sustainable digital transformation, improving labor markets and supporting social policies;
- (g) Enhance the impact of UNIDO's partnerships and programmes, including the Programmes for Country Partnerships (PCPs) and country programmes (CPs).

6. In line with the strategic priority of the medium-term programme framework 2018-2021 of advancing economic competitiveness, and the mandate given by the Abu Dhabi Declaration, UNIDO is advancing ISID in the 4IR era through its four complementary core functions: (i) analytical, research and policy advisory services; (ii) normative; (iii) technical cooperation; and (iv) convening and partnerships.

II. Analytical, research, policy advisory services, and norms and standard setting

7. Normative work is the bedrock of innovation and digital transformation, given the need to equip policymakers with a solid evidence-based approach to capacity building. To this end, it is crucial to craft appropriate digital policies to enhance productivity, resilience and competitiveness amongst firms in developing countries.

8. Recognizing the diverse needs of its Member States in this regard, UNIDO has been active in the sphere of 4IR knowledge dissemination. For instance, the Industrial Analytics Platform provides policymakers with a wealth of industrial data worldwide, while the UNIDO Knowledge Hub provides an active platform with respect to policy knowledge and training initiatives.

9. Enhancing innovation ecosystems is also central to these efforts, at the national, regional and global levels. This endeavour can be assisted principally by providing mapping and measurement, evidence-based advice and development of relevant indicators. Micro-, small and medium-sized enterprises (MSMEs), start-ups, multinationals, government and regulatory bodies, and academia are at the core of this endeavour. The work of the UNIDO field presence is essential in this regard, particularly the network of Investment and Technology Promotion Offices.

10. The corollary of this normative function is targeted advocacy. UNIDO has been highly active on this front, convening several expert webinar series and developing publications, most notably on COVID-19 implications and responses, digital transformation and industrial recovery, and on quality infrastructure being mobilized against future disruptions.

11. Standards have an important role in shaping the digital transformation, complementing and supporting the regulation of digital technologies. UNIDO has been actively developing and disseminating relevant standards and related guidelines and knowledge products, such as those on innovation management systems developed in cooperation with the International Organization for Standardization, and on smart quality infrastructure, in cooperation with the International Network on Quality Infrastructure.

12. UNIDO continues to participate in important platforms and fora reflecting on these issues, such as the Artificial Intelligence for Good Global Summit and the Principles for digital development, the latter of which has been endorsed by the Organization. It will be important to maintain this work stream and relationships with relevant actors given the increasing demand for agile regulatory approaches and responsive standards that can keep pace with technological development and handle potential risks, particularly in areas such as data protection and cybersecurity.

13. UNIDO was invited to provide inputs to the elaboration of the related Declaration of G20 Digital Economy Ministers approved by the Group in August 2021. The Organization was recognized in the Declaration as a knowledge partner and acknowledged for its capacity to contribute to the agile regulation of 4IR technologies through, for instance, global initiatives on technology foresight. UNIDO has been integrally involved in the G20 Digital Economy Task Force, chaired by the Italian presidency in 2021.

14. Given the considerable lack of gender equality regarding representation in STEM sectors and the disproportionately negative effects experienced by females as a result of digital transition, UNIDO acts to ensure a gender mainstreaming approach to digital transformation.

III. Technical cooperation programmes

15. In order to achieve transformational benefits across the value chain, promotion of innovation and technological upscaling is essential. UNIDO implements innovative technical cooperation interventions addressing smart manufacturing, smart energy, the circular economy, and smart agri-food. These action areas represent the economic, environmental and social inclusion dimensions of UNIDO's ISID mandate.

16. As part of this drive, and in the context of the COVID-19 pandemic, UNIDO supported the deployment of unmanned vehicles to transport medical goods and supplies to hospital workers in Wuhan, China, during the initial stages of the pandemic.

17. UNIDO has also leveraged its knowledge to assist firms, especially MSMEs, to move towards smart manufacturing. The Enterprise Modernization and Innovation Programme provides a graduated approach to digital transition at the micro, meso and macro levels, while the COVID-19 Industrial Recovery Programme provides a macro-level focus to increasing business resilience and recovery. The umbrella Digital Innovation Programme is being developed to scale up and enhance joint efforts.

18. Interventions in this area also include deploying digital twinning and industry 4.0 tools to streamline product optimization in the automotive value chain in Colombia. The project supports local automotive component manufacturers with the development of new products and introduces new software solutions, including cloud-based ones, as alternatives to the established ones that can be used by small and medium-sized enterprises.

19. Satellite-based technology has also been leveraged in Namibia to combat invasive species and thus improve food security. UNIDO has utilized satellite imagery to allow advanced machine learning algorithms to detect invasive acacia bush species with very high precision, enabling yield predicting for farmers and pinpointing where harvesters can find the bushes and cut them.

20. UNIDO supported the establishment of 4IR pilot demonstration centres, such as the 4IR Pilot and Demonstration Centre in Belarus and the Global Shanghai Technology and Science Innovation Centre in China, to improve smart specialization capacities. Similarly, UNIDO also launched a new Science and Technology Parks (STP) module that aims to facilitate the development of new STPs or the refurbishment of existing industrial parks to promote an innovation-driven economy.

21. Within the framework of the UNIDO PCP in Morocco, UNIDO is also supporting the establishment of advanced manufacturing sites, allowing for the gradual upgrading of production facilities through automation and the use of advanced manufacturing technologies in smart factories.

22. The 4IR also holds the potential to deliver transformative change in other areas, most notably in the implementation of the 2030 Agenda for Sustainable Development and the Paris Agreement. Advanced technologies support the integration of renewable energies into energy systems and can promote access to modern energy in off-grid regions. Likewise, the 4IR will play a fundamental role in the transition towards a circular economy, bio economy and nature-based technology solutions.

23. UNIDO has deployed the Internet of Things to improve sourcing of geothermal energy in Kenya. Central to this is technology demonstration, removal of existing barriers to information and technical knowledge, capacity building to better absorb and domestically replicate such technologies, and identification of new business models, while strengthening market conditions for investment in Africa.

24. Sustainable financing is an integral element of the green and digital transitions and thus UNIDO is active in supporting impact investment. Together with the World Association of Investment Promotion Agencies, UNIDO developed an e-learning course on impact investing for investment promotion agencies to understand how this important trend will affect investment promotion and facilitation efforts.

25. As part of UNIDO's efforts to promote smart agri-food, blockchain technology has been harnessed to improve the traceability of the cocoa value chain in Ghana. UNIDO is piloting a methodology to assess the readiness of a value chain to adopt blockchain technology, aimed to advise developing countries willing to enter the 4IR on the challenges and benefits of adopting such technology. Blockchain can provide real-time, accurate and complete interconnected data on provenance, quality, safety, transportation, certification, and product ingredients from farm to end consumer.

26. Similarly, a virtual assessment has taken place and remote support has been provided to the Food and Drugs Authority of the Government of Ghana. UNIDO provided smart glasses, an innovative tool that combines video conferencing and augmented reality, allowing anybody with an internet connection to see and interact with the environment of the smart glasses' user. This solution has potential for enhancing technical assistance, verifying products, processes and capabilities, and generating electronic evidence for international certification and accreditation.

27. UNIDO has also established a traceability platform for the seaweed value chain in Indonesia. The SeaweedTrace platform allows processing firms to closely monitor their supply base of more than 3,000 farmers. The ability to trace seaweed back to farms will add value to the processed seaweed, enable companies to monitor quality and quantity of supply from individual farms and support companies in their efforts to expand their export market.

IV. Convening and partnerships

28. No one actor can hope to implement as broad an action agenda as this without close cooperation with relevant partners. UNIDO thus leverages a variety of partnerships with stakeholders in government, the United Nations system, the private sector and the research community.

29. Convening is another feature of this partnership function, by bringing together partners to catalyse new initiatives, knowledge and funding for development. Together with the Ministry of Industry and Advanced Technology of the United Arab Emirates, UNIDO co-chairs the Global Manufacturing and Industrialisation Summit (GMIS), a platform aiming to advance an inclusive and sustainable 4IR through multi-stakeholder dialogue, partnerships and action. The 2021 Summit will take place in Dubai, in parallel to the Expo 2020, from 22 to 27 November 2021, under the theme of “Rewiring Societies: Repurposing Digitalization for Prosperity”.

30. UNIDO also convenes the Learning and Knowledge Development Facility (LKDF), which aims to provide young workers in developing countries with the online training they require to access the industrial labour markets of the future. In 2020, the LKDF supported a green skills agenda showcasing the relevance of STEM skills to enable the green transformation in the industrial sector.

31. Other flagship UNIDO fora addressing the disruptive effects of digital transition include the Vienna Energy Forum, Bridge for Cities and the Green Industry Conference.

V. Outlook

32. In order to achieve an inclusive and sustainable digital transformation, UNIDO believes four enabling elements are necessary: innovation, digital infrastructure, digital skills, and digital cooperation. Without addressing these critical factors on a large scale, it will be impossible to achieve the sort of transformational effect the Organization aims for through digital technology upscaling and capacity building.

33. UNIDO already addresses these enabling elements through its existing portfolio of technical cooperation assistance and programmatic services. However, upscaling UNIDO’s capacities and the effect of its interventions will be necessary to drive the scale of the transformation needed to realize an inclusive and sustainable fourth industrial revolution.

VI. Action required of the Conference

34. The Conference may wish to take note of the information provided in the present document.
