United Nations Industrial Development Organization

Distr.: General
11 November 2022

Original: English

Industrial Development Board
Fiftieth session
Vienna, 21–23 November 2022
Item 9 of the provisional agenda
UNIDO activities related to digital transformation and innovation

UNIDO activities related to digital transformation and innovation

Report by the Director General

The present document provides an overview of the recent activities of UNIDO in the area of digital transformation, innovation and frontier technologies, including artificial intelligence. These are key focus areas of the Organization's new Division of Digital Transformation and AI Strategies, as presented in the Director General's Bulletin of 7 October 2022, on the UNIDO Secretariat Structure 2022 (DGB/2022/19).

I. Background

1. Digital transformation is a major trend that has triggered a productive shift that brings with it the potential for increased efficiency and more sustainable production and products, but also challenges to current development pathways. Technologies furthering digital transformation, particularly artificial intelligence (AI), have the risk of perpetuating current biases and inequalities if not well utilized. Strategies and actions to foster this transformation must consider several limiting factors, including the digital divide and digital gender gap.

2. UNIDO has been cooperating closely with its Member States and other partners to harness the power of digital transformation for development, and during the recent organizational restructuring, a Division for Digital Transformation and AI Strategies was established to respond to related challenges, as well as to provide solutions that will contribute to the Sustainable Development Goals through progress by innovation.

3. As the United Nations agency mandated to promote inclusive and sustainable industrial development, UNIDO leads the way in addressing the opportunities, challenges and risks stemming from the fourth industrial revolution (4IR). The Organization's vision, according to its medium-term programme framework (MTPF) 2022–2025, is "to assist Member States in accelerating their transformation towards inclusive and sustainable industrialization, seizing industrial development opportunities to achieve the 2030 Agenda". More than ever, inclusive and sustainable pathways to advance industrial development require systemic approaches as well as innovative, collaborative, transformational and flexible solutions.

V.22-25128 (E) 151122 161122

4. Therefore, UNIDO has defined five enabling elements which drive digital transformation, namely: digital transformation at the firm level; skills and capacity-building; innovation ecosystems; partnerships, investment and infrastructure; and governance, technologies and innovation. These elements address essential outcomes, without which 4IR cannot permeate beyond isolated "technological islands", high-income countries or highly digitalized sectors, and without which digital transformation would lose much of its transformative power.

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

5. 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 in this area. It is crucial to craft appropriate digital policies to enhance productivity, resilience and competitiveness among firms in developing countries.

6. Digital transformation and artificial intelligence also continue to present risks, including, but not limited to: automation of industrial plants and infrastructures; reshoring of foreign direct investment from developing countries; threats to cybersecurity and data protection; perpetuation of inequalities through AI-enabled algorithms; and a widening digital divide between high-income countries and low and middle-income countries.

7. Enhancing innovation ecosystems is also central to overcome environmental and socioeconomic risks at the national, regional and global levels. This endeavour can be assisted 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.

8. Targeted advocacy is critical for UNIDO to fulfil its normative function. In this regard, UNIDO has convened several conferences and webinars, and developed publications highlighting relevant trends in the area of development, as well as providing examples of best practice on issues like standards, norms and policy advice.

9. Countries that adopt sound and comprehensive strategies on digital transformation technologies in general, and artificial intelligence in particular, will benefit from a holistic and all-encompassing approach that ensures wide and efficient application across relevant sectors of the economy, as well as the removal of obstacles and bottlenecks related to commercial and non-commercial AI applications.

10. To respond to the strategic priorities outlined in the Abu Dhabi Declaration, and under the guidance of its Member States, UNIDO is preparing a set of regional studies to map out the unique 4IR challenges and opportunities in each region where the Organization operates. Those studies are built on the UNIDO MTPF 2022–2025 and the Organization's activities related to digital transformation and innovation. They will facilitate and promote a dialogue on digital transformation and 4IR among Member States of dedicated regions, outlining geographical and economic perspectives, and presenting an action plan for UNIDO.

11. In 2021, UNIDO approved the creation of an internal task force on digital transformation and 4IR, which was later renamed to the task force on the strategic framework for digital transformation, innovation and AI strategies. The task force is advancing on the development of the strategic framework, incorporating regional approaches, which will be presented to Member States during the first half of 2023.

III. Technical cooperation programmes

12. At the micro level, UNIDO works to ensure the digital transformation of firms and individuals through a variety of interventions like training and upskilling (e.g. through the UNIDO Learning and Knowledge Development Facility); knowledge enhancement; technology transfer; and the dissemination of best practices. The Organization also cooperates directly with partners in the private sector, including through its network of Investment and Technology Promotion Offices (ITPOs), to accelerate the uptake of e-commerce in developing countries, as well as assisting with enterprise assessment and modernization plans, and the development of entrepreneurship support and curricula.

13. 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.

14. In Colombia, UNIDO is helping to implement digital twinning and other industry 4.0 tools to streamline product optimization in the country's automotive value chain. Under the guidance of project experts and with the help of new advanced digital tools, automotive component manufacturers can turn their attention to new products and software solutions that further increase their efficiency. Looking for alternatives to the big software providers can also make certain technological solutions available to MSMEs, which are often too small to cover the costs of enterprise software solutions.

15. In Namibia, AI, machine learning (ML), big data and remote sensing based on satellite and drone imagery technologies have been leveraged to combat invasive species and thus improve food security. UNIDO has utilized satellite imagery to allow advanced AI and ML algorithms to detect invasive acacia bush species. By automatically identifying and locating invasive species, the project enables the harvesting of these plants to be transformed into animal fodder and charcoal for energy, creating a digital circular economy in the sector. In addition, UNIDO is testing the use of unmanned aerial vehicle, including drones, and intelligent sensors for precision farming to analyse the health of the soil in terms of humidity and salinity, and the status of fertilization.

16. In Jordan, UNIDO is supporting the formulation of the country's AI strategy to advance national industrial development and firm productivity, putting its experience and expertise forward to execute a diagnostic research, provide strategic advice and facilitate the consultation process between the Government and related stakeholders.

17. UNIDO and the International Telecommunication Union (ITU) have partnered for a series of events on Artificial Intelligence for Manufacturing as part of ITU's AI for Good digital platform, convening experts from all over the world to cover manufacturing-related topics and issues of relevance to both organizations. As part of the AI for Good Summit, this cooperation provides high visibility for activities supporting productive firms and opportunities for partnerships with the private sector, as well as access to leading experts in the field of digital transformation and AI.

18. UNIDO is exploring partnerships with public and private entities. The Organization is currently advancing a strategic partnership with the private sector to collaborate on digital transformation matters, and to provide support to MSMEs across the globe. In that regard, Huawei and UNIDO plan to organize high visibility events, during which start-ups from all over the world will be exposed to international best practice; an important learning experience, particularly for start-ups and MSMEs from developing countries.

19. In Tunisia and Côte d'Ivoire, UNIDO is implementing a project on industry 4.0 with the main objective of advancing the transformation of the countries' productive sectors to increase productivity and competitiveness, and contribute to youth

employment with a focus on gender equality. The project will ensure the sustainability of its impact by supporting the establishment of a smart factory, and strengthening the capacity of academic and vocational institutions to promote the required skills and approaches related to industry 4.0.

20. In the area of climate change, UNIDO has developed the eco-industrial park management services tool. The objective of this tool is to strengthen and advance the modern industrial park services provided by park management to tenant companies, thereby supporting innovative production practices, increasing the value for money provided by park management to tenant companies and securing/expanding revenues of park management entities. The tool assists park management entities in the reviewing, prioritizing, scoping and action planning of value-added services, including industry 4.0 services, for their industrial park and tenant companies.

21. UNIDO has developed an innovative model incorporating AI, which is being implemented under the Blue Economy component of the SwitchMed programme to support Mediterranean aquaculture transition towards sustainable and circular practises. Artificial intelligence enables the optimization of fish feeding, which promotes sustainable fish growth that increases the profitability of the aquafarm while reducing the dispersion of exogenic substances in marine ecosystems.

22. In the area of energy, UNIDO has established the Global Cleantech Innovation Programme (GCIP) to support start-ups and small and medium-sized enterprises (SMEs) offering frontier information and communication technologies to contribute to the clean energy transition and to climate action. The Programme is implemented in Cambodia, Indonesia, Kazakhstan, Lesotho, Mongolia, Morocco, Nigeria, Pakistan, the Republic of Moldova, Senegal, South Africa, Türkiye, Ukraine, Uruguay and Viet Nam. GCIP promotes energy and climate solutions which apply digital and AI applications for smart renewable energy generation facilities, energy distribution and storage systems, energy efficiency in industrial processes, and energy and battery infrastructure for mobility markets.

23. In the area of agriculture, UNIDO convened a virtual Expert Group Meeting (EGM) on digital agribusiness that brought together key experts from various international organizations, academia and the private sector along the agribusiness value chain. The EGM concluded with an understanding of the key convening role of UNIDO in efficient and inclusive digital agribusiness development. The meeting established that digital technologies can provide a pathway to solutions that can improve connectivity and visibility across agriculture value chains. As a follow up of the EGM, an issue paper was produced on the topic of smart agribusiness. A new digital tool on enterprise performance management (Smart and Sustainable Agri-Business) is being developed and deployed under a project to support SMEs in Ghana, with the potential to be scaled up at regional level.

IV. Convening and partnerships

24. Bridging the digital divide that is reflected in digitalization and in AI and the use of frontier technologies for productive transformation is a key development challenge. To address this issue, UNIDO produces normative products, toolkits and methodologies for firms; provides policy advice for the public sector; and organizes and participates in global forums and networking events. UNIDO further leverages a variety of partnerships with stakeholders in government, the United Nations system, the private sector (such as through its ITPO network) and the research community. This includes the Organization’s cooperation with ITU, the United Nations Educational, Scientific and Cultural Organization, the United Nations Conference on Trade and Development and the regional economic commissions to scale up the reach of its work on digitalization, frontier technologies and AI.

V. Outlook

25. To achieve an inclusive and sustainable digital transformation, UNIDO believes four digital enabling elements are necessary: digital infrastructure, digital governance, 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.

26. 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 advance an inclusive and sustainable digital transformation.

27. Artificial intelligence in connection with 4IR frontier technologies will be one of the key elements of digital transformation, and UNIDO will look to increase its support to Member States seeking to capitalize on developments in this area. More technical demonstration work will be conducted and (national) strategies fostering AI development will continue to be supported as a tool to harness the benefits of these technologies. UNIDO will promote the discussion around AI in industry and provide further elements to design public policies and tools for firms.

28. UNIDO will organize engagement activities with Member States to best respond to the needs of the countries and regions, and to help overcome the digital divide. These will be organized at the regional level, as context is a necessary dimension in UNIDO's strategies to support Member States.

VI. Action required of the Board

29. The Board may wish to take note of the information provided in the present document.