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UNIDO Strategic Framework for the Fourth Industrial Revolution

UNIDO Strategic Framework for the Fourth Industrial Revolution 2022–2030

Report by the Director General

This report offers a description of UNIDO's approach to building a strategic framework to enhance the advance of the fourth industrial revolution to support the achievement of inclusive and sustainable industrial development (ISID) and implementation of the 2030 Agenda for Sustainable Development in UNIDO Member States.

I. Introduction

1. The present report provides an overview of the proposed strategic framework to promote inclusive and sustainable industrial development (ISID) and to fulfil the 2030 Agenda for Sustainable Development in Member States through the acceleration of the fourth industrial revolution (4IR) and digital transformation.

II. Background

2. The fourth industrial revolution is at the centre of the digital transformation of societies. In the manufacturing and services sector, it is characterized by the convergence of advanced digital production (ADP) technologies that include artificial intelligence (AI), 3D printing, big data, robotics and others, with advances in energy storage and generation, as well as quantum computing, transforming the global industrial landscape. ADP technologies and industrial production processes have furthermore generated the concept of the smart factory, based on continuous optimization.

3. The digital divide and its implications for manufacturing are an urgent concern to UNIDO Member States. The UNIDO Industrial Development Report 2020 noted that just 10 high-income economies account for over 90 per cent of the advanced

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innovation patents and around 70 per cent of the exports associated with ADP technologies. Meanwhile, 88 developing economies located in the global South play little or no role in 4IR. This underlying structural issue has been magnified by the COVID-19 pandemic and the disruptions in global value chains as well as cross-border manufacturing.

4. Manufacturing has been vital in tackling the COVID-19 pandemic by, inter alia, reorganizing production systems in firms, repurposing industrial facilities towards essential goods in the healthcare sector, ensuring availability of food and other basic consumer goods and supporting innovations such as testing kits to enable contact tracing and identification.

5. As the post-pandemic period approaches, some global trends have been identified among multinational firms choosing to avoid global risk by prioritizing local production, customization and intra-regional trade over global value chain production. This shift may have implications for developing countries, which are disproportionately dependent on foreign direct investment and trade in labour-intensive sectors, and which currently lack the advanced technological capacities to transition to 4IR.

6. A major concern is that the 4IR landscape continues to exhibit inequalities, with women being underrepresented in the associated sectors of science, technology, engineering and mathematics (STEM), and experiencing disproportionate negative impacts, among others from the automation of manufacturing employment that creates a mismatch in labour markets. AI algorithms often perpetuate discrimination and biases, and big data raise concerns about privacy. UNIDO's role is to support the positive effects of 4IR and to mitigate the negative impacts of technology on prosperity.

7. The Abu Dhabi Declaration, adopted at the eighteenth session of the General Conference in November 2019, and the conference room paper on the UNIDO strategic framework for 4IR (IDB.49/CRP.11), submitted to the forty-ninth session of the Industrial Development Board in July 2021, drew attention to the emergence of frontier technologies and called for an embracement of their advantages, as well as the establishment of a global private sector alliance for ISID. UNIDO's medium-term programme framework (MTPF) 2022–2025 responds to this call and identifies digital transformation and innovation as one of the three focus areas for the Organization to advance ISID.

8. To further support its Member States, UNIDO is developing a strategic framework for the fourth industrial revolution which will permit the Organization to strengthen its position as a global leader in this area by:

(a) Working more systematically and strategically with Member States and development partners on topics pertaining to 4IR, and synergizing more effectively the different areas of work of the Organization;

(b) Developing results-oriented global programmes and tailored interventions and approaches for advancing 4IR in Member States, considering regional perspectives and building on UNIDO's accumulated knowledge, experience and assets;

(c) Attracting additional funding to scale up solutions that address digital transformation priorities in Member States as well as increasing the visibility of UNIDO's activities and better showcasing the potential of its project pipeline;

(d) Providing comprehensive support to Member States by better integrating UNIDO's work on the three priority areas identified in the MTPF 2022–2025, namely (i) structural transformation and sectoral expertise, (ii) climate-neutral industry and circular economy, and (iii) digital transformation and innovation;

(e) Enhancing the impact of UNIDO's partnerships and programmes, including the Programmes for Country Partnerships and country programmes, and promoting synergies with other organizations, national, regional and multilateral

development banks and the business sector at national, regional and international levels.

III. Strategic objectives and areas

A. UNIDO's global role to promote 4IR

9. As the United Nations specialized agency with a mandate to promote ISID, UNIDO is uniquely placed to leverage its technical cooperation, policy and convening capacities to assist its Member States in their transition to 4IR.

10. On innovation and industrial sectoral policies, UNIDO possesses capabilities to scale up technologies and integrate them with the methodologies and tools to work on industrial sectors from value and supply chains to clusters. The Organization also has extensive programmes on science and technology parks, special economic zones and industrial parks to enhance technological and innovation ecosystems.

11. In terms of digital upskilling and vocational training, UNIDO aims to raise capacities in developing countries through its Learning and Knowledge Development Facility. It has also enabled digital policy learning during the pandemic through specially convened webinar series such as "ISID in the Age of 4IR", "Standards and Testing in Fighting COVID-19" and "Countering the Impacts of COVID-19 with International Standards".

12. On the level of partnerships and convening, UNIDO is active in reaching out to partners in the international private sector, the research community, the United Nations system and national governments through dedicated fora such as the Global Manufacturing and Industrialisation Summit (GMIS), which UNIDO co-chairs together with the Ministry of Industry and Advanced Technology of the United Arab Emirates.

13. In relation to normative activities and policy advice, UNIDO has increased its support to Member States with respect to 4IR. The Organization's discussion paper "Bracing for the New Industrial Revolution", webinar series "Making the Fourth Industrial Revolution Work for All" as well as the "Industrial Development Report 2020: Industrializing in the digital age", focused on the implications and challenges of 4IR for all countries. The UNIDO Knowledge Hub provides information on 4IR advances, both normative and operational, while the Industrial Analytics Platform provides a one-stop-shop for industrial data globally. The Organization has also established a methodology for leveraging blockchain technology in supply chains.

B. UNIDO's 4IR strategic objectives and priority areas

14. The 4IR strategic framework aims to make 4IR work for all by (i) advancing smart production for climate action, (ii) harnessing 4IR for economic development, and (iii) improving livelihoods using 4IR technologies. To support those goals, UNIDO advances on innovation ecosystems, skills and capacity-building, governance, partnerships, investment and infrastructure, with interventions at the micro (enterprise ecosystem), meso (governance) and macro levels (integrated policies at spatial domains).

15. The strategic objectives will fully integrate the United Nations principles of leaving no one behind and building back better with regard to gender equality and the empowerment of women, youth, elderly and vulnerable populations.

Strategic objective 1: Strengthen 4IR capacity-building for firms with implementation tools and methodologies

16. To support the achievement of this strategic objective, UNIDO will:

(a) Improve digitalization at the firm level, developing modules and policy advisory tools on digitalization, digitization and innovation, in order to support firms to access frontier technologies;

(b) Support the digital transformation of firms through the implementation of 4IR strategies which consider products, processes, business models and logistics and which target key thematic areas to all Member States such as nature-based solutions, renewable energy, circular economy, smart agribusiness, and smart manufacturing;

(c) Increase firm level competitiveness, productivity and resilience with policy advisory tools, quantitative analysis and strategies, supporting firms in the design of extensive projects and programmes with frontier technologies.

Strategic objective 2: Expand UNIDO's services on 4IR diagnostics, innovation and technology advice

17. To expand UNIDO's 4IR services on governance at the institutional level, the Organization will:

(a) Expand capacity at the meso level to design, implement and evaluate 4IR technologies' contribution to productivity enhancement;

(b) Strengthen innovation ecosystems by improving linkages between stakeholders and institutions;

(c) Improve the business environment and facilitate dynamic entrepreneurship. Provide efficient and contextual advice to develop a national technology and innovation ecosystem and environment that embraces digital transformation with strong dynamic entrepreneurship and start-up capabilities.

Strategic objective 3: Expand UNIDO's research and policy advice to enhance technology policies and strategies

18. UNIDO's track record of developing research, policy advice, norms and standards across different sectors (agriculture, automotive, textile, fishery and pharmaceuticals inter alia) in Member States will enable us to:

(a) Enhance partnerships and investment to advance the design of national 4IR and industrial innovation programmes among Member States;

(b) Expand UNIDO's expertise on policy and engagement with standard-setting bodies and associations to support Member States in gaining benefits from new industrial models;

(c) Consolidate technology and innovation policies, basic infrastructure plans (information and communications technologies, and physical infrastructure) and soft skills (education, STEM and sector capabilities) to advance the knowledge-driven economy.

IV. Theory of change

19. UNIDO's strategic framework is guided by a 4IR theory of change that presents how UNIDO's technical expertise and service areas will contribute to the advancement of the Sustainable Development Goals (SDGs) through ISID in the transition to the new industrial paradigm. UNIDO is undertaking an internal exercise to assess resources and capacities to support the 4IR transformational change. The main points of this approach are:

(a) As an immediate task, UNIDO will expand a programme and critical mass of 4IR tools and methodologies, as well as projects and programmes implemented as

part of the UNIDO 4IR strategic framework 2022-2030 to accelerate the achievement of the SDGs through ISID. An internal survey will provide baseline information on UNIDO's 4IR engagement, to advance internal 4IR capacity-building and digital transformation of processes;

(b) In the medium term, UNIDO will continue supporting firms and the public sector in the adoption of 4IR technologies and business practices. UNIDO's workforce will design methodologies and tools based on thematic and contextual interventions in sectors, countries and regions; conduct firm-level readiness and maturity assessments; review technical capacities, policies and strategies; and map gaps;

(c) By 2030, UNIDO aims to have assisted its Member States in adapting their industrial policies to 4IR. This will allow for the development of new programmes which have strong digital and innovation components in the areas of skills and capacity-building, governance, infrastructure and investment, all having digital transformation and prosperity at the centre to make 4IR work for all.

V. Action required of the Conference

20. The Conference may wish to take note of the information contained in the present document.

Theory of change

UNIDO 4IR THEORY OF CHANGE 2022-2030

