



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION



COVID-19

Implications & Responses

**DIGITAL TRANSFORMATION
& INDUSTRIAL RECOVERY**



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

COVID-19

Implications & Responses

**DIGITAL TRANSFORMATION
& INDUSTRIAL RECOVERY**

June 2020

ACKNOWLEDGEMENTS

This document is published by the United Nations Industrial Development Organisation (UNIDO), under the overall guidance of Mr. Bernardo Calzadilla-Sarmiento, Managing Director of the Directorate of Digitalization, Technology and Agri-Business.

The final document benefited from the valuable inputs, review and constructive comments received by Mr. Alejandro Rivera Rojas, Mr. Stefan Kratzsch, Ms. Dorina Nati, Mr. Andrea Carapellese, Ms. Rebeca Gallardo Gomez, Mr. Darren Gleeson, and Mr. Nikolaus Martys.

DISCLAIMER

Copyright © 2020 United Nations Industrial Development Organization. This document has been produced without formal United Nations editing. The designations and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations Industrial Development Organization (UNIDO). Mention of company names or commercial products does not constitute an endorsement by UNIDO. Although great care has been taken to maintain the accuracy of the information presented, neither UNIDO nor its member states assume any responsibility for consequences which may arise from the use of the material. This document may be freely quoted or reprinted, but acknowledgement is requested.



Foreword

The COVID-19 pandemic has impacted hugely upon our society, not alone in terms of its threat to human health and wellbeing, but also the disruption of global economic activity, jeopardizing livelihoods and straining public finances worldwide. No less than any other sector, manufacturing has been affected, with many essential global value chains either being halted or severely interrupted.

Official statistics by UNIDO show that manufacturing output growth declined by 6.0 per cent in the first quarter of 2020, a sharp decrease triggered by the pandemic, as well as existing trade restrictions. The UNIDO Industrial Production Index dataset also shows that in March 2020, the majority of the countries suffered negative growth rates compared with pre-crisis periods, with the average contraction being 4.8 per cent against December 2019 and 4.6 per cent compared with March 2019.

Meanwhile, Foreign Direct Investment (FDI) is expected to decline significantly. This is likely to affect developing countries disproportionately, owing to their reliance on investment within global value chains. In comparison with High Income Countries, they are less endowed with resources to be able to put macroeconomic contingency measures in place.

Nonetheless, industrialization will continue to play a vital role in long-term growth and development strategies, as well as meeting immediate needs in healthcare. The manufacturing sector is crucial to rebuild society, and during this crisis, in the immediate term, through the production of essential medical goods, personal protective equipment and testing kits inter alia.

The UNIDO strategy for combatting Covid-19 hinges on the phrase “prepare and contain, respond and adapt, recover and transform”, assisting the manufacturing sector to keep essential production chains in operation through a tailored portfolio of services for inclusive and sustainable industrial development, including technical cooperation, programmatic assistance, normative services, and convening (in a virtual setting).

The disruption caused by the outbreak presents us with an opportunity to “build back better” by sharing and enhancing knowledge, building competitiveness and resilience and improving quality infrastructure, so that we can address unforeseen events with confidence in the future.

The digitalization of industry has been at the forefront of industrial transition in recent years, simultaneously promising immense potential for increasing value added, productivity and efficiency but also posing challenges to social inclusion and for accessibility in developing countries. The outbreak is accelerating digitalization of industry (or “Fourth Industrial Revolution”) through encouraging more localized production and customization, thus shortening value chains and reducing supply chain risks for businesses.

It is also a sine qua non for the implementation of the 2030 Agenda for Sustainable Development, as outlined in the annex to this document. The challenges of digital recovery are truly of a global nature, given that COVID-19 does not respect national boundaries. Restoring the global economy, safeguarding human health and wellbeing and successfully managing the digitalization of manufacturing can only be ensured through strong international cooperation with multi-stakeholder partnerships at the core.

The future of manufacturing should be underpinned by strong quality infrastructure and innovation ecosystems and it must be aspirational for all people in all countries. UNIDO will create partnerships with a broad range of stakeholders to ensure the highest quality standards, the upscaling of technological capacities and inclusivity in an era of digital transformation.

Li Yong
UNIDO Director General

Managing Disruption

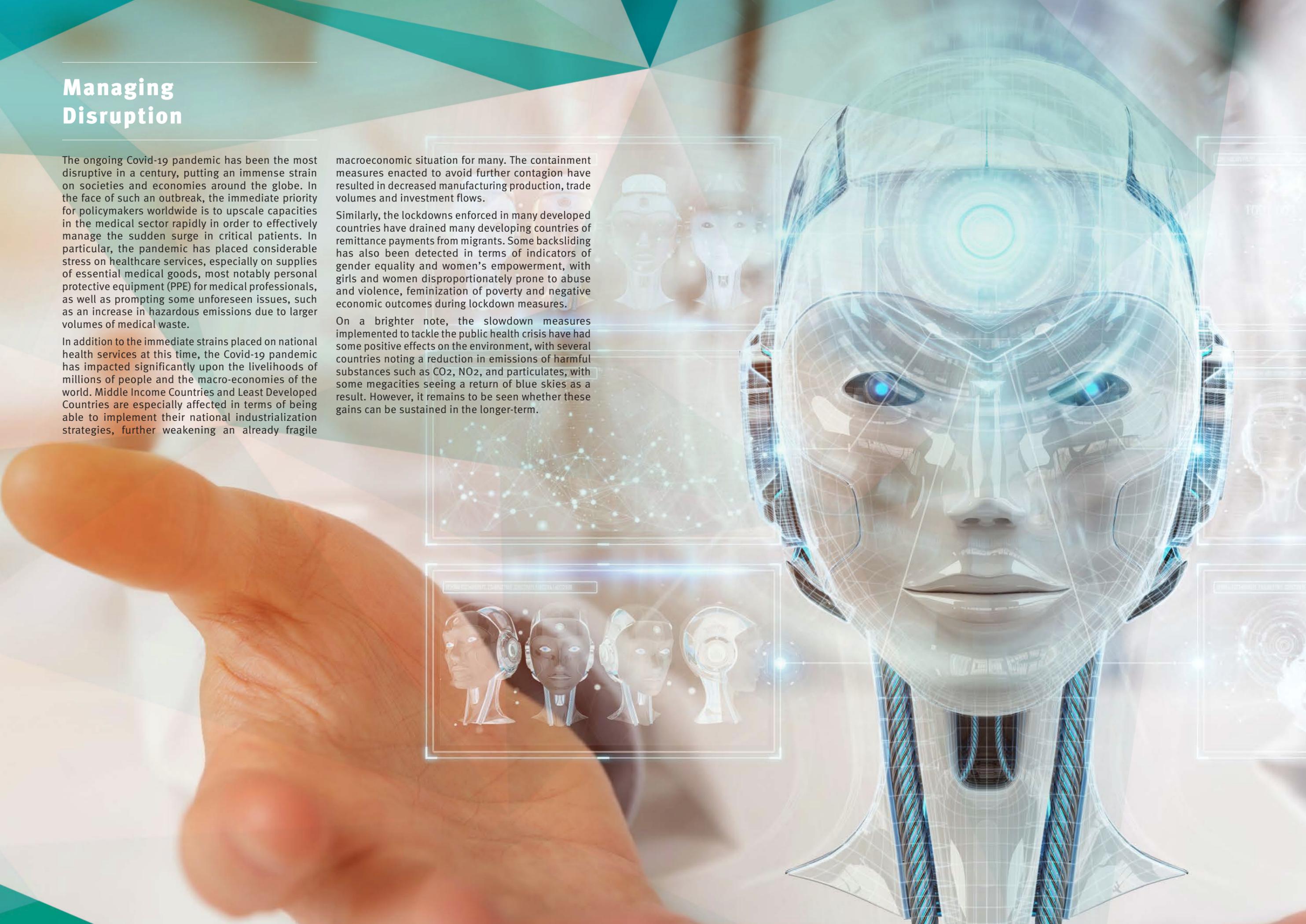
The ongoing Covid-19 pandemic has been the most disruptive in a century, putting an immense strain on societies and economies around the globe. In the face of such an outbreak, the immediate priority for policymakers worldwide is to upscale capacities in the medical sector rapidly in order to effectively manage the sudden surge in critical patients. In particular, the pandemic has placed considerable stress on healthcare services, especially on supplies of essential medical goods, most notably personal protective equipment (PPE) for medical professionals, as well as prompting some unforeseen issues, such as an increase in hazardous emissions due to larger volumes of medical waste.

In addition to the immediate strains placed on national health services at this time, the Covid-19 pandemic has impacted significantly upon the livelihoods of millions of people and the macro-economies of the world. Middle Income Countries and Least Developed Countries are especially affected in terms of being able to implement their national industrialization strategies, further weakening an already fragile

macroeconomic situation for many. The containment measures enacted to avoid further contagion have resulted in decreased manufacturing production, trade volumes and investment flows.

Similarly, the lockdowns enforced in many developed countries have drained many developing countries of remittance payments from migrants. Some backsliding has also been detected in terms of indicators of gender equality and women's empowerment, with girls and women disproportionately prone to abuse and violence, feminization of poverty and negative economic outcomes during lockdown measures.

On a brighter note, the slowdown measures implemented to tackle the public health crisis have had some positive effects on the environment, with several countries noting a reduction in emissions of harmful substances such as CO₂, NO₂, and particulates, with some megacities seeing a return of blue skies as a result. However, it remains to be seen whether these gains can be sustained in the longer-term.





IMPLICATIONS FOR SUSTAINABLE DEVELOPMENT

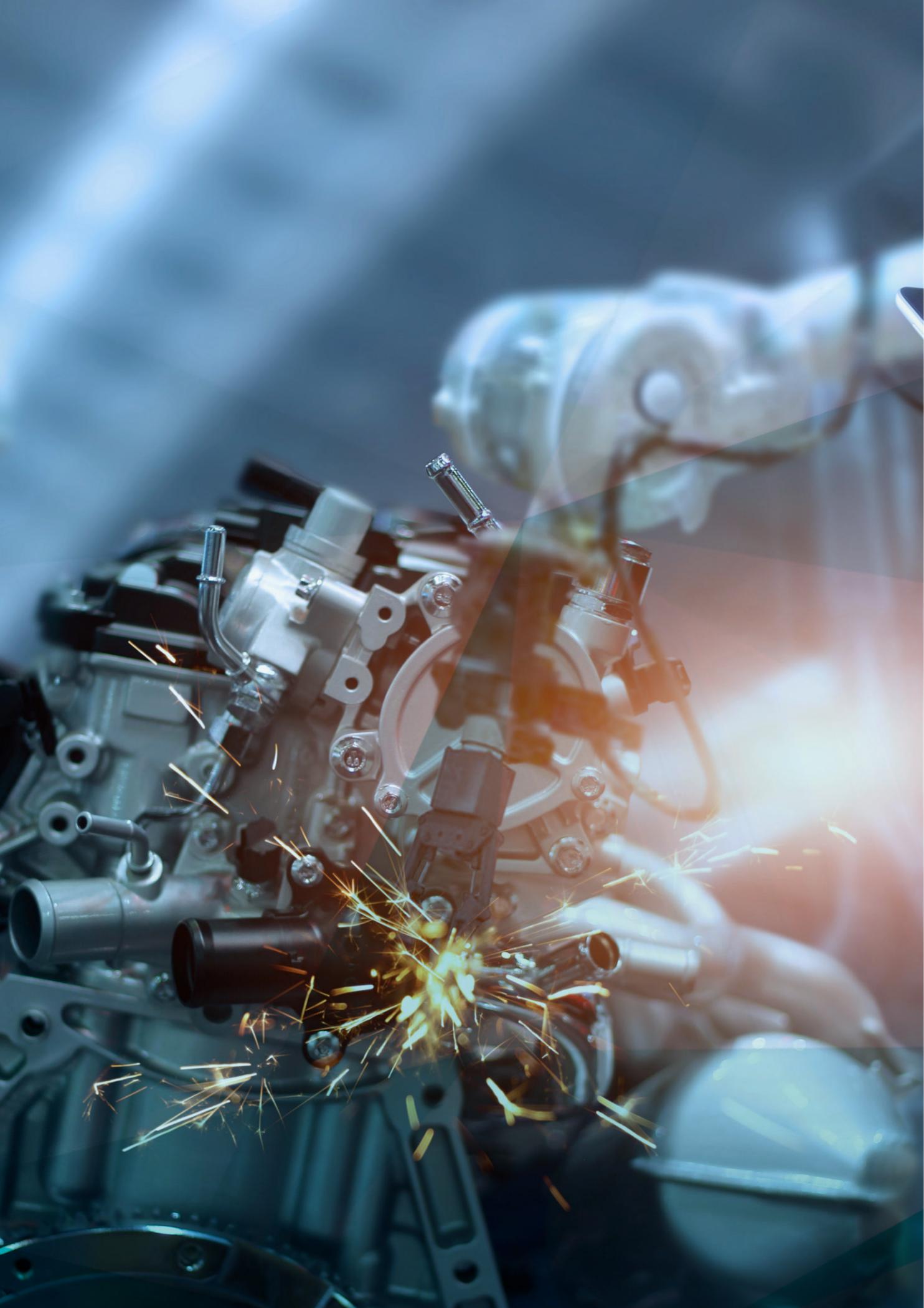


Implications for Sustainable Development

The Covid-19 pandemic may have considerable negative implications for the implementation of the 2030 Agenda for Sustainable Development, as

adopted by the United Nations General Assembly in September 2015. The 2030 Agenda addresses the economic, environmental and social dimensions of development, as represented by its 17 Goals.

Given the immediate threat posed to public health by the pandemic, priorities and funding at the national level earmarked for international development may be diverted to address immediate humanitarian concerns. This understandable prioritization of competing demands may cause shortfalls in other policy areas, potentially leading to unforeseen consequences for people, planet and prosperity further down the line.



Implications for People

In terms of future challenges for people, the outbreak poses a variety of issues and disruptions to human wellbeing on a broad scale, most notably for the eradication of poverty, which may be seen as the overarching objective of the 2030 Agenda. However, this has already been impacted strongly by the pandemic and may lead to further retrenchment the longer that the pandemic lasts, especially due to disruption to economic activity. Similarly, there are some fears that food restrictions could exacerbate global hunger, which already affected some 820 million people before the crisis.¹ This has negative implications for the achievement of Goal 2 concerning zero hunger. Goal 3 concerning health has also been severely affected, with many countries lacking adequate PPE for medical professionals, reliable testing kits and quality controls.

Educational services have also been disrupted due to the necessity of social distancing and quarantining, thus impacting on Goal 4. Women and girls have also been disproportionately affected as they are much more likely to work in precarious and low-paid employment, to be employed in exposed professions such as caregiving or nursing, or to be the victims of domestic abuse or violence than males. Gender equality (Goal 5) has thus been imperilled by the Covid-19 pandemic.

Water and sanitation services (Goal 6) are also likely to be challenged by the outbreak, which may exacerbate existing water scarcity in some countries/regions, with shortfalls of up to 40 per cent of existing water supplies forecast prior to the pandemic.

Implications for Prosperity

The potential implications for prosperity are also multifaceted. The drastic reduction in the use of both personal and public transport vehicles has coincided with a temporary fall in the cost of fossil fuels, which is making renewable sources less attractive. This could make it considerably more difficult to achieve Goal 7 regarding sustainable energy, for instance. In terms of trade and investment, the pandemic has significantly reduced global demand, manufacturing production and trade volumes, leading to a possible Global Depression and unprecedented lack of security in the labour market.

Concerning manufacturing, the global drop-off in demand has caused shortages of intermediate parts, factory closures and reduced orders, impacting on the achievement of Goal 9. For instance, in China,

¹ Ibid.

a key actor in many global value chains, industrial production fell 13.5 per cent in January and February 2020, as compared with the same period in 2019.² And while some companies have shifted the operations to meet the surging demand in medical goods and supplies, some barriers to entry in those sectors exist, given the need to meet stringent standards, certifications and accreditation in production.

It may also be that Goal 10 concerning inequality may also be adversely affected, as many developing countries' already lack the public health infrastructure to combat a crisis of this magnitude. FDI flows are also likely to be affected due to the slowdown in economic activity worldwide. And Least Developing Countries in particular would be affected if the pandemic accelerates the digitization of manufacturing immediately, as a vastly lesser proportion of the populations there have access to basic digital services. For instance, in Africa, the percentage of people using the Internet stood at less than 25 per cent in 2018, compared with almost 80 per cent in Europe.³

Implications for Planet

The planet too is being impacted by the “new normal” associated with Covid-19. For example, the social distancing and quarantining measures designed to tackle the spread of the virus are often impossible in informal settlements, impacting negatively on Goal 12 regarding sustainable cities. The priority given to addressing the health implications of the outbreak are also likely to detract from the focus on achieving climate action (Goal 13) and sustainability of the oceans, seas and marine (Goal 14). And although the Covid-19 pandemic has provided the planet with some respite from carbon emissions, some new environmental hazards have arisen, such as increased waste in the medical sector.

There are some social risks to people associated with the outbreak also, as the restrictions imposed by governments have been met with protests and unrest in some countries (Goal 16), while the crisis has also added fuel to some geopolitical tensions and protectionism in terms of medical goods in particular, endangering the goodwill necessary to tackle international challenges cooperatively, as per Goal 17 on global partnership. There is also a strong probability that the unexpected nature of the crisis will force many countries to borrow from international money markets to address immediate healthcare needs, adding to national debt and reducing the scope for future interventions elsewhere.

For more details on the implications of Covid-19 for the SDGs, please see Annex.

² <https://www.weforum.org/agenda/2020/04/covid-19-pandemic-disrupts-global-value-chains/>

³ <https://news.itu.int/itu-statistics-leaving-no-one-offline/>

Covid-19 as a Catalyst for Digital Transformation

However, it is also evident that the Covid-19 pandemic affords the international community an opportunity to accelerate progress towards collaborative solutions to these international development issues, most notably with through advanced manufacturing technologies and digitalization. Even prior to the crisis, global manufacturing was in the midst of an unprecedented and rapid change, due to the convergence of the digital and traditional manufacturing sectors: the Fourth Industrial Revolution (4IR). Disruptive technologies, such as artificial intelligence, advanced robotics, 3D printing, wearable and the Internet of Things inter alia are revolutionizing the manufacturing landscape, presenting huge opportunities to upscale productivity but simultaneously challenging social inclusion objectives.

The accelerated pace of change of 4IR is unique in comparison to previous Industrial Revolutions, which took decades or even centuries to come fully into effect, and it will touch aspects of life far beyond the workshop or factory, impacting upon the way we live, interact and travel.

The far-reaching repercussions of the current pandemic have forced the world to consider the urgency of structural shift towards the 4IR, with Covid-19 becoming the unexpected **accelerator of the digital transformation**. The disruptions caused by the crisis

are having a profound impact on the world's mindset, which is now more open to embrace change to curtail the effects of the pandemic and to return to normality. In fact, due to these disruptions the world has arguably experienced greater digital transformation in a few months than we have seen in the last decade.

The crisis exhibits a unique opportunity to leverage the 4IR to future-proof productive sectors, foster long-term resilience and build a better future. In some ways, we can already observe that the outbreak and associated lockdowns and quarantining measures implemented in most countries have spurred on the mainstreaming of 4IR. For instance, migration to cyberspace and remote participation in social, educational and economic activities is allowing us to reduce the psychosocial impact of social distancing. Big data is increasingly being deployed in terms of crisis management and predictive learning, allowing real-time data-based decision making and a faster and more efficient response. Similarly, the world has witnessed a shift to electronic commerce over physical retail and service provision.

The necessity for crisis response has also undoubtedly spurred on innovation in some contexts. Artificial intelligence and Big Data have been used to assist virus research, vaccines development and data analysis for supporting public policy decisions. Similarly, robotics have played an increasing role in monitoring and assisting patients, while wearables demonstrated to be effective in screening and tracing patients and medical staff.

The 4IR has brought about a wide range of potential solutions to fight against the COVID-19 and its associated social, economic and environmental effects. A small selection of these are depicted in the table on the right.



	RESPONSES TO THE HEALTH CRISIS	RESPONSES TO THE ECONOMIC CRISIS
Drones 	<ul style="list-style-type: none"> » Delivery of critical supplies » Disinfection of public spaces » Measurement of body temperatures » Enforcement of quarantine controls 	<ul style="list-style-type: none"> » Increased efficiency on delivery of services » Scan extensive and highly populated areas and broadcast information
Robotics 	<ul style="list-style-type: none"> » Monitoring and assisting patients » Optimization of medical stock » Delivery of medicine and food 	<ul style="list-style-type: none"> » Remote inspection, repair and maintenance » Semi-autonomous operations
3D Printing 	<ul style="list-style-type: none"> » Production of medical equipment and essential components 	<ul style="list-style-type: none"> » Counteract component shortages » Design and test prototypes for new products
Blockchain 	<ul style="list-style-type: none"> » Digital identity, including health status » Medicine safety tracking » Management of healthcare claims 	<ul style="list-style-type: none"> » Resilience of supply chains » Traceability and transparency about the origin and transformation process
Big Data/AI 	<ul style="list-style-type: none"> » Analyze data and model viral outbreaks » Assist the development of vaccines » Analyze patterns to improve control 	<ul style="list-style-type: none"> » Digital twinning of industrial facilities to enable quick switch of production lines » Data and trend analysis to predict demand changes and assess impacts
IoT 	<ul style="list-style-type: none"> » Public health data collection » Analyze air quality inside buildings » Assist transport of critical goods 	<ul style="list-style-type: none"> » Improve accuracy and response time » Enhance understanding of consumers preferences and needs

These examples illustrate how the role of the Fourth Industrial Revolution has changed in the light of the current crisis. Up until now, the predominant focus of those driving 4IR has been primarily on issues such as cost-optimization, increasing productivity or gaining competitive edge. However, the fallout from the Covid-19 pandemic has refocused minds somewhat, as it offers considerable scope for digital transformation and innovative solutions to be deployed for maintaining essential services and supply chains, enhancing business and societal resilience against unforeseen shocks, and the development of new businesses and new business sectors.

It is thus evident that the “new normal” in the post-pandemic world will increasingly be driven by 4IR technologies and their applications for inclusive and sustainable industrial development (ISID).

However, the crisis has also presented challenges across the spectrum of 4IR development and proved that not everyone is ready to embrace a more digitized existence under the “new normal”. The digital divide is still highly visible, with several outstanding digitalization challenges. Figures from the International Telecommunication Union estimate that less than 50% of households in developing countries have internet access, while in Least Developed Countries (LDCs) only around 12% of individuals had home access to the Internet in 2019.⁴ The strain put on public services by the current crisis may have further depressed the capacity to innovate in developing countries, widening the existing gap with high income countries even further.

The response of UNIDO: mainstreaming the Fourth Industrial Revolution

As aforementioned, manufacturing is rapidly evolving, and 4IR will be a major element of UNIDO’s service delivery in order to assist its Member States effectively in fighting the crisis and recovering from its consequences. This objective is reinforced by the 2030 Agenda for Sustainable Development, which will challenge the international community given its complexity, universal nature and the breadth of economic, environmental and social challenges it encompasses.

As a leading UN agency with a mandate to foster ISID, UNIDO leads the way in addressing opportunities, challenges and risks stemming from the 4IR and how these can affect inclusive and sustainable industrial and economic development. The Organization aims to enable a smooth transformation towards the

⁴<https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx>

4IR for countries with different levels of economic development, ensuring that no one is left behind.

Making the Fourth Industrial Revolution work for all should be the key driver of technological development policy and action. This can be achieved through a variety of interventions, namely:

- » **Innovation and New Technologies:** promoting digital transformation and building strong innovation ecosystems, to advance the economic competitiveness of developing countries by helping them to benefit from the rapid progress of digital and convergent technologies associated to the 4IR.
- » **Investment and Technology Promotion:** harnessing different types of partnerships at corporate, institutional and political level to support developing countries in their endeavour to attract investment and boost knowledge and technology transfer.
- » **Quality Infrastructure and Standards:** strengthening the business sector through improved national and regional quality infrastructure systems, building conformity assessment capacities and supporting small and medium enterprises (SMEs) to take advantage of new technologies and standards for smart production and participation in global value chains.

In view of the drastically changed landscape for international development, UNIDO has been refocusing and repurposing its functions, in order to better contribute to common crisis response actions and also to help developing countries to build back better.

1. Through its **analytical work**, UNIDO provides and disseminates evidence-based support for ensuring a smooth structural transformation to 4IR. Recent examples of this include inter alia the **Industrial Analytics Platform**, which has been providing cutting-edge analysis of the implications of Covid-19 for the future of manufacturing; and the **DTI Knowledge Hub**, which disseminates knowledge on how quality infrastructure and industry can respond to the outbreak.
2. **Technical cooperation** programmes and strategies are also being adjusted to future-proofing industry against exogenous shocks and to achieve ISID in a rapidly evolving environment. UNIDO has identified and developed integrated service packages to Member States such as the **COVID-19 Industrial Recovery Programme**, which will provide targeted support to national governments with the restructuring of their industrial sector in the aftermath of the crisis.
3. UNIDO is also tailoring its **normative function** and quality infrastructure programmes to meet the demands of pandemic and post-crisis rehabilitation, including standards, metrology, conformity assessment, accreditation and certification, to make sure that industry can continue to meet essential societal needs.

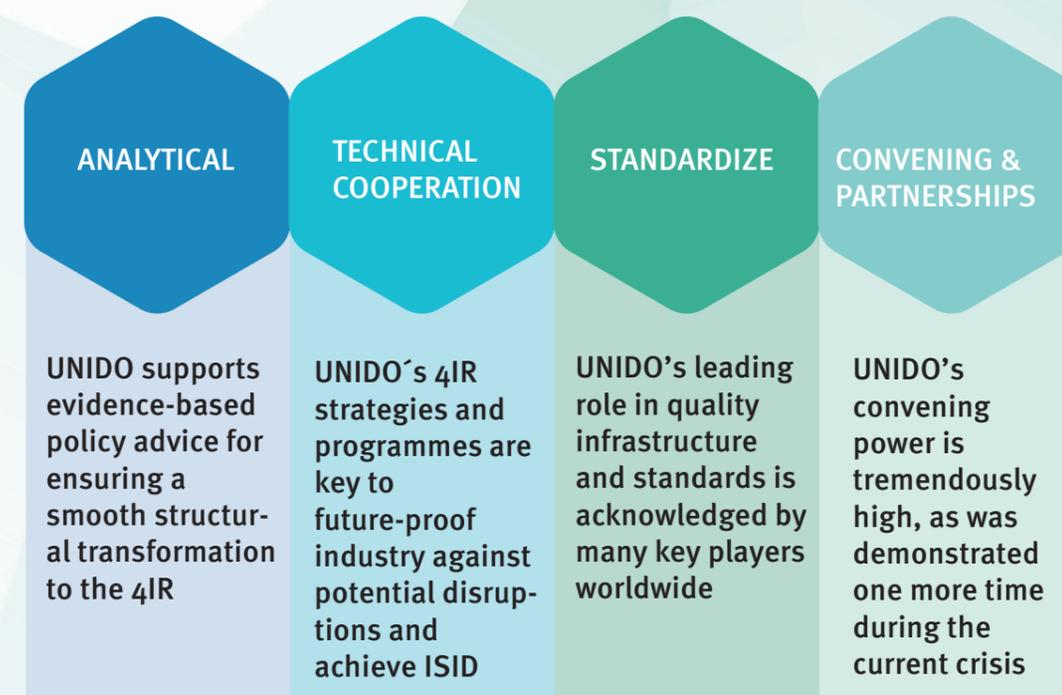
4. **Convening** is a crucial element of international cooperation, in order to gain the widest possible range of expertise, exchange and agreement on industrial development actions. **Partnerships** are equally critical to maintain manufacturing operations as much as possible worldwide. UNIDO thus coordinates closely with partners in the private sector, government and academia to this end.

The impact of these functions is amplified by a number of large-scale programmes that the Organization implements, in cooperation with industrial development stakeholders. For instance, UNIDO acts as a co-chair of the **Global Manufacturing and Industrialisation Summit (GMIS)** (in cooperation with the Ministry of Energy and Industry of the United Arab Emirates) to convene advanced technology actors worldwide in pursuit of an inclusive and sustainable Fourth Industrial Revolution. Similarly, UNIDO implements the **Global Quality and Standards Programme (GQSP)**, supported by the State

Secretariat of Economic Affairs (Switzerland) to assist SMEs in integrating sustainably within global markets.

UNIDO’s **Investment and Technology Promotion (ITPO) network** is at the core of its technology programmes, through brokering technology actions and agreements between developed countries, developing countries and countries with economies in transition. An example of such a programme is the **West Africa Competitiveness Programme (WACOMP)**, supported by the Economic Community of West African States (ECOWAS) and the European Union (EU) which aims to upscale competitiveness in the region and to enhance the integration of ECOWAS countries into the international trading system. Within this framework, UNIDO cooperates with the Ministry of Trade and Industry of Ghana to enhance the competitiveness of value chains in the fruit, cassava and cosmetic sectors in the country.

REFOCUSING UNIDO FUNCTIONS



©UNIDO



UNIDO's Approach

UNIDO's vision is **responding to the crisis by building a better future**. The Organization's approach is structured in three phases that can be summarized in one phrase: *"Prepare and Contain, Respond and Adapt, Recover and Transform"*. In the short-term, UNIDO is helping its Member States in promptly responding to the emergency and mitigate the immediate effects. UNIDO's actions seek to contain the impact of the disruptions and to protect supply chains, the business sector and its employees. In the mid-term, it provides advice on how to counter the situation, reactivating production. UNIDO promotes the adoption of digital and innovative solutions to respond to the evolving business environment and to increase business sector resilience. In the aftermath of the crisis, UNIDO provides development support to Member States towards the recovery of an inclusive, resilient and sustainable economy in the 4IR era.

1. PREPARE AND CONTAIN

The force of the Covid-19 pandemic has arguably been compounded due to its unexpected nature: many countries were taken by surprise and struggled to adapt to an unprecedented threat to human health and wellbeing and severe disruption to economic activity and vital supply chains. Clearly, enhanced international preparedness and contingency plans will be vital to combatting any future disruptions on this scale. To this end, UNIDO cooperates extensively with United Nations counterparts on proactive responses to the pandemic that enable developing countries to take full advantage of the 4IR and offers guidance on digital and innovative solutions for business continuity. The Organization is also offering its expertise through multi-stakeholder platforms, both within the United Nations framework and with its other stakeholders.

For instance, the Global Manufacturing and Industrialisation Summit 2020 has moved from a traditional convention to an online format, encompassing a series of webinars and an interactive Summit that will bring together 4IR stakeholders to reflect on the future of manufacturing. Similarly, UNIDO's Department of Digitalization, Technology and Innovation has coordinated a series of webinars with multilateral and national partners on how quality infrastructure can be mobilized for increasing resilience during and after Covid-19.

On investment and technology promotion, leveraging partnerships enables us to put these into place, as well as preparing tailored business plans with MSMEs in order to implement contingency plans. In terms of quality infrastructure, UNIDO dovetails with other international organizations to share knowledge on how to manage disruptions through strong standards, provides normative support to businesses on how to improve their resilience, and increases the capacities of laboratories for testing of vaccines and pharmaceutical products. Since the outbreak, the Organization has ramped up its cooperation with multilateral partners to fill gaps in international quality infrastructure and standards relating to PPE and conformity assessment systems.

2. RESPOND AND ADAPT

The flexibility of international production and value chains will also have to be upscaled in order to maintain future competitiveness and resilience in the face of unforeseen issues. UNIDO is also helping companies to **respond and adapt** to the impact of the pandemic through a variety of activities that include innovative approaches to investment promotion; e-platforms promoting knowledge exchange on quality infrastructure; promoting enhanced laboratory policies and standards; advocating for new technologies to improve traceability, inspection, metrology, and other services. For instance, UNIDO has assisted project partners in the textile sector in Tajikistan and

RESPONDING TO THE CRISIS BY BUILDING A BETTER FUTURE

PREPARE & CONTAIN

Support to contain impacts of disruptions and protect supply chains, business sector and its workers

RESPOND & ADAPT

Promote digital and innovative solutions to respond and adapt to the evolving situation and increase business sector resilience

RECOVER & TRANSFORM

Support towards the recovery of an inclusive, resilient and sustainable economy in the era of the 4IR through ISID

Armenia to diversify their operations to produce PPE such as medical masks and gowns. The Organization has developed resilience roadmaps for Ghana's fruit, cassava and cosmetic sectors, which could be adapted and replicated in other developing countries. In China, UNIDO has assisted private sector partners to introduce new disinfection products and to utilize robotics for transporting medical supplies.

3. RECOVER AND TRANSFORM

Another set of issues arises once international trade and production begins to resume; many companies, especially MSMEs, may find that they encounter a very different business environment, in particular spurred on by significant growth in the medical manufacturing sub-sector, a slowdown of globalized production chains and accelerated digitalization of operations. Given UNIDO's mandate to promote and accelerate ISID, the Organization is prioritizing post-crisis **recovery and transformation** through a variety of actions, such as 4IR readiness assessments and analysis at country-level; 4IR upskilling and training programmes; investment and technology matchmaking forums; promotion of 4IR clusters, networks and export consortia; and assistance for SMEs with accessing global value chains, technology adoption and digitalization. For example, in Colombia, UNIDO has worked with partners in the automotive industry to develop guidelines for restarting production. The **Global Market Access Programme (GMAP)**, supported by the Norwegian Agency for Development Cooperation (NORAD), also addresses compatibility issues that SMEs encounter when trying to access international export markets. Guidance for Micro, Small and Medium Enterprises (MSMEs) is provided in the document titled: "Responding to the COVID-19 Crisis. Pathway to Business Recovery". An online platform called **Building Back Business from Crisis (B3C)** is enabling MSMEs in India and further afield to recover from the strains of lockdown.

Building a Better Future

As the international community grapples with the immediate and after-effects of the pandemic, it is essential not only to restore economic competitiveness but also to make it harder for future widespread disruption to occur: we must "build back better". The UNIDO Strategic Framework aims to address this essential need by feeding into a number of focus areas aimed at upscaling capacities, resilience and competitiveness to the rapidly altered demands of the international business climate, as depicted below. These include institutional transformation; innovation clusters and ecosystems; industrial modernization and MSMEs; and inclusive skill building and technological learning.

INNOVATION AND DIGITALIZATION

For institutional transformation, technology and innovation are vital to improving the quality of public services, decision-making and investment through increased capacities for value addition, trade and productivity. There is considerable scope to achieve this through a multitude of actions, such as creating observatories, virtual collaboration platforms and capacity-building initiatives to undertake readiness analysis and develop industry roadmaps and innovation-friendly policies, business environment regulations and standards.

Innovation clusters and strong innovation ecosystems are also crucial to realize the potential of the 4IR. They are not only a source of quality employment and the backbone of any knowledge-based economy, but they also enable practice-oriented research, innovative solutions and deep technological modernization. UNIDO implements a number of programmes to this end, including promoting new business models; strategies for strengthening innovation systems; engaging in knowledge-sharing forums; and implementing country-level and global data management strategies, to allow stakeholders to assess markets and gain competitive advantage.

It is also imperative to enhance the digital resilience and competitiveness of the business sector, particularly of MSMEs. The disruptions caused by the pandemic have hit them hard, particularly those operating in the informal economy, putting their survival at stake. UNIDO promotes tailored programmes to assist MSMEs with digital transition; designs e-commerce strategies for digitalization; and strategizes to encourage innovation. Programmes will focus inter alia on increasing the flexibility of production lines, aligning IT systems and support to evolving work requirements, increasing safety and cybersecurity. UNIDO likewise supports the development of strategies to reduce the gap between the formal and informal sectors, promoting and reducing costs of formalization for SMEs through digitalization and improving their access to finance and training.

Upskilling and retooling programmes are also key to tackling gaps in digital skills and under-representation of women in digital industries, keeping up with the fast-changing employment needs of the industrial sector and building an inclusive and resilient workforce. In order to contribute to resolving these issues, UNIDO is expanding its suite of digital learning services; building capacities for industrial security and safety, organizational resilience and innovation management; and promoting knowledge sharing on business continuity and recovery.

In order to meet the wide breadth of challenges-economic, environmental and social-posed by the Covid-19 pandemic to ISID, UNIDO has identified a number of focus areas to support its Member States in innovating and adopting new technologies, as depicted below.

FOCUS AREAS AND UNIDO RESPONSE



INSTITUTIONAL TRANSFORMATION AND INNOVATION

WHY ?

Technology and innovation are essential to **streamline efforts, enable collaborative approaches and support better decision-making**

WHAT ?

Virtual collaboration platforms

Innovation-friendly policies, regulations & standards

Readiness analysis, roadmapping & monitoring

Observatories for digital economy, indicators & measurement tools



INNOVATION CLUSTERS AND ECOSYSTEMS

WHY ?

Innovation clusters and ecosystems allow **practice-oriented research, innovative solutions and deep technological modernization**

WHAT ?

New generation of innovation clusters

Strategies to strengthen innovation ecosystems

Innovation and 4IR technology knowledge-sharing platforms

Country- & global-level data management strategies



INDUSTRIAL MODERNIZATION AND INNOVATION OF MSMEs

WHY ?

Business innovation and digital capabilities are an imperative if MSMEs are to **adapt to the evolving situation and build future business resilience**

WHAT ?

Strategies & tools to encourage business innovation

Programmes to assist MSMEs & support enterprise restructuring

E-commerce strategies

Strategies to bridge the formal-informal sector gap



INCLUSIVE SKILL BUILDING AND TECHNOLOGICAL LEARNING

WHY ?

Foster digital skills and competencies in the 4IR is essential to **bridge the digital and gender gaps**, keep up employment needs and ensure future inclusion

WHAT ?

Upskill & reskill the workforce

Expand UNIDO offer of 4IR-related e-learning modules

Build capacities on innovation management & organizational resilience

Promote knowledge sharing around 4IR technologies

INVESTMENT AND TECHNOLOGY PROMOTION

Investment and technology promotion is also a crucial driver of economic diversification, trade and value added and thus is a crucial vector of many national development strategies. However, the onset of the Covid-19 pandemic has greatly reduced world trade flows, with UNCTAD estimating that Foreign Direct Investment (FDI) may be reduced by up to 40 per cent in the period 2020-21. This is compounded by a trend in which multinational companies (MNCs) are reshoring capital to their countries of origin, thus disproportionately affecting developing countries, as well as a shortening of value chains, in order to reduce exposure to external shocks. Developing countries may thus be disproportionately affected by economic shocks set in motion by the Covid-19 pandemic, given that many rely on low-cost manufacturing and FDI.

UNIDO recognizes the enormous challenges for investment promotion in the aftermath of the pandemic and has adapted its operations accordingly. Traditional methods of matching investors and developing countries, such as trade fairs and investment promotion events, are not possible due to the need for social distancing. There has thus been a shift in focus towards online matchmaking and remote support for manufacturers diversifying their production (for instance, in the case of bottling moving towards production of sanitizers, or garment producers switching their operations to manufacturing medical equipment).

A secondary issue is that many MNCs are consolidating their existing operations, with many overseas subsidiaries being closed. UNIDO is thus devoting priority to reorienting its capacity building efforts, with a special focus on e-tools and e-learning. For example, the DTI Investment Portal is currently

being fast-tracked for the Africa Caribbean Pacific (ACP) region, maintaining investment promotion efforts through cyber-initiatives such as GIS mapping, digital analysis and investment tracking functions, while e-commerce tools such as the Investment Hub and Investment Portal are also promoting digital investment.

Pharmaceutical production is also a major priority area for investment given the imperative to develop a vaccine for the Covid-19 pathogen and to develop resilience against possible future outbreaks. UNIDO is working through its ITPO network to strengthen institutional capacities in Africa especially, through a number of targeted interventions. These include developing active pharmaceutical ingredient manufacturing hubs (APIs) for priority medicines in order to reduce dependency on imports; repurposing of exports towards disinfectants and sanitizers; and updating the Pharmaceutical Manufacturing Plan for Africa (PMPA) to meet crisis-response and digital challenges.

It is also crucial to make financing for technology accessible to MSMEs in developing countries, so that they will be better able to adapt for the accelerated digitalization ushered in by the outbreak. UNIDO is working towards this end in a variety of ways, including through mapping of pharmaceutical value chains for investment promotion; promoting digital tools such as the COMFAR software for financial analysis and reporting; assisting with business contingency plans; and matching manufacturers with buyers in the medical sector to facilitate transition of production.

In order to meet the wide breadth of challenges-economic, environmental and social-posed by the Covid-19 pandemic to ISID, UNIDO has identified a number of focus areas to support its Member States in innovating and promoting investment, business resilience and technology transfer, as illustrated below.

FOCUS AREAS AND UNIDO RESPONSE



REINVENTING MANDATES OF IPAS

WHY ?

IPAs need to **re-invent themselves** to slow down the trend of large-scale re-shoring of multinational corporations' productive activities

WHAT ?

Investor retention & avoidance of divestments

Smart & virtual investment promotion techniques

Proposing diversification/re-scoping, financial packages and incentives

Embracing new technologies



RE-ORIENTING CAPACITY BUILDING EFFORTS

WHY ?

IPAs should change their **business models** and mainstream **innovative solutions** into their own institutional ecosystem and that of their peers

WHAT ?

E-learning solutions through the TII Knowledge Hub

Fast-track the implementation of digital investment tracking tools

TII Investment Portal going live

Leverage the ITPO Network to support the launch of international call (s)



LOCAL PHARMACEUTICAL & VACCINES PRODUCTION IN AFRICA

WHY ?

Currently dormant productive capacities in the local pharma sector should be made permanent to **build resilience** against future pandemics and challenges

WHAT ?

Application of innovative technologies

Develop active pharmaceutical ingredients (APIs) manufacturing hubs

Substantial investment & technology transfer

Update of the Pharmaceutical Manufacturing Plan for Africa



BOOSTING SME INNOVATION THROUGH INVESTMENTS

WHY ?

Strengthening **SMEs access to finance** is crucial for them to adopt technologies and become more flexible and innovative.

WHAT ?

Step up ITPO Network outreach to investors & 4IR technology providers

COMFAR-based business/investment plan development support

Assess SMEs' diversification options

Local and regional value chain & investment gap mapping



QUALITY INFRASTRUCTURE AND SMART PRODUCTION

For businesses and public services to continue to function during and after the Covid-19 pandemic, it is vital to enhance quality infrastructure, to ensure that businesses remain resilient and competitive and for public services to meet essential needs. Value chains are increasingly globalized and thus manufacturing firms need to meet increasingly complex and stringent quality standards in order to export their products internationally. Quality infrastructure thus aims to build capacities across a wide range of technical requirements for manufactures, including standards, metrology, certification, conformity assessments, laboratory policy inter alia. UNIDO has accelerated its actions regarding quality infrastructure in order to respond proactively to the rapid changes propelled by the outbreak.

The outbreak has illustrated the vital role played by laboratories during a public health emergency, including robust laboratory policies and standards, trustworthy analysis of samples, conformity assessments of PPE and resilience measures. In order to strengthen this vital sector, UNIDO is devising a plethora of actions, including the establishment of a laboratory policy promoting adequate lab services; creating a laboratory network with information on conformity assessment services; supporting measures for the adoption of new technologies; and the raising of awareness of quality infrastructure globally.

Laboratory policy will play an especially key role in maintaining essential services and enhancing societal resilience to potential pandemics. A robust quality policy ensures that laboratories function well during a crisis, providing reliable test results that maintain public confidence in healthcare services. Secondary actions, such as the establishment of a laboratory network and expert exchange mechanisms can also enhance quality infrastructure for future resilience.

Similarly, metrology and conformity assessment and accreditation services enable international trade through establishing confidence in quality standards. UNIDO works closely with quality infrastructure actors at national level, such as National Standards Bodies, to ensure that cutting-edge knowledge and practice of international standards filter down. Likewise, UNIDO cooperates with private sector firms, particularly SMEs, in order to implementat occupational health and safety standards (ISO 45001) and quality management standards (ISO 9001). UNIDO also conducts training in several areas relating to risk management and prevention, such as ISO 31000, business continuity management (ISO 22301) and other standards relating to disinfection and cleaning practices.

In order to meet the wide breadth of challenges-economic, environmental and social-posed by the Covid-19 pandemic to ISID, UNIDO has identified a number of focus areas to support its Member States in innovating and promoting strong quality infrastructure and smart production, as depicted below.

FOCUS AREAS AND UNIDO RESPONSE



POLICY

WHY ?

Quality & Laboratory Policy serves to clearly **identify and define roles and responsibilities** of all actors of the QI, which is crucial to act quickly and synchronize efforts

WHAT ?

Quality & Laboratory Policy to ensure the provision of adequate quality infrastructure and laboratory services

Laboratory Network, with information on available conformity assessment services in a given country / region

Experience sharing on the use of quality and standards



STANDARDISATION

WHY ?

Standards are essential for business to repurpose their production, **define business continuity plans and measures** and adopt health and safety related standards and good practices

WHAT ?

Support National Standards Bodies to disseminate standards, identify and assess potential 4IR-related new standards

Support MSMEs to adopt occupational health and safe standards and/or voluntary management system standards

Provide trainings, guidance, and awareness on relevant standards



METROLOGY

WHY ?

Accurate, trustworthy and reliable measuring instruments are more relevant than ever, with international suppliers in great pressure to fulfill the global demand

WHAT ?

Support National Metrology Institutes to provide relevant services & promote Metrology 4.0

Support countries to become an OIML Issuing Authority for certificates of medical measuring instruments

National systems for verified and traceable competences using blockchain technology



CONFORMITY ASSESSMENT & ACCREDITATION

WHY ?

Standards are essential for business to **repurpose their production, define business continuity plans and measures** and adopt health and safety related standards and good practices

WHAT ?

Support National Standards Bodies to disseminate standards, identify and assess potential 4IR-related new standards

Support MSMEs to adopt occupational health and safe standards and/or voluntary management system standards

Provide trainings, guidance, and awareness on relevant standards

Embracing the **Digital Transformation**

It is evident that the Covid-19 pandemic has accelerated megatrends that were already ongoing, such as digitalization of industry, and is also steepening the gradient in terms of achieving the 2030 Agenda for Sustainable Development. Through its proactive strategic framework, UNIDO is addressing the rapidly-changing manufacturing landscape, in order to continue delivering the necessary services to its Member States for the achievement of inclusive and sustainable development worldwide. Within this framework, key areas for supporting the digital transformation and industrial recovery are:

- » **Innovation and Digitalization.** Promoting digital transformation of MSMEs and strengthening innovation ecosystems for institutional capacity building and networking;
- » **Investment and Technology Promotion.** Harnessing multi-stakeholder partnerships to enhance the knowledge-policy interface, which is essential to stimulating the appropriate investment for technology acquisition, upgrading and transfer in developing countries;
- » **Quality Infrastructure and Smart Production.** Strengthening the competitiveness and resilience of the business sector through improved QI, standards and smart production.

Finally, cross-cutting factors must be considered as well. At the intra-firm level, **upskilling and knowledge creation** measures are crucial to augmenting innovation capacities. But innovation alongside deprivation cannot be considered a success: we must ensure that some **structurally-disadvantaged segments of the population** can be part of the digital transformation, such as women and girls, young people, older persons, people with a disability, ethnic minorities and indigenous groups inter alia. This can most effectively be achieved through **leveraging partnerships** from all relevant sectors of society, in order to deliver the potential economic, environmental and social gains of advanced manufacturing.





ANNEX: Potential Impacts of Covid-19 Pandemic upon the Sustainable Development Goals

SDGs	Facts					
 <p>1 NO POVERTY</p>	<ul style="list-style-type: none"> » The World Bank has warned that almost 24 million more people will remain in poverty this year because of the coronavirus pandemic. » Many of the wealthy are already recovering, but experts warn that the virus could kill scores of the poorest people, who must work every day to feed their families, live in unsanitary conditions and lack proper medical care. » By 2020, it is expected that more than 7.1 million jobs will be displaced, and by 2050, half of the jobs that currently exist will have disappeared. 					
	<p>Implications</p> <ul style="list-style-type: none"> » Explosive unemployment » Most low-income jobs cannot be done remotely » Poor have limited access to sanitation, medicine, etc. » Poor cannot afford quarantine 					
	<table border="1"> <thead> <tr> <th>Innovation</th> <th>Investment</th> <th>Standards and Quality</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> » Fewer innovative resources available in poorer countries </td> <td> <ul style="list-style-type: none"> » Reduced investment can lead to poverty </td> <td> <ul style="list-style-type: none"> » Fewer standards and testing availabilities in poorer countries » Preventive care less accessible in poor countries </td> </tr> </tbody> </table>	Innovation	Investment	Standards and Quality	<ul style="list-style-type: none"> » Fewer innovative resources available in poorer countries 	<ul style="list-style-type: none"> » Reduced investment can lead to poverty
Innovation	Investment	Standards and Quality				
<ul style="list-style-type: none"> » Fewer innovative resources available in poorer countries 	<ul style="list-style-type: none"> » Reduced investment can lead to poverty 	<ul style="list-style-type: none"> » Fewer standards and testing availabilities in poorer countries » Preventive care less accessible in poor countries 				

SDGs	Facts		
2 ZERO HUNGER 	<ul style="list-style-type: none"> » Malnutrition weakens peoples' immune system. » Millions of people around the world depend on international trade for their food security and livelihoods. » Restrictions imposed by some European Union countries at their borders with other member states in response to the pandemic are also disrupting food supplies 		
	Implications		
	<ul style="list-style-type: none"> » Border closures, quarantines, market, supply chain and trade disruptions restrain food » Future agricultural production is threatened by the lack of labour, services, and inputs (i.e. fertilizers) » Restriction of movement of agricultural workers » Protectionist movements (developing countries hoarding food, increase in prices harming affordability) » Panic buying reduces demand for fresh products affecting farmers » Reshoring of agricultural productions 		
	Innovation	Investment	Standards and Quality
	<ul style="list-style-type: none"> » Restaurants missing e-commerce capabilities » I4.0 technologies help in agriculture (i.e. drones pollinate crops) » Rise of urban farming (vertical farming) 	<ul style="list-style-type: none"> » Investment in shorter value chains to add value to local food products (export consortia, origin) 	<ul style="list-style-type: none"> » Border delays for food containers resulting in food waste » Food supply chain distorted from border closures and trade restriction measures » Problematic hygiene practices » Food safety issues (lack of certification, food decaying in markets)

SDGs	Facts		
3 GOOD HEALTH AND WELL-BEING 	<ul style="list-style-type: none"> » More than 300,000 deaths from COVID-19 have now been reported to WHO from almost every country in the world » Across Africa, however, there are only approximately 1.2 hospital beds per 1000 people 		
	Implications		
	<ul style="list-style-type: none"> » Lack of traceability of quarantined people » Overloaded healthcare systems » Lack of sufficient PPE, medical devices and essential medicines to protect medical personnel and conduct patient treatment 		
	Innovation	Investment	Standards and Quality
	<ul style="list-style-type: none"> » I4.0 technologies helpful in healthcare sector (telemedicine, biotechnologies and digital health, robotics minimise face to face, AI used to diagnose the virus, track and forecast new outbreaks, as well as helping to find a potential cure, blockchain technology is also utilized in the procedure of healthcare claims, 3D printing) 	<ul style="list-style-type: none"> » Not enough investments made in healthcare facilities before crisis » Shift of investment flows towards healthcare industry » Industrial sector of medical goods and services resilience to future shocks 	<ul style="list-style-type: none"> » Procurement problems (lack of respiratory protective devices, PPE, testing kits, bio-pharmaceutical and chemicals) » Production support Issues (lack of quality control and minimum standards manuals, limited production capabilities in developing countries, strict licensing requirements) » Lack of CA capacity to assure quality testing kits, PPE products, medical devices and essential medicines from domestic and foreign origins » Rise of fake medical devices and equipment

SDGs	Facts					
4 QUALITY EDUCATION 	<ul style="list-style-type: none"> » It has been estimated that 90% of future jobs will require ICT skills, and some 2 million new jobs will be created in the computer, mathematical, architecture and engineering fields. » Roughly 1.25 billion learners, or 72.9 per cent of total enrolled learners, worldwide have been affected by the coronavirus outbreak 					
	Implications <ul style="list-style-type: none"> » Schools and universities shut down due to quarantine measures 					
	<table border="1"> <thead> <tr> <th>Innovation</th> <th>Investment</th> <th>Standards and Quality</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> » Weak connectivity hinders ongoing education » Access / availability of e-platforms insufficient (non-existent in DCs) » Lack of awareness of available digital mediums » New digital learning methods introduced reshaping traditional system (live-streams, cloud-based lectures, tv broadcasting) </td> <td> <ul style="list-style-type: none"> » Existing lack in primary education causing gap between developing and developed countries / rich and poor (distance, infrastructure, access) » Rise in investments into digital / remote learning </td> <td></td> </tr> </tbody> </table>	Innovation	Investment	Standards and Quality	<ul style="list-style-type: none"> » Weak connectivity hinders ongoing education » Access / availability of e-platforms insufficient (non-existent in DCs) » Lack of awareness of available digital mediums » New digital learning methods introduced reshaping traditional system (live-streams, cloud-based lectures, tv broadcasting) 	<ul style="list-style-type: none"> » Existing lack in primary education causing gap between developing and developed countries / rich and poor (distance, infrastructure, access) » Rise in investments into digital / remote learning
Innovation	Investment	Standards and Quality				
<ul style="list-style-type: none"> » Weak connectivity hinders ongoing education » Access / availability of e-platforms insufficient (non-existent in DCs) » Lack of awareness of available digital mediums » New digital learning methods introduced reshaping traditional system (live-streams, cloud-based lectures, tv broadcasting) 	<ul style="list-style-type: none"> » Existing lack in primary education causing gap between developing and developed countries / rich and poor (distance, infrastructure, access) » Rise in investments into digital / remote learning 					

SDGs	Facts					
5 GENDER EQUALITY 	<ul style="list-style-type: none"> » Women disproportionately hold jobs in industries with poor protections » Many of the industries in the formal economy are directly affected by quarantines and lockdowns—travel, tourism, restaurants, food production—have very high female labour force participation. » Women also constitute a large percentage of the informal economy in informal markets and agriculture around the world. » On average women did three times as much unpaid care work as men at home even before COVID-19. » There are some 250 million fewer women online than men, and the gap is widening (from 11% in 2013 to 12% in 2016) 					
	Implications <ul style="list-style-type: none"> » Woman hit harder by economic impacts working in insecure jobs » Women’s dominance in the service fields and their tendency to be family caregivers could expose them to the disease at higher rates » Surge in domestic violence by staying home » Women typically lack health insurance and have no social safety net to fall back on 					
	<table border="1"> <thead> <tr> <th>Innovation</th> <th>Investment</th> <th>Standards and Quality</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> » Women have limited access / availability of digitisation </td> <td> <ul style="list-style-type: none"> » Sectors carried out by women in healthcare and food supported (basic pillars of crisis) » Re-boost resilient economy need more investment where women not supported (low skilled jobs) </td> <td></td> </tr> </tbody> </table>	Innovation	Investment	Standards and Quality	<ul style="list-style-type: none"> » Women have limited access / availability of digitisation 	<ul style="list-style-type: none"> » Sectors carried out by women in healthcare and food supported (basic pillars of crisis) » Re-boost resilient economy need more investment where women not supported (low skilled jobs)
Innovation	Investment	Standards and Quality				
<ul style="list-style-type: none"> » Women have limited access / availability of digitisation 	<ul style="list-style-type: none"> » Sectors carried out by women in healthcare and food supported (basic pillars of crisis) » Re-boost resilient economy need more investment where women not supported (low skilled jobs) 					

SDGs	Facts					
6 CLEAN WATER AND SANITATION 	<ul style="list-style-type: none"> » 6 out of 10 people lack access to safely managed sanitation facilities. Clean and accessible water is crucial to follow basic instructions to contain the virus, like washing hands » Globally three billion people do not have access to even basic hand washing facilities at home 					
	Implications <ul style="list-style-type: none"> » Lack of access to clean water affects vulnerability to disease and ill health » Poor cannot afford clean water and sanitation » Water important for agricultural purposes / energy sector 					
	<table border="1"> <thead> <tr> <th>Innovation</th> <th>Investment</th> <th>Standards and Quality</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> » Optimise water usage for food sector </td> <td> <ul style="list-style-type: none"> » Investment focus on centrality of water (energy, food, sanitation) » Current lack of investment in sanitation in combatting and preventing crisis </td> <td> <ul style="list-style-type: none"> » Lack of sanitation facilities and standards </td> </tr> </tbody> </table>	Innovation	Investment	Standards and Quality	<ul style="list-style-type: none"> » Optimise water usage for food sector 	<ul style="list-style-type: none"> » Investment focus on centrality of water (energy, food, sanitation) » Current lack of investment in sanitation in combatting and preventing crisis
Innovation	Investment	Standards and Quality				
<ul style="list-style-type: none"> » Optimise water usage for food sector 	<ul style="list-style-type: none"> » Investment focus on centrality of water (energy, food, sanitation) » Current lack of investment in sanitation in combatting and preventing crisis 	<ul style="list-style-type: none"> » Lack of sanitation facilities and standards 				

SDGs	Facts					
7 AFFORDABLE AND CLEAN ENERGY 	<ul style="list-style-type: none"> » Lockdown measures to contain COVID-19 have led to economic contraction and a significant drop in energy consumption including electricity, gas and oil. 					
	Implications <ul style="list-style-type: none"> » Fall in fossil fuel prices making its usage more attractive » Availability of energy limited in developing countries (i.e. energy infrastructure, grid strength) » Renewable energy supply chain disrupted due to component shortages » During a pandemic, reliance on fossil fuels exposes countries to severe economic shocks. Shifting towards locally produced renewable energy could help reduce such risks 					
	<table border="1"> <thead> <tr> <th>Innovation</th> <th>Investment</th> <th>Standards and Quality</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> » Innovations decreasing costs of renewable energy making it more affordable </td> <td> <ul style="list-style-type: none"> » Decreased investment in energy access, as national budgets refocus on other priorities » Decline of investment in clean energy development – slowing progress in renewable energy and energy efficiency </td> <td> <ul style="list-style-type: none"> » Business continuity plans not in place everywhere » Coronavirus vaccine will need cold storage and refrigerated transport over large areas for large-scale immunisation in developing countries </td> </tr> </tbody> </table>	Innovation	Investment	Standards and Quality	<ul style="list-style-type: none"> » Innovations decreasing costs of renewable energy making it more affordable 	<ul style="list-style-type: none"> » Decreased investment in energy access, as national budgets refocus on other priorities » Decline of investment in clean energy development – slowing progress in renewable energy and energy efficiency
Innovation	Investment	Standards and Quality				
<ul style="list-style-type: none"> » Innovations decreasing costs of renewable energy making it more affordable 	<ul style="list-style-type: none"> » Decreased investment in energy access, as national budgets refocus on other priorities » Decline of investment in clean energy development – slowing progress in renewable energy and energy efficiency 	<ul style="list-style-type: none"> » Business continuity plans not in place everywhere » Coronavirus vaccine will need cold storage and refrigerated transport over large areas for large-scale immunisation in developing countries 				

SDGs	Facts		
8 DECENT WORK AND ECONOMIC GROWTH 	» Almost 25 million people could lose their jobs due to a coronavirus-induced economic and labour crisis, the International Labour Organization (ILO) has projected		
	» Some countries immediately stopped export of medical supplies		
	» The effect of COVID-19 on global foreign direct investment (FDI) flows will be dramatic with, according to UNCTAD, an estimated decline of 40%.		
	Implications		
	» Global GDP will drop significantly		
	» Restrictions on movement of people, goods and services, and containment measures such as factory closures cut manufacturing and domestic demand sharply		
	» Global trade volume contracts		
	» Fall in tourism		
	» Business disruption due to quarantines and widespread restrictions on labour mobility		
	» Contracts and orders cannot be fulfilled		
» Explosive unemployment			
» DCs cannot support / compensate SMEs losing jobs / profits			
» SMEs struggling to survive, making losses			
» Developing countries predicated on their daily customer flow and face-to-face interactions			
» People in informal employment would not have social protection they need in times of crisis			
Innovation	Investment	Standards and Quality	
» SMEs may not be able to implement digital solutions due to affordability, accessibility	» Investors' confidence lost and reduced FDI streams	» Trade plays an important role in ensuring the availability and affordability of vital medicines, medical products and protective gear	
» I4.0 technology provides opportunities (i.e. blockchain helps certification/ smart contracts, teleworking, robotics performs remote inspection, repair and maintenance tasks)	» Global trade needs to be supported » Virtual means of investment promotion increase	» Mutual recognition of accredited test results facilitates the trade of essential goods » Sanitation standards will be needed for firms when implementing in-store protections	

SDGs	Facts		
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE 	» Researchers, businesses, and innovators around the world are putting technology to work to alleviate the effects of the global health crisis		
	» According to ITU data, 93 per cent of the global population within reach of mobile broadband (3G network or higher), and yet 3.6 billion people remain offline		
	» Advanced economies and China have put together massive government packages which, according to the Group of 20 leading economies (G20), will extend a \$5 trillion lifeline to their economies		
	Implications		
	» Supply chain issues causing component shortages, factory closures, delayed/reduced orders		
	» Public healthcare infrastructure lacking (availability of facilities, inefficient reporting/monitoring,		
	» Manufacturing sector shifting production focus to essential medical goods (i.e ventilators and masks		
	» Industry facing financial and economic slumps from restrictions		
	» Public infrastructures are restricted		
	Innovation	Investment	Standards and Quality
» Existing problems of digitalisation usage are highlighted (limited access, availability)	» Companies are reshoring production causing FDI shift to have a shorter and resilient value chain	» Quality infrastructure ensures the identification and dissemination of relevant standards, accurate measurement (metrology) and provides attestation (accreditation) of reliable test results	
» Lack of ICT infrastructure (grids overloaded, weak internet connections)	» Increased investment focus into innovative tools and healthcare infrastructures	» Standards ensure technologies used in mitigation of the crisis are safe, and that privacy and users are protected	
» Rise of cyber-criminality		» Trade barriers from TBT&SPS measures which have significant impact on int. trade and movement of people	
» I4.0 technologies present opportunities (robotics, IIOT with cloud computing, global manufacturers could also remotely access a virtual command and control centre to monitor and operate multiple facilities from anywhere in the world			
» Local market ecosystems can relieve shortages			

SDGs	Facts						
10 REDUCED INEQUALITIES 	» In crisis, the most vulnerable, including women and children, people with disabilities, the marginalized and the displaced, are most disadvantaged						
	Implications						
	» Lack of affordability and availability of sanitation / healthcare in poorer countries increasing inequality						
	» Outcomes of economic crash from COVID-19 will further harm equality						
	» Poor lack adequate protective gear, paid sick leave, health insurance, and childcare increasing inequality						
	» Employers holding jobs that cannot be done remotely will suffer more						
	<table border="1"> <thead> <tr> <th>Innovation</th> <th>Investment</th> <th>Standards and Quality</th> </tr> </thead> <tbody> <tr> <td>» Digital divide increasing inequality for SMEs and developing countries</td> <td>» The most vulnerable, poor and marginalized are paying the highest price of this crisis, exacerbating social inequalities across all continents. Removing the existing barriers to trade and investment thus facilitating an inclusive economic development key to reducing the scale of the unprecedented socio-economic effects of this pandemic</td> <td></td> </tr> </tbody> </table>	Innovation	Investment	Standards and Quality	» Digital divide increasing inequality for SMEs and developing countries	» The most vulnerable, poor and marginalized are paying the highest price of this crisis, exacerbating social inequalities across all continents. Removing the existing barriers to trade and investment thus facilitating an inclusive economic development key to reducing the scale of the unprecedented socio-economic effects of this pandemic	
Innovation	Investment	Standards and Quality					
» Digital divide increasing inequality for SMEs and developing countries	» The most vulnerable, poor and marginalized are paying the highest price of this crisis, exacerbating social inequalities across all continents. Removing the existing barriers to trade and investment thus facilitating an inclusive economic development key to reducing the scale of the unprecedented socio-economic effects of this pandemic						

SDGs	Facts												
11 SUSTAINABLE CITIES AND COMMUNITIES 	» Air pollution has decreased in urban areas across Europe during lockdowns												
	» The COVID-19 pandemic will hit the world's most vulnerable people the hardest including the one billion people living in informal settlements and slums worldwide												
	» Growing urban concentration and high population density make cities more vulnerable during a pandemic outbreak												
	Implications												
	» Recommended measures to prevent Covid-19 transmission such as hand washing, physical distancing, self-quarantine, self-isolation or e community-wide lockdowns are often impossible in informal settlements												
	» Many slum residents work outside the formal sector with unstable incomes and minimal savings. They will lose their livelihoods as cities shut down with no chance of any social benefits and will be unable to afford water, soap, food or medical treatment												
	» Loss of income from lockdowns and stay-at-home orders threatens the ability of residents in informal settlements to pay for rental housing												
	<table border="1"> <thead> <tr> <th>Innovation</th> <th>Investment</th> <th>Standards and Quality</th> </tr> </thead> <tbody> <tr> <td>» Social innovation, new business models based on community still under-developed</td> <td>» Slums and other poorer communities underinvested causing rapid spread of infections (lack of space, sanitary)</td> <td>» Lack of screening arrangements / testing, quarantine and other measures in slums / refugee asylums</td> </tr> <tr> <td>» I4.0 technology helps provides vital information that helps governments and healthcare systems react effectively and rapidly to contain the outbreak (i.e drones, big data)</td> <td>» Attract new investment to enhance cities sustainability focusing on urban design (new services)</td> <td></td> </tr> <tr> <td>» Digitisation can make cities more interconnected</td> <td></td> <td></td> </tr> </tbody> </table>	Innovation	Investment	Standards and Quality	» Social innovation, new business models based on community still under-developed	» Slums and other poorer communities underinvested causing rapid spread of infections (lack of space, sanitary)	» Lack of screening arrangements / testing, quarantine and other measures in slums / refugee asylums	» I4.0 technology helps provides vital information that helps governments and healthcare systems react effectively and rapidly to contain the outbreak (i.e drones, big data)	» Attract new investment to enhance cities sustainability focusing on urban design (new services)		» Digitisation can make cities more interconnected		
Innovation	Investment	Standards and Quality											
» Social innovation, new business models based on community still under-developed	» Slums and other poorer communities underinvested causing rapid spread of infections (lack of space, sanitary)	» Lack of screening arrangements / testing, quarantine and other measures in slums / refugee asylums											
» I4.0 technology helps provides vital information that helps governments and healthcare systems react effectively and rapidly to contain the outbreak (i.e drones, big data)	» Attract new investment to enhance cities sustainability focusing on urban design (new services)												
» Digitisation can make cities more interconnected													

SDGs	Facts												
12 RESPONSIBLE CONSUMPTION AND PRODUCTION 	» Businesses worldwide struggle to keep up production of essential goods												
	Implications												
	» Rise of protectionist movements harming global consumption / production												
	» Effects of globalization now evident, leading to some big suppliers dominating the world market												
	» Panic buying of essential goods leading to shortages and increased prices												
	» Decreased consumption of non-essential goods harming economy												
	» Production of non-essential goods halted, firms shut down, staff laid off												
	<table border="1"> <thead> <tr> <th>Innovation</th> <th>Investment</th> <th>Standards and Quality</th> </tr> </thead> <tbody> <tr> <td>» I4.0 technologies allow greater traceability and transparency about the origin and transformation process of a wide range of products (i.e. blockchain)</td> <td>» Need of investments into value chains to become more resilient to future shocks and encourage responsible production and consumption</td> <td>» Business continuity, risk and emergency management standards are key to ensure the uninterrupted production of essential goods</td> </tr> <tr> <td>» I4.0 technologies conduct data and trend analysis and give enhanced understanding of consumer preferences and needs</td> <td>» Leverage role of responsible investment and sustainability strategies from private sector</td> <td>» Standards ensure that goods produced in response of COVID-19 (protective masks, gloves, etc.) are fit-for-purpose while workers are kept safe</td> </tr> <tr> <td></td> <td></td> <td>» Rise of counterfeit goods</td> </tr> </tbody> </table>	Innovation	Investment	Standards and Quality	» I4.0 technologies allow greater traceability and transparency about the origin and transformation process of a wide range of products (i.e. blockchain)	» Need of investments into value chains to become more resilient to future shocks and encourage responsible production and consumption	» Business continuity, risk and emergency management standards are key to ensure the uninterrupted production of essential goods	» I4.0 technologies conduct data and trend analysis and give enhanced understanding of consumer preferences and needs	» Leverage role of responsible investment and sustainability strategies from private sector	» Standards ensure that goods produced in response of COVID-19 (protective masks, gloves, etc.) are fit-for-purpose while workers are kept safe			» Rise of counterfeit goods
Innovation	Investment	Standards and Quality											
» I4.0 technologies allow greater traceability and transparency about the origin and transformation process of a wide range of products (i.e. blockchain)	» Need of investments into value chains to become more resilient to future shocks and encourage responsible production and consumption	» Business continuity, risk and emergency management standards are key to ensure the uninterrupted production of essential goods											
» I4.0 technologies conduct data and trend analysis and give enhanced understanding of consumer preferences and needs	» Leverage role of responsible investment and sustainability strategies from private sector	» Standards ensure that goods produced in response of COVID-19 (protective masks, gloves, etc.) are fit-for-purpose while workers are kept safe											
		» Rise of counterfeit goods											

SDGs	Facts									
13 CLIMATE ACTION 	» Global warming is one of the underlying factors of the pandemic outbreak, contributing to the migration of wild animals increasing the risk of spreading pathogens to humans									
	» As industries, transport networks and businesses have closed down, it has brought a sudden drop in carbon emissions.									
	Implications									
	» Countries prioritising economic growth over climate actions									
	» Loss of focus on climate goals									
	<table border="1"> <thead> <tr> <th>Innovation</th> <th>Investment</th> <th>Standards and Quality</th> </tr> </thead> <tbody> <tr> <td></td> <td>» Refocus on economic goals away from climate</td> <td></td> </tr> <tr> <td></td> <td>» Investments in climate action to prevent future outbreaks</td> <td></td> </tr> </tbody> </table>	Innovation	Investment	Standards and Quality		» Refocus on economic goals away from climate			» Investments in climate action to prevent future outbreaks	
Innovation	Investment	Standards and Quality								
	» Refocus on economic goals away from climate									
	» Investments in climate action to prevent future outbreaks									

SDGs	Facts									
14 LIFE BELOW WATER 	» Oceans absorb 30% of carbon dioxide produced by humans, buffering the impacts of global warming and contributing to the survival of food chains during a crisis									
	» Plummeting global demand for fish and seafood causes halt of commercial fishing during both world wars, when the idling of fleets led to the rebound of fish stocks.									
	Implications									
	» Countries prioritising economic growth over climate actions									
	» Loss of focus on climate goals									
	<table border="1"> <thead> <tr> <th>Innovation</th> <th>Investment</th> <th>Standards and Quality</th> </tr> </thead> <tbody> <tr> <td></td> <td>» Investments flowing away from sustainability towards healthcare</td> <td></td> </tr> <tr> <td></td> <td>» Importance of investing in fisheries for food security in times of crisis</td> <td></td> </tr> </tbody> </table>	Innovation	Investment	Standards and Quality		» Investments flowing away from sustainability towards healthcare			» Importance of investing in fisheries for food security in times of crisis	
Innovation	Investment	Standards and Quality								
	» Investments flowing away from sustainability towards healthcare									
	» Importance of investing in fisheries for food security in times of crisis									

SDGs	Facts									
15 LIFE ON LAND 	» Forests are home to 80% of all terrestrial species. Deforestation contributes to loss of natural habitats by some animal species, which may cross paths with humans and spread pathogens to them									
	» Biodiversity has a short-term breath as global production and consumption are reduced									
	Implications									
	» Countries prioritising economic growth over climate actions									
	» Loss of focus on climate goals									
	» Additional medical and hazardous (infected) waste is generated									
	<table border="1"> <thead> <tr> <th>Innovation</th> <th>Investment</th> <th>Standards and Quality</th> </tr> </thead> <tbody> <tr> <td></td> <td>» Investments flowing away from sustainability towards healthcare</td> <td>» Standards help to manage the increased hazardous waste</td> </tr> <tr> <td></td> <td>» Investing in forests can prevent future pandemic outcome due to the spread of pathogens of wild animals</td> <td>» Testing laboratories can detect pollution levels</td> </tr> </tbody> </table>	Innovation	Investment	Standards and Quality		» Investments flowing away from sustainability towards healthcare	» Standards help to manage the increased hazardous waste		» Investing in forests can prevent future pandemic outcome due to the spread of pathogens of wild animals	» Testing laboratories can detect pollution levels
Innovation	Investment	Standards and Quality								
	» Investments flowing away from sustainability towards healthcare	» Standards help to manage the increased hazardous waste								
	» Investing in forests can prevent future pandemic outcome due to the spread of pathogens of wild animals	» Testing laboratories can detect pollution levels								

SDGs	Facts		
16 PEACE, JUSTICE AND STRONG INSTITUTIONS 	<ul style="list-style-type: none"> » Rights and freedoms can be limited to overcome a health emergency, it is therefore crucial to promote the rule of law and enforce non-discriminatory laws and policies » Coronavirus crisis impairs international trust and cooperation 		
	Implications <ul style="list-style-type: none"> » Rise in social unrest due to quarantine restrictions 		
	Innovation <ul style="list-style-type: none"> » Cyberthreats threatening institutions 	Investment <ul style="list-style-type: none"> » The COVID-19 pandemic has placed significant limitations on business, trade, and investment, with catastrophic repercussions particularly in developing countries. Strong and well-functioning commercial institutions are needed to increase business confidence, improve the investment environment, and improve growth potential through enhanced cross-border trade. 	Standards and Quality <ul style="list-style-type: none"> » Institutions are unprepared and lacking business continuity plans

SDGs	Facts		
17 PARTNERSHIPS FOR THE GOALS 	<ul style="list-style-type: none"> » European Union is launching its “Team Europe” package to support partner countries in the fight against the coronavirus pandemic and its consequences » International tensions between countries have emerged concerning the origins and response to the pandemic » Crime patterns have moved online since the pandemic and associated lockdown » International cooperation is essential in order to mitigate the further spread of the coronavirus and to reconstruct our societies once the present outbreak has been tamed 		
	Implications <ul style="list-style-type: none"> » Increased tension between countries » Increased protectionism and individualism 		
	Innovation <ul style="list-style-type: none"> » Digitalisation facilitates interorganizational communications 	Investment <ul style="list-style-type: none"> » Prioritises collective investment in global public goods—including technological and ethical goods—to the benefit of all 	Standards and Quality <ul style="list-style-type: none"> » SQI community provided free standards







UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

Department of Digitalization, Technology and Innovation (DTI)

Vienna International Centre,

P.O. Box 300, 1400 Vienna, Austria

Email: dti@unido.org

www.unido.org