



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

SECTORAL TRANSFORMATION FOR INCLUSIVE AND SUSTAINABLE INDUSTRIAL DEVELOPMENT

**Methodological
approaches**

SUSTAINABLE
DEVELOPMENT
GOALS

Sectoral transformation for inclusive and sustainable industrial development

METHODOLOGICAL APPROACHES



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FOREWORD

Throughout its history, UNIDO has strongly focused on supporting its member states in areas related to value adding, competitiveness, productivity and quality covering various industrial sectors, spanning the breadth of the International Standard Industrial Classification of All Economic Activities (ISIC).

With the rapidly evolving landscape for inclusive and sustainable industrial development (ISID), hastened by the onset of the fourth industrial revolution (4IR) and accelerated digitalization as a result of the ongoing pandemic, the boosting of manufacturing value added remains a core expertise of the Organization. This is evidenced by the UNIDO Medium-Term Programme Framework 2022–2025, which affirms structural transformation as an area of expertise of the Organization, complementing its digital transformation and circular economy know-how.

This publication which I am pleased to introduce will draw on the UNIDO's long-running experience in supporting its member states to achieve sectoral transformation towards inclusive and sustainable industrial development (ISID). The publication will expound on the six enabling pillars, and will share insights from two case studies.

The six essential enablers are knowledge and skills; a conducive business environment; enhanced investment and industrial infrastructure; robust quality and standards; strong business linkages, clusters and value chains; and upscaled science, technology and innovation.

This publication will show that the UNIDO approach is driven towards enabling greater market access for private sector companies in developing countries, in particular small and medium-sized enterprises (SMEs). It will also show the practical approaches that member states can take to enhanced productivity, increased employment and to foster better regional and global trade integration at the micro, meso and macro levels.

Of course, the global environment for ISID is dynamic and UNIDO has had to readjust to increased demand for certain manufacturing services in recent years, such as the repurposing of manufacturing towards health-care products, personal protective equipment, and pharmaceuticals, as well as increased demands to assist Member States and firms in their transitions to 4IR. The Organization has also repurposed its resources to helping SMEs to enhance their industrial resilience and to recover from the disruption caused by the COVID-19 pandemic. The restoration, strengthening and optimization of value chains has also been a major activity during this period, when the need to enhance the global trust necessary to enable productivity and trade worldwide arose.

We anticipate that the upscaling of innovation ecosystems and digital manufacturing capacities will become more vital in the years to come given the acceleration of digitalization. Investment promotion will therefore gain importance as well. Towards this end, UNIDO will leverage on its Investment and Technology Promotion network to engage in areas, amongst others, relating to industrial infrastructure, the business environment, matchmaking and investment facilitation and technology upgrading.

As we look towards the future and, in particular, the urgent need to achieve the 2030 Agenda for Sustainable Development, UNIDO is enhancing its capacities to address the sectoral needs, priorities and capacities of its Member States. We relish the challenge and hope that this publication will pique your interest.

Li Yong
UNIDO Director General



EXECUTIVE SUMMARY

This publication provides an overview of the methodological toolkit of UNIDO in supporting structural transformation as a critical pathway towards developing countries' industrialization objectives. It is linked to and should be read in conjunction with the UNIDO Medium-Term Programme Framework 2022–2025, which underscores the importance of sector and value chain transformation in economic development and poverty eradication, for increased productivity and exports, and also for employment and income generation. The publication consequently introduces, in chapter 2, six main interwoven drivers that a developing host economy should gauge to ensure that the desired industrial structural transformation is indeed taking place and remains inclusive and sustainable.

An external impetus is necessary for these drivers to become dynamic and to unleash a virtuous circle of structural industrial transformation. This is where UNIDO sectoral expertise in delivering technical cooperation comes into play. In its chapter 3, the publication explains these six areas of expertise in greater detail and along a spectrum of industrial upgrading and enterprise modernization, SME clustering approaches, quality and standards, innovation and skills promotion, technology and investment promotion, and also business environment and market access. Cognizant that industrial structural transformation requires support and capacities of a wide variety of actors and individuals at various levels, each of the technical cooperation areas delves into the intertwined three dimensions of policy (macro level), institutions (meso level) and firms (micro level). In doing so, it also follows the logic of the UNIDO Integrated Results and Performance framework (IRPF), as the principal monitoring and reporting instrument under the Medium-Term Programme Framework 2022–2025.

The relative impact of these six technical cooperation areas on the six drivers differs, depending on the thematic scope and respective intervention logic. It is for that reason that UNIDO advocates for combining several of such technical cooperation areas towards a larger, holistic development impact in addressing sets of drivers of sectoral transformation at the same time and through a single programmatic intervention. The two flagship cases on "Upgrading local production capacities of essential medicines" – highly relevant in this present time of the pandemic – and "Inclusive and Sustainable Industrial Development of the Colombian Automotive Supply Chain" serve to underpin this logic and provide normative guidance on how UNIDO could design its future programmes to augment impact on developing countries' most pressing problems of absent or slow structural transformation.

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ABBREVIATIONS

4IR	Fourth Industrial Revolution	IPA	Investment Promotion Agency
ADP	Advanced Digital Production (technologies)	IPMA	Indian Paper Manufacturers Association
AfripAnet	African Investment Promotion Agencies Network	IPS	Investment Promotion Service
AI	Artificial Intelligence	IRPMA	Indian Recycled Paper Mills Association
AMDIE	<i>Agence Marocaine de Développement des Investissements</i> (Moroccan Investment Promotion Agency)	ISID	Inclusive and Sustainable Industrial Development
ATA	Agricultural Transformation Agency	ITPO	Investment and Technology Office
AVMI	African Vaccine Manufacturers Initiative	KOICA	Korea International Cooperation Agency
B2B	Business to Business	KPI	Key Performance Indicator
BAT	Best Available Techniques	LIFE	Learning Initiatives for Entrepreneurs
BIO	Business Intermediary Organization	LPP	Local Pharmaceutical Production
BRR	Business Registration Reform	M&E	Monitoring and Evaluation
CAREC	Central Asia Regional Economic Cooperation	MSME	Micro, Small and Medium-sized Enterprise
CDA	Cluster Development Agent	MTPF	Medium-Term Programme Framework
CIP	Competitive Industrial Performance	NBRS	National Business Registry System
CIRP	COVID-19 Industrial Recovery Programme	NCCBM	National Council for Cement and Building Materials
CMMI	Capability Maturity Model Integration	NCDC	Nigeria Centre for Disease Control
COMFAR	Computer Model for Feasibility Analysis and Reporting	OEM	Original Equipment Manufacturer
CPPRI	Central Paper and Pulp Research Institute	ONAC	<i>Organismo Nacional de Acreditación de Colombia</i> (National Accreditation Board of Colombia)
CSR	Corporate Social Responsibility	PAMPAT	<i>Projet d'accès aux marchés des produits agroalimentaires et de terroir</i> (Programme for Market Access of Traditional Agrifood Products)
DIPP	Department of Industrial Policy and Promotion	PCP	Programme for Country Partnership
DTI	Department of Digitalization, Technology and Innovation	PGI	Protected Geographical Indications
EAEU	Eurasian Economic Union	PMPA	Pharmaceutical Manufacturing Plan for Africa
ECOWAS	Economic Community of West African States	PPE	Personal Protective Equipment
EDIP	Enterprise Development and Investment Promotion Programme	ProColombia	Colombian National Export Promotion Agency
EIC	Ethiopia Investment Commission	PTP	Productive Transformation Programme
EMIP	Enterprise Modernization and Innovation Programme	QCD	Quality, Cost, Delivery
EPMP	ECOWAS Pharmaceutical Manufacturing Programme	QI	Quality Infrastructure
EPZ	Export Processing Zone	QI4SD	Quality Infrastructure for Sustainable Development Index
EqIP	Enhancing the Quality of Industrial Policy	QI4TF	Quality Infrastructure for Trade Facilitation Toolkit
FAPMA	Federation of African Pharmaceutical Manufacturers Associations	QI4VC	Quality Along the Value Chain
FDI	Foreign Direct Investment	QP	Quality Policy
FECOPROD	Federation of Production Cooperative	R&D	Research and Development
GMP	Good Manufacturing Practices	SADC	Southern African Development Community
GVC	Global Value Chain	SAGMA	Southern Africa Generic Medicines Association
HP	Hewlett Packard	SDG	Sustainable Development Goal
IAF	International Accreditation Forum	SE/CZPE	Secretariat of the National Council for Export Processing Zones
IARPMA	Indian Agro and Recycled Paper Mills Association	SEZ	Special Economic Zone
IC-ISID	International Centre for Inclusive and Sustainable Industrial Development	SME	Small and Medium-sized Enterprise
ICONTEC	Colombian Institute of Technical Standards and Certification	SPX	Subcontracting and Partnership Exchange Programme
ICT	Information and Communication Technology	STEM	Science, Technology, Engineering, and Mathematics
IDDA III	Third Industrial Development Decade for Africa	STP	Science and Technology Park
ILAC	International Laboratory Accreditation Cooperation	TAP	Technical Assistance Programme
ILO	International Labour Organization	TFA	Trade Facilitation Agreement
INM	National Metrology Institute of Colombia	UIP	<i>Unión Industrial Paraguaya</i> (Paraguayan Industrial Union)
INMA	Indian Newsprint Manufacturer's Association	UNAIDS	Joint United Nations Programme on HIV/AIDS
INVIMA	National Institute of Food and Drug Monitoring	UNCTAD	United Nations Conference on Trade and Development
IP	Industrial Park	UNICEF	United Nations Children's Fund
		UNIDO	United Nations Industrial Development Organization
		WAHO	West African Health Organization
		WHO	World Health Organization

1

Introduction

Aiming to accelerate the economic growth of UNIDO Member States, this publication describes the requisite conditions for countries to achieve sectoral transformation for inclusive and sustainable industrial development (ISID).





Today's world is characterized by an exponential evolution of the technologies of the fourth industrial revolution (4IR). Digital transformation is already influencing many aspects of people's lives and in industry it has turned out to be a vital part of business and research. Digitalization presents opportunities to improve the efficiency and elasticity of industrial processes, thus increasing productivity and economic competitiveness and contributing to the transition towards sustainable supplies and sustainable production.

Although substantial progress has been made in the last decade towards achieving a digitalized industry and digitalized industrial research, the full potential of digital business operations should be harnessed to the subsequent evolution of emerging technologies, and this demands the establishment of an appropriate infrastructural basis. To attain a wide-ranging digital transformation of the industry, a step that would be welcomed by stakeholders, users and society at large, both the benefits and the drawbacks of advanced technologies need to be identified and clarified.

COVID-19 has revealed the vulnerabilities of many value chains, concurrently offering opportunities for vertical and horizontal integration within confined geographic spheres. The pandemic has highlighted the importance of national sectoral independence, in terms of creating efficient local supply chains for continued business

survival in times of crisis. Governments and the relevant stakeholders should act swiftly to ensure strong economic recovery and build back in a more resilient and inclusive manner from the COVID-19 pandemic. Essentially, by enlarging the development potential within the economies' strategic value chains or sectors, leveraging geographical characteristics and generating employment for a growing workforce, countries can be helped to improve their socioeconomic development trajectory.

A sectoral transformation approach that enables sustainable market access can be pursued through the engagement of all stakeholders in the prioritized sectors in the development of policies, capacity-building activities and the facilitation of cooperation with host country governments as an integral element of the sectoral strategy. At the same time, the various tools used in industrial development can also reduce gender disparities by creating a conducive environment for encouraging the participation of women in industry.

The sectoral diagnostic tools are applied at all intervention levels in the industry, i.e., macro, meso and micro, to ensure a complete transformation of the overall industrial environment. The sectoral focus increases the ability of stakeholders to gain market access to the global markets and increases the sustainability of operations in the medium to long term.

The notion of inclusivity involves the active participation of women in industrial development and economic growth, acknowledges the significance of gender from an investing perspective, and recognizes the importance of supporting women and youth in accessing finance for entrepreneurship. Multilateral engagements between and among stakeholders are essential to involve small and medium-sized enterprises (SMEs) in the sectoral transformation of the strategic value chains of economies. Public-private partnerships have proved to be more successful, in that they create shared value for all participating stakeholders towards achieving sector or value chain objectives. Joint operational activities improve the flow of scarce resources by exploiting synergies and capitalizing on the capabilities of more established value chains to access the global market.

To assure sustainable market access, the development of value chains should identify sectoral market leaders to identify proven procedures for successful establishment. The observations would include focus groups or research into trending policies governing industrial development objectives. Sectoral diagnostic studies should be undertaken to analyse existing regulatory regimes which could be game-changers in making or breaking a business. An in-depth knowledge of the regulatory trends of the economy's strategic sectors in the business environment, and the effects of those trends on a sector, will serve to enhance the design of appropriate strategies and road maps towards sectoral development, and advance economic competitiveness in wide-ranging ways.

In designing sectoral transformation goals, it is critical to emphasize the need for integrated sustainability to address today's pressing global issues such as resource scarcity, climate change and inequality. Embedding sustainability into sectoral value chains not only helps secure a sustainable future but it also benefits enterprises, enabling them to prepare for future risks, act on opportunities and create shared value for the business and its stakeholders. To ensure a long-term impact on sustainable market access, value chains should integrate sustainability into both core strategies and business models. Sectoral value chains should integrate sustainability in such a way that their business models create substantial social and environmental value in addition to financial returns.

Aiming to accelerate the economic growth of UNIDO Member States, this publication describes the requisite conditions for countries to achieve sectoral transformation for inclusive and sustainable industrial development (ISID). They are encompassed in six enabling pillars that provide a framework for the methodological approaches to sectoral transformation, which are presented with case studies. Two best practice cases of UNIDO projects illustrate how these methodological approaches can be customized and integrated for increased impact to assist diverse businesses in their bid to advance economic competitiveness at sectoral, national, regional, and global levels.

2

Strategic approach to sectoral transformation

Sectoral transformation is a central feature of economic development. Manufacturing industries play a key role in this transformation by increasing productivity, integrating the workforce, and fostering greater technological change and integration in global value chains.



UNIDO is the agency most closely linked to industry within the United Nations system, with a mandate to promote inclusive and sustainable industrial development (ISID) for poverty eradication, shared prosperity, and environmental sustainability. The three UNIDO pillars of intervention for ISID are defined in its Medium-Term Programme Framework (MTPF) 2022–2025 as follows:

CLIMATE CHANGE AND THE CIRCULAR ECONOMY

DIGITAL TRANSFORMATION AND INNOVATION

STRUCTURAL TRANSFORMATION AND SECTORAL EXPERTISE

This publication describes the contribution made by the experiences of the UNIDO Department of Digitalization, Technology and Innovation (DTI) to the third pillar: “**Structural transformation and sectoral expertise**”, and presents the practical framework set up by DTI to support structural transformation at the sectoral level.

Sectoral transformation is a central feature of economic development. Manufacturing industries play a key role in this transformation by increasing productivity, integrating the workforce, and fostering greater technological change and integration in global value chains.



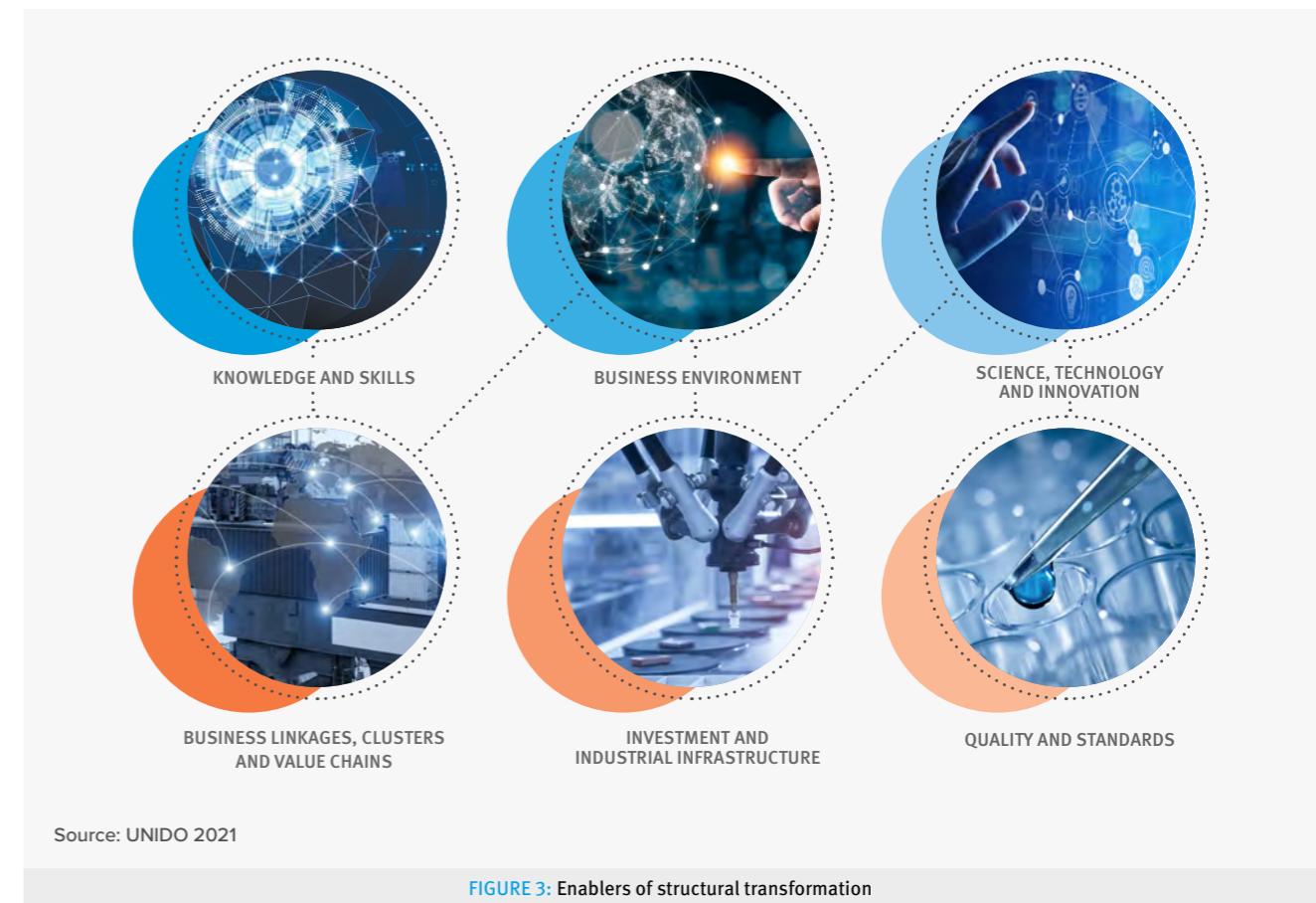
Source: UNIDO 2021

FIGURE 1: Inclusive and sustainable industrial development and the SDGs

Enabling pillars of sectoral transformation

These essential conditions are encompassed in six enabling pillars that could help to spur the necessary change that would, in the long run, lead to the

achievement of structural transformation at the sectoral level.



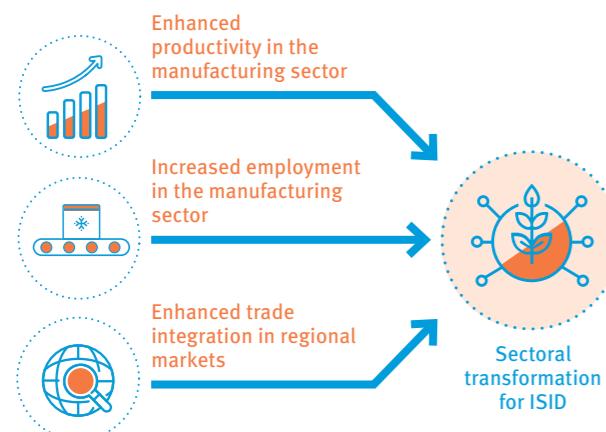
Source: UNIDO 2021

FIGURE 3: Enablers of structural transformation

KNOWLEDGE AND SKILLS

The main emphasis of structural transformation has shifted from agriculture towards manufacturing. Nevertheless, economic sectors can mask great differences in terms of the productivity of specific activities. For this reason, structural transformation can be seen as involving shifts within sectors towards activities that are more knowledge-intensive and generate higher value added, and not only a shift between sectors, namely from agricultural to manufacturing activities. In this wider definition of structural transformation, new technologies and skills promotion are identified as key factors driving economic development.

Economic growth cannot be achieved without the major contribution made by the skills, knowledge or value of people, also referred to as human capital. When a country invests in human capital, an increase in labour productivity can be observed. Moreover, as industries become more sophisticated globally, the skills required to achieve excellence also become more sophisticated. For that reason, activities that support countries' efforts to focus on improving and financing programmes for the development of skills and those to develop or improve industrial competitiveness, enhance the importance of human capital and support economic growth.



Source: UNIDO 2021

FIGURE 2: Necessary conditions to achieve the long-term goal of sectoral transformation

BUSINESS LINKAGES, CLUSTERS AND VALUE CHAINS

Sustainable linkages between enterprises and support institutions at every stage of the value chain are key determinants of the resilience of industries and their capacity to build economies of scale and diversification. By forming collaborative networks, SMEs overcome

limitations and reap opportunities that are beyond their individual reach. Bottlenecks that constrain the growth of small-scale business are thereby removed, triggering improvements in performance on an economic, social and environmental level.

BUSINESS ENVIRONMENT

It is well known that the business environment affects the performance of private enterprises. For example, in many developing countries, a business environment that is hostile to market-led growth can result in private enterprises suffering excessive regulatory barriers. A welcoming business environment is hence a prerequisite for economic growth and poverty reduction. Creating and maintaining a business climate that stimulates inclusive and sustainable industrial development must be at the heart of any effort to stimulate the growth of vibrant and competitive industrial sectors. Sound regulations are necessary to secure benefits, protect workers, consumers, and the

environment, and to promote the rule of law and the efficient functioning of market economies. Accordingly, policy and regulatory choices have a significant impact on SME competitiveness and play a crucial role in determining the extent to which SMEs are able to link to value chains. Governments have a responsibility to create an enabling environment based on policies and regulations that promote a sustainable environment in which the private sector can invest, adopting regulatory best practice and stimulating the demand for digital solutions, which in turn will lead to the structural transformation of sectors.

INVESTMENT AND INDUSTRIAL INFRASTRUCTURE

For decades, investment has been recognized as a central element in economic and social development, as increased national and foreign investments lead to enhanced productivity and competitiveness. Foreign direct investment is also a key driver in the industrialization process, stimulating technological and institutional upgrading and fostering knowledge transfer and job creation. Finding adequate investment finance for priority sectors is essential for achieving structural transformation, since it helps strengthen the circle of rapid productivity growth, an increase in the quality

and number of jobs, and expansion of markets (both at home and abroad) leading in turn to higher levels of investment, and thus helping to boost productivity. Investment thus plays a catalysing role in the process of structural change. Countries seeking to advance their industrial productivity and foster technological change face challenges in finding the right instruments and policies to ensure adequate investment. Supporting countries to manage these challenges is at the heart of the UNIDO programmes and interventions.

SCIENCE, TECHNOLOGY AND INNOVATION

The great disparities in income and social development between developed and developing countries are often rooted in the different levels of their industrial development and use of technology, and the resulting gaps in their productivity. For this reason, UNIDO helps countries make effective use of innovation and 4IR

technologies to close these gaps and develop sustainable solutions for inclusive economic development. In this way, innovation and technology are placed at the centre of structural change and industrial development, as key enablers for economic growth.

QUALITY AND STANDARDS

International trade is a powerful tool for stimulating economic progress and reducing poverty, and standards play an important role in this regard. Standards that uphold not only the quality, but also the sustainability of methods of production can be central to enabling developing countries to unlock new markets. Compliance with quality and standards requirements in target markets are among the essential factors affecting competitiveness in trade and have become increasingly important elements in ensuring access to global markets. A demand-driven quality culture, together with a quality infrastructure system and conformity assessment

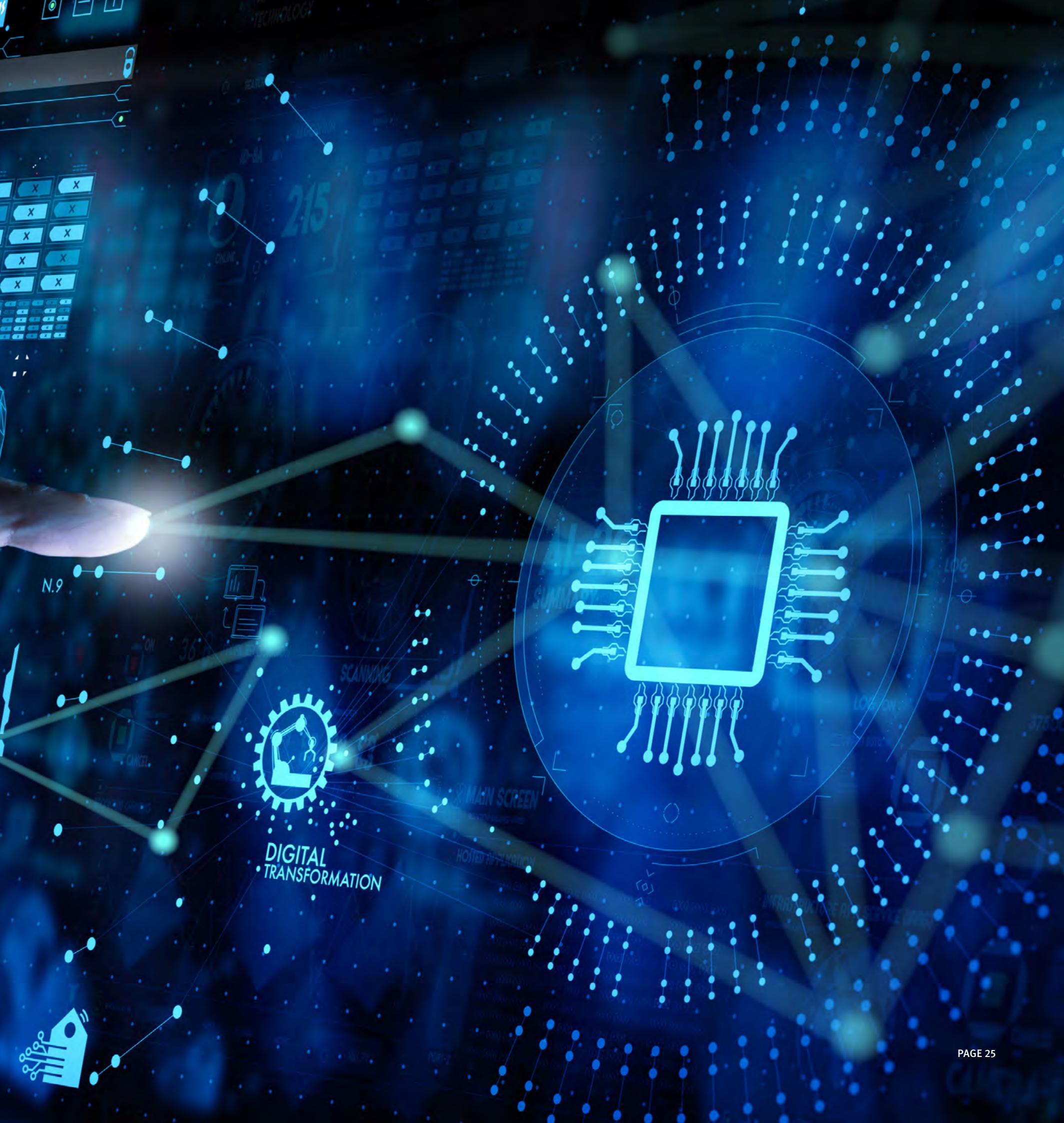
services, help to support economic operators (in particular SMEs), to achieve and prove their conformity with market requirements, compete in international markets and connect to global value chains. The interventions of UNIDO assist the development of quality infrastructure institutions and conformity assessment services, including the support of the private sector in achieving compliance with international standards.

This detailed strategic approach provides a framework for the methodological approaches to sectoral transformation, which will now be presented.

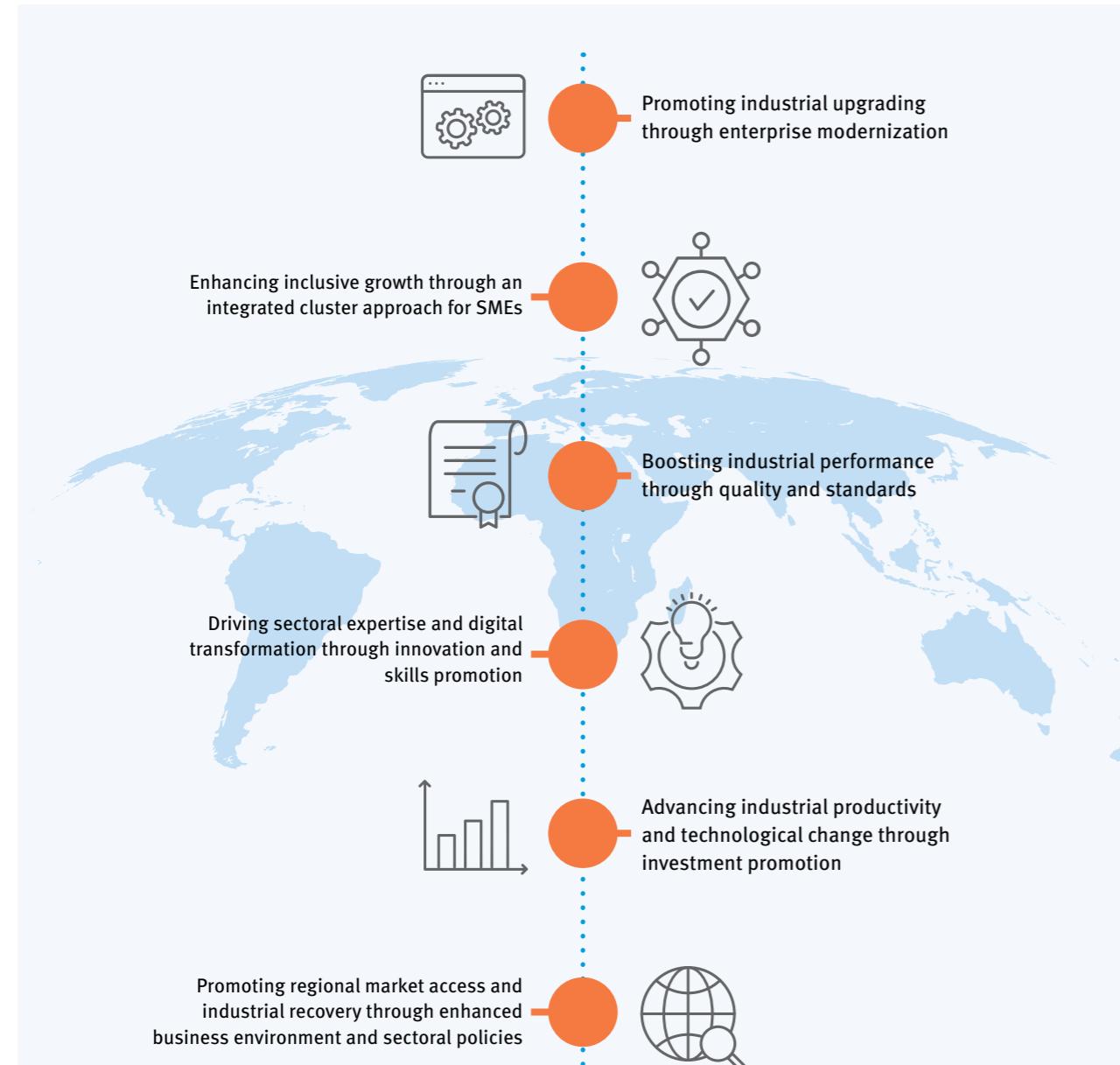
3

Methodological approaches to sectoral transformation

Following decades of extensive experience in supporting the structural transformation of countries and the development of manufacturing sectors in developing countries, UNIDO has built on its successful cases to provide a practical framework supporting structural transformation at sectoral level.



Embarking on the path of inclusive and sustainable industrial development, demands the appropriate expertise and know-how to shape effective policies, workable institutions and effective programmes and interventions that can create the necessary conditions for progress towards sectoral transformation.



Source: UNIDO 2021

FIGURE 4: Six programme services included in UNIDO's practical framework supporting structural transformation at sectoral level

Following decades of extensive experience in supporting the structural transformation of countries and the development of manufacturing sectors in developing countries, UNIDO has built on its successful cases to provide a practical framework supporting structural transformation at sectoral level. This includes six programme services, as listed below.

The figure below describes the theory of change towards the UNIDO long-term goal of sectoral transformation for ISID by showing the interrelation between the UNIDO

methodological interventions, the enablers of structural transformation and the necessary transformation to reach the goal.

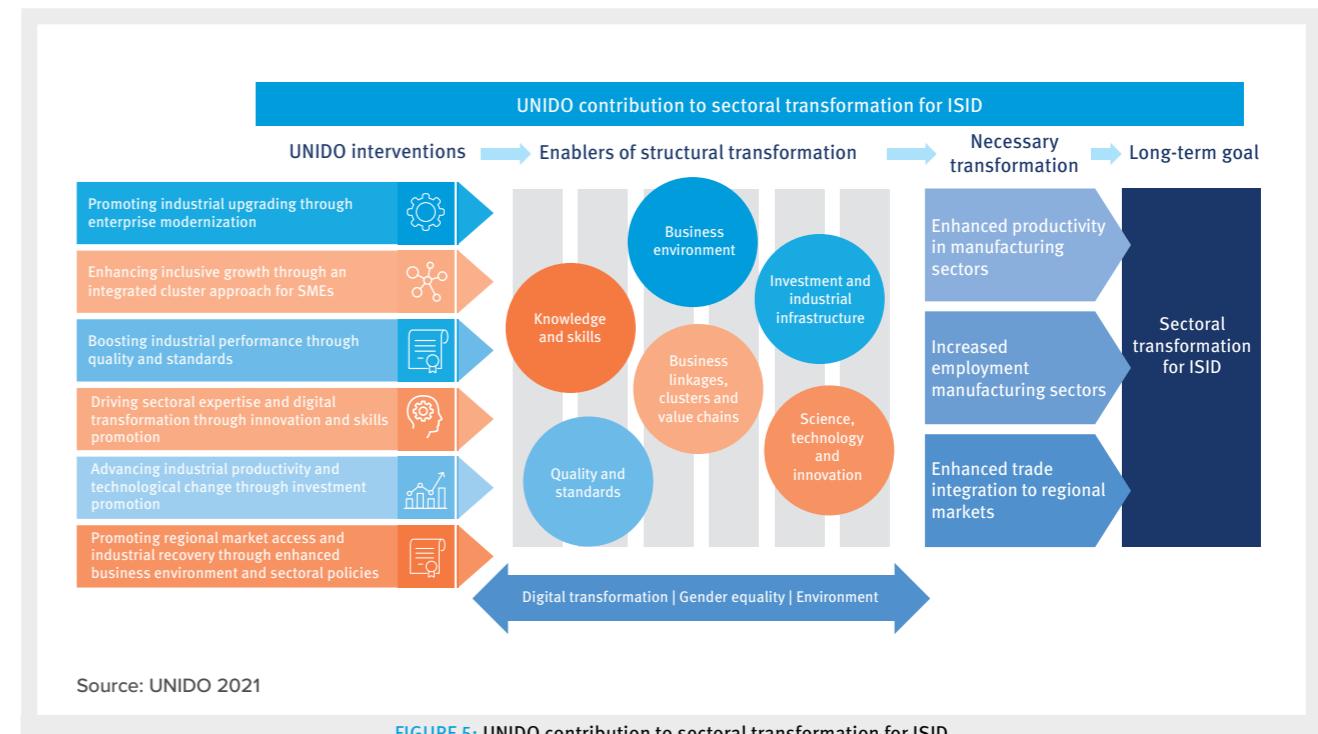


FIGURE 5: UNIDO contribution to sectoral transformation for ISID



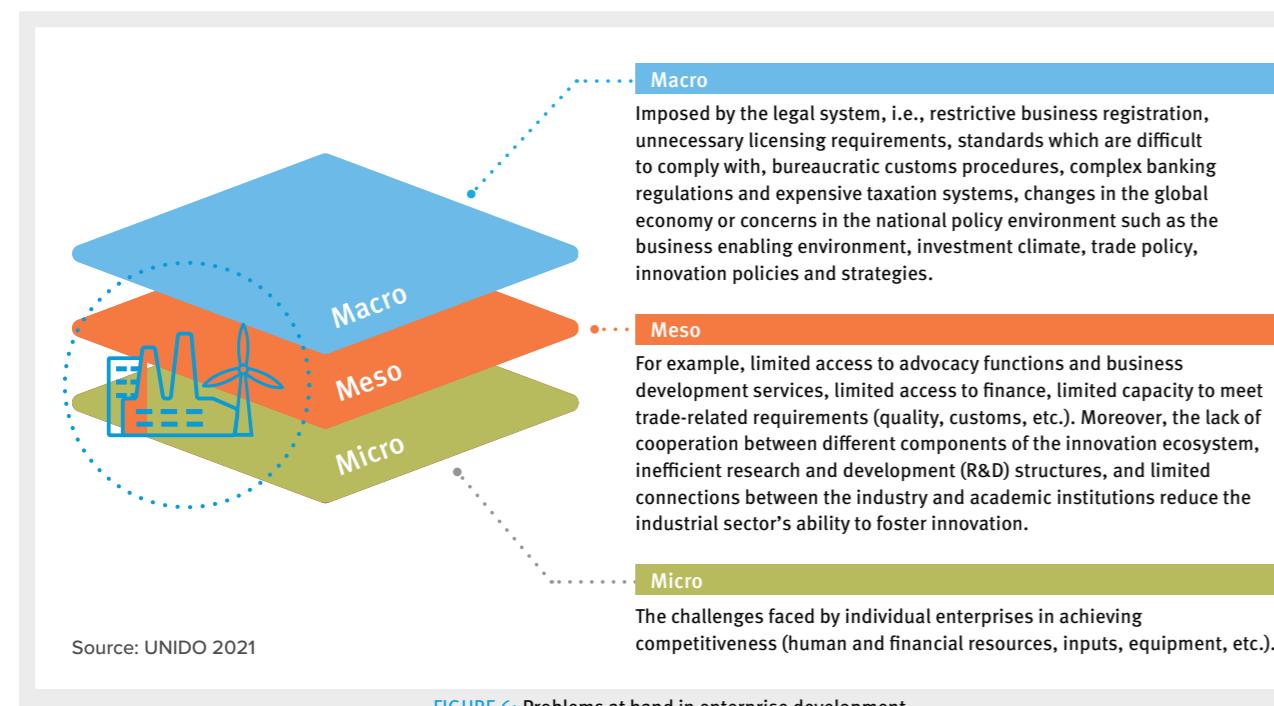
3.1 PROMOTING INDUSTRIAL UPGRADING THROUGH ENTERPRISE MODERNIZATION

3.1.1 INTRODUCTION

Many developing countries view with concern the dawn of the fourth industrial revolution (4IR) and its potential impact on their economies. With the new technologies, business models and shifts in the value chains, developing countries need to be prepared to embrace these elements. While some countries prepare to tackle

the challenges, others are slow to respond and are therefore exposed to the risk of further decline of their economic competitiveness.

The problems at hand in enterprise development can be grouped into three categories: *macro*, *meso* and *micro*.



To meet the numerous requests from these countries, UNIDO has in recent years developed a comprehensive and multidisciplinary approach encompassing industrial enterprises and their environment. The approach adopted is based on the experience acquired by UNIDO in executing several industrial upgrading projects during recent years.

The newly designed approach was named the Enterprise Modernization and Innovation Programme (EMIP). EMIP aims at transforming the enterprises in a target country to increase its productivity and competitiveness using modern innovative tools in a contextualized and customizable manner to address different countries and regional challenges. The objectives of EMIP include those listed below.

-  Increasing exports (and reducing imports)
-  Creating employment
-  Developing poverty-stricken regions
-  Growing the economy

3.1.2 EMIP APPROACH

MACRO LEVEL

On the macro level, EMIP addresses the elements influencing the enterprise and its environment, mainly the macroeconomic policies, the national and supra-national legal frameworks, the sociopolitical context and the technological context.

This is done by undertaking the activities listed below.

- 1 Performing a regulatory review of the enterprise modernization and innovation context to:
 - Identify regulations or legislation which limit industrial development.
 - Determine the cost implications of the different regulations.
 - Ascertain which regulations need to be improved to achieve the goal of enterprise modernization; and
 - Innovation.
- 2 Support regulatory reform of industrial upgrading and innovation. This involves:
 - Drafting a road map for the Government to remove barriers (selection of options for legislative and regulatory reform) where agreement has been reached that the benefit to private sector growth outweighs any negative impact on other objectives.
 - Drafting new regulation determined as critical to enterprise modernization and innovation.

MESO LEVEL

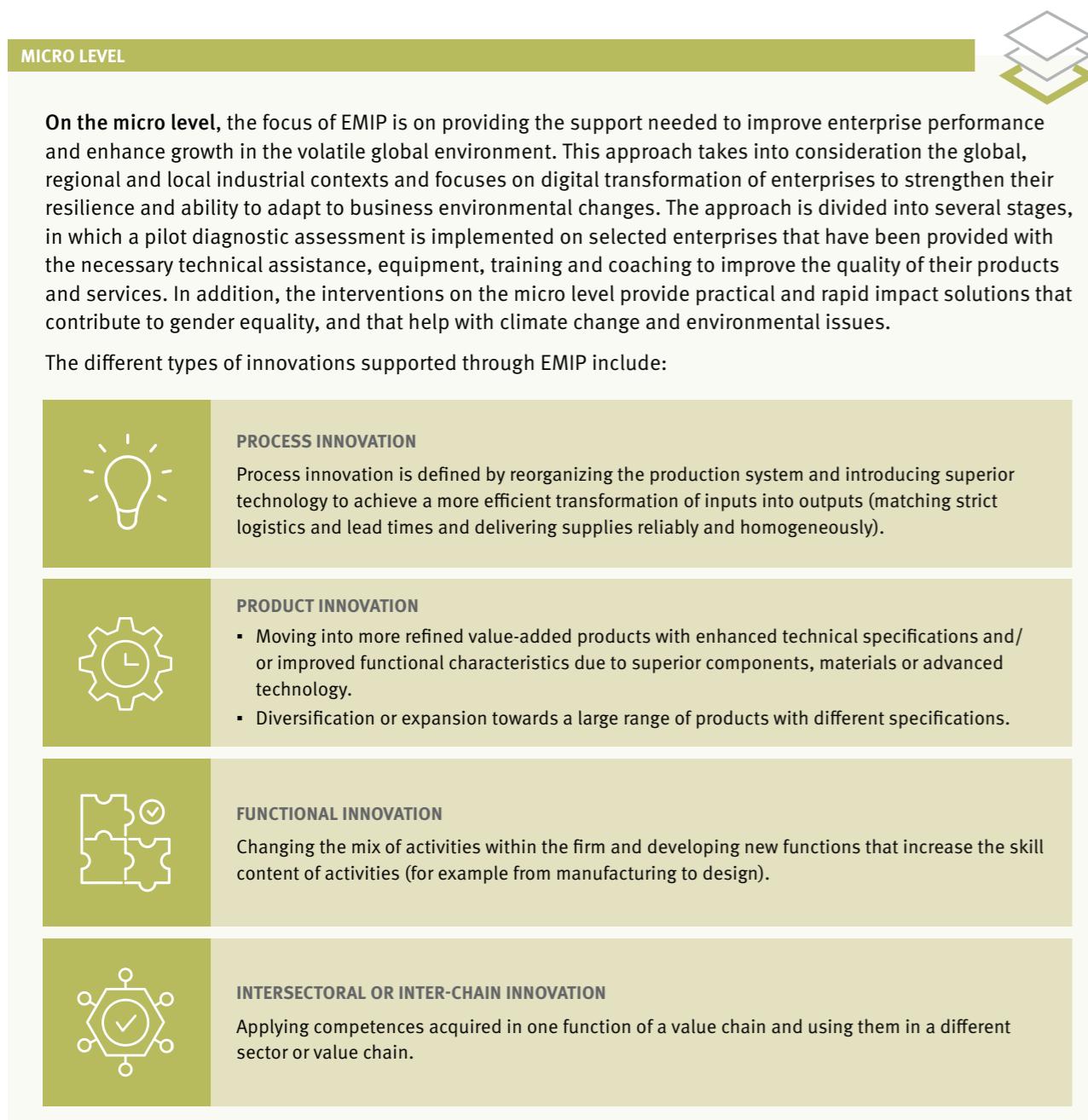
On the meso level, EMIP addresses the industry and enterprise institutional support mechanisms to ensure that technological upgrades, knowledge sharing, access to finance, capacity-building and other services provided by meso-level organizations are available to the enterprises within the target country or region

This is done by undertaking the following:

- 1 Support to increase the provision of business development services: this is aimed at institutions or entities providing business development services, making a distinction between operational and strategic services) including training, consultancy and advisory services, such as marketing assistance, information and technology transfer, and R&D.
- 2 Support for improvement of business regulatory requirements: support for the development of conducive business regulatory processes will vary depending on the need for reform of the organization.
- 3 Support access to finance for enterprise modernization and innovation: this involves undertaking a situation analysis on finance for enterprise modernization and innovation; and cooperating with development finance institutions (development banks, credit guarantee funds, development investment funds, etc.) to determine how they can best provide the finance needed to support the implementation of the project.
- 4 Support to improve advocacy for enterprise modernization and innovation: this activity aims to enable the voice of business associations to be articulated in a unified manner to inform the policymakers about the necessary regulatory improvements.
- 5 Support to clusters and value chains: EMIP supports both approaches to emphasize the importance of industrial upgrading and innovation in sustaining competitiveness in global markets. EMIP will principally benefit from the expertise of UNIDO and the published guidelines related to clusters and value chains

consisting of a 6-phase methodology: (1) cluster identification and selection; (2) cluster governance and trust building; (3) cluster diagnostic; (4) vision building and action planning; (5) implementation; and (6) monitoring and evaluation.¹ It will support the main institutions of operations in the selected clusters such as business associations, business development service providers, financial services providers, public authorities and training agencies (vocational centres, universities, etc.).

6 Support to strengthen the national structures responsible for Enterprise Modernization and Innovation.



1) SMEs Integrated Cluster approach

3.1.3 EMIP AND COVID-19

In response to COVID-19, UNIDO has developed the COVID-19 Industrial Recovery Programme (CIRP), which builds on the EMIP approach and has recovery and modernization of the enterprise at its core. In addition to the micro level interventions, CIRP constitutes a

rapid response mechanism to address the challenges of COVID-19 in the short term and increase the readiness of the country or region for adaptation to future economic shocks.

3.1.4 LIST OF TOOLS



EMIP remote assistance application

This *app* performs an enterprise diagnosis to evaluate performance and needs. It also serves as an operational tool for a rapid assessment of the impact of COVID-19 on enterprise performance. In addition, it facilitates the matching of identified needs with the UNIDO pool of experts able to provide the required remote assistance.



Enterprise diagnosis and upgrading tools

Tools are designed to digitalize the process of enterprise upgrading (diagnosis and implementation of soft and hard infrastructures) within industrial upgrading programmes and EMIPs.

3.1.5 LIST OF DELIVERABLES



Capacity-building of national institutions



Capacity-building of industry support institutions



Enhanced services of business development service providers



Enterprise functions diagnosis (production, marketing, finance, human resources, environment, energy, strategic positioning)



Upgrading plans designed for soft and hard investments to prepare the enterprise in the context of the fourth industrial revolution



Enterprise clusters mapped and developed



Value chain and sectoral diagnosis



Process, product, functional and intersectoral value-chain upgrading



Training, coaching and mentoring sector enterprises on best practices in innovation and product development

CASE STUDY: NIGERIA

STRENGTHENING THE CAPACITY OF LOCAL MSMES IN NIGERIA TO PRODUCE HIGH-QUALITY PERSONAL PROTECTIVE EQUIPMENT AND HEALTH-CARE PRODUCTS



The demand for imported health-care products and personal protective equipment (PPEs) has reached unprecedented levels, while the procurement of essential supplies to combat COVID-19 has become more difficult. In Nigeria, several factories, textile industries and local manufacturers have taken advantage of the high demand to manufacture health-care products and kits, many of which fall below the required quality and standards and thus may undermine their intended purpose.

In this context, UNIDO, under the United Nations COVID-19 Response Basket Fund, started implementing in July 2021 a one-year technical assistance project in cooperation with three other United Nations agencies: the United Nations Entity for Gender Equality and the Empowerment of Women (UN-Women), the World Health Organization (WHO) and the International Labour Organization (ILO). The project

aims at strengthening the capacity of Nigerian micro, small and medium-sized enterprises (MSMEs) to produce urgently needed PPEs and other health-care products, to serve both Nigeria and neighbouring countries in the Economic Community of West African States (ECOWAS) region. The expected overall impact of the project is to contribute to increasing the resilience of these MSMEs in the context of the COVID-19 pandemic, support the creation of decent jobs and employment, improve supply chains, and promote transformative economic recovery and growth.

The project is implemented through an integrated service package focusing on “promoting industrial upgrading through enterprise modernization”, which includes UNIDO analytical work, policy and normative support, mapping and partnership formulation.

Result level 1: policies and strategies for ISID and the SDGs

The project is aligned with the objectives of Nigeria’s National COVID-19 Multi-Sectoral Pandemic Response Plan, namely objective 1: contribute to an effective national and local response to COVID-19, and objective 3: minimize disruption of critical social, economic, and medical services during the pandemic. The project contributes to the task list of phases 3 and 4 of the Response Plan with regard to laboratories, infection prevention and control and case management. The focus is on the production of quality items across the

six geopolitical zones of the country including, but not limited to, facial and disposable surgical masks, hand rubs, medical scrubs, gowns, face shields, aprons, and overalls.

Furthermore, the project is following gender-responsive and youth-sensitive approaches to ensure the involvement of women and youth led MSMEs and entrepreneurs in the local production and supply of high-quality PPEs and health-care products.



Result level 2: conducive industrial ecosystems

Within the framework of the United Nations COVID-19 basket fund, UNIDO, in collaboration with the Federal Ministry of Trade and Investment and relevant agencies of the Ministry, will draw on its expertise in normative functions, MSMEs and cluster development, standards, conformity assessment and quality related activities. Specifically, the West African Competitive Programme and the Nigeria Quality Infrastructure Project will be harnessed to complement the project.

The project will contribute to enhancing the industrial ecosystem through giving support to a number of service providers, including conformity assessment

bodies, which will result in better services being offered both to producers and final consumers. The project will select, assess and capacitate a number of conformity assessment bodies in providing services to test the products of the beneficiary MSMEs, with the ultimate aim of ensuring that high-quality conformity assessment services are provided to check quality and safety requirements through the certification, inspection and testing of kits and health-care products in accordance with national and regional quality standards.



Result level 3: innovative, inclusive, and sustainable businesses

The project will contribute to innovative, inclusive, and sustainable businesses, through the support planned for at least 170 MSMEs across the six geopolitical zones in adopting innovative production methods and complying with standards and technical regulations as a reference for production of PPEs, while targeting 30 per cent and 20 per cent of women-led and youth-led businesses respectively.

The selected MSMEs will be organized in clusters based on their products (cloth facemasks, disposable surgical masks, alcohol-based hand rubs, gowns, face shields, aprons, and overalls) and supported through training measures/workshops on new technologies and production processes. Moreover, MSMEs will be

provided with adequate equipment and material in accordance to their needs.

The project will also facilitate market outlets for the products developed by the targeted MSMEs through engagement with the government and the private sector organizations to serve as the major supplier of raw materials and market for the finished products, applying gender-responsive procurement principles. The training, distribution and marketing of the locally manufactured PPEs will be done by the participating United Nations organizations in collaboration with the Nigeria Centre for Disease Control (NCDC), the Ministry of Health and other national partners.



Result level 4: sustainability

The project is in line with the UNIDO response framework to prepare and contain, respond and adapt, and recover and transform. It will rely on the network of selected 170 MSMEs to fast-track the local production of the proposed PPEs in the desired quality and ensure their sustained availability across the country.

Project interventions will be linked to other ongoing relevant projects in the participating United Nations organizations, such as the UNIDO-Hewlett Packard (HP) Learning Initiatives for Entrepreneurs (LIFE) to promote access to finance by linking the selected MSMEs to NIRSAL Microfinance Bank and the Bank of Industry.

Moreover, the proposed interventions will contribute to mitigating the impact of the COVID-19 crisis on some segments of the MSME sector. Accordingly, the emphasis in the medium and long term should shift to the other productive sectors of the economy, to ensure inclusive growth and employment in the post COVID-19 era, starting with an in-depth evaluation of the new realities that have reshaped international trade and global value chains. Based on that, a flexible and intelligent readjustment mechanism should be designed to mitigate the economic impact.



CASE STUDY: ARMENIA**UNIDO PROJECT: IMPROVING COMPETITIVENESS OF EXPORT-ORIENTED INDUSTRIES IN ARMENIA THROUGH MODERNIZATION AND MARKET ACCESS: PHASES I, II AND III**

Objectives: To contribute to the development of the textile industry through strengthening the productivity, competitiveness and collective export capacities of Armenian manufacturing companies operating in the priority light industries, and seeking to maintain and improve the market share of local light industry operators in national and international markets by harnessing the

opportunities offered by the regional economic integration processes. The project also aims at the development of the light industry training and service centre into a self-sustainable entity providing cost-effective services to local companies, along with capacity-building for national experts and business support institutions for the long-term sustainability of the project.

Result level 1: policies and strategies for ISID and the SDGs

At macro level, the project contributes to effective integration into regional and international markets, thus improving international positioning in manufactured value addition, manufactured exports and global competitiveness. In the context of the Eurasian Economic Union (EAEU) market (from the perspective of Armenia), the project sought to revive industrial linkages between textile and clothing, leather and footwear sector producers within local and regional value chains by promoting business networking and institutional partnerships between different value chain operators, including raw material producers, product manufacturers (both individual

and collective), product developers (design and modelling), exporters, marketing agencies and their associations.

With UNIDO support in improving international market access through participation in numerous exhibitions, fairs and business meetings in a business-to-business (B2B) format, Armenian manufacturers signed contracts with the largest manufacturers and retailers of fashionable clothes in the Russian Federation and the EAEU region, which gave new impetus to the development of the country's light industry, creating new jobs and increasing the value added to the produced products.

Result level 2: conducive industrial ecosystems

At this level of intervention, the technical assistance is geared towards building public and private sector capacities that enable local manufacturing enterprises



to achieve collective efficiency and gain wider market access by establishing strong linkages with potential buyers.



The project significantly contributed to accelerated job creation and development of sector-specific skills, in particular among women and representatives of vulnerable social groups (such as refugees from Nagorno Karabakh).

Over the course of implementation of the project in Armenia, more than 727 local light industry specialists have gained new professional skills through a series of master classes on design, production management, creation of fashion collections and quality control of manufactured products, as well as their positioning in the domestic and international markets and cooperation with retail outlets. In cooperation with the Milan Fashion Institute, the Atex-Burgo fashion school was opened in Yerevan, where Armenian specialists trained in Italy lecture and graduates receive international standard diplomas in fashion and designing.

Capacity-building activities and master classes of the SPACE59 Light Industry Training and Service Centre are continuously upgraded by international experts in preparation of a new collection in the Armenian 5900 BC series, including fashion trend forecasts, eco-fashion and sustainable fashion practices.

The project constantly engages both light industry employees from project beneficiary SMEs and future specialists (95 per cent of which are usually women) in its capacity-building activities to provide the necessary professional learning opportunities and secure jobs for hundreds of women. The project attracts and nurtures female talent irrespective of age, status, professional or socioeconomic background, to create income opportunities and enable short-term and long-term employment provided by beneficiary companies.

Result level 3: innovative, inclusive, and sustainable businesses

To address the needs of the textile and garment industry due to the pandemic, UNIDO provides upgrading support to reorient and diversify production in the health industry in Armenia. The COVID-19 pandemic has triggered an unprecedented downturn in economic activity, creating new challenges and exposing long-standing vulnerabilities. UNIDO adapts its interventions to focus on alternative online business performance optimization solutions and tools:

- Using the existing technological and human capacities to respond to the needs and challenges of the crisis-driven economy

- Employing digital business tools such as e-commerce by project beneficiaries to strengthen their positions in local and global markets
- Assisting project beneficiaries to develop a strong online market potential locally and globally through involvement of industry-specific product development and digital marketing specialists for all target subsectors
- Conducting capacity-building activities for project beneficiaries targeted at two main components: product development and e-commerce.

Result level 4: sustainability

Work by UNIDO with public and private institutions and businesses of the target industries and the development of tailor-made modernization strategies empowered project beneficiaries with best innovative and entrepreneurial practices. The light industry upgrading process generated superior returns on investment, estimated against the technical assistance funding provided by the project donor.

The processes of innovation and digitalization, capacity-building activities and master classes are continually strengthening the knowledge and hands-

on experience of light industry professionals in digital design and product development using digital tools.

The project promoted private sector SMEs, business operators, communities and entrepreneurs active in the textile and garment industries. Public and private industry support institutions, including innovation, technology and vocational training centres, national experts, the staff of beneficiary enterprises, designers and other stakeholders, recognized the importance of creating backward linkages between different actors to ensure a smooth implementation of the project.

3.2 ENHANCING INCLUSIVE AND SUSTAINABLE GROWTH THROUGH SMEs CLUSTER DEVELOPMENT

3.2.1 INTRODUCTION

SMEs play a key role in economic growth and the acceleration of inclusive and sustainable industrial development. They contribute to employment generation, poverty eradication, gender equality and wider distribution of wealth and opportunities. Unfortunately, the potential role of SMEs is often not fully realized for reasons that are commonly attributed to their size.

Because they are small in size, individual SMEs seem unable to perform economies of scale and find it difficult to deliver large stocks of standardized products. They also tend to have limited bargaining power in the purchase of inputs and little influence in the identification of support policies and services. It is also true that some SMEs use outdated and environmentally hazardous technologies. Generally, they lag behind in digitalization and may find it difficult to comply with the standards of quality needed for successful integration into global value chains.

Although these problems have been attributed to the size of the enterprises, closer examination reveals that lack of cooperation amongst the SMEs is the major drawback. Nearness to one another in location and the sharing of common strategic business interests enable the realization of shared benefits, through the organization of joint actions between enterprises and support institutions, such as the provision of technical assistance by business associations to SMEs or investment in

infrastructure by the public sector. Cooperation along the local value chain between the different public and private actors is key to overcoming these obstacles.

Clusters are economic environments that are helpful in effectively tackling the problem of SMEs' isolation. UNIDO defines a cluster as a geographical and sectoral concentration of inter-connected enterprises and associated institutions, which share common challenges and opportunities. Clusters can be developed around unique local products such as traditional handicrafts, or local food flagship products, or as part of global value chains such as in the automotive or clothing industries.

Dynamic clusters play a significant role in achieving inclusive economic growth. The mere fact of geographical agglomeration of enterprises is not a guarantee of strong economic performance. Experience shows that inter-cluster cooperation among companies and between companies and support institutions does not always happen automatically. Among the factors that can hinder cooperation between geographically close SMEs are transaction costs, coordination costs and adverse business culture. Therefore, UNIDO has developed an integrated approach to cluster development that tackles the underlying causes of cluster stagnation at macro, meso and micro levels.

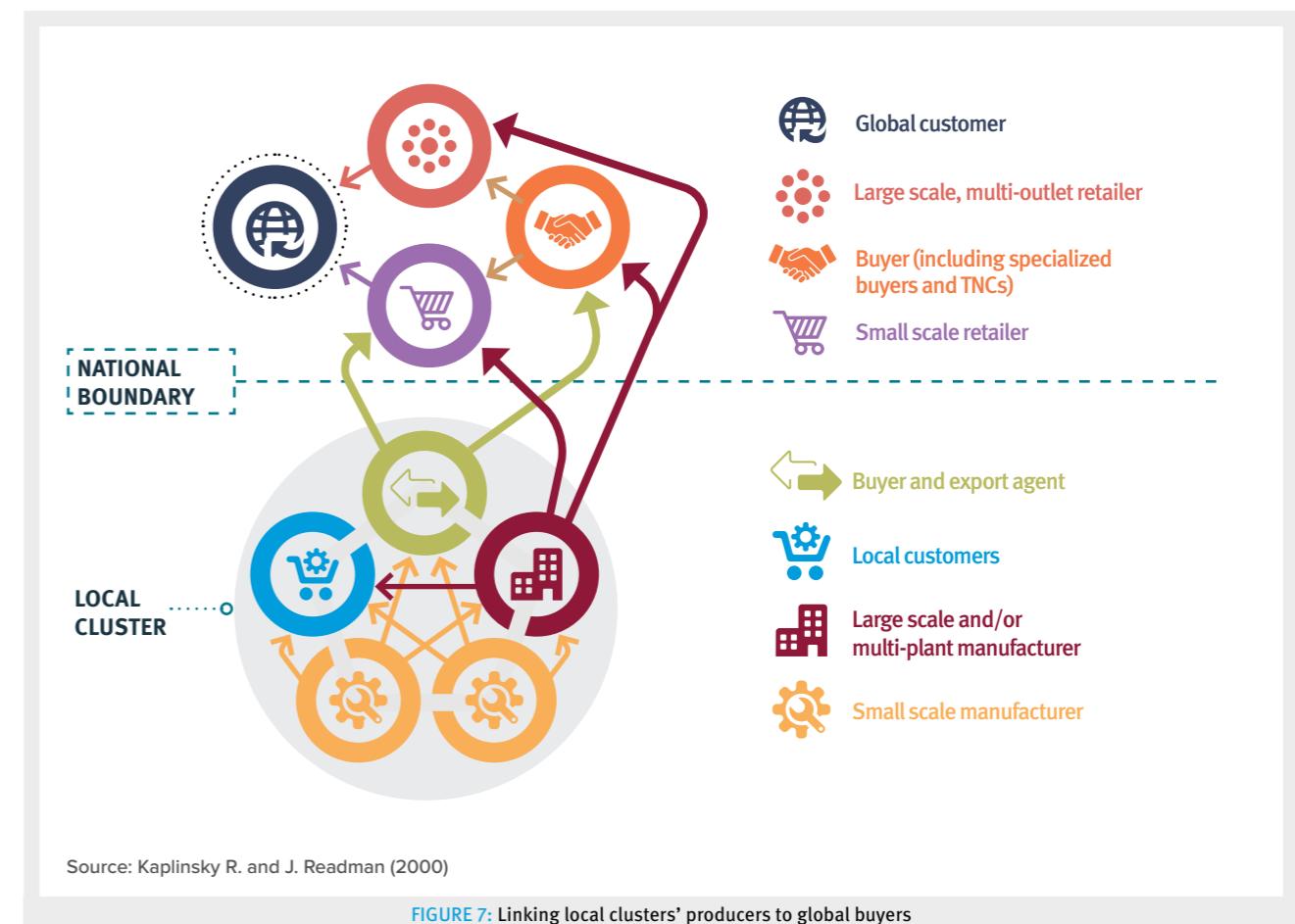


FIGURE 7: Linking local clusters' producers to global buyers

Mapping national clusters

The first step in preparing nation-wide cluster mapping is to support policymakers to enable them to take informed decisions about cluster assistance programmes. Cluster mapping is instrumental in identifying emerging and potential clusters in a country, understanding the distribution of clusters among different industrial sectors,

assessing cluster sizes, determining their current degree of performance and analysing the bottlenecks that compromise SMEs' performance levels. Cluster mappings serve as a basis for the subsequent cluster selection process as explained below.

3.2.2 UNIDO CLUSTER APPROACH

Macro – Cluster policy formulation

Promoting cluster policy

Clusters have gained increasing prominence in debates on economic development in recent years. Governments around the world regard clusters as potential drivers for the development of SMEs and innovative approaches towards them. Cluster initiatives are efficient policy instruments that enable the concentration of resources and funding to targeted areas of rapid economic growth and development potential that can eventually spread



beyond the target locations in what is known as spill-over and multiplier effects. UNIDO supports governments in mainstreaming the cluster approach into existing policy or regulatory frameworks or to adopt new policies, assistance schemes and cluster support programmes. UNIDO also builds the capacity of policymakers to develop clusters and to foster the integration of local clusters into international value chains.

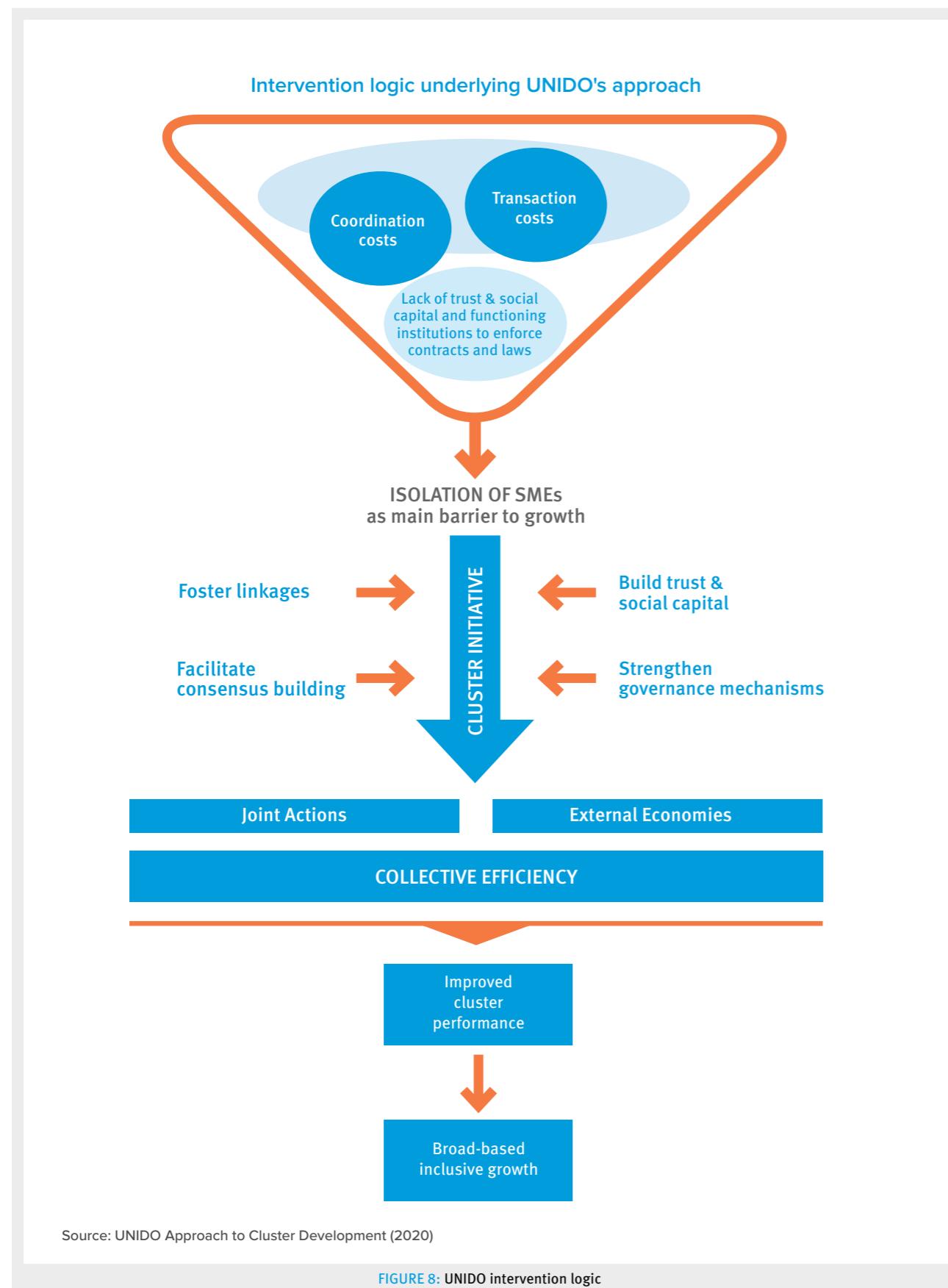
Meso – Cluster development implementation

The potential of a cluster development initiative rests not only in its capacity to stimulate high growth rates, but also in its ability to cultivate an environment conducive to the promotion of broad-based and inclusive forms of development. This is partly because clusters constitute socioeconomic systems where the enterprise population overlaps with the communities living and working within a specific area or territory. Cluster-based entrepreneurs and employees often share a similar social, cultural,



and political background, practising self-reliance and interacting in a reciprocal way. This leads to growth patterns that are more inclusive than in other economic contexts.

Developing clusters is a medium to long term process that requires an integrated modular approach. The UNIDO intervention logic underlying this approach is depicted below.



UNIDO has developed a six-phase methodology to guide practitioners, policymakers and business institutions to

support the development and strengthening of clusters.

PHASE 1: CLUSTER IDENTIFICATION AND SELECTION

A well-designed and participatory selection process, based on clearly defined criteria, is a precondition for the implementation of successful development initiatives, enabling the identification of organically grown clusters where the impact of planned interventions can be maximized, given the available time and resources. A set of well-defined criteria and variables should be identified in alignment with the stated development objective of the cluster initiative or national policy.

PHASE 2: CLUSTER GOVERNANCE AND TRUST BUILDING

Once a cluster has been identified for the receipt of support, a cluster development agent (CDA), or cluster broker, is appointed to facilitate the process of cluster development and to trigger the interaction among the cluster members. The CDA will implement day-to-day interventions to foster trust-building and collective actions among local stakeholders. The objective of the CDA is to make progress towards the ultimate establishment and implementation of a cluster governance structure.

PHASE 3: CLUSTER DIAGNOSTIC

Once the cluster has been identified and selected, a diagnostic study is undertaken under the supervision and with the participation of the CDA to:

- » Build initial trust between the CDA and the cluster stakeholders through initial interviews, focus groups and workshops.
- » Develop an understanding of the socioeconomic and institutional environment of the cluster.
- » Analyse the division of labour and accessibility of resources and decision-making power of men and women in the cluster.
- » Detect potential leverage points for the interventions, and
- » Provide a baseline for monitoring and evaluation.

The cluster diagnosis is a participatory exercise in which the cluster stakeholders are the principal participants. It offers an opportunity for the CDA to establish a relationship with the stakeholders and to introduce the concept of cluster development. The CDA should adopt a gender perspective from the outset, so as to anticipate potential gender concerns at all stages of cluster development.

PHASE 4: VISION BUILDING AND ACTION PLANNING

Vision building and action planning are not one-off processes but develop in feedback loops through the whole trajectory of a cluster initiative. Starting with a discussion on the results of the diagnostic study, cluster stakeholders formulate a shared vision for the overall cluster development path, which will be periodically reviewed and, if necessary, refined over time in line with any possible changes in the cluster or related framework conditions.

Action planning relates to the translation of the vision statement into a realistic and achievable implementation strategy and can be regarded as a kind of road map. During this process, cluster actors jointly decide on which strategic interventions should be implemented collectively. Some joint initiatives may involve all cluster actors, for example those involving collective branding or governance, while other collective actions may only target groups of particularly motivated and receptive stakeholders such as specific groups of SMEs, start-up managers, etc.

Action plans are revised periodically by all cluster stakeholders on the basis of a sound monitoring and evaluation framework.



PHASE 5: IMPLEMENTATION

Implementation refers to the execution of the activities described in the cluster action plan. This action plan may contain all types of collaborative activities that can spur horizontal and vertical linkages such as the set-up of consortia, joint supplier contracts and encourage collective efficiency as with collective certification schemes, economies of scale such as joint infrastructure or other benefits including improved access to finance or tailor-made apprenticeship training modules. The CDA facilitates this process and mobilizes stakeholders and support institutions such as banks, universities, etc, but does not engage in direct service provision or resource disbursement to cluster actors. The CDA is not a substitute for functions that can be performed by existing private or public sector organizations but rather builds their capacity for implementation and enhances their responsiveness to the needs of the cluster.

An important medium-term objective of a cluster development initiative is to ensure the joint designation of a cluster governance structure such as chamber, association, or innovation hub to oversee the entire local development process and ensure sustainability once a UNIDO project has been completed.



PHASE 6: MONITORING AND EVALUATION

As cluster initiatives are implemented, it is important to keep track of the investments made and subsequent impacts on industry expansion, domestic value addition, employment generation, gender-equality, export revenues and other environmental or social benefits. The monitoring and evaluation (M&E) of cluster initiatives is a continuous process, which starts with the drawing up of a clear result chain.

A result chain outlines how specific inputs and project activities are linked to the expected outputs and outcomes and to what extent they contribute to the overall development objective of a cluster programme. In line with the information needs of various stakeholders, key performance indicators, data collection methods, and reporting responsibilities are defined and integrated into the M&E framework.

Micro – Supporting SME clusters to spur inclusive growth



Upgrading and compliance with standards

For ease of penetration into international markets, cluster stakeholders need to adapt to stringent market requirements on minimum production volumes, come up with appropriate logistics arrangements and comply with standards and product certifications. Through its upgrading interventions, UNIDO is supporting cluster members in optimizing resources, improving productivity and production capacity, promoting product safety, and ensuring compliance with market regulations to foster inclusive and sustainable industrial development.

Creation of SME networks and consortia

Besides setting up regional governance structures, UNIDO also supports individual cluster stakeholders in collaborating and establishing formal alliances along the local value chain for increased collective efficiency. Spatial proximity and shared strategic interests allow producers and SMEs to set-up cooperatives (the origin consortia for the promotion of typical food products) and export consortia or other types of networks in order to benefit from the shared use of equipment and to help develop collective marketing and export initiatives.

Innovation and digitalization

Innovation clusters and strong innovation ecosystems are crucial to accelerating growth. UNIDO promotes tailored programmes to assist SMEs with digital transition designs, e-commerce strategies for digitalization and strategies to boost innovation. Among other things, these programmes focus on increasing the flexibility of production lines, aligning IT systems with evolving work requirements, keeping up industrial safety standards, and ensuring cybersecurity.

Fostering inclusive SME growth through CSR

In recent years, increasing attention has been given to the concept of corporate social responsibility (CSR), defined in terms of the responsiveness of businesses to stakeholders' ethical, social, and environmental expectations. Encouraging SMEs to sign up to the concept of CSR requires approaches that fit the capacities of these businesses and do not adversely affect their economic viability. UNIDO offers technical assistance to enable SMEs to minimize their company's environmental impact, promote gender-equality within their business and carry out their work in conformity to societal expectations, while at the same time ensuring financial stability.

BOOSTING CLUSTER DEVELOPMENT BY PROMOTING TYPICAL AGRIFOOD PRODUCTS (PAMPAT PROJECT)



Implementation period	2013 – 2019, covering Morocco and Tunisia; 2019 – 2024, Tunisia Phase II, including the organization of a national contest for local food products in Egypt
Donor	State Secretariat for Economic Affairs SECO

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Action plans are revised periodically by all cluster stakeholders on the basis of a sound monitoring and evaluation framework.



GOVERNANCE

Strengthening the capacity of public and private actors. Establishing a working group of key actors in the value chain to develop a shared vision and joint action plan.



COMPETITIVENESS

Upgrading different links in the value chain (Improving quality, optimizing resource use, increasing productivity and production capacity).



LINKAGES

Strengthening alliances (e.g. cooperatives, consortia) and formalizing linkages between the different actors in the value chain (e.g. supply contracts).



QUALITY AND ORIGIN

Ensuring compliance with quality, safety and origin labels. Promoting labels among different actors in the value chain, buyers and consumers.



MARKETING

Improving market access and the Marketing Mix of companies and consortia (from branding and product development to negotiating new sales contracts).



DIVERSIFICATION

Diversification and innovation along the value chain (including creation of new entrepreneurial initiatives and new product development).

Source: UNIDO Approach to Cluster Development (2020)

In Morocco, UNIDO applied this approach to the prickly pear and argan oil clusters, with a view to ensuring the certification of producers and the market promotion of the Protected Geographical Indications (PGI). In this project, the Interprofessional Federation for the Argan Sector (FIFARGANE) was helped to develop traceability application to ensure that producers complied with the code of practice to produce argan oil under the PGI. Producers, including groups of cooperatives and SMEs, were trained to comply with the code of practice, and also the national law on food safety and hygiene. As a result, the number of certified producers based on the PGI, increased by 150 per cent between 2013 and 2019. The programme also covered the promotion of collective branding centred on the argan oil PGI to enhance market access for argan oil products produced by SME cooperatives.

In Tunisia, the approach was applied to the harissa and prickly pear value chains and to the fig cluster of Djebba. This rural cluster possesses a fig of exceptional quality, which was the first fruit to be granted Protected Geographical Indication in Tunisia. The programme supported producers in the Djebba cluster to comply with the product specifications of the PGI. In 2019, about 25 per cent of the local production received PGI certification.

To promote awareness of the quality attributes of the PGI-labelled figs to consumers, a public-private promotion programme was launched which involved tasting events in Tunisian supermarket chains, cooking events and trade fair participation. As a result of the intervention, prices to fig producers in Djebba have since doubled, and the PGI fruit was sold in different retail chains all over Tunisia and exported to the Gulf countries and Canada.

To create additional revenues for the inhabitants of Djebba, the programme also supported local producer groups in an initiative to promote local products such as sun-dried figs, jams, traditional pastries and essential oils. A cooperative and two rural groupings were established and given support to set up new production facilities that were in compliance with legal requirements. Furthermore, they received training and technical assistance to standardize the new processing techniques, create innovative packaging and logistics solutions and incorporate modern marketing techniques. These new products from Djebba experienced notable success on the local market. Within a couple of years, prices of dried figs had increased by 50 per cent. The PGI Djebba fig played a major role in raising the profile of this mountain village among Tunisians. Between 2015 and 2019 the number of visitors to Djebba had more than doubled (www.aocfiguedjebba.com).

The programme also supported the development of the prickly pear/ cactus cluster in Kasserine, a region located in west central Tunisia. Kasserine has always been well-known for its cactus plantations, but the sector was generating little income, since the hundreds of small-scale farmers were focusing on low value produce for livestock feeding. In Tunisia, the prickly pear has always been considered the fruit of the poor. When the UNIDO programme started in 2013, there was only a single agro-industrial company in Kasserine that specialized in the production of high-priced cosmetic cactus seed oil, and, in total, there were only five cactus processing companies in the whole of Tunisia.

Over the years, UNIDO has given its support to 520 farmers in Kasserine to improve their production practices and to set-up cooperatives. As a result, the land of 230 farmers has been certified as organic, and over 100 farmers are already applying new agricultural techniques to produce late-pick prickly pears that cost four times as much. Furthermore, the increasing demand for cactus produce from the company has increased the bargaining power of rural women cactus workers, who received a 50 per cent rise in their wages.

UNIDO also assisted young entrepreneurs to invest in the cluster and to scale up their operations in other regions of Tunisia. As a result, in 2021 ten new cactus seed oil start-ups have been created in Kasserine, generating 450 new jobs, mostly for women, and 32 additional companies have been established in other districts of Tunisia. The programme provided support to an increasing number of cactus start-ups, enabling them to promote a collective brand for organic Tunisian cactus seed oil in national and international trade fairs, involving 23 exporting companies.

Currently, the cactus cluster is considered to be a key element in the economic sector, creating significant value-added in the region of Kasserine and attracting targeted support from public and private institutions. Due to the increased significance of the cactus value chain Tunisian authorities, with the help of UNIDO, published, in 2021, the first technical standard for cosmetic prickly pear seed oil. Tunisia has become the first country in the world to set a standard for the characteristics of this oil. This new standard will further boost Tunisian cactus oil exports, which continued to increase even during the global pandemic of COVID-19. The next objective of the cactus cluster stakeholders is to register a PGI for the prickly pear from Kasserine with UNIDO support, with a view to placing “the fruit of the poor” in selected niche markets.

3.3 OPTIMIZING VALUE CHAIN PERFORMANCE THROUGH QUALITY AND STANDARDS

3.3.1 INTRODUCTION

The fourth industrial revolution (4IR) is a technology-development nexus that unlocks new opportunities to advance economic competitiveness and sustain productivity improvements to achieve pro-poor outcomes and improve livelihoods, particularly in developing countries. Value chains play a leading role in production and trade as manufactured products in international trade remain dominated by intermediate goods that have to undergo further processing in other countries. Their structure and dynamics are, however, being transformed not only through new business models and innovations but also through the advance of 4IR technologies such as AI, blockchain and digital production. Quality infrastructure (QI) as a key enabler of the value chain performance stands out among these transformations.

Value chain performance is not solely determined by endogenous activities such as the optimization of a business model or the establishment of seamless and efficient production mechanics but also through effective and efficient systems ensuring that products and services meet the requirements of customers. Though often tabled as a secondary reform agenda in developing economies, QI is a combination of initiatives, institutions, organizations, activities and people. QI also needs to adapt to ever-evolving requirements.

The QI pillars that undergird the value chain include standards, metrology, accreditation, and conformity assessment. A holistic, systemic approach is required to build a demand-driven, fit-for-purpose QI system that runs efficiently and effectively. **UNIDO has been at the**

forefront of building and modernizing QI systems that are responsive to addressing end-to-end quality needs along the value chain. Within the last five years, UNIDO has implemented the technical cooperation programmes of more than 150 million euros on QI systems. More than 600 laboratories and 2,000 enterprises, spanning 100 countries, have been prepared for accreditation and certification, respectively.

UNIDO technical cooperation programmes are designed to close the supply and demand gap for QI services based on analyses of QI service needs and diagnostic mapping of QI elements. The tools and methodologies applied in these programmes have undergone many iterations in design and development, incorporating the lessons learnt across the continents, to optimize their deployment. UNIDO works closely with governments, the private sector, academia, and regional and international bodies, first conducting diagnostics, then setting guiding principles and finally mainstreaming international best practices.

UNIDO has developed a powerful toolkit with tailored solutions at macro, meso and micro levels to support countries in their navigation process through these transformations. The toolkit also serves as the backbone of UNIDO technical cooperation programmes that identify bottlenecks and gaps in national and regional QI systems, issue recommendations to address challenges, build capacity and advise institutions and enterprises at every levels, in particular SMEs.



3.3.2 UNIDO QUALITY APPROACH TO VALUE CHAINS

Macro level: policy environment and value chain selection

Policy environment



At macro level, value chains need to be guided by a clear policy framework that consolidates and monitors their performance. Developing countries, however, often operate from static and incomplete policy frameworks that hinder the governance of effective measures to improve the value chain performance.

Similarly, there is a need to reinforce more systemic and dynamic quality policy frameworks to establish long-term economic goals and map strategic directions. The starting point for QI modernization is a holistic **quality policy (QP)** through which the government translates its political vision into actions that unite the entire QI system. Although the QP is operationally complex and often takes several years to complete, the robust and long-term socioeconomic impact in developing countries justifies the efforts involved. UNIDO promotes a fully participative QP formulation process, including the private sector, who are the main



implementers and cost absorbers of the policy measures. The **UNIDO Quality Policy Guiding Principles, Technical Guide and Practical Tool** takes stakeholders through the full cycle of QP formulation, implementation, and monitoring.

UNIDO also conducts a diagnostic of the country's technical regulations regime, and its level of compliance with international good practices through the **Quality Infrastructure for Sustainable Development (QI4SD) Index**, which is an open source for the secondary analysis of how a country's QI is fit-for-purpose, and its readiness to meet the Sustainable Development Goals (SDG). It enables stakeholders to obtain a quick overview of the progress made over time and reveals where best to direct scarce resources. While the QI4SD Index is a useful input for policy processes, it cannot take the place of a fully-fledged assessment, which is critical for QP formulation and QI capacity-building.

Sector and value chain selection



Once the policy framework has been clearly defined, UNIDO examines the national development objectives and sectoral socioeconomic potential to determine whether there is any potential for competitive advantage in terms of quality differentiation and cost leadership for a specific sector and value chain. The selected value chain should

have good prospects for export diversification and success in the target markets. Using a participatory approach, UNIDO also measures the potential for socioeconomic returns of the value chain in terms of generating employment to improve livelihoods, integration into regional or global value chains (GVCs) and impact on the environment.



Meso level: QI diagnostics and institutional capacity-building along the value chain

Once a value chain has been determined for support, UNIDO assesses the quality-related gaps along the value chain to develop the fit-for-purpose QI system which optimizes the value chain performance. QI services required at each step should be mapped and technical delivery modalities appropriately designed so that those

services can be delivered effectively and efficiently. Ensuring of an adequate supply facilitates the creation of an optimal business environment that not only satisfies minimum requirements, for example technical regulations, but also focuses on the competitive element in the value chain.

These services are open to both public and private operators, with core service delivery provided by the national standards body, the national metrology institute, the accreditation body and conformity assessment bodies. Developing countries often face challenges in determining the extent of services that should be offered, particularly with respect to conformity assessment services such as testing and calibration.

To this end, UNIDO measures:

- Whether the prevailing non-conformities are due to breaches in quality-related parameters.
- The current and required capacities for the QI institutions and private sector in order to demonstrate the degree of compliance.
- Mandatory and voluntary requirements of the import market to determine the conformity assessment services required at each stage or node along the value chain.
- How QI can ultimately foster economic growth, inclusive and sustainable development, improve food security and human well-being, and increase responsible consumption and production.

The first step of this UNIDO diagnostic assessment is to apply the **Standards Compliance Analytics Tool**, which enables national governments and donors to determine the appropriate allocation of limited financial and technical resources for capacity-building

by using rejection data to identify the key compliance challenges of exporting. This analysis can enable policy and programme design to navigate and focus efforts into addressing compliance issues more effectively and efficiently and, in the long-run, to mitigate compliance-related economic loss and reputational risk due to large-scale rejections.

UNIDO also employs the **Quality Infrastructure for Trade Facilitation (QI4TF)** toolkit to identify and address, in a systematic manner, technical gaps in their national quality infrastructure systems that need to be addressed before trade can be facilitated. The application of the toolkit entails a value chain approach with a view to identifying strengths and weaknesses in the export of specific products to international markets. The results serve as inputs in the prioritization of trade facilitation measures and steps to be taken to support countries in the implementation of the WTO Trade Facilitation Agreement (TFA).

Lastly, UNIDO applies the **Quality Along the Value Chain (QI4VC)** methodology to perform quality diagnoses of the value chain to get an insight into QI-related bottlenecks and gaps relative to requirements. In the agriculture sector, it analyses agricultural inputs, harvest and post-harvest practices, collection and storage of raw materials and product processing and packaging.



Sectoral road map and institutional capacity-building

The assessment results are enriching in that they develop a collective sectoral vision and road map for tailored technical assistance programmes (TAPs) on conformity assessment services, in addition to providing core metrology and accreditation services. The responsiveness

of a QI pillar service delivery to industry needs is a test of its technical competence and "market readiness". At meso level, UNIDO implements technical cooperation programmes to refine the QI pillars and ensure efficient delivery of the required QI services.

STANDARDIZATION

- **Standards development:** supporting the standards development and giving priority to training delivery for technical cooperation chairpersons and secretariats.
- **Standards accessibility:** improving access to the standards and implementing a strategy for their dissemination.

METROLOGY

- **Laboratory infrastructure:** to foster innovation and strengthen the accuracy levels of laboratories relative to international benchmarks for the targeted sector; to establish the relevant national measurement standards; to provide internationally recognized calibration services; and to participate in inter-laboratory comparisons leading to the publication of the relevant calibration and measurement capabilities.
- **International recognition and membership:** to encourage international interface and membership in regional or international bodies such as the International Bureau of Weights and Measures and the Organization of Legal Metrology, including serving on their committees.
- **Core services:** in addition to calibration services, the core service menu should incorporate proficiency tests, inter-comparisons, and reference materials.

ACCREDITATION

- **International recognition and liaison:** to prepare the accreditation body for compliance with ISO/IEC 17011 and to undergo a peer evaluation by the International Laboratory Accreditation Cooperation (ILAC), the International Accreditation Forum (IAF), or regional cooperation bodies with the aim of becoming a signatory to a multilateral or regional recognition agreement.
- **Network and registry of assessors:** to train, develop, and register a pool of lead assessors, both within and outside of the accreditation body, in the field of accreditation scopes as per target market requirements.

CONFORMITY ASSESSMENT

- **Inspection:** to define priorities for inspection schemes and capacitate inspection bodies to conduct a range of non-regulatory and regulatory inspections, and to work towards international recognition as per ISO/IEC 17020;
- **Testing and calibration:** building capacities based on sectoral needs, particularly with respect to lead export products, critical health services, and the corresponding technical regulations;
- **Certification capacities:** to strengthen the quality of nationally produced goods and services and make it possible to compete with imported ones.

Micro level: maximizing value chain performance



Quality-led value chain development

At the value chain level, UNIDO delivers custom-made TAPs to enhance the compliance of enterprises with standard requirements. The following interventions capture the incremental approach to quality-led value chain development:

- Introduce enterprises to **international best practices** for improved enterprise productivity, underpinned by a quality management system that is in full compliance with the standards, a healthy balance sheet, effective workforce management, and optimal production logistics and sales channels.

Culture of quality for sustainability

To inculcate QI fundamentals in a deeper and more sustainable way, it is essential to create a set of values that will determine how improvements are made to working practices and consequent outputs, and convince developing economies that quality is what matters. It is consumers who are the driving force behind a culture of

- Provide customized technical guidance to enterprises towards achieving **compliance with standards, technical regulations and market requirements**.
- Strengthen the **use of information and communication technology (ICT) based solutions along the value chain to reinforce compliance with quality parameters**.
- Conduct training sessions to increase the competitive advantage of the value chain in terms of product **quality, product differentiation, and efficiency gains**, through improving methods of production with the aim of attracting investment.

quality, and this is reinforced when an internationally recognized QI system can provide independent attestation of the quality of a product, service, or system. The more consumers demand quality, the more robust the QI system will be.



CASE STUDY: COLOMBIA**TRADING WITH CONFIDENCE: COSMETICS SECTOR QUALITY PROGRAMME (SAFE+ COLOMBIA)**

The Colombian Government joined forces with UNIDO in an effort to increase the access of local companies to international markets, using funding from the government of Switzerland and Colombia. The project Safe+ was executed under a QI programme focused on the Colombian cosmetics industry and various stakeholders who were seeking to overcome the technical barriers hindering their access to international markets. The programme was launched in 2015 and deployed several key levers for increasing productivity and value addition growers, harvesters and SMEs while strengthening the national quality institutions to demonstrate compliance with

international quality requirements. At the inception of the project, SMEs in the cosmetics sector exhibited a very limited ability to offer competitive products that would meet the standards of target markets in terms of quality, health, safety, and environmental protection. Moreover, their knowledge of foreign markets was limited, and they lacked awareness of the benefits of implementing international standards. SMEs were also hindered by the absence of regionally and internationally accepted conformity assessment services in Colombia. The objective of Safe+ was to bridge this gap.

**How UNIDO supported the overarching policy framework of the cosmetics sector:
macro-perspective of Safe+**


UNIDO examined the national development objectives of Colombia to determine whether there was any potential for competitive advantage for a particular sector and value chain. Under the Productive Transformation Programme (PTP), the cosmetics industry had already been identified as a world-class player with great growth and export potential. By 2032, Colombia aims to be recognized as a world leader in the production and export of cosmetics manufactured using natural ingredients. UNIDO confirmed that the sector did indeed have the potential for employment generation and offered opportunities for inclusive growth and feasibility through using a participatory approach to develop a common vision and theory of change. The stakeholders could identify the overall transformational aspirations for the sector and

understand how the project activities could lead to the desired outcome. The stakeholders, for example, defined a new national laboratory framework as being a necessary condition for driving transformational change in the sector. Safe+ accordingly supported the national entities in drafting the CONPES 3957 National Laboratories' Policy. The support of UNIDO involved providing expert validation and policy inputs, and also encouraging Colombia to create an overarching policy framework that can be useful across the board, including guaranteeing consumer rights, safeguarding public health, enhancing environmental protection, boosting the competitiveness of national producers and increasing international market access.

**How UNIDO strengthened the national quality infrastructure to provide end-to-end internationally recognized services along the value chain:
meso-perspective of Safe+**


Once the sector was selected for support, UNIDO proceeded to map, assess and support the QI services required at each step of the cosmetics value chain.

To develop the fit-for-purpose QI system, UNIDO strengthened the technical capacities of Colombia's key institutions to serve the cosmetics sector: the National Metrology Institute (INM) was helped to maintain the provision of reliable and accurate measurement services and international traceability; the National Accreditation Board (ONAC) was encouraged to facilitate independent attestation of the technical capabilities of the conformity assessment service providers to satisfy local and international markets and authorities; and the National Institute of Food and Drug Monitoring (INVIMA) was given support to enhance its capacity to perform inspection, surveillance and control.

In addition, UNIDO implemented a tailored TAP to support the key functions of conformity assessment bodies, including testing and calibration laboratories, as required by the value chain stakeholders. A laboratory in Antioquia, for example, relied on the expertise of UNIDO to become the first laboratory accredited in Colombia to perform the biodegradability and phosphorus tests that are mandatory in the country for products such as cosmetic soaps and cleansing products.

These services support the cosmetics sector by demonstrating the quality of products independently from the manufacturer or the supplier. As a result of the systemic approach, the programme was able to strengthen five public institutions, 16 testing laboratories, and two associations of small producers that received significant technical assistance.

**How UNIDO supported key players within the value chain - from growers to processors and exporters - to improve their compliance with quality requirements:
micro-perspective of Safe+**


On the micro level, the project worked closely with all key players (growers, producers, processors, exporters) to enhance their capacity to comply with standards, technical regulations and market requirements along the natural ingredients value chain for cosmetics production. UNIDO implemented another TAP for growers, processors and exporters with custom-made technical guidance based on their specific needs and buyer requirements. In total, 26 MSMEs benefited from technical guidance and support, ranging from the implementation of good manufacturing practices (GMP) to organic certification or the facilitation of market linkages with premium international buyers. GMP compliance enabled a company from Antioquia to double its sales and production capacity, while a company from Bogota succeeded in negotiating new distribution agreements for Europe and Central America.

As a consequence of the contribution of Safe+, Colombian cosmetic products have managed to reach

a greater number of countries. About 58 per cent of the MSMEs in the value chain which participated in Safe+ have accessed new markets, increasing their exports by over 60 per cent. Safe+ has reduced sanitary risks by 17 per cent, boosting national production of the sector by 11.7 per cent and augmenting exports by 2.4 per cent between 2015 and 2017. SMEs in the Colombian cosmetic sector have continued to meet external quality requirements and now have a stronger quality infrastructure which means that services within the country have been expanded and upgraded. This has had an impact not only on the well-being of local and international consumers, but also on income-generating opportunities for communities and SMEs in Colombia. Over the four years of project implementation, UNIDO raised the technical competence of more than 3,400 people, thereby fostering a culture of quality that goes beyond the cosmetics sector and extends its reach to the broader national productive apparatus.

3.4 DRIVING SECTORAL EXPERTISE AND 4IR DIGITAL TRANSFORMATION

3.4.1 INTRODUCTION

The fourth industrial revolution (4IR) is characterized by the convergence and complementarity of emerging technology domains, including nanotechnology, biotechnology, and advanced digital production (ADP) technologies. The latter includes 3D printing, human-machine interfaces and artificial intelligence (AI), and is already transforming the global industrial landscape. Incorporating ADP technologies into industrial production processes has given rise to the concept of industry 4.0, also known as the smart factory – one that learns as it works, continuously adapting and optimizing its own processes.

What truly sets 4IR technologies apart is the innovative way in which hardware, software and connectivity are being reconfigured and integrated to achieve ambitious goals, collect and analyse vast amounts of data, interact seamlessly between smart machines and bring together the physical and virtual dimensions of production.

The implications of 4IR are multilayered and difficult to disentangle. For example, while automation is often seen as an opportunity to reduce the gender gap in employment, studies suggest that this entails disrupting the long-established gender divide in terms of STEM education, digital access and family responsibilities, among other things. There is also potential for ADP

technologies to support environmental sustainability through the more efficient use of energy and materials, thereby leading to a drop in carbon emissions and a reduction in particulate pollution.

The 4IR represents a technological paradigm shift that could have a range of impacts in many spheres of life. While the opportunities for greater productivity, sustainability, social inclusion and prosperity are compelling, they are contingent on having an enabling industrial ecosystem and a supportive policy regime.

The adoption of 4IR technologies and practices across the international community can significantly contribute to advancing the 2030 Agenda for Sustainable Development, by leveraging ISID.

The UNIDO approach to the 4IR is a multi-level and multi-stakeholder approach and foresees an engagement knowledge-sharing and capacity-building; technical cooperation, policy advice and normative activities; and the formulation of strategic partnerships with key stakeholders, including the private sector and academia. As such, in the context of 4IR, the approach of UNIDO relates to driving sectoral expertise and digital transformations at all levels: macro, meso and micro.

3.4.2 UNIDO DIGITAL TRANSFORMATION APPROACH

Macro: policy framework

Technologies and innovation policies



The digital transformation journey comprises four distinct pillars: human capital development (including skills in data mining analytics, information processing and cybersecurity); innovation, (specific tools that enable companies to design new products, processes and business models; clusters (synergies between coordinated actions), and adoption of technologies (more productive and competitive processes in medium and small companies).



UNIDO is assisting governments and the private sector with the development of advanced technology foresight analysis, by using benchmarking to carry out policy reforms, and devising far-reaching industrial development strategies, road maps and innovation-friendly policies. For example, UNIDO recently received an official request from the Government of Jordan to contribute to the formulation and implementation of its national strategy on artificial intelligence (AI) and has already initiated a project in support of

the initiative. The overall objective of the project is to provide support towards building the AI system in Jordan, aimed at creating job opportunities and improving the efficiency and quality of government services as well as enhancing the comprehensive

social and economic development of different sectors, accelerating economic development, and creating an environment conducive to innovation and entrepreneurship.

Partnerships and investment



Industry and policymakers alike recognize the huge opportunities for growth offered by digital transformation, interconnectedness and the new manufacturing technologies related to 4IR. In line with the national planning approaches and investment plans driving this digital transformation, UNIDO seeks to ensure that its 4IR capacity-building initiatives demonstrate a

close country-level coherence and helps facilitate investment and technology transfer by building strategic partnerships with high-tech institutions and multinational companies, and supporting the preparation and execution of 4IR readiness assessments at enterprise, sector and country levels.

Regulatory framework, norms and standards



4IR is advancing at an unprecedented pace at all levels and in almost all socioeconomic areas. Its impact and the risks that can be involved tend to cross national or regional borders and the spillover effects also cross sectors and value chains. This requires efforts at all levels to establish a convergent governance framework and provide a common ground for digital development and governance.

The global framework of digital governance is still far from complete, and fragmented governance is usually concentrated within national or regional boundaries, especially those where regulatory effects hamper cross-border infrastructure connectivity, impeding the flows of digital products and services, and undermining global collaboration and trust.

Digital technologies and the new business models of digital transformation do not fit easily into the traditional regulatory framework regulators used to intervene in markets. It is therefore apparent that previous governance modalities, which are largely reactive in nature, cannot hope to be effective in the era of advanced digital transformation. In recognition of the above, the development of standards and norms is imperative for the promotion of digital transformation across the various sectors.

Standards play a crucial role in reinforcing opportunities, enhancing productivity, advancing interoperability, and promoting technology adoption and knowledge dissemination. These functions, in turn, enhance the economy in a variety of ways, including fair competition, higher

efficiency and positive network effect. They also allow the diffusion of innovations, while at the same time reducing production costs.

Standards can help to minimize risk, improve safety, and, in this way, provide support for policy and regulation. While standards are voluntary in nature they can inform effective regulations, creating an enabling environment for innovation and minimizing the risk of disruption of innovations and entrepreneurial investors. Standards developed by international organizations provide an effective response to market barriers at global level.

UNIDO is committed to supporting Member States in establishing and improving their digital governance framework for sustainable development through leveraging its experience and partnership in standardization. For example, based on the review of the current state of development of digital-related standards and the activities of those committees charged with standards development in the digital space, UNIDO has put forward seven principles to guide digital standards making. These principles are: trustworthiness; inclusiveness; sustainability; interoperability; safety and security; data privacy and international collaboration.

In addition to these normative activities, UNIDO has also continued to leverage its vast technical co-operation portfolio to support Member States in the adoption of 4IR technologies in key sectors. For instance, UNIDO has harnessed digital twinning in Colombia to improve product optimization and quality in the automotive sector, leading to lower levels of emissions and wastage.

Meso: governance for digital transformation

Public sector governance for 4IR



The approach followed by UNIDO is holistic, ranging from awareness-building to helping to initiate, develop and strengthen a fit-for-purpose good governance system. This approach emphasizes the

Digital transformation and strengthened innovation ecosystems



At its broadest level, 4IR signifies a shift not only in how companies function and how goods are produced, but also in the way systems, suppliers, customers, regulatory considerations, investors and other third-party experts and influencers would function and interact.

UNIDO promotes digital transformation and innovative ecosystems building to advance the economic competitiveness of developing countries by helping them to benefit from the rapid progress of digital and convergent technologies associated

need for strong collaboration with all stakeholders to meet the shared objectives by performing agreed activities that lead to concrete actions.

Institutional capacity to build 4IR-related skills



The multidimensional and multifaceted challenges involved in transferring the benefits of 4IR to developing countries and economies in transition require new and innovative partnership approaches.

In this respect, UNIDO offers services that aim to connect academia, the private sector and the international community to accelerate the pace of absorption and knowledge dissemination required for integrating 4IR technologies into a country's economic system. Initiatives include the establishment of multi-stakeholder knowledge-sharing platforms to create awareness of the

with the 4IR. This includes assisting in the development of innovative ecosystems for enabling product, process, functional and value chain industrial innovation by establishing collaborative knowledge-sharing platforms and innovative funding support mechanisms and schemes. For example, UNIDO is providing support to the Government of Belarus in its efforts to strengthen the local innovation ecosystem by establishing a pilot demonstration centre in the Brest region to help develop smart manufacturing technological learning for SMEs.

opportunities and challenges posed by industry 4.0 in pursuing ISID in developing countries. UNIDO also provides support to local universities and vocational training institutions to help them develop modern programmes and a curriculum that would enable students to improve their skills and knowledge of industry 4.0 issues. As an example, UNIDO entered into partnership with the Brest State Technical University in Belarus to develop a practice-oriented curriculum for industry 4.0 which would improve the level of education of students and increase their chances in a competitive employment market.

Micro: firms' digital transformation

Digitalization at sector level



UNIDO works with its partners and Member States to ensure that sector-specific and country-specific programmes are developed, understanding that what may work in one setting may not automatically work elsewhere. Therefore, the programmes that

are tailored to harness new technologies and 4IR must consider all the different needs and requirements, as well as the extent to which new technologies could be applied in different sectors.



Through the sector-level approach to digitalization, UNIDO is therefore promoting a technology assessment of the economic sectors relevant to supporting the efforts of developing countries

to achieve industrial transformation. A thorough understanding of technological trends is crucial to predicting innovation opportunities and effective business model developments.

Digitalization at firm level



There is a multitude of good outcomes for SMEs and MSMEs to be gained from the adoption of 4IR technologies, such as enhanced competitiveness, productivity, resilience and participation in global value chains. Nevertheless, SMEs and MSMEs are facing challenges in the adoption of 4IR technologies, primarily related to factors such as the costs involved, the lack of skilled labour, failure to provide an implementation plan and security concerns. At the same time, failure to make these necessary investments and changes is likely to cause negative impacts on productivity and competitiveness.

The 4IR, while offering significant opportunities, will also bring new challenges to which communities will have to adapt. One crucial barrier to be addressed is the increasing automation of low-skilled jobs, which will result in a demand for people with higher levels of education and skills in the job markets. There is a general trend, especially in developing economies, for women to remain in the minority in the digital labour market. Among the main barriers that women face when attempting to seek opportunities in the digital economy are:

- Disruption of access to life-learning opportunities because of the need to juggle professional and family responsibilities;
- Low numbers of women enrolling in STEM education as they are often discouraged from studying STEM or other branches of computer science because they feel that men are dominant in these areas;
- The lack of access to the entire entrepreneurial path, especially in developing countries, puts obstacles in the way of women managing businesses or raising capital, as investors have taken note that women have not been able to undergo all the stages of entrepreneurship.

To promote gender inclusivity within the 4IR ecosystem in Member States, UNIDO will prioritize the following actions:

- Supporting firms in setting up accurate measurement tools and targets. UNIDO will help firms to set up achievable and relevant recruitment and retention targets, together with accountability mechanism at all levels. The development of a disaggregated database will help evaluate the causes of gender imbalances and ensure that progress is tracked;
- Supporting firms in the development of dedicated mentorship and training programmes for women. These programmes will aim to stress the importance of diversity as well as the sharing of knowledge on how to manage a more diverse workforce and how to attract, retain and promote female talent. Mentorship programmes will focus largely on promoting leadership curriculums to help women secure influential positions within firms.

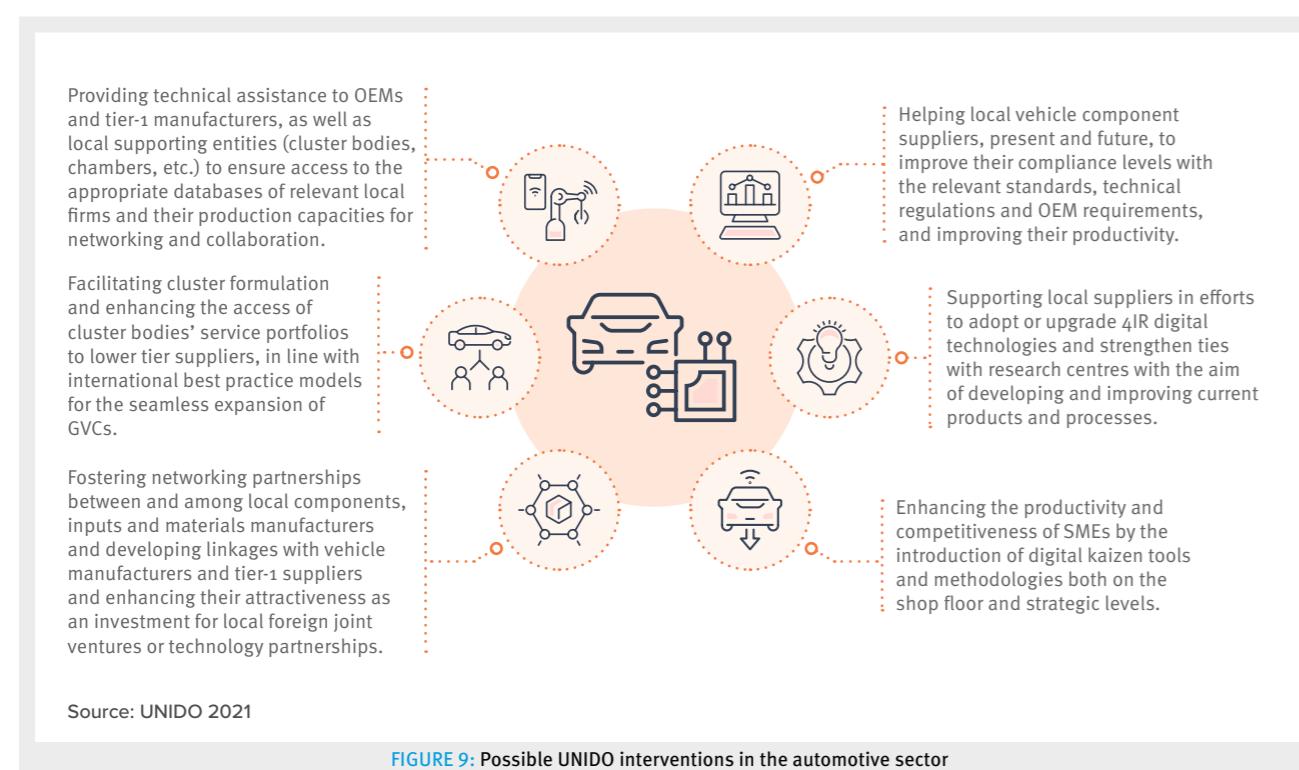
Given the importance of digitalization at firm level, UNIDO provides support for its Member States to keep abreast with innovations and technologies and the rapid transformation processes of 4IR at that level. Enterprises are given support through the transfer of technologies and expertise and the introduction of innovative processes, including digitalization and automation of production processes, e-commerce tools and enterprise management practices, thereby ensuring a smooth transformation to 4IR. This process also includes skills development and training of SMEs with a view to enhancing their capacity to prepare for the adoption of industry 4.0 technologies.

3.4.3 SECTORAL APPROACHES

Value chain and supply

UNIDO has adopted a conservative approach with regard to the value chain processes in different industrial sectors. This approach promotes 4IR readiness analysis, technological needs assessment and the potential for relevant emerging technologies to be made applicable at each stage of value creation. This is carried out with a specific focus on the following technical modules: skills and capacity-building; digital transformation of SMEs and MSMEs; adoption of sector-specific technology; the establishment of smart platforms and innovation ecosystems.

One example is that an increase in the adoption of 4IR technologies among automotive sector companies could lead to a significant rise in the productivity and competitiveness of local automotive suppliers. In turn, this improvement could make it easier to meet the requirements of the large number of original equipment manufacturers (OEMs) and tier-1 manufacturers operating in the country, thus promoting a greater integration of local automotive suppliers into GVCs. A possible UNIDO intervention could be guided by some of following actions listed below.

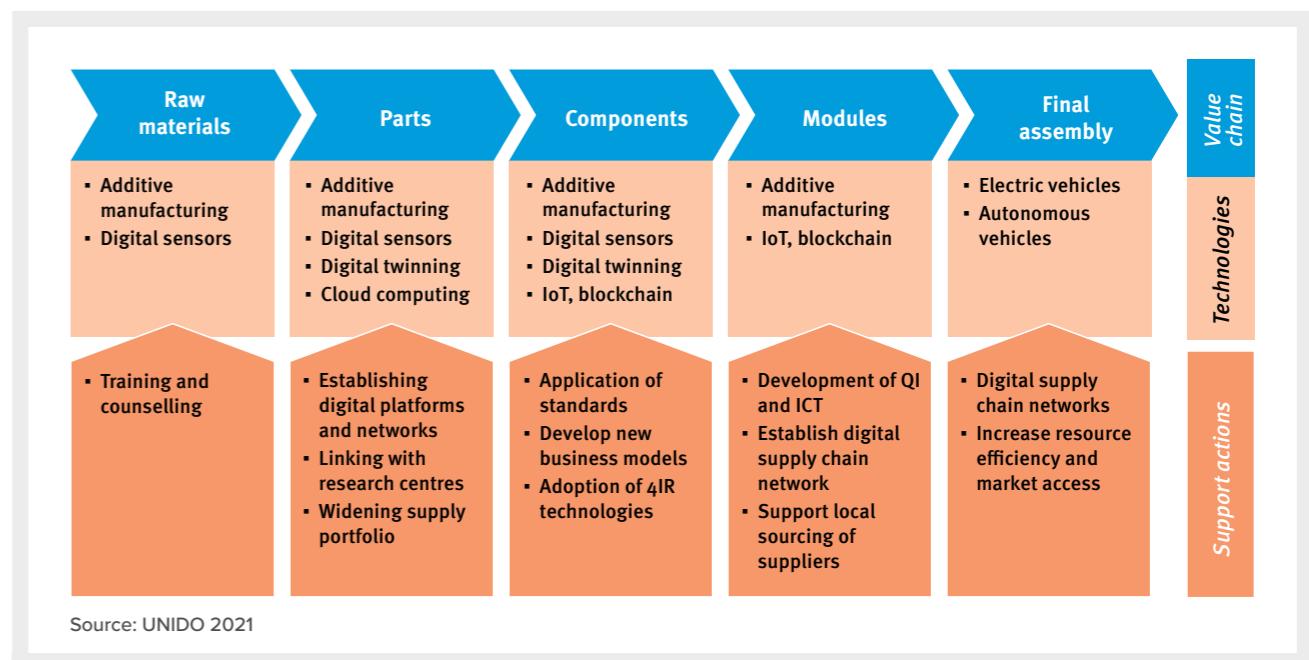


The actions intended to promote the adoption or upgrading of 4IR technologies could include the following:

- Assessing the readiness for adoption of 4IR technologies and preparing individualized action plans to enable a smooth 4IR digital transformation;
- Analysing the existing capacities of academic institutions for the establishment of a local learning or training centre in industry 4.0 technologies and business models;

- Fostering the establishment of digital networking and platforms and developing a 4IR sectoral strategy, stressing the needs of the tier 2 and tier 3 levels, directed at informing future public policies and programmes.

A potential intervention to support the adoption of 4IR technologies at each stage of the value chain within the specific context of the automotive sector is depicted below.



The 4IR is in the forefront of a fundamental shift in every business model, and the value chain approach can be implemented in a variety of sectors. Enterprises are increasingly evolving from a linear supply chain to a networked and tightly interconnected supply chain, and

from a relatively straightforward production line to a complex ecosystem of actors. The increasing capabilities of the 4IR technologies are advancing the consolidation of these new models and turning them into common industry practices.



CASE STUDY: BELARUS**INSTITUTIONAL STRENGTHENING AND POLICY SUPPORT TO UPGRADE THE COMPONENT MANUFACTURERS IN THE AUTOMOTIVE SECTOR IN BELARUS (PHASE II)**

During 2017 and 2019 UNIDO implemented an automotive sector project in Belarus to broaden and deepen in a sustainable way the scope and outreach of already established programme services (implemented in the previous project over the period 2014–2017). This project was implemented with the purpose of further strengthening the ability of Belarusian automotive component suppliers to meet the requirements of OEMs and tier-1 manufacturers.

The core output of this project was the establishment of a dedicated institution that would support SMEs in leveraging shop-floor assistance for industrial upgrading and moving from lean management to industry 4.0. This centre also provided dedicated training programmes, using UNIDO methodology, and organized study tours and workshops with the purpose of expanding the outreach of the shop-floor assistance programme to additional groups of companies. It also raised awareness on issues related to industry 4.0, such as smart specialization models and sustainable industrial development. During the implementation of the project, multi-stakeholder engagement was leveraged to support industrial upgrading and diversification within the automotive sector.



FIGURE 11: Robots in car production

Source: UNIDO 2021. Belarus project

This project successfully supported the grading of component manufacturers in the automotive sector in the Republic of Belarus by moving from lean management to the change for the better model, known as “kaizen”, and to digital kaizen. This project has trained more than 500 experts and helped 44 pilot companies to achieve economic returns exceeding USD 9 million.



FIGURE 12: Manufacturing precision process

3.4.4 DIGITAL TRANSFORMATION AND WAY FORWARD

UNIDO aims to ensure that its Member States take full advantage of the breakthrough of 4IR digital technologies and the subsequent digital transformation, thereby ensuring the promotion of ISID and advancing the sustainable development agenda. The vision of UNIDO is to become the leader in addressing the opportunities and challenges stemming from 4IR and their impact on ISID and economic development. To achieve this vision

and mission, UNIDO plans to take further actions to help developing countries adapt to digital transformation, helping LDC's to advance, progress and prosper and enable middle-income countries to overcome the constraints they are facing and help them open up to the new opportunities offered by 4IR to drive positive and sustainable change.

3.5 ADVANCING INDUSTRIAL PRODUCTIVITY AND TECHNOLOGICAL CHANGE THROUGH INVESTMENT PROMOTION**3.5.1 INTRODUCTION**

The rapidly changing global investment landscape and revolutionary technical advancements brought by 4IR open up many opportunities but, at the same time, present new challenges. While attracting greater volumes of foreign direct investment (FDI) has long been seen to be a desired outcome for developing countries, increased integration of the domestic industry, in particular SMEs, in global value chains, is also very important within the broader narrative of FDI impact. Modern industrial policy approaches follow an evolving logic of evidence-based targeting of specific industrial sectors for domestic and foreign direct investments. For instance, sector-based industrial policy reform actions in Ethiopia provided the foundation for intensive UNIDO support in the context of the Programme for Country Partnership (PCP) geared towards the agro-industries, leather and textile sectors (see case study).

National-level investment promotion agencies (IPAs) together with other investment promotion institutions (IPIs) are seen as the institutional agents whose role is to ensure that industrial policy targets are translated into higher levels of investments flows into the targeted sectors or value chains. At the same time, IPAs are at the forefront in continually advocating further policy reforms conducive to investment climate improvements and they provide swift and efficient services, involving attracting new investment, facilitation and retention, and inter-institutional coordination with foreign and domestic investment clients.

3.5.2 METHODOLOGIES AND TOOLS USED**Macro: Enhancing investment targeting and promotion strategies in industrial policy formulation and implementation**

UNIDO engages development partners within policy-making responsibilities with the objective of transferring knowledge and skills in the areas of strategy-setting and industrial investment policy formulation. The main principle is that industrial policymaking should be evidence-based and emanate from a sound methodological foundation such as those provided in the UNIDO **Competitive Industrial Performance (CIP)** methodology or

its **Enhancing the Quality of Industrial Policy (EQuIP)** toolbox. A comprehensive industrial policy analysis should assess the levels and dynamics of investments in each sub sector or value chain through the measurement of gross fixed capital formation (investment in machines, equipment, factories and other capital goods) of firms operating in that subsector or value chain.



An analysis of foreign investor presence, impact and performance following UNIDO methodologies and taxonomies offers tangible entry points for active industrial policy interventions seeking to:

- Actively increase the foreign investors' presence in a value chain or subsector through active investment opportunity profiling and regional and global promotion work; or
- Address the issue of foreign investors overwhelming and almost entirely taking over a value chain or subsector through enabling more active vertical supplier-buyer linkage support or vertical/horizontal clustering support.

The related toolkit stems from UNIDO work in the context of the African Investment Promotion Agencies Network (AfIPANet). Recent upgrades enable ministries and IPAs to deploy a modular and configurable online survey toolkit to

gauge firm-level investment behavior and the impact of SDG on priority value chains and sectors.

UNIDO follows a structured process to roll out an evidence-based policy advocacy based on common datasets and analytical approaches. Related methodologies (business directories, survey guidelines and manuals, data checking algorithms, data structuring and metadata) will assist policy stakeholders to leverage the investor survey data for the creation of analytical reports, such as sector studies, trend analyses, business constraints related to increased transaction costs and information asymmetries, gender analysis and others, that underpin a data-driven investment policy advocacy process. UNIDO provides the frameworks and governance structures for investment-related policy advocacy.



Meso: methodologies to enhance the efficiency and quality of investment service provision by IPAs and IPIs in target sectors



Investment opportunity profiling and development: UNIDO capacity-building of IPAs and IPIs draws from the course curricula of its **Investment Learning Centre** and online **Knowledge Hub**. Both offer a wide range of courses in areas of investment facilitation, investment attraction, aftercare and financial analysis. To ensure relevance to the policy dimension, institutional capacity-building activities directly respond to the sector-specific targets laid out in the country's industrial policies or strategies. Investment profiling experts work together with the IPAs and IPIs to develop investment opportunities in the priority sectors with regard to joint ventures, private equity or impact investing, as well as other greenfield investment projects, with the ultimate aim of building up a country-wide portfolio of bankable investment project opportunities. This specifically includes new investment opportunities offered by favourable industrial infrastructure linked to industrial parks or special economic zones following the investment promotion methodologies described in the **UNIDO International Guidelines for Industrial Parks**.

Supplier-buyer linkage and development support through the UNIDO Subcontracting and Partnership Exchange Programme (SPX) creates institutional support structures that aim to strengthen the multiplier effects of foreign direct investments on domestic investments. The COVID-19 crisis demonstrated that geographically shorter supply and value chains have the effect of mitigating external shocks on global value

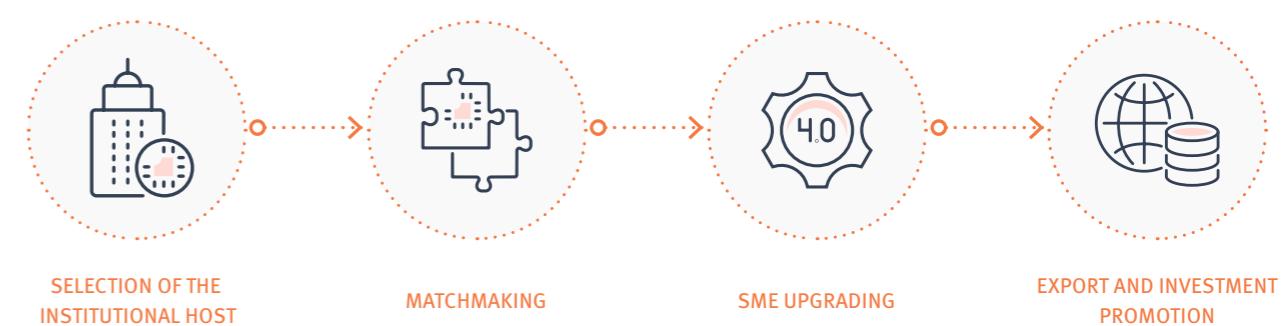
chains besides providing a positive contribution towards reducing CO₂ emissions stemming from long and multi-tiered global transportation chains. An SPX intervention is particularly relevant in industrial settings where FDI firms dominate an industrial sector, for example in mining or natural oil extraction, while exhibiting no backward and forward linkages with the rest of the economy, or at best very few. An SPX would initially focus on fostering local production of basic, lower risk items and then move towards items that have a larger technology content. The UNIDO SPX approach follows four main steps.

- **Selection of the institutional host** and provision of training to existing or newly recruited SPX institutions which will carry out typical SPX services;
- **Matchmaking:** identification of buyers' needs and profiling of SMEs to understand their existing productive capacities; matchmaking with major buyers to facilitate domestic and international business contracts;
- **SME upgrading:** benchmarking of SMEs to identify strengths and weaknesses and subsequently prepare an action plan for their upgrading. In order to harness the availability and specialization of locally available business development providers in a given country, benchmarked SMEs are linked to enterprise development support programmes and national SME financing schemes;

- **Export and investment promotion:** organization of international industrial investment promotion forums in developing countries and participation in international trade fairs to provide SMEs with exposure to international investors and traders. Follow-up support will be provided after these events in a bid to maximize the conversion rate of business leads to actual investments.

The UNIDO investment delegates programmes, spearheaded by the Investment and Technology Office (ITPO) network, act as a further conduit for practical and results-oriented capacity-building to IPAs and IPIs. Individual ITPOs invite investment or technology promotion delegates for short-term visits to hold business meetings and carry out networking

with companies and government institutions in each ITPO host country. The delegate familiar with the legal context of the developing country they represent, will be in a good position to promote targeted sub-sectors or value chains to attract FDI and innovative technologies. Once back in their country of origin, follow-up support will ensure that the delegate shares the experience with other staff of the IPA or IPI to achieve wider learning and scale effects. Often an advisor selected or seconded by an ITPO will provide more permanent support and coaching assistance to the IPA and IPIs in the country, focusing on value chains and sectors that could lead to promising investment opportunities vis-a-vis potential investor or technology providers.



Micro: methodologies to assist firms and entrepreneurs to develop bankable investment proposals



A long-standing UNIDO software product, the **Computer Model for Feasibility Analysis and Reporting (COMFAR)**, is geared towards supporting individual firm-level or entrepreneurial actors in a given sector or value chain to improve their skills in investment project formulation and feasibility analysis techniques. Given the applicability of COMFAR to various investment project scenarios (new projects, modernization, expansion, rehabilitation, joint ventures), it acts as an ideal complement to the efforts of IPAs and IPIs related to sector-based investment opportunity profiling and the SPX programme. COMFAR, together with the UNIDO feasibility analysis manual, is accepted as a standard for the preparation of bankable projects in many countries. The system comes with predefined templates for sectors such as industry, agriculture, infrastructure, environment, mining and tourism. These templates are capable of adaptation for use

in any sectors. There are currently more than 11,000 COMFAR users in 160 countries. The application of the COMFAR tool has demonstrated that it really works in enhancing investment promotion capacities to ensure the viability and economic benefits of investments in developing countries. COMFAR is also an integral part of the **UNIDO Enterprise Development and Investment Promotion (EDIP) Programme**, assisting the creation and growth of entrepreneurial businesses, particularly those led by women and young people.

The forthcoming **UNIDO digital investment promotion platforms** will aim to bring more transparency to SME-led investment opportunities and will be active in removing barriers and enabling investors to identify such opportunities and to post queries in relation to firm-level investment opportunities.

CASE STUDY: ETHIOPIA

INVESTMENT PROMOTION SUPPORT IN AGRO-BUSINESS



Investment promotion has, from the very outset, been pivotal to the flagship UNIDO Programme for Country Partnership (PCP) in Ethiopia, which was launched in 2014 and focuses primarily on three light manufacturing sectors, namely agrifood processing; textiles and apparel; and leather and leather products. These sectors are acting as a springboard for the transformation of the Ethiopian agriculture-based economy, to one driven primarily by light industries.

UNIDO leveraged its close cooperation with the Ethiopia Investment Commission (EIC) and the Ministry of Trade and Industry to organize two successful international agro-industry investment forums, held from [5 to 7 October 2016](#) and from [5 to 8 March 2018](#). Following a global investment promotion effort, involving the UNIDO networks of ITPOs, UNIDO field offices and UNIDO partners, about 2,350 people attended the second forum, including 300 international guests. The exhibition facilitated 11,000 contacts, of which 2,700 involved international investors (24 per cent), and 28 per cent were deemed “promising” contacts with a view to a follow-up investment or technology transfer agreement. These achievements were based on major efforts to [collect promising investment opportunities](#) prior to both forums and to build the capacities of Ethiopian investors to enable them to present their project ideas in a convincing manner in order to bring on board foreign technologies and investments. The investment opportunity profiling was carried out jointly with the Ministry and as such served to build the capacities of the Ministry and EIC and that of other partners such as the Agricultural Transformation Agency (ATA).

In 2020, based on these earlier efforts, UNIDO launched its flagship publication [“Agro-Industry Investment Opportunities Directory: Ethiopia”](#), which since then has underpinned the country’s investment promotion efforts in agro-industries, as spearheaded by EIC and the Ministry of Trade and Industry, specifically its two institutes, the Ethiopian Food and Beverage Industry

Development Institute and the Ethiopian Meat and Dairy Industry Development Institute. The Directory features summaries of 126 investment opportunities in the different agro-industrial sectors of Ethiopia, covering tea and coffee, seeds and spices, edible oil (soya, palm) and its processing, corn and soya blends, wheat and flour products, dairy processing, honey, live animals and animal feed, meat processing and poultry. The investment opportunities are an opportunity for local enterprises that are eager to expand their businesses and are looking for partners that can facilitate access to modern agro-processing technologies and technical expertise. Some enterprises are keen to start exporting processed agricultural products and are actively looking for partners to gain access to international markets. The directory shows that Ethiopia boasts business opportunities based on a young and dynamic private sector, which is ambitious to grow and diversify its products and services.

A related e-learning module, launched on the occasion of the eighteenth [session of the UNIDO General Conference](#) in 2019 and featuring on the UNIDO [knowledge hub](#), will ensure that a larger group of Ethiopian stakeholders will receive further capacity-building support in the [critical area of international business alliances](#) and emerging areas such as [impact investing](#).

UNIDO is likewise preparing for the launch of a [digital investment opportunity portal](#) which will feature digital versions of Ethiopia’s current investment opportunity profiles as well as new ones. The portal will provide a conducive digital environment facilitating the handling of investor enquiries, the regular updating of profiles and the tracking of investment promotion efforts in terms of their conversion to tangible investment deals. This support is much appreciated by Ethiopia’s investment promotion stakeholders as it ensures business continuity during a period when physical training cannot be carried out due to the mobility and travel restrictions caused by the global Covid-19 pandemic.

CASE STUDY: ITPO (MOROCCO AND BANGLADESH)

UNIDO ITPO TOKYO DELEGATES AND ADVISORS IMPACT STORY



The UNIDO ITPO Network, comprising a total of nine offices in different countries (Bahrain, China (x2), Germany, Italy, Japan, Nigeria, Republic of Korea and Russian Federation), plays a vital role in advancing industrial productivity and technological change through investment promotion. The investment and technology promotion delegates

programme has been an integral part of the service offered by the ITPOs since the early days of UNIDO. The predecessors of the ITPOs, the so-called Investment Promotion Service (IPS), introduced the delegate programmes as early as 1977. IPS New York in the United States invited, for the first time, investment promotion

officers from Haiti, Morocco and Sri Lanka to dedicated orientation programmes in the United States (see [UNIDO \(2016\) – UNIDO Investment Promotion: A Retrospective](#)).

Since then, ITPOs have welcomed and trained hundreds of investment promotion delegates in their host countries and thus have helped to build pockets of excellence within developing countries’ investment promotion agencies and institutions. This approach has proven effective and practical and has helped with the specific structuring of new foreign direct investment (FDI) deals.

ITPO Tokyo, Japan, is among those ITPOs that make most intensive use of this channel of institutional capacity-building. [UNIDO ITPO Tokyo invites 5–10 delegates per year to Japan](#) from selected countries all over the world, to engage in high-impact bilateral business discussions to attract FDI and technologies from Japanese companies in fields such as automotive, textiles, environment, renewable energy, transport, logistics and services. Delegates normally

spend one to two weeks in Japan and hold three to four proactive meetings per day in Tokyo, but also in other cities (Osaka, Nagoya, Fukuoka, Sapporo, and others). The meetings match the interests of Japanese companies with the needs of recipient countries and provide maximum support to facilitate effective FDI and technology transfer projects. Delegates also engage in seminars, exhibitions, and factory visits to disseminate information about their countries and to learn best practices in industry and manufacturing from Japanese companies.

As a result of such activities, several projects initiated by the Japanese private sector with an impact on the SDGs have been successfully targeted and concluded, involving the delegate at all steps in the promotion, facilitation, and negotiation stages to provide a sense of continuity, trust and comfort to the Japanese investors. In this way, ITPO Japan succeeded in concluding several major industrial investment deals, of which two are given as examples below.

Morocco: investments in the auto parts sector



Following the realization that Japanese investments in the Moroccan automotive and agrifood sectors were low compared to those of other industrialized countries, ITPO Japan took the deliberate decision to step up efforts to promote investment opportunities in Morocco to potential Japanese Investors. A delegate representing the Department of Investments in Morocco (now Agence Marocaine de Développement des Investissements, AMDIE) and later the Tangiers Free Zone, went to Japan for training. As a result of repeated delegate programme visits to Japan, followed up by business missions by investors to Morocco, several companies started doing business in the country. The most notable of these were in auto parts. For example, the Yazaki Corporation invested in three plants to manufacture wire harnesses mainly for export to Europe for use by global automotive makers. The investments made by the Yazaki Corporation generated employment for 10,000 people, helped develop the value-added supply chains in Morocco, increased the country’s export capacities, and provided an opportunity for women’s empowerment through employment. Moreover, all plants are run by Moroccan staff and managers, which demonstrates the positive impact that FDI can have on transferring not only technical but also managerial know-how. The delegate facilitated all stages of the investment preparation, establishment and implementation phases of the Yazaki Corporation, thus attesting to the effectiveness of this approach (refer to case 13 in [UNIDO \(2019\), Partnerships – Japanese Private Sector and UNIDO](#), for further details).

Bangladesh: expanding the potential and capacities of the textile sector



Fast Retailing Ltd., the owner of the Uniqlo brand of clothing, was looking to diversify its manufacturing bases in Asia around mid-2000. The company targeted Bangladesh as a new destination to source its garments and textiles for exports and needed help in getting its business set up there efficiently. A delegate from the Board of Investment of Bangladesh visited Japan and, over a period of five years, from 2008 to 2013, offered timely and tailored investment facilitation assistance to Fast Retailing. As a result, the company set up a base in Bangladesh, creating much-needed employment, especially for women, as the industry usually relies on delicate handwork, and making the industry more attractive for investors worldwide. Given that the company is an industry leader, many related businesses from Japan in sectors such as clothing supply chains, logistics management and freight forwarders etc. followed its example. The company also cooperated with the Grameen Bank Group in 2013 and established 15 social stores, offering inexpensive clothing for the local market (refer to case 14 in [UNIDO \(2019\), Partnerships – Japanese Private Sector and UNIDO](#), for further details).

3.6 SUSTAINABLE TRADE INTEGRATION AND REGIONAL MARKET ACCESS THROUGH AN ENHANCED BUSINESS ENVIRONMENT AND SECTORAL POLICIES

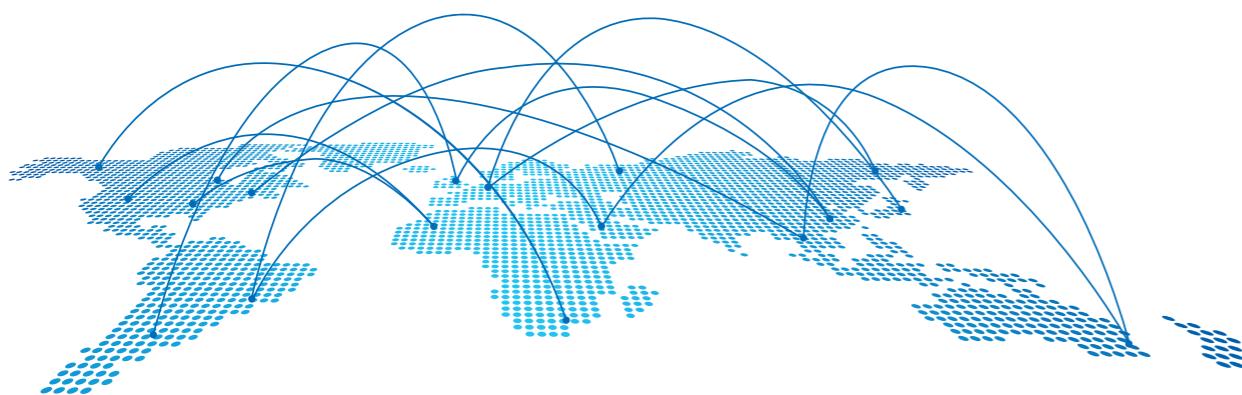
3.6.1 INTRODUCTION

Reviewing the business environment is key to supporting trade and production, and a prerequisite for economic growth and poverty reduction

The business environment is determined by the nexus of policy, legal, institutional, and regulatory conditions that govern business activities together with the mechanisms of government policy and institutional arrangements that influence the way in which key actors operate. Key actors include government agencies, regulatory authorities and business membership organizations, such as women-led business associations, civil society organizations, trade unions, chambers of commerce, industrial confederations, SME bodies, and others.

Creating and maintaining a business climate that stimulates ISID is at the core of UNIDO interventions. The Organization seeks to strengthen the capacities of public and private actors to enable business environment reforms, geared towards reducing business costs and risks, encouraging competition and the social inclusion of disadvantaged population groups, and increasing investments.

Moreover, an enabling business climate that stimulates ISID can translate into regional market access and trade integration. An enhanced business environment and sectoral policies (for example quality, innovation, finance, etc.) allow businesses to become more competitive and gain access to international markets, to benefit from international trade and global value chains.



To provide more support to enable Member States to achieve ISID, UNIDO developed an approach to improve the business environment and sectoral policies, aiming to:

- Improve legal, policy and regulatory frameworks for business registration and company formation.
- Design investment policy with the aim of improving access to finance, market information and the overall investment climate.
- Design quality infrastructure systems to ensure effective connections with international trading regimes, thus improving access by SMEs to regional markets.
- Create an enabling environment for entrepreneurship development, including social enterprises and inclusive businesses.
- Design sector-specific reforms and SME cluster reforms.
- Enable public-private dialogue and multi-stakeholder consultation mechanisms.
- Improve skills and labour market conditions, including the provision of modern infrastructure, business development and innovation services.
- Mainstream gender in business environment reforms.

This approach aims to support SMEs, institutions, policymakers, and other relevant stakeholders at three

levels. Each level directly targets the key elements to which UNIDO brings its expertise and support, namely:



MACRO

- Conducting preliminary assessments on the regulatory framework, including sectoral policies (SMEs, innovation, quality, investment, technology, and standards).
- Supporting sector-specific reforms to the regulatory framework, policies and initiatives associated with the operation of SMEs and other key actors in the business environment, and developing innovative approaches to policy-making, such as regulatory sandboxes.
- Promoting market access and trade facilitation through a gap analysis of national QI policies.
- Supporting national business registration reform programmes, such as a computerized single-point business, tax and statistics registration system.
- Enabling public-private dialogue and multi-stakeholder consultation mechanisms.
- Strengthening comparative advantage, geographical and sectoral specialization, export performance, and capacity to adapt to changes in demand.



MESO

- Transfer of knowledge and best practices for implementing business environment reforms.
- Promoting capacity-building activities for evidence-based policymaking (i.e., design, manage, monitor, and evaluate) among governments and institutions.
- Promoting international trading partnerships through the attainment of QI international recognition.
- Developing or refurbishing existing special economic zones (SEZ), industrial parks (IPs) and export processing zones (EPZs).
- Improving conditions in the labour market, and providing modern infrastructure, business development and innovation services.
- Providing strategic and operational support to business development service providers to make their services more responsive to the needs of firms and the requirements of both domestic and export markets.
- Preparing action plans to enhance national competitive positioning in line with best international practices in strategic sectors, i.e. benchmarking the sector or value chain.



MICRO

- Supporting the identification of the most promising products, value chains and sectors and their competitive positioning through carrying out market intelligence appraisals and diagnostic studies at firm level.
- Supporting SMEs in the development of guides, business plans, road maps and strategies to improve competitiveness and market integration.
- Facilitating the adoption of standards and technical requirements at firm level to enable the application of knowledge and innovation and the preparing of SMEs for the challenges and demands of international markets.
- Disseminating best international practices and enabling capacity-building (workshops, training events, technical assistance) activities for SMEs.
- Providing awareness sessions on business environment opportunities and challenges through training workshops and study tours.

3.6.2 METHODOLOGIES AND TOOLS USED

Policy support and regulatory and institutional framework: innovation



4IR strategies

UNIDO provides advisory, capacity-building and facilitation services to regulators and policymakers, to design a Fourth Industrial Revolution (4IR) strategy and to develop sectoral road maps for the digital transformation of priority sectors, including diagnoses and proposals for public policy intervention. This endeavour requires assessing existing regulatory and institutional frameworks around industrial policy governance in the country. The approach also enables the creation of synergies with other policy domains, such as digitalization, education or science, technology, and quality, thereby creating a complex and diversified map of stakeholders with overarching policy and strategy setting responsibilities.

Moreover, UNIDO provides an analysis of framework conditions for adaptation to the 4IR technologies. UNIDO assists with the evaluation of existing conditions across different sectors to determine their readiness for adopting digital technologies. Such interactions facilitate learning about opportunities and constraints, in deciding on the extent of desirable policy experimentation and coordination during the different stages of policy design, implementation, monitoring and evaluation.

build the capacity and capabilities of institutions and other relevant stakeholders to address the technical gaps and challenges being faced by the industry.

In addition, UNIDO examines micro-economic indicators by undertaking field visits to enterprises within specific sectors to evaluate their technological capacities, level of knowledge,

quality of their products, and other indicators. The objective is to benchmark the sectors and value chains and to prepare an adequate action plan for enhancing their competitive positioning in line with international best practices. The resulting report sheds light on international trends in the industrial sector and provides recommendations to prepare the industry for changes in the market.

Policy support and regulatory and institutional framework: quality



Quality policy for an improved national quality system

The world trading system is continuously developing. For countries to stimulate their socio-economic development agenda, they should comply with the appropriate international requirements and good practices. Many countries have seen the need to re-engineer their QI systems to connect more effectively with international trading regimes. This is particularly important for smaller and less developed economies to meet the requirements of their trading partners with well-developed operational systems. The development and implementation of a quality policy (QP) has become a necessity in this respect.

The QP is adopted at national or regional level to develop and sustain an efficient and effective quality infrastructure. It specifies the overall policy

vision or goal, the policy objectives, expected outcomes and required measures in respect of the development of the QI. Additionally, an implementation plan should be developed, outlining the individual activities and specifying responsibilities, timelines and wide-ranging budgetary and other resource requirements with respect to the QP strategy.

UNIDO has developed a set of documents (guiding principles, technical guide and a practical tool) for QI practitioners and policymakers to design and develop robust, holistic, and demand-driven QI systems following a comprehensive review of national and regional QI development approaches and policies.

Business registration and single point of registration



UNIDO interventions provide policy and technical advice to facilitate the achievement of nationwide business registration reforms. The intervention starts with a comprehensive review of all legal documents relating to business registration to provide specific recommendations to the amended national regulatory frameworks. This results in the approval of new regulations or modification of existing ones and the promulgation of important guiding documents on enterprise registration. National capacities are developed to simplify the legal framework and the procedures to set up

and operate the computerized national business registry system (NBRS). As a result, enterprises can register for business, tax code, statistics and seals through a single point, using a consolidated form and obtaining a unique enterprise ID. Information on licensed enterprises (national and foreign) is digitalized, cleaned, converted and transferred to a national database. Moreover, registration officers are trained in the new regulations and the operationally upgraded software, supporting a smooth implementation of the revised regulatory framework.

Market intelligence and diagnostic studies



UNIDO carries out competitive positioning and market intelligence studies for priority industrial sectors and selected value chains. It also supports the implementation of identified activities, to improve the competitiveness of the sector at national or regional levels.

Market intelligence provides a sectoral analysis on the status of the technology and the potential to apply the best available techniques (BAT) in the context of a specific country. Diagnostic studies involve the assessment of institutions, the development of key performance indicators (KPIs) for the sector and a comprehensive action plan to

Advisory services on business infrastructure (hard and soft) for establishing industrial parks

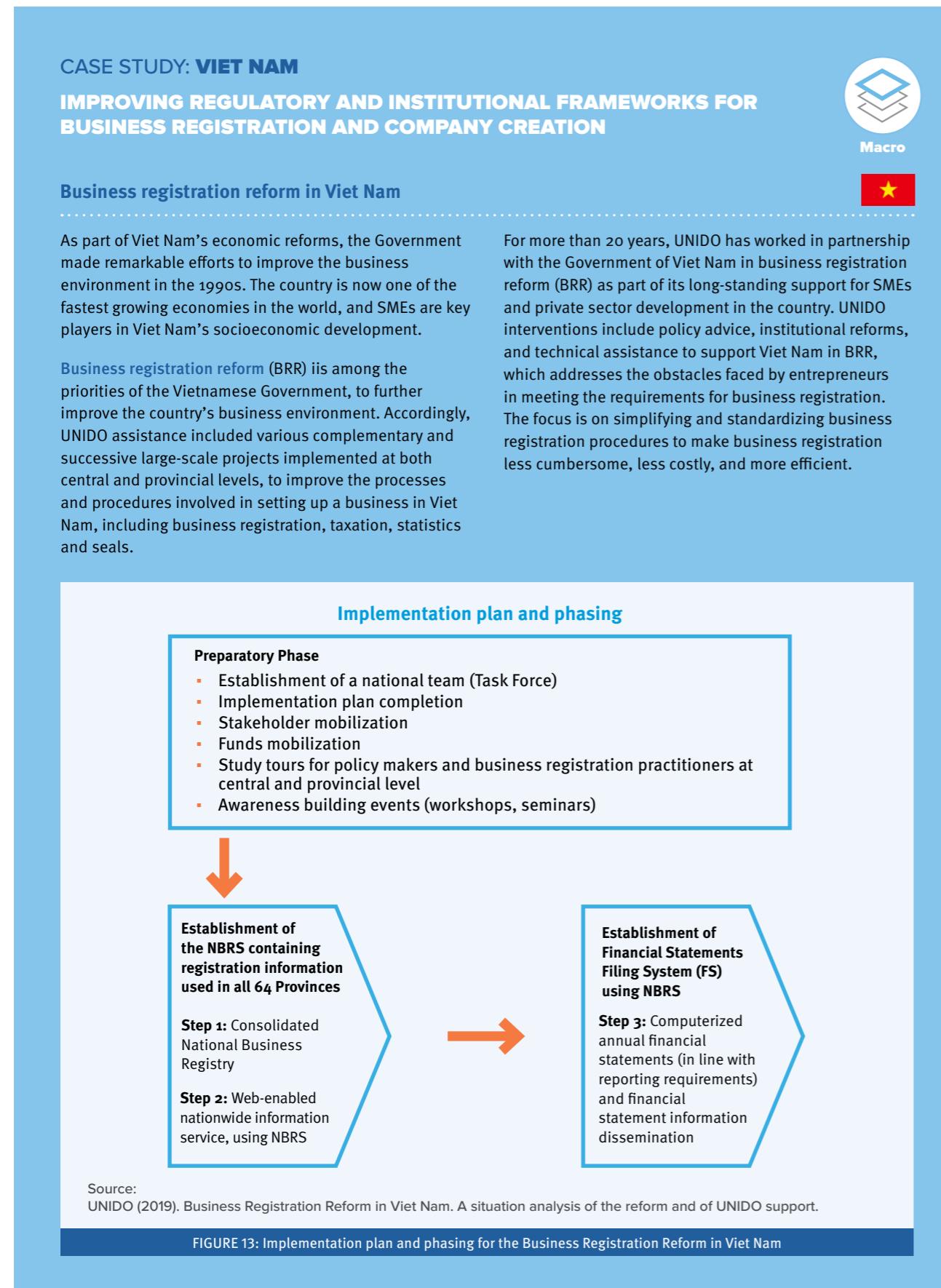


Industrial parks (IPs), special economic zones (SEZs), export processing zones (EPZs), and science and technology parks (STPs) have the potential to develop the manufacturing sector, attract investment, foster innovation, and improve the business environment. The main challenge for governments is to ensure that they are used in the most effective and efficient way possible within the context of a specific country.

The objective of UNIDO interventions in this regard is to leverage the advantages presented by the IPs, SEZs, EPZs and STPs and to provide step-by-step advice on the planning, development, and operation to the various stakeholders, including

regulators, developers, operators, tenants, partners (such as multilateral development agencies) and financial institutions. This is achieved through transfer of best international practices, public-private dialogue, and multi-stakeholder consultation mechanisms, and capacity-building for M&E among governments and institutions.

UNIDO ensures that stakeholders have a better understanding of the potential of industrial and economic corridors for achieving inclusive and sustainable economic development. Moreover, its efforts also envision improved policy frameworks for IP, SEZ, EPZ, and STP development and upgrading.



CASE STUDIES: INDIA AND BRAZIL

STRENGTHENING INSTITUTIONAL CAPACITIES AT SECTORAL LEVEL CONDUCTING DIAGNOSTIC STUDIES AND DEVELOPING METHODOLOGIES TO IMPROVE SECTORAL COMPETITIVENESS AND PROMOTE REGIONAL INDUSTRIAL DEVELOPMENT



Meso



Enhancing productivity in the Indian cement sector

In close cooperation with the Ministry of Commerce and Industry, the Government of India, and the Department of Industrial Policy and Promotion (DIPP), UNIDO aimed at strengthening the global competitiveness of the Indian cement sector. To that end, UNIDO reinforced the capabilities of the technical nodal institution for the sector through various technical workshops, with the aim of facilitating structured expert dialogue, transferring cutting-edge technologies and carrying out numerous technical capacity-building activities. The technical workshops were conducted specifically for scientists

and engineers of the National Council for Cement and Building Materials (NCCBM) in areas such as energy use and energy-efficient solutions, fuels from waste, carbon dioxide emissions and green technologies, patents and intellectual property rights (IPR), global best practices and modern technologies. Information about the best available technologies and techniques and about kiln operation when using alternative fuels and alternative raw materials was transmitted, together with ways in which to identify business opportunities and gaps.

Enhanced productivity in the Indian paper and pulp sector

The Indian paper industry accounts for about 2.6 per cent of global paper production, and employs more than 0.5 million people directly and 1.5 million people indirectly. Given the significant growth potential of the industry, UNIDO has introduced modern technologies and trained personnel to increase productivity in the pulp and paper sector, with the aim of strengthening international competitiveness by entering export markets. The target groups include selected companies that served as demonstration plants, as well as technical institutions such as the Indian Paper Manufacturers Association (IPMA) and the Central Paper and Pulp Research Institute (CPPRI), the Indian Agro and Recycled

Paper Mills Association (IARPMA), the Indian Newsprint Manufacturer's Association (INMA) and the Indian Recycled Paper Mills Association (IRPMA). In the long term, the strengthening of these institutions will enable the sustainability of the project activities and the self-sufficiency of the sector. The project has been formulated in response to a direct request and in consultation with DIPP, the Government of India and relevant associations within the industry and is being implemented in collaboration with the international centre for inclusive and sustainable industrial development (IC-ISID) in New Delhi.²

Monitoring and evaluation methodology for the Brazilian EPZ regime

In Brazil, companies in the so-called export processing zones (EPZs) have access to special tax and administrative benefits to increase their competitiveness. In this context, UNIDO is implementing a project with the Executive Secretariat of the National Council for Export Processing Zones (SE/CZPE) to establish a comprehensive and continuous monitoring system for the Brazilian EPZ regime based on relevant KPIs. This

system provides the basis for detailed assessments of the economic, social, and environmental impacts of EPZ industrial performance at national, state, and local levels. The project is being implemented by the international company Global Policy Incubator (GPI), a global pioneer in improving the capacity of governments to make industrial policy more effective.

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2) Further details may be found at <https://open.unido.org/api/documents/17333103/download/UNIDO Paper Project – Benchmarking Report.pdf>

CASE STUDY: AZERBAIJAN, TAJIKISTAN, TURKMENISTAN, UZBEKISTAN

STRENGTHENING INSTITUTIONAL CAPACITIES AT SECTORAL LEVEL CONDUCTING DIAGNOSTIC STUDIES AND DEVELOPING METHODOLOGIES TO IMPROVE SECTORAL COMPETITIVENESS AND PROMOTE REGIONAL INDUSTRIAL DEVELOPMENT

New generation of industrial parks and zones within cities



Meso



As part of its support to help Central Asian countries achieve ISID through economic diversification and economic corridor development, UNIDO, in close cooperation with the Central Asia Regional Economic Cooperation (CAREC) programme, initiated a project to harness the potential of industrial parks, zones and cities as key policy tools to promote balanced regional economic development. The CAREC programme is a partnership of 11 countries and several development partners working together to promote connectivity leading to accelerated economic growth, regional economic integration between member countries and poverty reduction. The Asian Development Bank project selected Kazakhstan and Kyrgyzstan as pilot project countries, while the UNIDO project focused on Azerbaijan, Tajikistan, Turkmenistan, and Uzbekistan.



FIGURE 14: Selected UNIDO publications aimed at strengthening institutional capacities at sectoral level: diagnostic studies and methodologies to improve sectoral competitiveness

CASE STUDY: PARAGUAY

STRENGTHENING INSTITUTIONAL CAPACITY AND COMPETITIVENESS OF SMES IN SELECTED VALUE CHAINS



Micro



Enhancing the support services of business intermediary organizations (BIOs) for the competitiveness of MSMEs

In its functions, UNIDO aims to strengthen the institutional capacity of the two business intermediary organizations (BIOs), the Paraguayan Industrial Union (UIP) and the Federation of Production Cooperatives (FECOPROD), to deliver high-quality business development services to improve the competitiveness of micro, small and medium enterprises. Specific emphasis is placed on technology and innovation services and mechanisms, as well as on promoting integration of MSMEs into larger value chains. The programme focuses on five selected subsectors: leather and leather goods; flour and bakery products; fruit and vegetables; medicinal and infusion herbs; and grains.

The project aims to contribute to inclusive and sustainable economic growth and job creation by improving the competitiveness of MSMEs and the business environment in Paraguay.

As part of its intervention, UNIDO transfers best international practices through capacity-building activities. The staff from BIOs are trained to implement a gap analysis of the MSMEs participating in the programme. The gap analysis enables the identification of the needs of the market in terms of compliance with standards and requirements in processes, products and services. The intervention follows the application of a Lean Six Sigma maturity model for the gap analysis through a diagnosis of 12 operational excellence criteria using the capability maturity model integration (CMMI) for process management and process excellence. The CMMI scale, together with Malcolm Baldrige's productivity factors are used to identify the level of maturity against the productivity criteria that will allow the identification of actions to close gaps and achieve the strategic objectives of the MSMEs.



FIGURE 15: Capacity development training as part of the project: Enhancing Business Intermediary Organizations' Support Services for MSMEs Competitiveness in Paraguay

Source: Working group session for the selection of value chains to be supported within the project. FECOPROD, December 2019

Following these examples of six individual programme services, two best practice cases now will now be presented, based on UNIDO projects that demonstrate how these programme services can be combined for increased impact

4

Best practices from selected sector experiences: Pharma and Automotive

The two best practice project examples on “Upgrading local production capacities of essential medicines” and “Inclusive and sustainable industrial development of the Colombian automotive supply chain” underpin the DTI holistic strategic approach to structural transformation by presenting various methodologies to augment the impact of structural transformation efforts undertaken by developing countries.



4.1 UPGRADING LOCAL PRODUCTION CAPACITIES OF ESSENTIAL MEDICINES

4.1.1 BACKGROUND

The local manufacture of pharmaceutical products is today a widespread reality in many countries that needs to be carefully managed to minimize the risks of wide-spread harm to people's health and well-being due to sub-standard manufacturing practices. It is also, however, an opportunity to strengthen the sustainable health security of low and middle-income countries and their most vulnerable populations, and to apply the vision of ISID through expanding and strengthening the pharmaceutical sector in developing countries. By advancing know-how, technology and skilled employment, high quality and economically viable capacities to produce essential medicines in developing countries contribute to the processes of structural change and economic transformation that are needed for realizing the 2030 agenda and achieving the SDGs whilst increasing resilience to crises such as the ongoing pandemic.

Against this background, UNIDO has, since 2006, been providing technical cooperation and advisory services to strengthen local pharmaceutical production (LPP) in developing countries. UNIDO has been making substantive contributions to improving the business environment and technical capabilities of local manufacturers whilst helping to mainstream LPP as a global development theme. This engagement has established UNIDO as a leading organization within the LPP agenda, collaborating with a diverse and vibrant network of partners. The successful support provided by UNIDO in this area and its potential for both public health promotion and socioeconomic development have increased demand for the Organization's services and allowed it to diversify its engagement beyond essential medicines into the local production of biological substances and vaccines.



4.1.2 APPROACH

UNIDO has adopted a holistic approach that recognizes the current context for pharmaceutical manufacturing in developing countries and establishes a realistic technical pathway for manufacturers to upgrade their operations. It also assists governments in establishing a supportive environment for businesses to make the requisite investments and access technology, and provides technical assistance to manufacturers and other stakeholders, thus helping to develop and implement plans for upgrading of the sector in specific countries. The project facilitates the development of a conducive regional context for developing pharmaceutical manufacturing capacities in such a way that all countries can benefit from improved access to essential medicines and other health commodities while benefiting from aligned approaches to strengthen their industry.

UNIDO also works on the demand side, collaborating with multilateral donor funds that procure priority essential

medicines to ensure that there is a "market pull", so to speak, to justify investments. A market pull is also generated through approaches that provide market data and inform businesses and investors of the opportunities that can be realized in different parts of the continent.

UNIDO has developed a training course for manufacturers to ensure that there is sufficient demand, enabling manufacturers to operate efficiently. While regulatory barriers may be addressed at the regional economic community level, the advent of the African Medicines Agency provides a promising pathway towards regulatory harmonization. In addition, UNIDO looks at addressing the trade barriers that exist within the regional economic communities while leveraging the potential of the Agreement Establishing the African Continental Free Trade Area for pharmaceutical market integration and interregional trade.

4.1.3 ACHIEVEMENTS

Partnering with the African Union Commission



Milestones achieved include partnering with the African Union Commission to write the business plan for the accelerated implementation of the Pharmaceutical Manufacturing Plan for Africa (PMPA), as endorsed by African Union Heads of State and Government. This work was welcomed by the United Nations General Assembly in its 2017 resolution 71/242 on industrial development cooperation. The project has focused significantly

on developing the pharmaceutical industry in Africa, which has been identified as a priority sector under the Third Industrial Development Decade for Africa (IDDAIII). UNIDO is a lead partner of the African Union Commission in supporting the development of the industry on the continent.

Engagement to promote the LPP agenda



Over time, UNIDO has been engaged in many global forum activities to promote the LPP agenda and has collaborated with other agencies within and beyond the United Nations system, such as WHO, the Joint United Nations Programme on HIV/AIDS (UNAIDS), The Global Fund, Medicines for Malaria Venture, and the New Partnership for Africa's Development. A joint statement supporting the

agenda signed by the heads of six organizations – UNIDO, WHO, the United Nations Children's Fund (UNICEF), the United Nations Conference on Trade and Development (UNCTAD), UNAIDS and the Global Fund to Fight AIDS, Tuberculosis and Malaria – was launched at the World Health Assembly in May 2019.

Development of technical expertise



UNIDO has also developed the technical expertise to address challenges faced by the industry and associated stakeholders. The services developed in this field include a step-by-step approach to upgrading standards of production, approaches for assisting companies to develop vibrant business propositions to attract investment and technology, strategy development for governments to invest in the pharmaceutical sector, and

technical support packages for industry to improve production efficiency and the management of capital investment projects. The project has also implemented pharmaceutical market data solutions in East Africa, Ghana and Zimbabwe. Robust market data is a vital input for policymakers, investors and businesses, as they seek to make decisions based on sound evidence.

Close collaboration with the private sector



UNIDO has worked closely with the private sector, reaching out to some 120 of the estimated 350 companies currently operating in sub-Saharan Africa. Among other things it has assessed their level of compliance with international GMPs as part of its efforts in supporting the industry to upgrade. These companies have received assistance in preparing plans to implement corrections and corrective actions that are required for developing their manufacturing activities. The private sector has played a key role in formulating strategies for countries. Over 250 staff members from more than 150 companies have received training in the international requirements of GMP. UNIDO has sponsored the foundation of the trade associations for the Southern African Development Community (SADC) region and Africa in general,

respectively the Southern Africa Generic Medicines Association (SAGMA) and the Federation of African Pharmaceutical Manufacturers Associations (FAPMA). This close relationship with the private sector, alongside its work in collaboration with ministries and parastatal organizations, gives UNIDO a unique insight into the range of issues that needs to be addressed to instigate change. This insight has been captured in the 2019 report on the pharmaceutical industry in sub-Saharan Africa: “A Guide for Promoting Pharmaceutical Production in Africa”. The document was developed to promote investment and access to technology in the sector, notably the International Business and Investment Forum for Africa’s pharmaceutical industry held in Bonn, Germany, 1–2 March 2018.

Partnership with the West African Health Organization



The catalytic funding provided by Germany enabled the formulation of an ongoing partnership with the West African Health Organization (WAHO), which, at the beginning of 2017, engaged UNIDO to develop a regional approach to apply its quality upgrading methodology across West African countries. This has entailed the release and cross-regional validation of a common reference framework and other related country-specific road map documents. In April 2018, the Directors General of UNIDO and WAHO signed a Joint Declaration stating the intention of the two organizations to work together to develop the industry in West Africa. This was followed by a relationship agreement concluded between the two organizations in May 2019, which establishes the legal basis of a long-term

collaboration for strengthening the pharmaceutical manufacturing industry in the ECOWAS region. Building on this, the two organizations have since joined forces to develop the ECOWAS Pharmaceutical Manufacturing Programme (EPMP), which is intended to contribute both to improved health outcomes and to economic development. Over time, the programme will support countries to work together and develop their own national strategies in such a way that the combined effect will be to require, enable and reward pharmaceutical manufacturers in West Africa as a reliable source of a broad range of safe, efficacious and high-quality essential medicines and vaccines that are affordable for the region’s health-care systems and eligible for international exports.

Vaccine manufacturing in Africa



UNIDO has also expanded its work to include vaccines and biological products. Working with WHO and the African Vaccine Manufacturers’ Initiative (AVMI), UNIDO has assessed the viability of vaccine manufacturing in Africa and produced a white paper on the implications of putting in place

a vaccine manufacturing facility. UNIDO also has an ongoing relationship with the International Centre for Genetic Engineering and Biotechnology and is exploring opportunities to make use of the Centre’s technology and UNIDO expertise to develop production of biosimilars in Africa.

4.1.3 WAY FORWARD

Building on its wealth of experience and expertise in pharmaceutical sector development, UNIDO is currently formulating a comprehensive strategy to harness the

potential of health industry development for improved resilience of health systems in its member States.



4.2 INCLUSIVE AND SUSTAINABLE INDUSTRIAL DEVELOPMENT OF THE COLOMBIAN AUTOMOTIVE SUPPLY CHAIN

The automotive industry is an important pillar of the world economy, and key to achieving ISID and the SDGs. It represents a fundamental sector of the economy for every major country in the world and is always a major source of employment, as approximately 5 per cent of global labour is directly or indirectly employed in this industry. The opportunities that this sector's linkages generate touch upon global development agendas, from poverty eradication through productive labour, to structural transformation, technological change and innovation. All along the automotive value chain it is possible to unlock new linkages to generate solutions for countries' multifaceted development challenges.

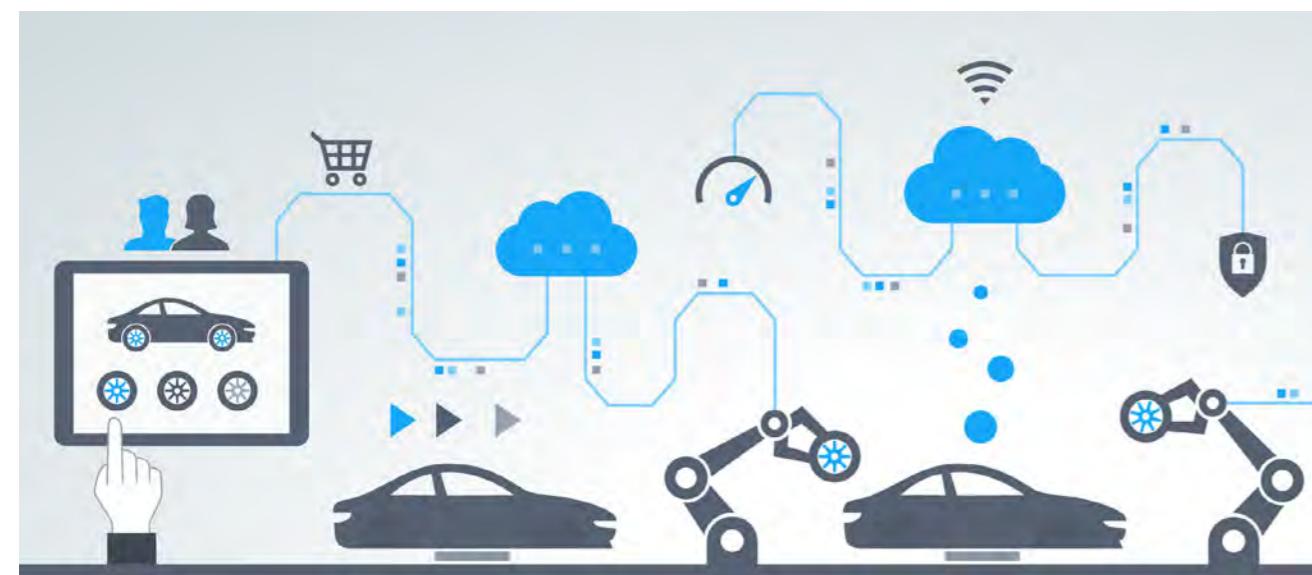
4.2.1 BACKGROUND

The Colombian automotive industry was born in the 1960s, when assembly and production plants were first installed. For a period of 40 years, the heavy tariffs imposed on vehicle imports made Colombian companies prosperous. The production of auto parts grew, and the automotive industry became an economic force for the development of Colombia. All the same, after the country had opened its economy to the international market during the 1990s, new companies settled in Colombia, leaving local vehicle manufacturers (OEMs) struggling to compete against cheaper imported cars and putting the local automotive industry in a critical situation.

The sector was in need of renewed help to enhance the quality and productivity of the supply chain, and this

led to the involvement of UNIDO. In its commitment to support Colombia's efforts to achieve ISID, UNIDO developed and implemented a project in 2016.

When the project was started, the intention had been to focus on diversifying market opportunities for the automotive suppliers in Colombia, given that various OEMs had departed, thus supporting the recovery of the automotive sector. More than five years later, the results are evident: the sector is set on a long-term growth trajectory. In the light of this success, Colombia rests assured that interventions such as this one make economies more resilient, promote job creation and translate development objectives into practical experience.



UNIDO AND KOICA JOINT PROJECT



Objective	To foster Colombia's integration into regional and multilateral trading systems and supply chains by enhancing its trade capacities, competitiveness, and performance.
Main stakeholders	Ministry of Industry, Commerce and Tourism through its Colombia Productiva initiative; ProColombia – the national export promotion agency; the National Metrology Institute; the Colombian Institute of Technical Standards and Certification.
Outputs	<ul style="list-style-type: none"> ▪ Output 1: local actors will have the capacity to implement the sectoral vision and strategy, Colombia Productiva Business Plan, with a focus on improving the productivity of the automotive industry. ▪ Output 2: the national quality infrastructure is strengthened to improve the international competitiveness of Colombian automotive component manufacturers. ▪ Output 3: local component suppliers (SMEs) upgrade competitiveness and comply with international standards, technical regulations and market requirements and improve their productivity. ▪ Output 4: local automotive component suppliers develop linkages within domestic and foreign markets for inclusive value-chain development. ▪ Output 5: local automotive component suppliers gain enhanced technical R&D capacities and skills.

Result 1: policies and strategies for ISID and the SDGs



Collaborative work at the macro level involved several actors, notably the Ministry of Industry, Commerce and Tourism, which was a key player. The Ministry intervened at this level through the portal of Colombia Productiva, the organization in charge of promoting productivity and competitiveness in the Colombian industry.

As part of the intervention strategy, the work with Colombia Productiva focused on aligning the normative frameworks of the country with international best practices, and in doing so, prioritizing ISID in the development agenda of Colombia and the automotive sector. From the very beginning of the project, the focus was on strengthening the national quality infrastructure at all levels. To this end, Colombia Productiva adopted an international regulatory framework from the set of standards aimed at evaluating the environmental and security related impacts of vehicles, known as WP29. Following exchanges with international experts, workshops, and consultative exercises, the WP29 regulations were all adopted into Colombian regulatory frameworks.

In addition to the WP29 framework, other regulatory practices were adopted. This entailed an assessment which explored the economic, social and environmental impacts of policies on the automotive sector. This exercise was facilitated by national and international experts.

This model of intervention benefited various stakeholders in Colombia. Policymakers and other actors managed to raise awareness of the importance of adopting international safety standards to reduce accident rates and deaths on the roads. This result was achieved through a national consultation process.

The aim was to include as many stakeholders as possible, enabling a more inclusive and open mechanism. These new spaces for public consultation led to an increase in participation, more transparency in the process and finally, more trust.

The result benefited everyone. Participants received a broad understanding of how the automotive sector relates specifically to each of them, from accessing new markets through enhancement of quality, to consumer rights, from regulations to fewer road accidents to upgrading exports and boosting commerce. Every single participant brought to the table a different perspective on how one single sector can impact many aspects of daily life. The awareness raised in society was key to the further implementation of actions.

Lastly, the awareness raising created among all stakeholders served as a catalyst for the adoption of best regulatory practices. Some of the interventions also impacted regional actors, such as the development of the regulatory impact analysis virtual

course which from 2018 to 2020 has benefited more than 700 officials working in several sectors and institutions, both local and international, in countries such as Argentina, Ecuador and El Salvador.

Another key area of the intervention strategy was the support that UNIDO provided to national stakeholders for the development of the definition of the national Industry 4.0 policy. UNIDO supported the National Department for Planning in drafting the national policy for Industry 4.0, a key document that sets the scenario

as to how other policies and instruments can be used within the framework of the fourth industrial revolution.

The normative role of UNIDO was recognized, and its expertise had an indirect impact on other policies, such as employment creation and poverty reduction. UNIDO was invited to participate and contribute inputs to develop the country's 2019 undertaking to economic growth and job creation, the "*Pacto por el crecimiento económico y la generación de empleo*".

Result 2: conducive industrial ecosystems

At this level of intervention, institutions worked under one premise: enhance quality to improve the efficiency, productivity, and competitiveness of the Colombian automotive sector.

INM was one of the beneficiaries working with UNIDO in an upgrading programme that targeted their technological upgrading and enhanced the institution's capacities.

Working with national and international experts, INM updated its service catalogue. Staff at INM received training on metrology needs assessment and had their knowledge and improving processes updated. On this basis, INM was able to provide a more substantial offer not only to the automotive sector, but to every productive sector in Colombia. To reach out to more participants, communication campaigns and other outreach activities were supported by UNIDO.

Emphasis was placed on technology, with the installation of a laboratory in Bogota and the training of specialists, guaranteeing the traceability of hardness and penetrability measurements. Before the intervention of UNIDO, producers either did not calibrate their equipment (leading to an increase in quality defects), or took on the higher costs of doing so.

This was of vital importance for the industry since there was no laboratory of that kind in Colombia, and this development gave local enterprises more accessibility for testing. This not only benefited the automotive sector but also any other sector that can make use of the INM laboratory.

Additional technical support was provided through training to improve reliability in the development of the testing and calibration activities of 12 laboratories for compliance with the requirements of ISO/IEC 17025 of 2017.

UNIDO supported the capacity strengthening of the Colombian Institute of Technical Standards and Certification (ICONTEC) for strategic surveillance of global trends and perspectives in science and technology, to incorporate innovation into the essential functions of the Institute. Through workshops, support from international and national experts, and the clustering of economists, engineers, and data mining scientists, ICONTEC increased its capacity to provide users with cutting-edge analysis. Moreover, once the importance of this knowledge had been taken on board and to ensure sustainability of this intervention, ICONTEC acquired the required software for this analysis.

Once these capacities had been developed, ICONTEC put into practice all the knowledge gained through an analysis of the automotive sector. Several forecast scenarios were made, and the implications discussed. The objective of this exercise was to ensure that Colombian standards were adapted quickly so that national products would remain current and competitive in the global market. As of now, ICONTEC has the capacity to observe and monitor trends and produce accurate data to serve various sectors of the Colombian economy.

The work with ICONTEC also encompassed the development of E-Conecta, a technological platform that makes the process of defining standards



more participatory, improves public consultation mechanisms and facilitates technical and scientific dialogue. This platform was designed and built specially for ICONTEC, using top experts in the field.

ProColombia is the specialized agency in charge of promoting exports, international tourism, and foreign investment (FDI) in Colombia. The joint work with ProColombia had a two-sided strategy, with one side focused on exports and the other on FDI.

To improve the performance of the automotive industry in Colombia and diversify the market, international best practices were observed. This led to the development of a methodology to prepare for the introduction of Colombian local industry exports to international markets. For this, a learning by doing approach was used.

While UNIDO was training local producers in international matchmaking strategies (including the development of intercultural abilities, sales, and communication skills), staff at ProColombia were learning how to implement this training.

Within the framework of this training of trainers, UNIDO also trained ProColombia staff to facilitate the closing of business deals at various world fairs and accompanied them to promotional events as part of a strategy of internationalization and diversification into markets such as the U.S., Canada, Mexico, and Brazil.

Other examples include preparing local clients and producers to develop their outreach materials, adjust the tone of their language to different audiences, and make sales presentations - all this in line with the work that ProColombia carries out to promote exports.

In this regard, UNIDO supported the ProColombia sectoral matchmaking forum for the motion industries

"Rueda de las industrias del movimiento" in 2019, 2020 and 2021, aimed at mobilizing national manufacturers and foreign buyers. In this way the institutional capacities of ProColombia to organize and implement these events were enhanced.

In terms of FDI, ProColombia worked with UNIDO in developing a catalogue of industrial capabilities so that clients and investors from around the world could learn about the manufacturing performance of Colombian companies.

This strategy also included public relations campaigns, participation in specialized publications and the creation of an automotive portal to close deals and find investors: automotivecolombia.com, which serves both for attracting FDI and boosting exports.

Another result of this change in organizational culture was the joint development of three guides. The first aimed at potential foreign investors, where the socioeconomic and cultural background is outlined, painting a comprehensive picture of the Colombian automotive sector, enabling investors to consult the highlights of the local industry and identify the potential for building their value chains in Colombia. The second and third guides were aimed at Colombian industry. The second concerned the management of financial mechanisms for local business and how to access these. The third gave guidance on how to attract FDI, elaborate a company profile, prepare for sales meetings and other undertakings.

The work of UNIDO with national institutions has assisted in creating a quality culture that is now embedded within the institutional DNA of its partners. With these new perspectives and enhanced capacities, a strategic vision to achieve ISID is set well in motion.



Result 3: innovative, inclusive and sustainable businesses

A three-layer cooperation strategy has been implemented with UNIDO partners to generate long-term strategic change. 180 enterprises were engaged at an introductory level, consisting of awareness-raising activities (courses, seminars, campaigns, etc.) revolving around different topics. Emphasis was placed on adopting international best practices, norms and standards as a key step for private sector development.

The second layer included the companies that wanted to take a step forward but were not sure where to start or needed some support to do so. With these companies, workshops of smaller groups were conducted (tailor-made approaches of 5–10 companies), where the companies themselves put together an action plan. At this stage, 80 companies have benefited from this personalized guidance.

Development of business continuity

In this way production chains were streamlined and 31 companies became global competitors. Moreover, other components beyond the automotive sector benefited from this project.

In the search to implement innovative mechanisms, the design and simulation network was created. This is a match-making platform that allows certain businesses to make use of the infrastructure and knowledge of other companies. It brings together companies that have unutilized or underutilized infrastructure for the design of auto parts, involving software and engineers, and connects them with other companies that do not possess these assets, enabling the latter to make use of that technology. With the aim of helping companies to gain access to services they would not otherwise be able to access so easily, the network enables an inclusive innovation process.

Approximately nine auto-parts manufacturers developed 12 new products – 7 of which, including headrests for ambulances, airbag compliant seat covers and bicycle brake pads, had already been introduced to the market, thus diversifying these firms' product offers and making them more resilient.

4.2.3 FOCUSING ON LONG TERM-IMPACT: SUSTAINABILITY

One of the major strengths of the UNIDO sectoral approach is its focus on long-term impact and the development of a sustainability strategy. The following

list presents some of the key aspects that allow for sustainability and support the achievement of long-term impact:

Entrepreneurial culture

UNIDO work with institutions and businesses led to a shift in acting, thinking and feeling approaches. The following list presents some of the key aspects that are conducive to sustainability and support the achievement of long-term impact, the strengthening of quality systems and the change in professional language and practices, and that aim to ensure that businesses and institutions will maintain the behavioural change and, in doing so, cultivate long-term transformation of the automotive sector.

Collaboration and teamwork

The importance of teamwork was stressed from the beginning. The approach taken by UNIDO was a collaborative one, always understanding the needs of every stakeholder, listening to each collaborator, and working together in all the activities. The learning-by-doing approach used with institutions and businesses harnesses the trust of all actors. Moreover, it makes it possible for stakeholders to benefit mutually from the results achieved. The synergies created go beyond individuals, and lie in the linkages created between institutions, sectors, government and businesses.

Ownership and inclusiveness

Close collaboration with actors, openness to the discussion of all kinds of issues, a problem-solving mindset, and the joint implementation of actions lead to ownership and trust. The collaborative processes that included many individuals beyond targeted beneficiaries allowed for more robust results. In doing so, stakeholders of the project saw themselves in the driving seat towards change. This is crucial to the intervention since it is of utmost importance for UNIDO that countries take ownership of the impact of the project.

Innovation and digitalization

A key aspect in the implementation of this project was the way in which innovation and digitalization were integrated in the project: the use of shared economy tools such as a network platform that facilitates exchange among businesses; the building of digital skills at institutional level through training measures and the exchange of best practices; and taking part in the shaping of national policy on Industry 4.0. All these ensure that the automotive sector will be able to take advantage of all the benefits offered by 4IR and be prepared to face the challenges still to come.

Articulated support

The individuals that supported the implementation of the project, from national and international experts, the local UNIDO team, workers and business owners, policymakers, staff at institutions, and other beneficiaries, always worked in a coordinated and organized way. This unified approach among all those involved made it possible to reach consensus and implement solutions when challenges were faced.



"It is the best initiative for the development of the sector that has been implemented in the last 40 years".

**Camilo Llinas, President
Colombian Association of Autoparts Manufacturers**

The holistic strategic approach exemplified in the two best practice examples can be replicated to increase the

impact of structural transformation efforts undertaken by developing countries

5

Way forward

UNIDO promotes inclusive and sustainable industrialization in developing countries, in line with Goal 9 of the 2030 Agenda for Sustainable Development. Central to this objective is the process of structural transformation and modernization across industrial sectors, enabling manufacturers in developing countries to transition from low value to higher-value activities and compete in global value chains. This publication contributes to the better alignment of UNIDO sectoral expertise and programme interventions with the vision of the Organization for the next years, as set forth in the Medium-Term Programme Framework 2022–2025, which recognizes structural transformation as a key driver for economic development and poverty eradication and identifies it as one of the essential focus areas for the Organization, in addition to digital transformation and the circular economy.

UNIDO is committed in the future to continue actively seeking the coordination of multi-theme approaches in its interventions, to ensure a more holistic assistance to both specific and general ISID challenges. The Organization plans to further expand its existing tools and methodologies to enable developing countries to catalyse the opportunities offered by structural industrial transformation to advance, leapfrog and prosper. With this publication, UNIDO also takes a further step

towards integrating its service modules and offering its Member States comprehensive solution packages for greater results at scale. The Organization will continue adapting its methodologies to the paradigm change brought about by the climate crisis and 4IR. Pioneering this effort is the revamped EMIP. This new approach uses modern innovative tools and technologies to increase productivity and competitiveness in a contextualized and customizable manner.

This publication takes stock of the UNIDO repository of sectoral expertise, and of how the Organization can effectively foster structural transformation in a climate-neutral and inclusive manner, while leveraging the opportunities offered by the digital transformation of industry. The unique expertise of UNIDO is grounded in its hands-on support for industrial firms great and small and across different sectors: from agro-industrial to textile; from automotive to creative industries; from heavy industry to building materials. Incorporating these insights into its industrial policy and normative activities at global, regional and country levels, enables UNIDO and its Member States to shape effective development strategies and implement structural industrial transformation that will be inclusive and sustainable, meeting the needs of tomorrow.

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