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CHARACTERIZING UNIDO'S APPROACH TO SCIENCE, TECHNOLOGY AND INNOVATION:

A Review of Project Evaluations 2010 – 2020

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Abbreviations

Abbreviation	Definition
3ADI	Africa (Accelerated) Agribusiness and Agro industries Development Initiative
AAAA	Addis Ababa Action Agenda
AfDB	African Development Bank
BAT/BEP	Best available techniques and best environmental practices
BIT	Business, Investment and Technology Services Branch from UNIDO
BRN	Tanzania's Big Result Now programme
CBL	Cluster and Business Linkages Unit from UNIDO
CP	Clean Production
CPCB	Central Pollution Control Board in India
CTA	Chief Technical Advisor
CTCN	Climate Technology Centre and Network
DDT	Dichlorophenyltrichlorethane
EABC	East African Business Council
EAC	East African Community
EACB	EAC Business Council
EC	European Community
ECOWAS	Economic Commission of West African States
EDIP	Enterprise Development and Investment Promotion Programme in Bahrain
EMAP	Upgrading the Medicinal and Aromatic Value Chain – Access to Export Markets (former Project executed by UNIDO)
ESCAP	Economic and Social Commission for Asia and the Pacific
ET	Evaluation Team
EU	European Union
EUROSTAT	The statistical office of the European Union
FAO	Food and Agricultural Organization
FSMSs	Food Safety Management Systems
GHP	Good Hygiene Practice
GMP	Good Manufacturing Practice
GTIM	Global Technology and Industry of Mali, recycling company
GVC	Global Value Chain
HACCP	Hazard Analysis Critical Control Points
IPR	Industrial Property Rights
ISID	Inclusive and Sustainable Industrial Development
ISO	International Organization for Standardization
IT	Information Technology
ITPO	Investment and Technology Promotion Office
LAC	Latin America and the Caribbean
LC-MS	liquid chromatography – Mass Spectrometry
LDCs	Least Developed Countries
LMIC	Low and Medium Income Countries
MACLE	Market Access & Compliance for Lebanese Exports
MAP	Medicinal and Aromatic Plant
MDG	Millennium Development Goal
MITI	Ministry of Industry, Trade and Investment of Tanzania
MRL	Maximum Residue Limits
NCPC	National Cleaner Production Centres
NGO	Non-Governmental Organization
NIP	National Implementation Plans
NORAD	Norwegian Agency for Development Co-operation
NSI	National Systems of Innovation
OECD	Organisation for Economic Co-operation and Development
PC	Project Components
PCB	Poly-chlorinated Biphenyls
PCDDs/PCDF	Polychlorinated dibenzo-p-dioxins/polychlorinated dibenzofurans
PCP	Pentachlorophenol
POP	Persistent Organic Pollutants
PTC	Division of Programme Development and Technical Cooperation from UNIDO
QUALEB	EU quality programme
SADC	Southern African Development Community
SAP	SAP number from UNIDO's system
SC	Stockholm Convention
SCW	Supreme Council for Women of Bahrain
SDG	Sustainable Development Goals
SDG1	End poverty in all its forms everywhere
SDG5	Achieve gender equality and empower all women and girls
SDG7	Ensuring sustainable energy
SDG8	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
SDG9	Build resilient infrastructure, promote inclusive and sustainable industrialisation, and foster innovation
SDG10	Reduce inequality within and among countries
SDG11	Making human settlement resilient and sustainable

SDG12	Ensure sustainable consumption and production patterns
SDG13	Take urgent action to combat climate change and its impacts
SDG14	Conserve and sustainably use the oceans, seas, and marine resources for sustainable development
SDG15	Halting land and forest degradation
SDG17	Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development
SITPC	Shanghai International Information Technology Promotion Centre
SMEs	small and medium size enterprises
SPS	Sanitary and Phytosanitary Measures (SPS Agreement under WTO)
SPWA-CC	Strategic Programme for West Africa – Climate Change
STI	Science, Technology, and Innovation
STS	Science and Technology Services
SVI	Swiss Packaging Institute
TA	Technical Assitance
TAF	Technical Assistance Facility
TBS	Tanzania Bureau of Standards
TBT	Technical Barriers to Trade
TCB	Trade Capacity Building
TEST	Transfer of Environmentally Sound Technologies
TIUMP	Tanzania Industrial Upgrading and Modernization Programme
TUT	Tshwane University of Technology
UIS	UNESCO Institute of Statistics
UN	United Nations
UNBS	Ugandan Bureau of Standards
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNIDO	United Nations Industrial Development Organization
UNODC	United Nations Office on Drugs and Crime
UPPOPs	Unintentional Produced Persistent Organic Pollutants
US	United States
USD	United States Dollars
UUT	Upgrading Unit Tanzania
VNCPC	Viet Nam Cleaner Production Centre

Executive Summary

Since its creation in 1966, the United Nations Industrial Development Organization's (vv) mandate has always included the promotion of investment and technology transfer to foster industrial development (Browne, 2012). UNIDO actively contributes to debates and actual practice of industrial development in developing countries, addressing issues of resources and factor endowments, capability development, and the enhancement of framework conditions for industrialisation, using specialised knowledge and appropriate technologies.

UNIDO's mandate to actively contribute to industrial development, and the promotion of the development and diffusion of relevant science, technologies, and capacity-building, resonates with the Addis Ababa Action Agenda (AAAA) of the Third International Conference on Financing for Development. This recognises science, technology, and innovation (STI) as well as industrial development as powerful drivers of economic diversification and value addition, economic growth, and sustainable development (United Nations, 2015). The Lima Declaration advocates inclusive and sustainable industrial development (ISID) (UNIDO, 2013); while the Abu Dhabi Declaration calls on UNIDO and its partners to scale up UNIDO interventions that support technological learning, technology transfer, and innovation, particularly for small and medium size enterprises (SMEs), women and the youth (UNIDO, 2019). These mandates underscore UNIDO's commitment to the achievement of the SDGs, with emphasis on SDG9.

The above notwithstanding, the absence of a reference framework to identify and isolate the diverse UNIDO's industrial development and STI-related interventions makes it difficult to establish the distinct UNIDO's contributions to the achievement of developmental outcomes in Member States, particularly in ways that illustrate how the promotion of ISID and STI contributes to the achievement of the SDGs. There is room to reflect on the different UNIDO activities and to build a common understanding, possibly leading to the adoption of a working definition of what STI means, aligned to UNIDO's operations.
This report contributes toward this goal. The main objective is to understand how STI are promoted in the inputs, processes, and outputs of UNIDO's interventions, and relate this practical understanding of STI with the long-term impact on ISID that UNIDO aims to achieve. To this end, this report presents the findings from a qualitative analysis carried out on a set of UNIDO's project evaluations from 2010 to 2020, to deconstruct the link between STI inputs and outputs, as expressed in project activities, and their contributions to ISID and SDGs. The analysis followed a three-prone approach. First, we built a database containing 207 project and 11 thematic evaluations conducted on UNIDO projects over the relevant period. Second, we applied content analysis and text search on these 207 documents to identify how STI dimensions are captured in UNIDO projects. Finally, the findings from this initial analysis were supplemented by a more in-depth content analysis building on a subset of 23 purposedly selected documents.

The results of the analysis are summarised in six main conclusions:

1 **UNIDO's interventions contribute mainly to the generation or improvement of Science and Technology Services (STS)** in the sectors and countries where the institution operates. STS include technical S&T support activities, scientific data collection and analysis, assistance for improvement of governance, management and legal framework supporting S&T, and preservation, interpretation and dissemination of scientific information and knowledge. These services are not directly related to R&D or with innovation but are necessary to improve the innovation systems of the sectors and countries where UNIDO works.

2 **UNIDO's approach to innovation is through fostering technology transfer and technology adoption in firms.** UNIDO works towards a change in the institutions and governmental organizations related to the sectors intervened that will foster adoption of technologies in firms in the long run. This is most evident in programmes related to clean production and renewable energy.

3 **UNIDO supports innovation in firms in an indirect way, through the effective use of pilot projects.** Most projects consist or include pilot programmes with few firms being direct beneficiaries. The expectation is that pilot projects, or proof of concept, will eventually lead to positive spill-overs in other firms. However, this is generally a passive objective, as UNIDO's interventions are bound in definite time and space.

4 **UNIDO's work is aligned with SDG9, while also contributing to several other SDGs, notably SDG5, SDG7, SDG8, SDG10, SDG12, SDG13, and SDG17.** By design, the objectives of UNIDO's interventions are aligned with SDGs objectives, more specifically SDG9. However, considering the scale and time bound nature of those interventions, it is difficult to relate, directly, the outcomes and impact indicators to the SDGs.

5 **UNIDO's ability to assess its contributions to SDG9 and other SDGs would benefit from more structured mechanism to describe how project outcomes and impacts flow from project activities toward specific SDGs.** There is a lack of clear tracing from projects objectives to projects outcomes and their contributions towards SDGs. This gap in project design prevents UNIDO to develop a better understanding of the institution's actions as regards its mandate, and the pertinence of its developmental STS interventions.

6 **UNIDO's contribution in STI and SDGs can be identified better in the medium- and long-term.** To understand better the contributions of UNIDO to STI and SDGs in Member States can contribute to effectively assess and determine the pertinence of its interventions based on its mandate around ISID.

From the above, few recommendations can be highlighted and lines of further research and enquiry within UNIDO can be suggested. These further studies can be informative of the work conducted along new dimensions not evaluated before. They can also set future guidelines for more precise use of terms and methodologies in project design, execution, and evaluation. We propose the following lines of enquiry:

1 **Conduct a strategic analysis of the demand from Member Stated for UNIDO interventions on innovation.** This study can contribute to understand the necessities of Member States on innovation programmes and policies, helping to change programmes design, execution, outcomes and indicators to actually satisfy the demand of its partners.

2 **Conduct periodic evaluations of the impact of UNIDO interventions on innovation at the sectoral or national level.** An analysis of innovation focusing on specific country/sector and distinct from all other possible UNIDO interventions in the selected country/sector, can contribute to understand better the role of UNIDO on promoting innovation.

3 **Conduct periodic evaluations of the impact of UNIDO interventions in a systemic way.** An analysis of UNIDO's STS activities and their effects on the innovation systems of beneficiary countries, and on different levels – national, regional, and sectoral – would be helpful to understand synergies between UNIDO's programmes, best practices, and the importance of local factors and institutions on the effectiveness of UNIDO's projects.

4 **Conduct a study to generate traceable indicators for projects that relate projects outcomes to impact indicators on the medium- to long-term, linking projects outcomes to ISID and SDGs.** An analysis of the relationship and relevance of ISID to the achievement of the SDGs would provide a frame of reference for projects' Theory of Change and their associated outcomes, detailing specific indicators for future project evaluations.

5 **Conduct periodic meta-evaluations of UNIDO's work and its long-term impact goals on SDGs.** An analysis of UNIDO's interventions in relevant SDGs, using similar methodologies to the "Thematic Evaluation of UNIDO's Contribution to the MDGs" (UNIDO, 2012) can provide evidence of the organisation's actual contribution to the realisation of the SDGs.

In planning for these suggested studies, careful consideration should be given to the timeframes covered by the evaluations and the time lapse required for UNIDO's interventions to reach or generate sufficient critical mass, thereby making it possible to correctly identify any system-level effects from projects on the working of innovation systems of Member States. Based on the findings from this study, one can suggest that an STS framework is of high relevance for UNIDO to generate substantive evidence on the relationship between its interventions and their effects on innovation, innovation systems, ISID and SDGs.

A final consideration can be made concerning the focus and aims of future project evaluations to make the STI, ISID and SDG components more structured and explicit, linking specific project outcomes with the broad objectives of UNIDO's work in these areas. Alternatively, UNIDO could plan for a regular set of specific evaluations on its impact on specific countries/sectors with respect to Innovation, S&T, ISID and SDGs; e.g., every 5 to 10 years. The latter approach would enable UNIDO to better understand the impact of its current interventions and assess the need for additional interventions, as required to accomplish the organisation's mandates.

1. Introduction

The United Nations Industrial Development Organisation (UNIDO) is the specialised agency of the United Nations that promotes industrial development for poverty reduction, inclusive globalisation and environmental sustainability. UNIDO's mandate is fully recognised in the Sustainable Development Goal 9 (SDG-9), which calls to "Build resilient infrastructure, promote inclusive and sustainable industrialisation, and foster innovation."

The Organisation's programmatic focus is structured in four strategic priorities: Creating shared prosperity, Advancing economic competitiveness, Safeguarding the environment, and Strengthening knowledge and institutions. UNIDO has been a very active player both at the level of intellectual debate on the role of technology for industrialisation and at the level of capacity development and technical assistance for technology transfer; brokering collaboration and knowledge sharing between developed and developing countries.

Despite the importance of science, technology and innovation (STI) in work carried out in UNIDO; it is difficult to identify the impact of UNIDO's work on its Member States in terms of their development results on inclusive and sustainable industrial development (ISID). The main challenges to identifying UNIDO's impact are:

- At the operational level, as found in project documents, the description of UNIDO's work on STI remains at the level of inputs –capacity building, technology transfer, and so on;
- An independent, systematic evaluation of STI components in UNIDO's projects remains pending (UNIDO, 2018).
- At the strategic level, while the objectives of several UNIDO programmes and activities include explicitly their intention to foster innovation in the Member States, the pathways towards achieving such a goal are usually insufficiently articulated (UNEP & UNIDO, 2008; UNIDO, 2010).

This lack of informed understanding of UNIDO's approach to STI makes it challenging to learn from past experiences and inform ongoing and prospective work on STI and the promotion of ISID. Addressing this gap is pertinent because STI, industrialisation and technical cooperation are dynamic fields. By aligning the Organization's approach to frontier knowledge around the contribution of STI to industrial innovation and industrial development would increase pertinence and impacts from UNIDO interventions. The emergence of new technologies affecting the way production and society are organised suggest that UNIDO's means, and interventions need to adapt continuously. Such adaptation should build on accumulated experience and a reference framework setting the goals and means to achieving intended results (UNIDO, 2010). However, this accumulated information and framework is not easily available within the organisation.

To close this gap, this report contributes to UNIDO's continuous efforts towards improving understanding of the role it ought to play in strengthening knowledge and institutions in Member States, building on its technical cooperation portfolio. More specifically, the objective of this project is to derive some strategic recommendations on how to track UNIDO's activities in the broad field of STI, and on the contribution of such activities to the achievement of the SDGs, with emphasis on SDG9. With this goal in mind, the report presents the findings of a systematic review of project evaluations and thematic evaluations of past and ongoing technical cooperation initiatives at UNIDO. Thus, we document and characterise UNIDO's involvement and contribution to STI, as drivers of ISID and the SDGs more broadly.

Since this study relies primarily on past project evaluations, it entails some methodological limitations. First, the sample might have a selection bias as only projects with available evaluations could be included and not necessarily projects that would best represent the different types of initiatives. In UNIDO's case, such a bias responds from the budgetary thresholds considered for a project to be subject to evaluation. Hence, the selection of projects with evaluations skews the sample to large projects funded mostly with extra-budgetary resources. Therefore, relatively small projects that are not subject to impact evaluations but that contribute to STI on Member States are not considered. Similarly, relying on past evaluations entails a significant time lag, as some of the findings may be based on past rather than current practices. Further, evaluation reports often provide information on impact in a limited and constrained time frame, restricting the conclusions on the effect of UNIDO actions in the Member States to the observed results of the projects. In the same token, impacts from UNIDO interventions may be underestimated, as unintended outcomes and spill over effects are difficult to capture in the absence of systematic, purposive evaluations.

The remainder of this report proceeds as follows: Section 2 identifies how STI is contextualized in UNIDO's work and interventions relating it with Science and Technology Services. The section also defines innovation and categorises possible innovative activities promoted by UNIDO. A description of the data and methodologies used to analyse the different documents is presented in section 3. Then, Section 4 provides descriptive statistics of the data, while section 5 presents the content analysis of the entire dataset in different areas of interest. Section 6 shows the in-depth analysis conducted on 23 selected evaluations. Section 7 discusses future studies that can be conducted to understand better the effects of UNIDO's intervention on an aggregated level. The final section concludes the report.

2. UNIDO's strategic objectives for its work on STI

UNIDO's vision is to eradicate poverty through promoting ISID. This vision combines principles of the Lima Declaration and has direct links to SDG9. The work of UNIDO and how it can relate to SDGs is graphically presented in **Figure 2.1** from its Medium-term Programme Framework 2018 – 2020 (UNIDO, 2017). While this framework is now superseded by the new Medium-term Programme Framework 2022 – 2025 (UNIDO, 2021), we decided to retain the former, as it was in place at the start of this study. Hence, it is the framework under which the evaluations will be better understood.

UNIDO's mission to promote and accelerate ISID in Member States is further structured in four strategic priorities for conducting its work (UNIDO, 2017):

1 **Advancing economic competitiveness:** Support developing countries to include STI as a key driver for industrial diversification, value added generation and sustained growth by building trade capacities in industries as a seedbed for entrepreneurship, business investment, and innovation.

2 **Safeguarding the environment:** Advance the abilities of developing countries to incorporate green principles and practices in their industrial activities. Support green industries by building institutional and industrial sector capacity related to resource efficiency and cleaner production technologies, and by improving waste management.

3 **Creating shared prosperity:** Promote industrial policies and the use of technologies that foster participation and opportunities for segments of the population traditionally left behind. To build productive capacities in an inclusive manner and aim to achieve equal opportunities for women and men, as well as for youth, and across social groups.

4 **Strengthening knowledge and institutions:** Support advancing the technical, policy and normative knowledge base and strengthening the institutional capacity for ISID, globally and in Member States. This will enhance UNIDO's positioning as lead agency in the industrialisation debates locally and globally through knowledge products and convening activities.

Work on STI in international organisations is a relatively crowded space: several UN and non-UN agencies have mandates to perform work on this topic. Nevertheless, UNIDO's specialised mandate around industrial development provides differentiation and a relevant entry-point to the countries. UNIDO's ability to intervene directly through pilot projects, policy advisory services and convening power offer good prospects to carve itself a niche while creating partnership opportunities with other development agencies, academic institutions, and private partners (UNIDO, 2018).

UNIDO's four core functions can contribute to support developing Member States' efforts to embed STI in their strategic development policies. UNIDO can assist in the adoption, development, and diffusion of technologies and innovations at different levels of intervention. For example, UNIDO can:

- Induce changes in the institutions and establish structures through new industrial policies or strategies and resources allocation, including developing legal and regulatory frameworks to support STI activities and programmes as they relate to industrial development;
- Buy-in to STI policies and commitment to the adoption of STI strategies as an integral part of national industrial development plans;
- Foster the adoption of practices/standards and norms that facilitate industrial innovation and the adoption of new technologies in manufacturing activities;

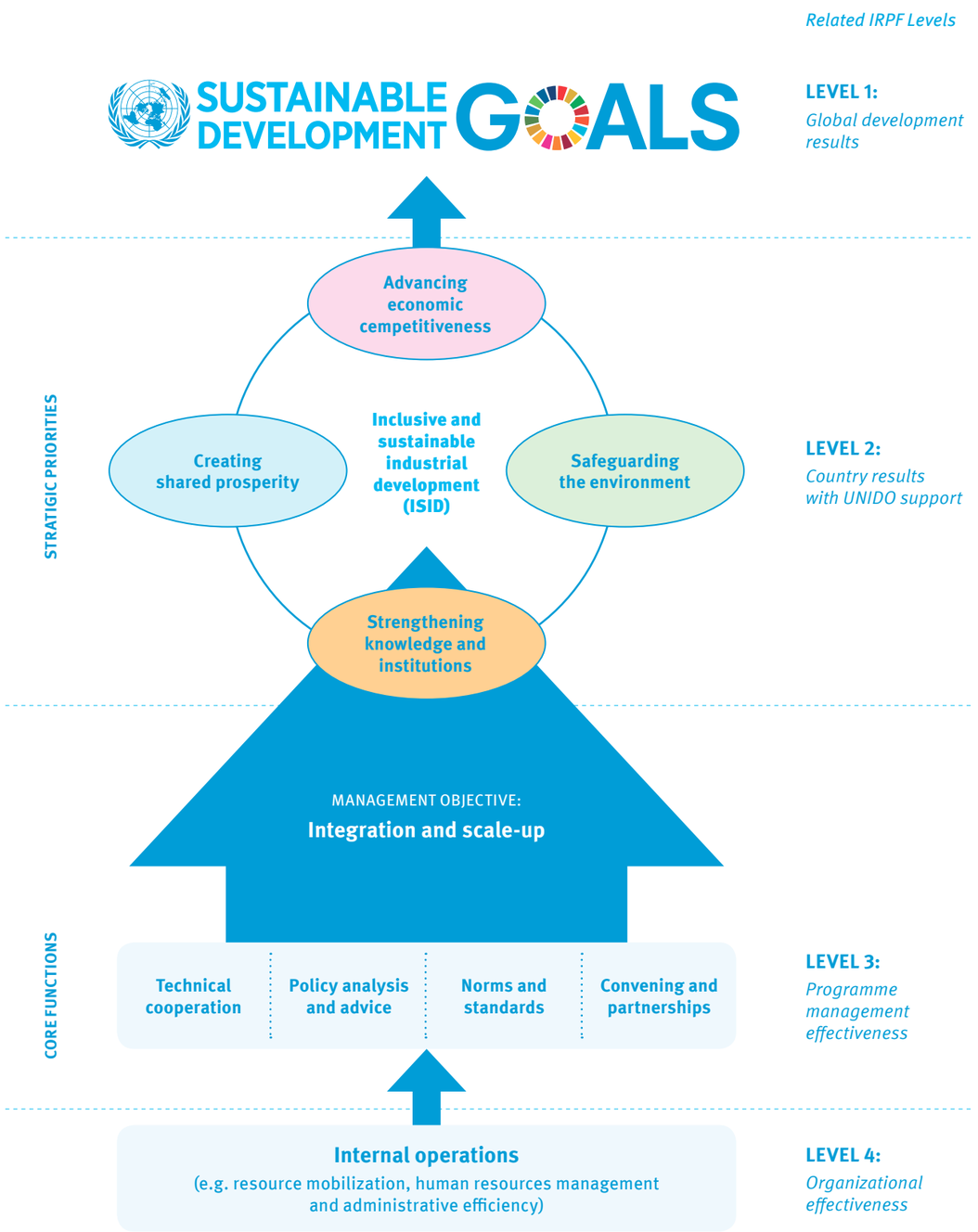
Provide frontier knowledge and practical guidance around capacity building strategies, as needed to accelerate progress towards ISID.

To better understand the role of UNIDO on STI, first it is necessary to define the terms, and how to operationalise them.

2.1. Identifying STI activities in the context of UNIDO's work

In 2018, UNIDO started a reflection on its role and contribution to STI as a driver of ISID, and its comparative advantage within the UN system regarding work on STI, most frequent case in developing countries, and it often applies to most UNIDO interventions, which entail technology acquisition, imitation, and adaptation.

Figure 2.1 UNIDO's Strategic Framework



Source: UNIDO's medium-term programme framework 2018– 2020.