TECHNOLOGY FACILITATION MECHANISM

التعاون الألماني
DEUTSCHE ZUSAMMENARBEIT

giz Deutsche Gesellschaft für internationale Zusammenarbeit (GIZ) GmbH

SUSTAINABLE DEVELOPMENT GOALS

Training on Science, Technology and Innovation (STI) Policy and Policy Instruments for SDGs for Tunisia and the Arab States

Session 2

Innovative entrepreneurship: Conceptual issues

Aleksei Savrasov
Industrial Development Officer, UNIDO
a.savrasov@unido.org

UNIDO UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

SUSTAINABLE DEVELOPMENT GOALS

FOSTERING INNOVATIVE ENTREPRENEURSHIP THROUGH DIGITAL TECHNOLOGIES

UNIDO CASES

Aleksei Savrasov
Industrial Development Officer, Division Digital Transformation and AI Strategies (DAS)

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

SUSTAINABLE DEVELOPMENT GOALS

Objectives

- Show how DT and 4IR technologies can contribute to fostering entrepreneurship
- Provide concrete cases / examples in developing countries

Key Takeaways

1. Technology - information and knowledge for entrepreneurs
2. Technological solutions: in developing countries can be cases to move from survival to growth and development
3. Developing countries need support for entrepreneurs, economic development and support institutions, and policymakers - 3-level technological interventions

Content

Different levels of project intervention:

1. Digital transformation and AI: study in Africa
   - Knowledge: Mapping infrastructure, Digital Skills, Partnerships
2. Digital transformation and readiness toolkit for SMEs
   - ✓ Asses challenges
   - ✓ Match with 4.0 solutions
   - ✓ Cost\benefit -> implement
3. Namibia: agriculture and bush control project
   - Developing country: challenge
   - Technological solution
   - Wider implications
4. Modernization project in Tunisia and Cote D'Ivoire
   - 3-level intervention
   - Access to digital skills
   - Entrepreneurship development

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

SUSTAINABLE DEVELOPMENT GOALS

DIGITAL TRANSFORMATION AND 4IR:

Regional Studies - Africa, Arab States, Maghreb

- Coming from the Needs/ Requirements
- Dataset and Governance map
- Policy framework to rely on 3 pillars:
  - Climate action
  - Smart production
  - Technologies for improved livelihood

- Digital transformation and 4IR
  - geographical and economic perspectives,
- Action oriented sections:
  - skills and capacity building;
  - digital transformation at firm level;
  - innovation ecosystems;
  - partnerships, investment and infrastructure;
  - governance, technologies and innovation policies.
- The studies will highlight activities and opportunities in the pillars of actions:
  - namely in smart production for economic development,
  - innovation and 4IR for advanced climate action,
  - and 4IR technologies for improved livelihoods
- Action plan for UNIDO in the region

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

SUSTAINABLE DEVELOPMENT GOALS

Toolkit will allow firms to match challenges with solutions

Productivity Challenges Assessment

(Steps 1 to 3)

Step 1: The firm will answer a small survey to identify the **main productivity challenges** ("pains")

Step 2: The pains will be categorised in a **Pareto chart** according to the SME's answers

Step 3: The pains will be confronted with **Industry 4.0 technologies** that could help to solve the problems

Industry 4.0 Readiness Assessment

(Steps 4 & 5)

Step 4: For each Industry 4.0 technology a list of **necessary capabilities** will be presented

Step 5: A second small survey can be answered then by the firm to check its **readiness for the I4.0** technology implementation

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

SUSTAINABLE DEVELOPMENT GOALS

The main challenges will be matched to I4.0 solutions

- Production management and scheduling
- Quality management
- Maintenance management
- Inventory management and logistics
- Energy management

Remote Sensing (*connected devices, RFID*)

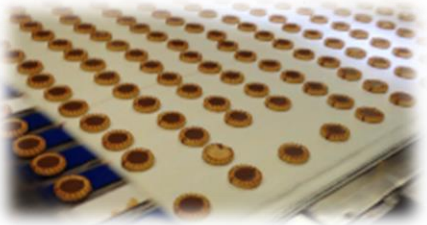
Internet of the Things (*IoT*)

Cloud Computing (*Cloud*)

Big Data Analytics (*BDA*)

Artificial Intelligence (*AI*)

Remote Sensing



Visual Computation

3D Printing

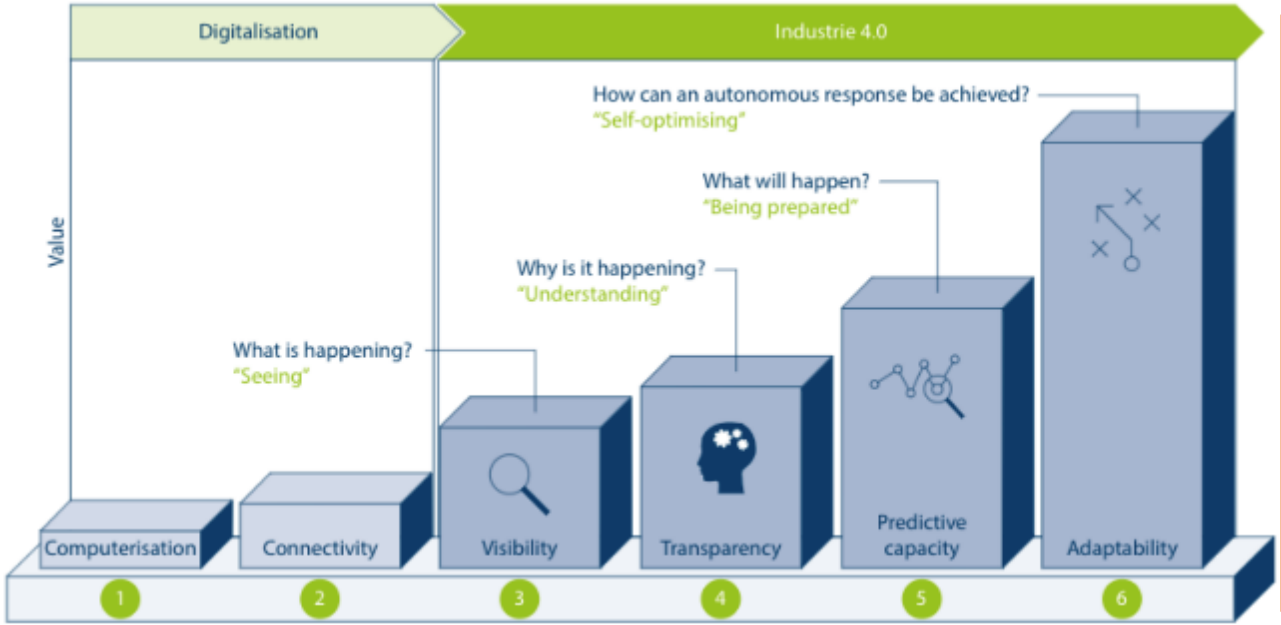
Warehouse Management System (WMS)

Firm's challenges | **Industry 4.0 base technologies** | **Applications to solve firm's challenges**

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

SUSTAINABLE DEVELOPMENT GOALS

3. Insights on implementation and expected return will be provided



How much should I invest?

How much time would it take?

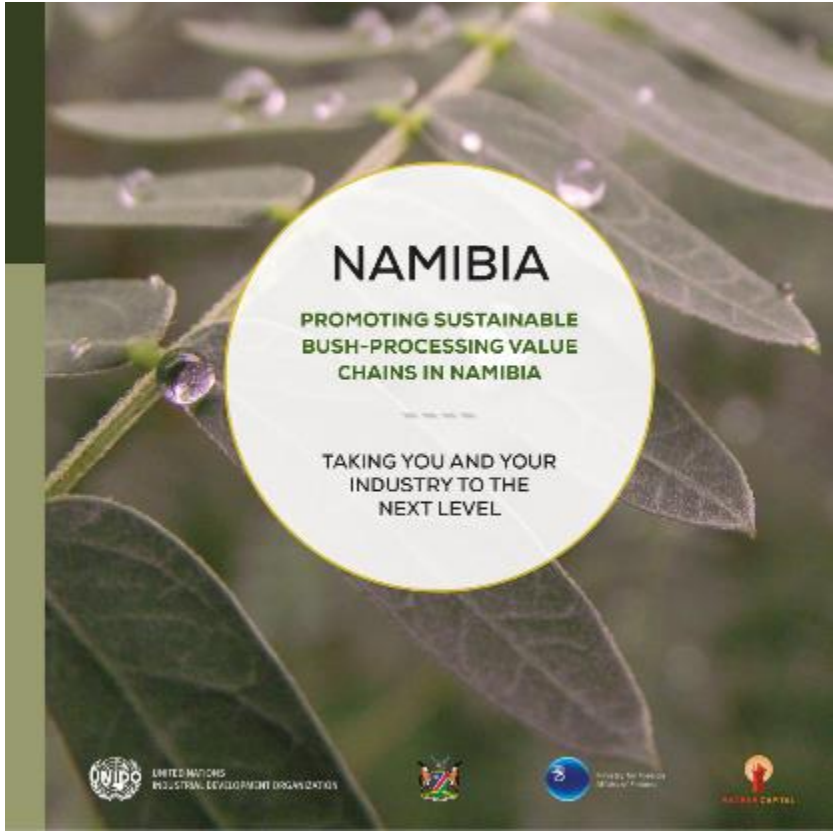
When would I see results?

Is the investment profitable?

Source: Industry 4.0 Maturity Index. Acatech (2020)

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

SUSTAINABLE DEVELOPMENT GOALS



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

SUSTAINABLE DEVELOPMENT GOALS

Namibia’s typical landscape in the past…

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

SUSTAINABLE DEVELOPMENT GOALS

Namibia's typical landscape today…

(Invasive) Bush Encroachment

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

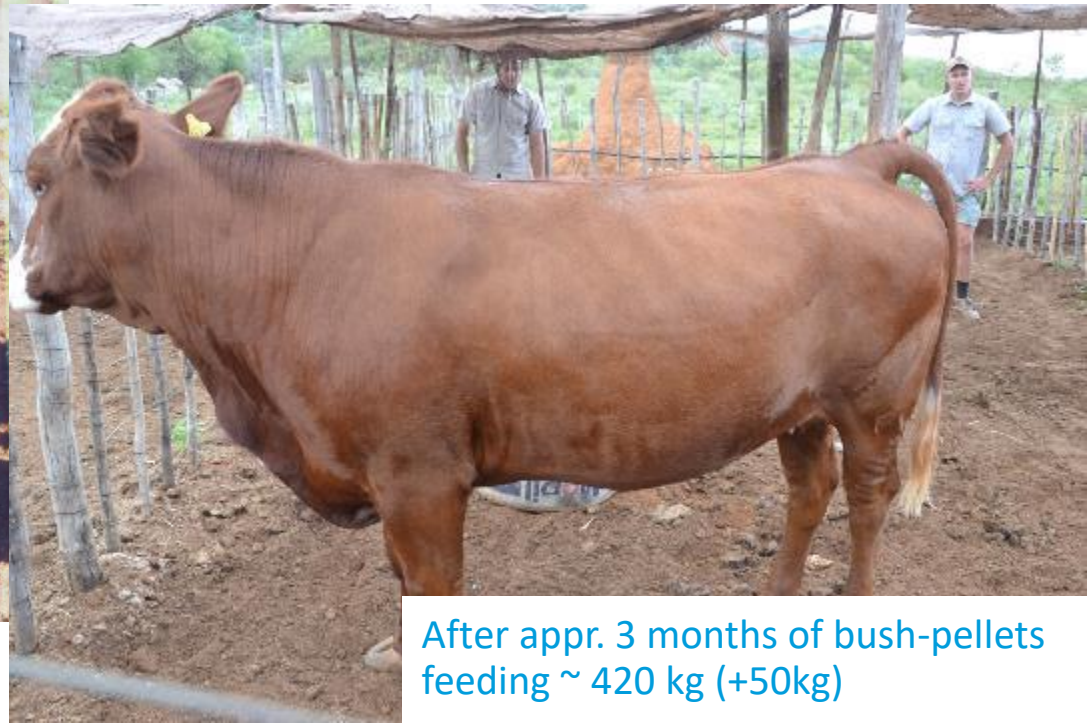
SUSTAINABLE DEVELOPMENT GOALS

Designing innovative solutions to environmental challenges

10-times smaller and more efficient containerized animal feed mill


39380
GRILL MEISTER
GRILL
Briketts
aus Holzkohle
3 kg

Before adding Bush-Feed to the Ration ~ 370 kg



After appr. 3 months of bush-pellets feeding ~ 420 kg (+50kg)

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

SUSTAINABLE DEVELOPMENT GOALS

Appealing to Satellite & Drone-based Imagery Recognition, Artificial Intelligence and Machine Learning systems

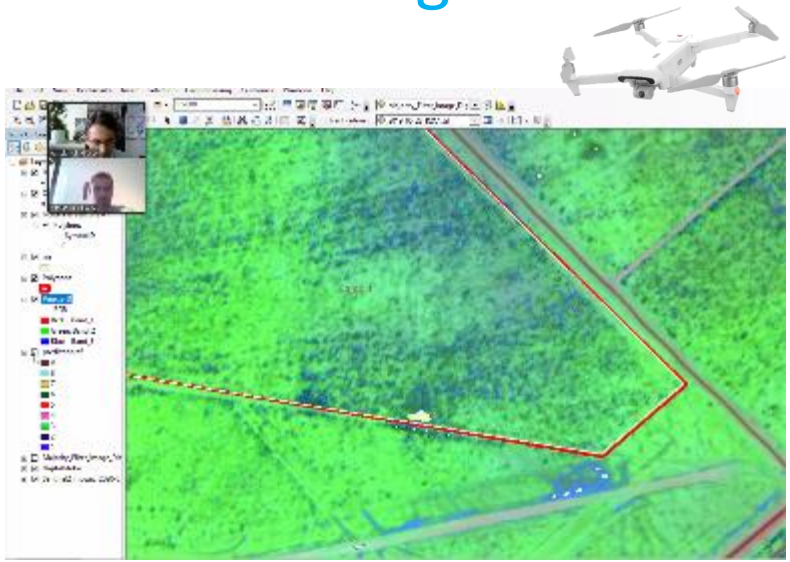
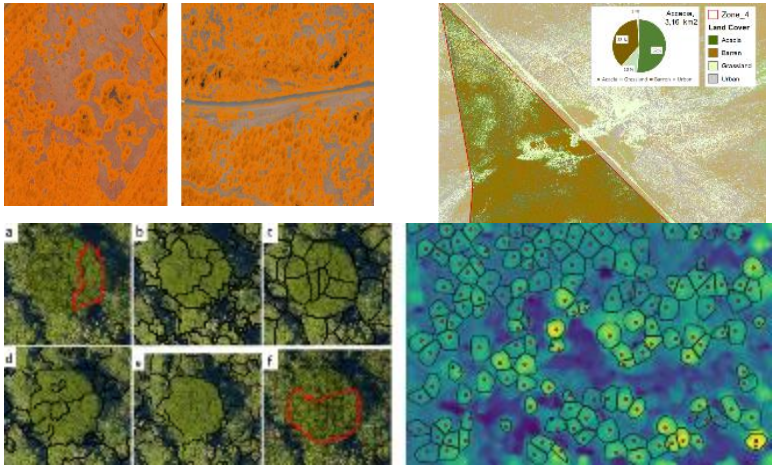


Image Unsupervised Classification

asking the system to ONLY visually separate the physical items in the images based on RGB and other visual elements



to allow industrial scale identification and sustainable, targeted, & responsible harvesting and processing of invasive species

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

SUSTAINABLE DEVELOPMENT GOALS

New: Textural Analysis on top of Visual Interpretation

Development of a Machine Learning **Prediction Model** for Acacia species mapping

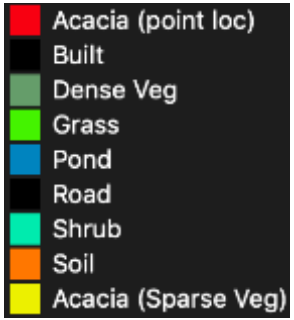
Data Input
- Very High Resolution Image from DG
- Field Data

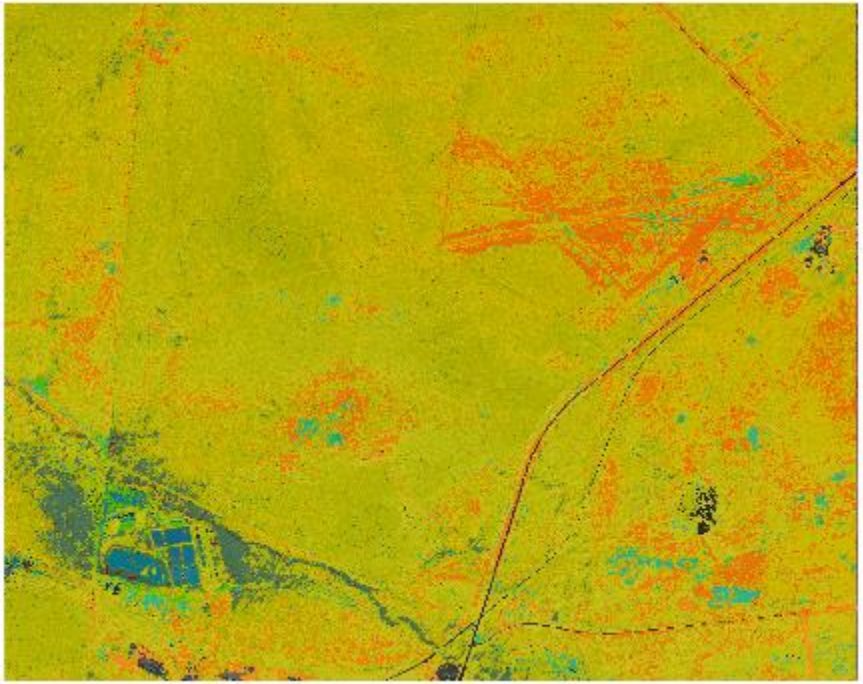
Training the Model
- Predictor Variables
- Labelled Training Data (Response)

Model Prediction for Acacia
- Variable Importance
- Best Model
- Final Prediction

Initial Results

Next Steps





Example result of the prediction algorithm.
Yellow is the classified Acacia area clusters and red is the Acacia at point location.

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

SUSTAINABLE DEVELOPMENT GOALS

Turning all data to a Commercial Value

Camp Site# 4

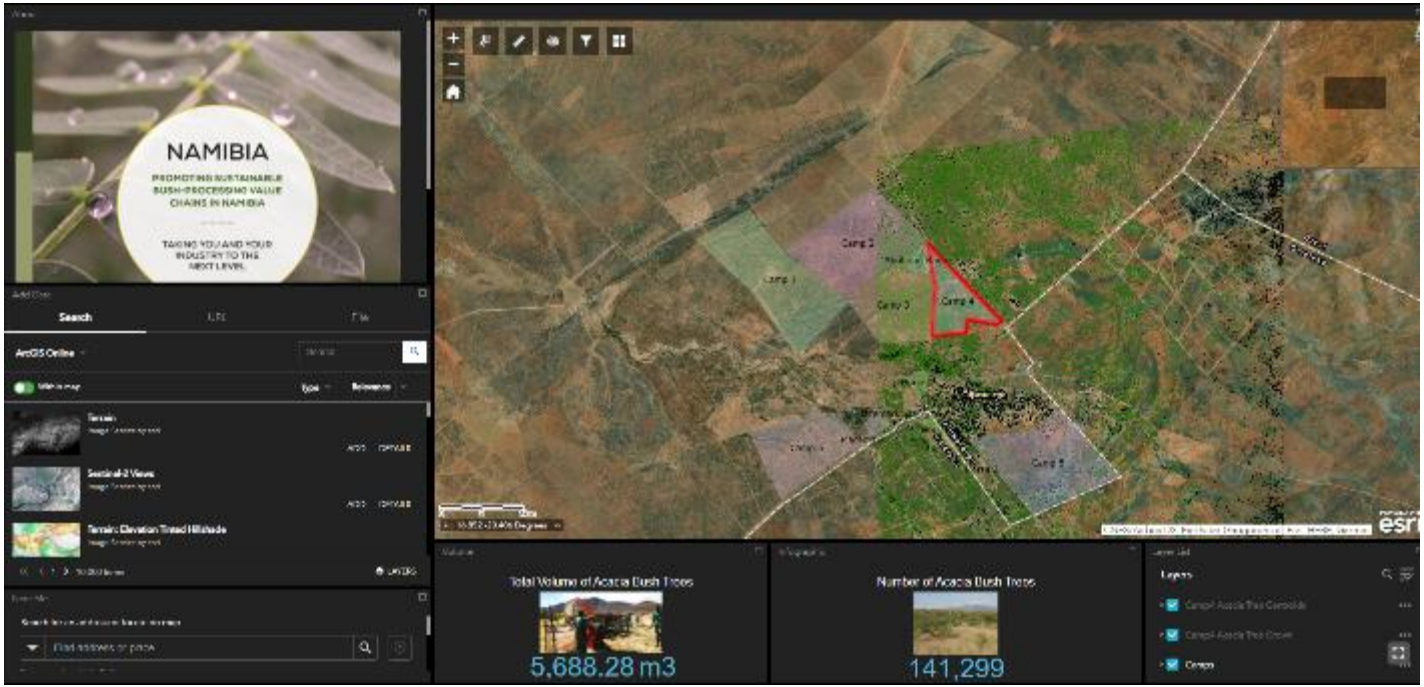
Total Size of Camp Site # 4 = 6.1 Km2
Total Area covered by Acacia Trees in Camp Site # 4 = 3.16 Km2
Total number of Acacia Trees in the area = 141299 trees
Total Volume of Acacia Tree in the area = 5688.278 m3

Tree V.m3 = 0.02621 – 0.01923 C.D.m + 0.00384 C.D.m $_2$	**0.86**	**<.0001**	**Vol2**

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

SUSTAINABLE DEVELOPMENT GOALS

Practical Application
Dashboard on Web, AR-based manual on Mobile Devices



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

SUSTAINABLE DEVELOPMENT GOALS

RESULTS/IMPACT

IN HARMONY WITH NATURAL PROCESSES...

DIRECT EFFECTS WILL COVER:

FARMING AND PRODUCTIVITY

SUSTAINABLE USE OF LAND

RENEWABLE FODDER

JOB CREATION

ENHANCED EXPERTISE

INDIRECT EFFECTS WILL COVER:

SUSTAINABILITY

Sustainable management of water resources and forestry

LAND USE PLANNING

Generation and use of knowledge for integrated land use planning

GENDER MAINSTREAMING

Increased gender equality in the agriculture sector

GOOD GOVERNANCE

Putting policy and turning it into practice

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

République tunisienne
MINISTÈRE DE L'INDUSTRIE, DES MINES ET DE L'ÉNERGIE

coopération allemande

Invest for Jobs
Opportunités de croissance en Afrique
Investissements pour l'emploi

SUSTAINABLE DEVELOPMENT GOALS

INDUSTRY 4.0

TO PROMOTE YOUTH EMPLOYMENT

« Employement4Youth »

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

République tunisienne
MINISTÈRE DE L'INDUSTRIE, DES MINES ET DE L'ÉNERGIE

coopération allemande

Invest for Jobs
Opportunités de croissance en Afrique
Investissements pour l'emploi

SUSTAINABLE DEVELOPMENT GOALS

The project "Industry 4.0 to promote youth employment in Tunisia and Côte d'Ivoire" or "Employment4.0Youth" aims to support job creation, particularly among young people and women.

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

République tunisienne
MINISTÈRE DE L'INDUSTRIE, DES MINES ET DE L'ÉNERGIE

coopération allemande

Invest for Jobs
Opportunités de croissance en Afrique
Investissements pour l'emploi

SUSTAINABLE DEVELOPMENT GOALS

Start-end date:
January 2022 - December 2024

Executing Agency:
United Nations Industrial Development Organization (UNIDO)

Partners:
- In Tunisia: Ministry of Industry, Mines and Energy
- In Côte d'Ivoire: Ministry of Trade and Industry / Ministry of Digital Economy, Telecommunications and Innovation

Funding:
German Federal Ministry for Economic Cooperation and Development (BMZ)

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

République tunisienne
MINISTÈRE DE L'INDUSTRIE, DES MINES ET DE L'ÉNERGIE

coopération allemande

Invest for Jobs
Opportunités de croissance en Afrique
Investissements pour l'emploi

SUSTAINABLE DEVELOPMENT GOALS

The aim is to support Tunisia and Côte d'Ivoire increase employment, incomes and working conditions for young people by shaping and consolidating digital economy ecosystem.

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

République tunisienne
MINISTÈRE DE L'INDUSTRIE, DES MINES ET DE L'ÉNERGIE

coopération allemande

Invest for Jobs
Opportunités de croissance en Afrique
Investissements pour l'emploi

SUSTAINABLE DEVELOPMENT GOALS

The expected impact of the project is to contribute to a structural transformation of the economy in Tunisia and lay the foundations for this transformation in Côte d'Ivoire in the targeted sectors, thus leading to the creation of sustainable jobs.

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

République tunisienne
MINISTÈRE DE L'INDUSTRIE, DES MINES ET DE L'ÉNERGIE

coopération allemande

Invest for Jobs
Opportunités de croissance en Afrique
Investissements pour l'emploi

SUSTAINABLE DEVELOPMENT GOALS

Beneficiaries

- **Entrepreneurs and job seekers**
- **Schools and vocational centres**
- **Diaspora**
- **Women and youth**
- **Higher education and research institutions**
- **Small and medium-sized enterprises (SMEs)**
- **SME federations, clusters, business associations and trade unions**

1500 decent jobs will be created

50% youth / 30% women

1500 people will have increased access to internship and apprenticeship opportunities

50% youth / 50% women

800 people will benefit from better working conditions

30% youth / 30% women

110 Beneficiary Companies will improve the performance

50% youth / 30% women

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

République tunisienne MINISTÈRE DE L'INDUSTRIE, DES MINES ET DE L'ÉNERGIE

coopération allemande

Invest for Jobs Opportunités de croissance en Afrique

Investissements pour l'emploi

SUSTAINABLE DEVELOPMENT GOALS

Outputs

- **Improved and enabling business environment;**
- **Facilitated digital transformation of the investment promotion network;**
- **SMART factory set up;**
- **Curricula, facilities and methodologies for the integration and adoption of Industry 4.0 developed;**
- **Training capacity dedicated to 4IR knowledge developed in vocational training centers, universities and business schools;**
- **Pilot on the adoption and exploitation of 4IR technologies in a number of selected companies.**

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

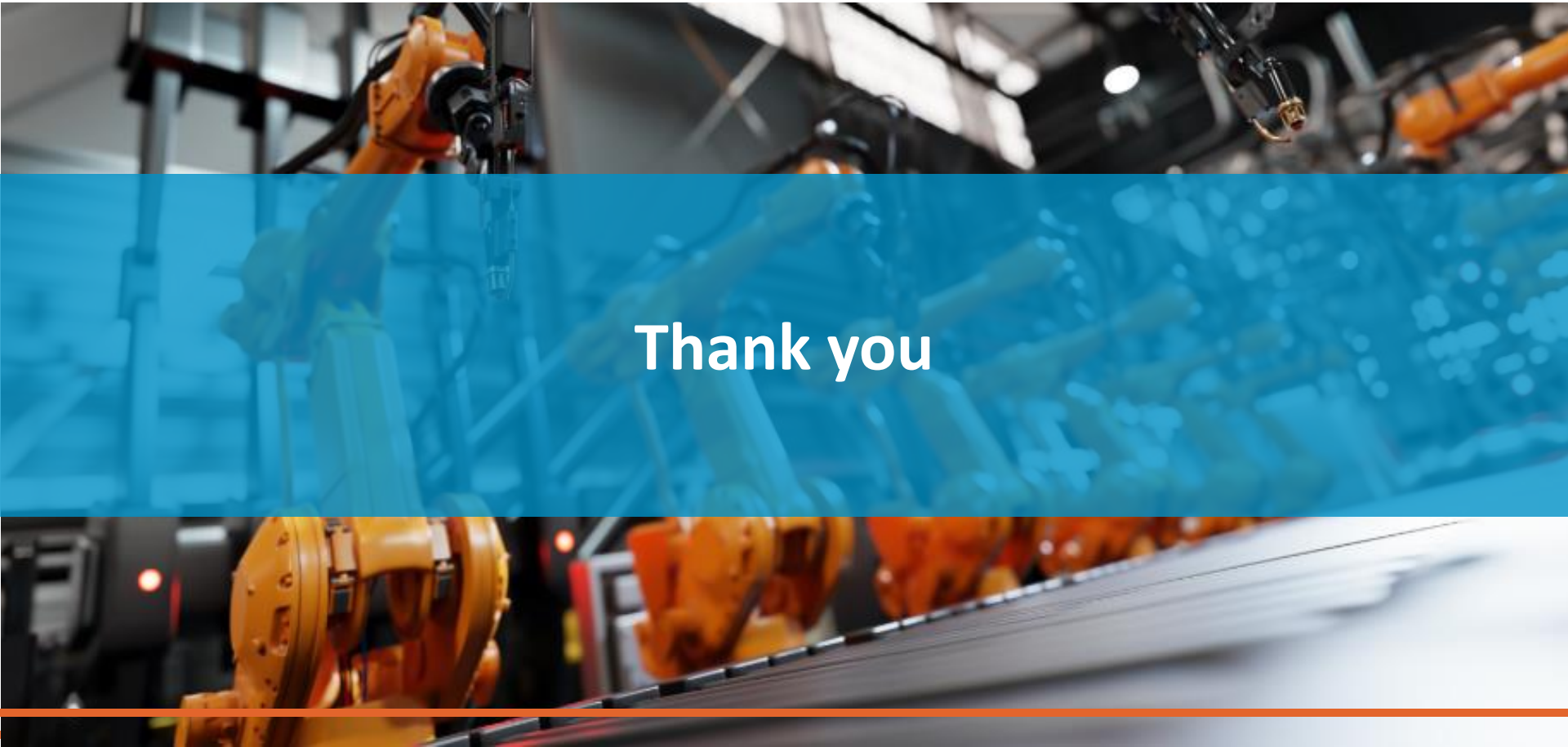
SUSTAINABLE DEVELOPMENT GOALS

Key Takeaways

1. Employ technology to meet the needs of entrepreneurs – including in information and knowledge, possibilities of future development
2. Use technological solutions: possibility to move to next stages of development (in developing countries sometimes it can literally change lives: from mere survival to growth and development of a SME), and under limited resources entrepreneurship can still flourish
3. Need to look at an entire innovation ecosystem: Developing countries need support on 3-level interventions, which include entrepreneurs, economic development and support institutions, finance providers and policymakers
4. Take account of possible resistance to change

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

SUSTAINABLE DEVELOPMENT GOALS



Thank you