Digital Transformation and its implication on key industries of SIDS

The Experience of Mauritius

by
Y Cader
Head, Business Information Unit
Ministry of Industrial Development, SMEs and Cooperatives

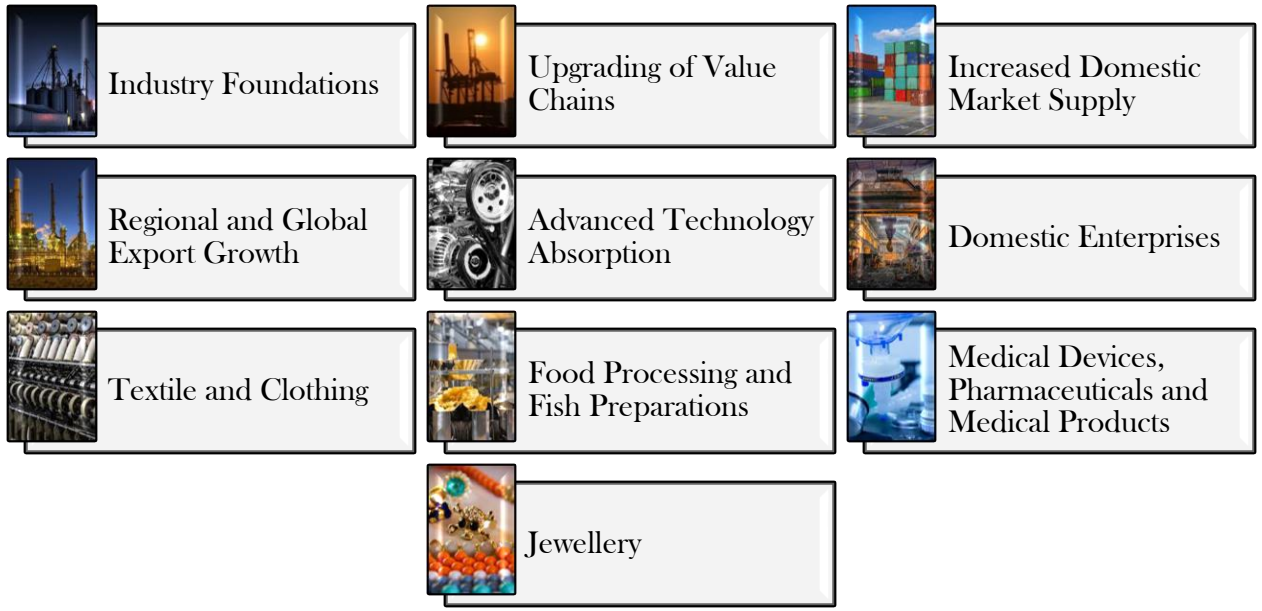
FEBRUARY 2024

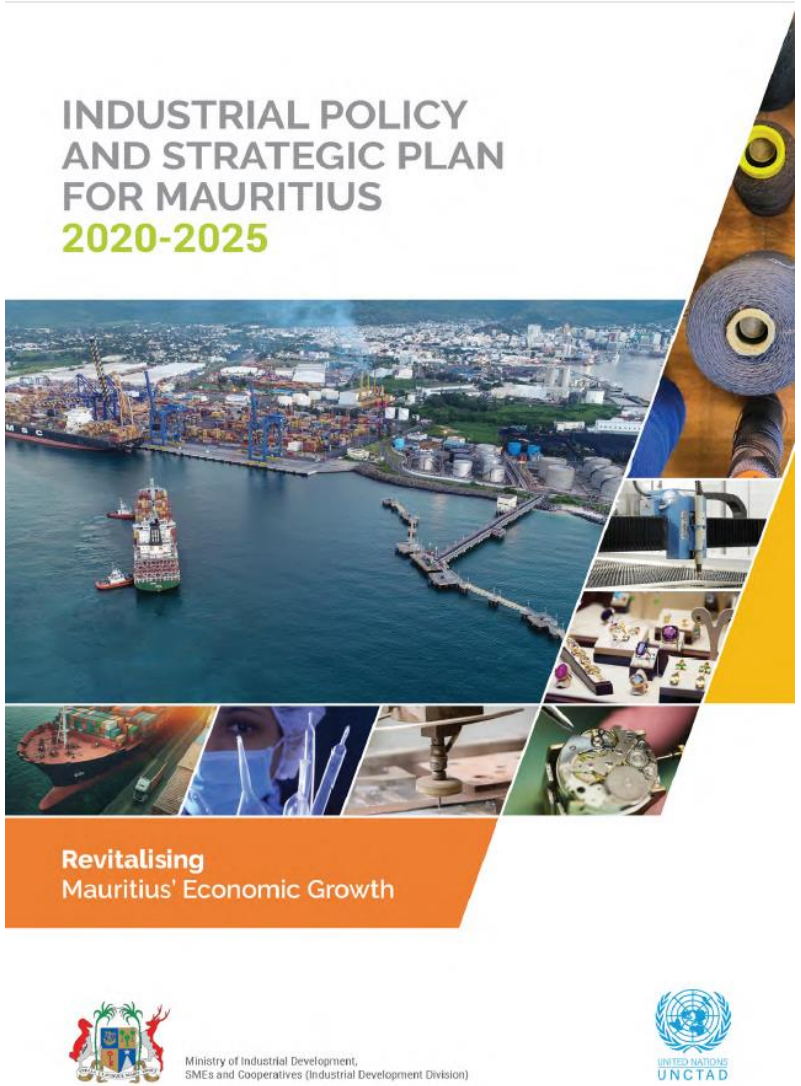
3 Sectors where SIDS can apply Digitalisation

- Manufacturing Sector - A detailed experience of Mauritius in Manufacturing 4.o
- Government - A summary of the Citizen Support Unit (CSU) - setting up a digital platform for citizens
- Agriculture – Digitalisation model for the agricultural sector

Industrial Policy and Strategic Plan for Mauritius (2020-2025)

- An Industrial Policy and Strategic Plan (IPSP) for Mauritius (2020-2025) was prepared with the technical and financial assistance of UNCTAD and the Industrial Development Division of the Ministry of Industrial Development, SMEs and Cooperatives, and was launched in December 2020.
- Its main objective is to significantly increase the contribution of the manufacturing sector to the overall GDP of Mauritius, targeting 25% of GDP by 2030.
- The IPSP consists of 194 projects resting on 10 focus areas:





Mauritius's Journey towards Manufacturing 4.0

- One of the focus areas of the IPSP is Advanced Technology Absorption as part of the establishment of an Industry 4.0 ecosystem through increasing digital and green innovations.
- The IPSP report recommended the development of a digital roadmap that advances the existing level of digitisation within the Mauritian manufacturing sector in alignment with emerging markets, value chain opportunities and requirements.
- Subsequently, we sought the technical assistance of the Commonwealth Secretariat for an Industry 4.o capacity building programme for Mauritius

Mauritius's Journey towards Manufacturing 4.0

- A Project *"Enhancing the Capabilities of Manufacturing Enterprises to adopt high-end technologies through the upgrading of their digital infrastructure"* with technical assistance from the Commonwealth Secretariat was prepared.
- The objective of the project is to assist enterprises in the adoption of advanced technologies associated with Industry 4.0 such as Robotics, Artificial Intelligence, Industrial Internet of Things, Cloud Computing and 3D printing.
- The project is implemented in 3 phases
  - Phase1 consists of a Study to assess the level of digitalisation of manufacturing enterprises
  - Phase 2 comprises a capacity-building programme for selected enterprises in key sectors including Textile & Clothing, Food, Medical Devices, Jewellery and others, to assist them in identifying appropriate advanced technologies for greater competitiveness; and
  - Phase 3 involves a study-tour to a Commonwealth country to learn best practices in the adoption of Manufacturing 4.0 technologies in production plants.

Phase 1 – Assessment of level of Digitalisation in Manufacturing

- During Phase One, Consultants from International Economics Consulting Ltd, designed a questionnaire to assess the current state of Mauritian manufacturing enterprises, their level of digitalisation and their ability to adopt high-end Manufacturing 4.0 technologies for the next **5** years.
- Manufacturing enterprises were selected from Medical Devices, Food Processing & Fish Preparations, Textile & Clothing and Jewellery Sectors.

- **Manufacturing 4.0 Core Dimensions** that were assessed were based on:
  - Manufacturing and operations – Level of digital integration and automation of production operations;
  - Smart products and processes – Digital models of processes and data collection;
  - Strategy and organisation – M4.0 in company's strategy and level of implementation; and
  - Supply chain – Improving supply chain management through integration of advanced technology to improve efficiency, transparency, and decision-making.

Phase 1 – Assessment of level of Digitalisation in Manufacturing

- Following the survey, it was observed that:
  - On average, Mauritian firms are at the intermediate level (between beginner and experienced) in terms of Manufacturing 4.0 maturity.
    - Medical Devices Sector – it is the most mature and has made significant strides in the use of advanced technologies.
    - Food Processing and Fish Preparations Sector – Firms have already acquired the basic skills to implement Manufacturing 4.0 technologies.
    - Textile and Clothing Sector – Firms are much more committed towards adoption of Manufacturing 4.0 technologies.
    - Jewellery Sector – Firms are still at early stages of adoption of advanced technologies.

- This Phase has been completed. The report submitted by the Consultants, highlighted, amongst others, that many enterprises in the manufacturing sector have already adopted basic automation capabilities and are gradually moving towards using more advanced technologies in their operations.
- Subsequently, 8 firms were selected for Phase 2 of the Manufacturing 4.0 Project.

Phase 2 – Capacity Building and Identification of Technology

- A group of 3 Consultants were recruited from the University of Warwick's Manufacturing Group by the Commonwealth Secretariat to implement Phase 2 of the project which was divided in 2 parts:
  - A one-day training session with officers of the Ministry was carried out to familiarise them with technologies associated with Industry 4.0; and
  - Capacity-building exercises at the 8 selected manufacturing enterprises were undertaken to build their knowledge on emerging technologies and assist them in the identification of appropriate Industry 4.0 technologies for greater competitiveness.
- The Consultants submitted a Report on their interventions at the 8 enterprises, identifying their current state of digitalisation and designing customised roadmaps for the implementation of sustainable Manufacturing 4.0 technologies at each company.

Phase 2 – Capacity Building and Identification of Technology

- Their main recommendations were:
  - The smaller enterprises need to ensure that waste is minimised and processes are optimised before investing in advanced technologies;
  - Initially, there is the need to implement Enterprise Resource Planning (ERP) & Material Resource Planning (MRP) for a better Business Management System (BMS) to enable data capture from shop floor to top floor. This will help in better stock and product management, enhance production routes, improve margin management, save energy and reduce operating costs.
  - Machine performance dashboards should be installed to monitor shop floor efficiency;
  - Lean Assessment should be carried out to improve workplace efficiency;
  - Finally, an automation feasibility study should be done prior to installing any automated/Industry 4.0 technologies.

Lessons for SIDS

- The manufacturing sector is heterogeneous in nature with diverse activities which are at different digitalisation level and require the adoption of different solutions.
- Collaboration with private sector operators is a key factor to ensure the success of digital projects. Stakeholders from Industry associations, chamber of commerce, etc could be imvolved throughout the project - example through steering committees.
- Capacity building in digital technologies was provided to both Government technicians and industry operators. They were convinced that enhanced digital technologies would lead to improved productivity.

A typical Digital Cycle for any sector of activity

- The same digitalisation journey for the manufacturing sector can be replicated across other sectors of activity including Agriculture, Finance SMEs, Healthcare, Tourism.
- This can be achieved by using the following process:
  - ✓ **Collect and Capture Data** – Sensors/IoT/local data
  - ✓ **Store and Access** – Cloud/Private Servers/Cyber Security
  - ✓ **Analyse and Visualise** – Modelling and Data Analytics
  - ✓ **Send information/findings** to Decision Makers/stakeholders
  - ✓ **Implement strategies/policies** to improve efficiency/processes

The Citizen Support Unit Digital Portal

- The Citizen Support Portal provides a gateway for citizens to register their complaints/suggestions/general inquiries online.

- With its advanced data analytics tool, the Citizen Support Portal uses detailed analysis of complaints and suggestions to produce pertinent statistics for both the government and the public. This allows the data to be used in a meaningful way by policymakers and other industry leaders to monitor and evaluate key metrics across the entire country, formulate policies to address common themes and plan and implement more targeted strategies both in the public and private sectors.

- The complaints registered on the online platform are captured in the CSU databases namely CSU Dashboard and Kibana Dashboard. The data filled in the form by the citizens are distilled in informative and comprehensible data fields. In this way, the number of tickets pertaining to each Ministry, Constituency and/or Department are extracted and sorted as per timeframe, ticket status/types and according to the needs of the relevant stakeholders.

Application of Digital Technologies in Agriculture

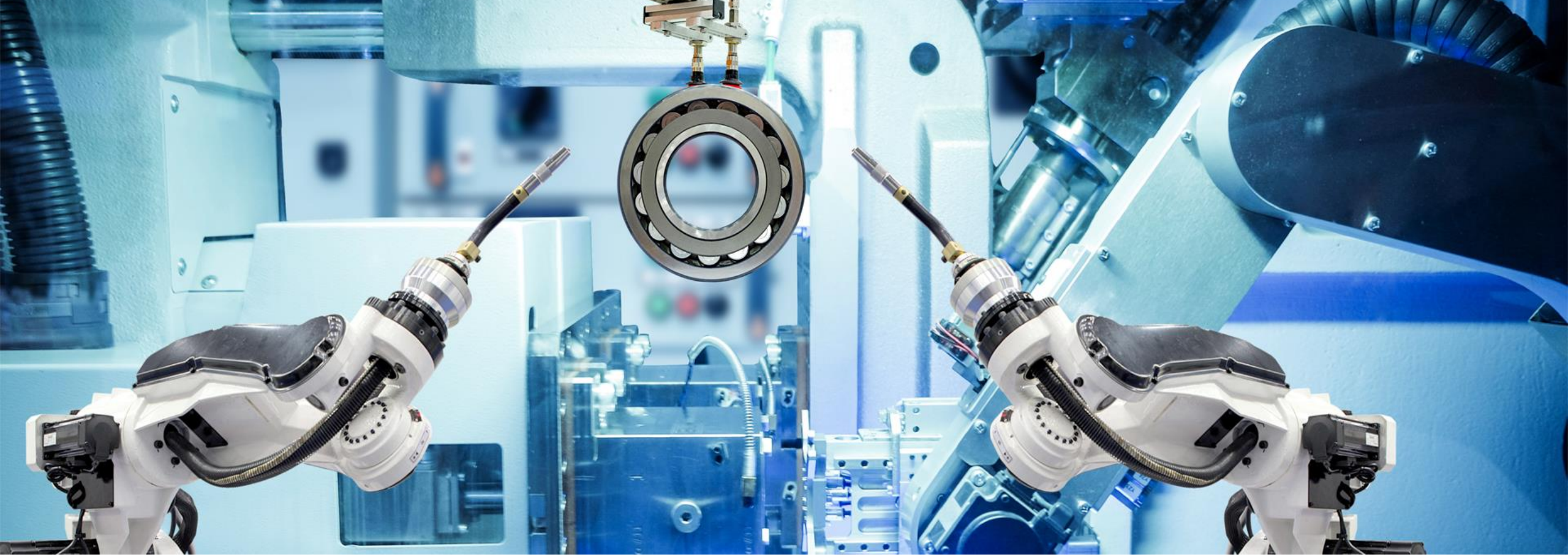
- For SIDS Digitalisation in agriculture is easier to implement.
- Food security has become one of the most critical concerns in the world especially after the COVID pandemic.
- The main benefits of integrating digital technologies such as artificial intelligence, automation and robotics, sensors, Internet of Things (IoT) and data analytics into agriculture practices are to reduce waste, optimize farming inputs, enhance crop production and better control on scarce resources especially water, fertilisers on one hand and labours on the other.
- This can help shift from repetitive and tedious operations to continuously automated processes, resulting in increasing agricultural production by enabling the traceability of products and processes.

A typical Digital Cycle for Agricultural – Production Side

- **Connect and Capture Data** – Sensors/IoT in greenhouses to monitor temperature, fertilisation, water requirements, pH of medium of growth, waste data, energy usage etc
- **Store and Access** – Cloud computing with inputs from other regions of the country on similar cultivation or alternative plants for comparison.
- **Analyse and Visualise** –Modelling and Data Analytics – Analyse by region, crop, season, breed and integrating inputs from weather big data.
- **Send information to Decision Makers** – Through mobile apps, use of smart devices.
- **Implementation** - Automation, Robotics.

A typical Digital Cycle for Agriculture – Service Side

- E-Commerce platform/cyber security features
- Online logistics platform – for exports or local markets
- Bar/QR codes
- Dissemination of information : Connect to buyers, email, Online marketing, Internet, Social Media marketing (insta, FCB)
- Integrate with banks through Internet banking/other payment gateway
- Use of mobile apps for sending and receiving payment
- Video conferencing for online collaboration with clients abroad
- ERP
- More advanced technologies - Remote sensors/drones
- Blockchain Technology – HACCP, traceability, ledger etc



THANK YOU