



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION



BOOSTING INNOVATION

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Innovation is integral to a country's performance as enhanced productivity ultimately results in higher social welfare. The large disparities in income and social development between developed and developing countries are often rooted in considerable differences in their industrial development and use of technology, and the resulting gaps in their productivity. These gaps may grow with the shift towards the new industrial revolution, summarized in the concept of industry 4.0. However, effective utilization of innovation enables sustainable solutions for inclusive economic development and environmental challenges. Therefore, to achieve transformative changes and to transfer and deploy technology for entrepreneurship, innovation needs to be scaled-up and spread globally.

In this respect, UNIDO's Department of Trade, Investment and Innovation (TII) offers services which aim to:

- » Provide advice and support to the formulation of innovation policies and strategies
- » Develop institutional capacities to manage, monitor and evaluate innovation policies
- » Strengthen national, regional and sectoral systems of innovation
- » Establish indicators for measuring and benchmarking innovation progress
- » Strengthen and advocate standards of innovation
- » Provide assistance to upgrade production processes and facilities, products, and skills of enterprises
- » Foster entrepreneurship and start-ups to promote and exploit benefits of innovation

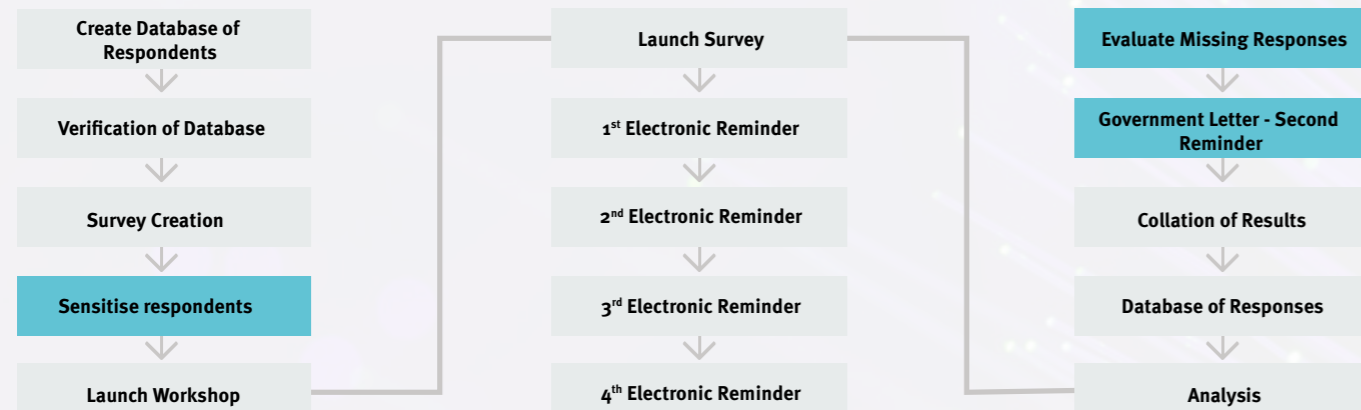
Flagship activities and tools include:

- » Establishment of Science, Technology and Innovation (STI) Observatory
- » Enterprise-level innovation and institutional capacity building
- » Technology foresight
- » Technology transfer
- » Innovation and technology centres, innovation zones/corridors and technology parks
- » Enhanced use of innovation management systems
- » Empirical analysis of enterprise and innovation systems data

With its wide international network of partners, which include universities, associations (e.g. the World Association of Industrial and Technological Research Organizations, WAITRO) and international organizations (e.g. the Organization for Economic Co-operation and Development (OECD) and the World Bank), TII provides a range of technical services to foster research and development (R&D) activities and technology transfer. In addition, the department contributes to empirical research and the development of tools and methodologies for furthering technological progress in developing countries.

Within the framework of boosting innovation, TII interventions involve strengthening the local production of essential medicines in Sub-Saharan Africa, namely local pharmaceutical production faces a complex set of challenges related to technical aspects of manufacturing, regulation, and the wider operating and business environment. TII draws on a combination of advisory, institutional capacity-building and enterprise-level activities to foster industrial development and thus enhance public health, recognizing that these two agendas are complementary.





The Government of The Republic of Kenya with respect to its Vision for 2030, First Medium-Term Plan states that the integration of Science, Technology and Innovation (STI) in national productive processes is central to the success of the government's policy priorities and programmes. This is particularly important within the context of demands for global economic competitiveness, sustainable development and equity concerns. Consequently, the development of the necessary scientific and technological infrastructure, as well as the technical and entrepreneurial skills is an essential prerequisite to the transformation of Kenya into a knowledge-based society.

The Kenyan economy exhibits limited levels on innovation required to foster increased output and productivity improvements necessary for employment and wealth creation. In this regard, a National Innovation Survey was conducted to determine the incidence of innovation in the national priority areas as well as determining the impediments to increased innovation in those sectors.

The project aimed to develop evidence-based policy capacity in government to enhance industrial innovation through the monitoring and mapping of Kenya's National System of Innovation (NSI). The Kenya National System of Innovation is a part of TII's programme for mapping and measuring Systems of Innovation (SI), which has been conducted in Ghana and is ongoing in Cabo Verde.

MAIN APPROACH

In the project, UNIDO used an innovative remote Data Acquisition and Survey Instrument (DASI), which had been operationalized and tested "in-house" and in

some African countries (Ghana, the Manu River Union countries, Morocco and Egypt). The approach consists of a methodology, as shown above, where numerous steps are taken to ensure validity, reproducibility and maximal response rate.

The results are compared to an analysis of the Government's own policy documentation to establish whether or not there has been a convergence or divergence from the Government's strategy. To add a level of robustness, the approach is based on empirical, data driven statistical analysis to provide rigorous evidence-based insights. In order to embed the capacity to repeat the measurement longitudinally, in Kenya a learning-by-doing approach was adopted where key stakeholders from government and knowledge-based institutions were trained on the methodology and approach. Once the analysis and reporting was completed this culminated in a policy seminar for the dissemination of results and policy implications.

IMPACT AND RESULTS

- » Database of Actors (Who's Who in STI in Kenya)
- » Longitudinal policy measuring tool
- » Database of actor responses, empirically measured actor perceptions towards current position of the Kenyan NSI
- » Analytical report delivered
- » Policy recommendations delivered

KENYA NATIONAL SYSTEM OF INNOVATION

ORGANIZATIONAL INNOVATION IN INDIA



enhance their productivity and competitiveness. The approach to understanding organisational innovation has been conducted in several other sectors in India including the cement and bicycle sectors.

MAIN APPROACH

The project has followed a two-phased approach. Phase I, the inception phase, included two major components:

- » An analysis to provide an accurate baseline scenario of the paper and pulp sector
- » A comprehensive diagnostic of the target institution, namely CPPRI, consisting of semi structured interviews and a network analysis, leading to a comprehensive action plan

Phase II, the implementation phase, aims to address gaps identified in the inception phase and articulated in the action plan. The following approaches are utilized in addressing the requisite capacity gaps:

- » Skills, knowledge and technology transfer
- » Structured expert dialogue (SED)
- » Study tours
- » Twinning programmes
- » International fellowship tours
- » Learning-by-doing
- » Training of trainers

IMPACT AND RESULTS

- » A comprehensive evidence-based action plan for government to affect institutional change
- » Better support infrastructure for innovation
- » Development of linkages and networks with European institutions

Innovation is recognised to be a dynamically non-linear, complex adaptive system and systemic process, requiring the production and transfer of knowledge through different inputs and interactions from and between actors within the system. Consequently, it is crucial to understand the role of key nodal institutions within the context of a sectorial system of innovation, as well as understand the process of organizational innovation. The ability of an organization to innovate is the requisite for the successful utilisation of resources and new technologies. Conversely, the challenges for organisations associated with the introduction of a new technology leads to changes in managerial practices and the emergence of new organisational forms.

Within this context the project was to enhance the capacity and capability of a key nodal government supported research institution, Central Paper and Pulp Research Institute (CPPRI). The process involved evidence-based skills and knowledge transfer so that CPPRI may better support firms in the Indian paper and pulp sector to

GLOBAL INNOVATION NETWORK CHINA

Many firms, particularly micro, small and medium enterprises (MSMEs) in the manufacturing sector in emerging and developing countries are slow to technologically upgrade in terms of production processes and management practices. When new technology is acquired, it tends to be obtained through imports of capital goods, but the how-to-best-organize-production question remains elusive to most MSMEs. Addressing these issues would strengthen the manufacturing sector performance and provide the foundation for sustained economic growth.

To this end, UNIDO has been requested to support the government counterpart in China with the establishment of the Shanghai Global Innovation Center (hereafter, the Center). The Center will be part of a global innovation network between different industrial and technological research and development organizations, including organizations such as WAITRO and CPTM.

The Center promotes the introduction of advanced technologies in the manufacturing sector in China, such as additive manufacturing and artificial intelligence. At the same time, the best and proven technology-led solutions from China will be identified and transferred through the South-South Cooperation modalities to developing countries, and in particular Least Developed Countries (LDCs). Furthermore, the Center aims at increased industrial competitiveness, technology upgrading and innovation, generation of decent jobs for men and women and sustainable environment and energy access.

MAIN APPROACH

The establishment of the Shanghai Global Innovation Center by UNIDO will increase the capacity and knowledge base for bringing in best practices and new and improved technologies to Chinese industries as well as to those in other developing countries in the region and globally.

National and International Approach: The Center will integrate two distinct but complementary functions for its projects and activities:

- » The national interventions will focus on providing a collaboration platform for various domestic public and private stakeholders in the area of manufacturing technology
- » International interventions will advance the South-South Cooperation in order to facilitate the technology transfer to other developing countries in the region and globally

Capacity-building: The Centre will focus on the skills development and building up of relevant technical capacity to enable the Chinese manufacturing enterprises and later on MSMEs in other developing countries to absorb and further diffuse advances and innovations in the area of manufacturing technologies.

IMPACT AND RESULTS

Regional/national level:

- » Enhanced productivity and export growth of SMEs in manufacturing industry of China
- » Technology upgrading and transfer of advanced technology and international best practice

International level:

- » Global partnership and networking platform established
- » Facilitation of partnerships between different industrial and technological research and development organizations, such as WAITRO and WAMA (World Advanced Manufacturing Association)
- » Facilitating transfer and adaptation of best technology-led solutions
- » Strengthened technical capacity and manufacturing capability of targeted industrial sectors in the recipient developing countries, particularly LDCs

PROGRAMME FOR COUNTRY PARTNERSHIP IN PERU OPTIMIZATION OF INNOVATION TECHNOLOGY CENTERS NETWORK

Centers for Innovation in Technology (CITEs) play an important role in the promotion of innovation, quality and productivity in Peru, as well as for the diffusion of information for the competitive development of the different stages of production of the national industry. The most significant change in the conceptualization of the role of CITEs occurred in 2014 when CITEs not only became instruments for innovation and competitiveness, but also became formal instruments for productive diversification. The surge in CITEs motivated the Government of Peru to request UNIDO's assistance in optimizing the resources and restructuring of CITEs.

MAIN APPROACH

Within the framework of UNIDO's Programme for Country Partnership, the evaluation of the twenty chosen technology centers will follow a three-stage approach.

The first phase is the viability evaluation of each individual CITE based on the following five categories:

- » Structure, both the infrastructure completion progress and technology services in their sector
- » Environment, to include local political appropriation and support, economic growth and development, level of education of the local producers and actors and the social development index
- » Demand of chosen value chains and Potential demand for technology services in selected chains, as well as possible demand for value chains not considered
- » Supply of services, personnel and structured and documented management systems suitable to the needs
- » Alliances and competition: complementarity of technological services and overlap with other institutions or companies

The second phase comprises an analysis and restructuring of the CITE network, as it currently stands, certain functions are centralized (investment decisions, acquisitions, budgets, personnel, etc.) in the ITP and decentralized in others (installation and use of equipment, service delivery and the generation of technical knowledge).

The third and final phase will concentrate on the recommendations, monitoring and management of the CITEs by the Government and through private participation.

IMPACT AND RESULTS

Upon completion of the evaluation to determine their caveats and strengths, an optimal network of technology centers will be defined. Furthermore, demand-driven creation of the CITE network will contribute towards better technology and organization which in turn will contribute towards sectoral innovation.

FACTS AND FIGURES

- » **30** public CITEs in operation or construction
- » **5** sectors (agriculture, wood & forestry, leather & footwear, hydrobiological products and textiles)
- » **16** districts





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