

*8 August 2016*

# **Supporting the operationalization of the Technology Bank for the Least Developed Countries:**

## **A 3-year Strategic Plan**

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## Rationale

Without rapidly building up capacities in Science, Technology and Innovation (STI), the goals of eradicating widespread poverty, removing daunting structural constraints and unleashing sustained growth and achieving sustainable development and the Sustainable Development Goals (SDGs) will remain a distant dream for the nearly a billion people living in the Least Developed Countries (LDCs). Yet even the building of such capacities is in and of itself not enough. Achievement of these desired results also requires access to much needed technologies. Dedicated and coordinated actions on these two fronts can help set the LDCs on a virtuous cycle of high growth, sustained social progress, robust resilience against natural and human-induced disasters and beneficial integration into the world economy.

Although the LDCs face important development challenges in STI, they also have one major advantage which the Technology Bank for the Least Developed Countries (Technology Bank)\* can help them exploit fully. This is also why the establishment of the Technology Bank is included in SDG 17. LDCs are latecomers and, as such, they do not have to invent everything they need. Latecomers can use existing technology as an instrument to solve problems and achieve significant results simply by developing the capacity to find, adapt, and adopt proven, off-the-shelf technology developed elsewhere. This off-the-shelf technology may not be new to the world, but from the perspective of LDCs it is newly available technology. The main challenge for the Technology Bank is to help LDCs build the capacity to find, adapt and adopt appropriate technology.

The latecomer advantage is especially important because the world today is awash in proven technology that could immediately help many LDCs make substantial progress toward their structural transformation and to achieve many of the SDGs and Istanbul Programme of Action (IPoA) priorities. These technologies: for producing renewable, distributed energy and operating micro-grids; for converting brackish and sea-water into affordable, potable water without building expensive, centralized water treatment facilities; for sustainable agriculture, food processing and off-grid refrigeration and cold storage; for installing and operating waste-to-energy facilities; for low-cost, high quality health care in urban neighborhoods and rural villages; and many others, already exist and new inventions are appearing at an ever increasing pace.

New products and innovations can not only generate large economic, social and environmental progress, but they can do so at radically lower prices, making the benefits affordable for hundreds of millions of aspiring LDC consumers, fostering local entrepreneurship, and providing new job opportunities. Simultaneously, they can enable LDCs to install modern, lower cost 21st century technology, while leapfrogging over obsolete, more expensive technologies, much like the cell phones enabled them to bypass more expensive, lower-performing fixed-line telephony.

## Objectives

- a) The overarching objective of the Technology Bank is to help the LDCs build the Science, Technology and Innovation (STI) capacity that they need to promote the structural transformation of their economies, eradicate poverty and foster sustainable development.
- b) The specific objectives as outlined in the Charter of the Technology Bank are:
  - *To strengthen the science, technology and innovation capacity of Least Developed Countries (LDCs), including the capacity to identify, absorb, develop, integrate and scale-up the deployment of technologies and innovations, including indigenous ones, as well as the capacity to address and manage Intellectual Property Rights issues;*
  - *To promote the development and implementation of national and regional STI strategies;*
  - *To strengthen partnerships among STI-related public entities and with the private sector;*
  - *To promote cooperation among all stakeholders involved in STI, including, researchers, research institutions, public entities within and between LDCs, as well as with their counterparts in other countries;*
  - *To promote and facilitate the identification, utilization and access of appropriate technologies by LDCs, as well as their transfer to the LDCs, while respecting intellectual property rights and fostering the national and regional capacity of LDCs for the effective utilisation of technology in order to bring about transformative change.*

## Organizational aspects

The United Nations Technology Bank for the LDCs is to be composed of three inter-related units:

1. A **Science, Technology and Innovation Supporting and Enabling Mechanism** (STIM) that helps the LDC governments and other stakeholders strengthen their STI capacities, which are essential for the development, acquisition, adaptation and absorption of technologies. The STIM is expected to accomplish this objective by fostering the development of national and regional innovation ecosystems that can attract outside technology, generate homegrown research and innovation and take them to market.
2. An **Intellectual Property Bank** (IP Bank) that will assist the LDCs in building their national and regional capacities in the areas of International Property Rights (IPRs) and technology related regulations. The IP Bank will facilitate technology transfer on voluntary and mutually agreed terms and conditions and, in the process, help accelerate

LDC beneficial integration into the global IP system and technology markets. The IP Bank should act as a conduit between IP holders and relevant actors in the LDCs to facilitate access and use of appropriate IPRs covering desired technologies. The IP Bank will also help LDC stakeholders identify, access and use appropriate technologies no longer protected by IPRs.

3. A **Management Support, Partnerships and Coordination Unit** will ensure synergies and coherence across the different work streams of the Technology Bank, and will coordinate with relevant organizations of the UN system and other stakeholders.

The project and activities of the STIM and IP Bank are complementary, and will be planned and implemented in an integrated manner. Indeed harnessing the benefits of accessing newly available technologies is inextricably linked to the ability of local actors to absorb and integrate them into the local context.

### **Action lines**

Technology Bank projects and activities that are directly implemented, as well as those that are promoted and catalyzed through its work, will help LDCs build STI capacities, ecosystems and regulatory frameworks that can harness the benefits of newly available technologies by:

- A. Attracting outside technology and facilitating technology transfer on voluntary and mutually agreed terms and conditions;
- B. Supporting homegrown innovation and research; and
- C. Bringing imported and indigenous technologies to market

#### **A. Attracting outside technology and facilitating technology transfer on voluntary and mutually agreed terms and conditions**

The Technology Bank intends to carry out a series of baseline STI reviews for a group of pilot LDCs. These STI Reviews should be organized in collaboration with UNCTAD and UNESCO, and modelled after their highly-regarded Science, Technology and Innovation policy reviews, expanded to cover technology needs assessments (STI/TNA reviews). These STI/TNA reviews should identify technological gaps and priority needs for each LDC, as a first step towards developing coherent and integrated strategies that are tailored to the specific situation of each LDC participant. The reviews will include recommendations for strengthening policies and measures to improve national and regional technological capabilities and encourage innovation, including detailed assessments in areas of critical importance for the studied LDCs.

In particular, to help build the capacity of LDCs to attract outside technology and facilitate technology transfer on voluntary and mutually agreed terms and conditions, the Technology Bank in collaboration with relevant organizations, intends to conduct STI/TNA reviews that focus on specific SDGs and/or IPoA priorities, agreed in advance with the relevant government

entities and in consultation with key stakeholders. For each subject area, the STI/TNA reviews will focus on four broad questions:

1. What is the country's current capacity in terms of innovation capabilities, R&D collaboration, technology scouting, IP systems, engineering, technical and vocational skills, etc?
2. What technologies and what capacities are required to achieve specific SDGs or IPoA objectives?
3. What policies and programs are needed to build this capacity?
4. What best practices are especially suitable for the LDC under review to help achieve specific SDGs or IPoA objectives?

The STI/TNA reviews should provide a blueprint for the STI capacity building programs that each country establishes as part of their national development strategies, in order to achieve specific SDGs and IPoA priorities. These blueprints, in turn, should give bilateral donors, multilateral and regional development banks, foundations, NGOs and the private sector a coherent set of STI capacity building programs which they may wish to finance.

In addition, the Technology Bank during its initial startup phase will identify pilot LDCs to receive support to build institutions and mechanisms, including at regional level, that can facilitate technology transfer on voluntary and mutually agreed terms and conditions. The Technology Bank will also be available to assist these pilot LDCs in their interactions with IPRs capacity building providers. In particular, the Technology Bank will assist LDCs, working in collaboration with the private sector, government ministries and agencies, universities, research institutes, educational institutions, private foundations and NGOs, in order to:

1. Identify, evaluate, and locate relevant technologies that exist outside their country.
2. License the external technologies, or find other modalities to bring them into the country.
3. Pass the technical knowledge along to scientists in universities, research institutes, and private businesses who can perform the translational or developmental research to adapt the technologies for local use.
4. Transfer or diffuse the technologies to farmers and local entrepreneurs who can use them to produce more knowledge-intensive, higher value added goods and services.
5. Develop new entrepreneurs and attract existing entrepreneurs from inside and outside the country who can start new businesses on the basis of new-to-the-country technologies.

Thus the Technology Bank will make available technical assistance to facilitate and support negotiations for the acquisition of appropriate technologies, including when IPRs are involved. Technical assistance will also be carried out in collaboration with relevant stakeholders, including from the private sector capable of helping LDC inventors/creators protect and implement their own adaptations.

## **B. Supporting homegrown innovation and research**

No country or region, acting on its own, can innovate or research its way to sustainable development. The pace of new knowledge creation is simply too rapid for any one country or region to attempt to go alone. If LDCs expect to play a meaningful role in the global knowledge creation arena, beyond increasing investment in science, technology, engineering and mathematics (STEM) education, they also need to enhance their STI capacity building programs to focus on two essential tasks: enhancing the quality of local R&D institutes, and other STI-related entities, while simultaneously linking them into an expanding network of North-South, South-South, intra-regional and inter-regional knowledge creation networks. In keeping with global best practices, these research institutes should be multi-disciplinary and focused on generating practical solutions to high-priority problems, such as maintaining food security, transforming energy water and irrigation infrastructure, and coping with urban and peri-urban development demand. To play a pivotal role in the technological future of their countries, the research institutes in LDCs need to expand their R&D/technology scouting capacity to learn about the research results generated around the world and incorporate them into their own research agendas and programs.

With this in mind, the Technology Bank will undertake activities to promote the substantial broadening of access for LDCs to global science and technology communities and the related research conducted worldwide. For countries without a critical mass of science and engineering R&D capacity, the Technology Bank will work on a multi-country/regional basis, helping countries to pool scientific resources and generate economies of scale in the use of scarce scientific capacity, thereby helping to broaden the array of technological solutions available to them.

## **C. Bringing imported and indigenous technologies to market**

A scientific discovery or even a patent is not a product and a product is not a business. Consider the case of a scientist in an LDC who invents a high-performance nano-filter that can convert highly-polluted water into drinking water at price that is affordable for the vast majority of low income rural and urban residents. From a science perspective, the solution to the drinking water problem in that LDC should be in hand. But inventing a filter or obtaining patent rights to use a filter developed by someone somewhere else is only the first part of the process of utilizing science to achieve the SDGs and IPoA objectives. The next step is to build a social enterprise or for-profit business that uses those filters to purify polluted water and sell potable water to local consumers. Thus, if science is going to serve the SDGs and IPoA objectives, entrepreneurs have to build businesses that deploy useful technology developed by scientists and engineers in their country or abroad.

The Technology Bank should support the process of commercializing technologies in pilot LDCs, including by helping local actors absorb and integrate these technologies into their daily operations, encouraging closer linkages between science and engineering faculties and students on the one hand and business faculties and students on the other, and by promoting a culture of innovation and entrepreneurship at all levels, starting at the level of secondary school students. Investing in LDCs to become a new frontier of innovation, collaboratively working with IP owners to modify existing technology to create new markets for existing products and new products for existing markets -- the two sources of high return-on-investment (ROI) growth -- will yield disproportionately positive results.

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These action lines can be pursued by a multitude of projects and initiatives both at national and regional level. It is however important to focus the activities of the Technology Bank during its first three year of operation. This is also necessary as the feasibility and financial sustainability of activities and projects undertaken by the Technology Bank will depend on the amount of resources that it can raise. Accordingly, Annex 1 contains the proposed activities and projects whose implementation should be commenced during the initial three years of operations. These all fall within one or more of the broad action lines set out above. Table 1 summarizes how the specific activities and projects prioritized for the first 3 years planning cycle contribute to the action lines identified in this Strategic Plan. Annex 2 includes activities which lend themselves to a more immediate start and could be prioritized for implementation during the first 18 months of operation. Annex 3 contains a set of guiding operational principles that should govern projects and activities of the Technology Bank.

## **Annex 1 – Work Programme for the first 3 years**

### ***1. STI Policy and Capacity Building***

This activity aims at improving STI policy-making and establishing collaborative innovation networks to enable LDC scientists, technologists and relevant public institutions to connect and collaborate with their global STI peers. This involves:

- a. Scaling up STI reviews to cover all LDCs over time (STI review should facilitate the articulation of evidence-based implementation plans).
- b. Collaborative networking with institutional actors in development partners.
- c. Supporting Academies of Science.
- d. STI capacity building of tertiary-level institutions.
- e. Training LDC' researchers in preparing grant proposals.
- f. Supporting research collaboration.
- g. Supporting dissemination of best practices and processes that enable translation of research into innovation to achieve sustainable development benefits.
- h. Promoting mechanisms and links between research and innovation activities and marketing opportunities in cooperation with the private sector.
- i. Diaspora outreach and creation of an LDC diaspora STI network.

### ***2. Technology Needs Assessment for Transformative Change***

Enlarge existing and future STI reviews so as to cover technology needs assessments. These will:

- a. Identify the core area of focus for each LDCs (such as public health, agriculture, industry, ESTs, sustainable energy, and information and communication technology) and prepare specific initiatives to maximize the impact of technology as an instrument to foster structural transformation, reduce poverty and promote sustainable development.
- b. Provide expertise to interface with donors, UN agencies and international organizations to articulate LDC priority needs, prepare proposals, and communicate with providers of IP-related support.
- c. Conduct an assessment of STI policies, the innovation ecosystem and technology commercialization capacity of the LDCs to identify gaps and appropriate interventions.
- d. Identify opportunities to strengthen R&D infrastructure, providing a platform to coordinate with existing capacity building programmes to improve access of LDCs.
- e. Promote collaboration at the regional level and among group of LDCs sharing common characteristics/challenges and explore synergies and complementarities.
- f. Collaborate with relevant UN system entities and other international organizations in identifying data gaps and fostering statistical capacities needed for STI policy-making.

### **3. *Digital Research Access and Networking***

#### **A. *National and Regional Research and Education Network Facilitation***

National Research and Education Networks (NRENs) as well as Regional Research and Education Networks (RRENs) are high-speed data-communications networks that are independent of the commercial Internet and are dedicated to meeting the needs of academic and research communities. In keeping with the overall strategic approach to develop its activities in an incremental manner, work initially could focus on:

- a. Promote connectivity between institutions, campuses and scientists from LDCs and development partners and facilitate onward connectivity.
- b. Carry out gap analyses of existing national infrastructure, and support the NREN build-out through interaction and advocacy with national governments and regulators (preferably done in collaboration with the World Bank, in such countries where the World Bank is already active or has plans).
- c. Support the roll out of Trust and Identity and Authentication Services in NRENs located in LDCs to ensure that scientists will have easy access to existing STI-initiatives and Technology Bank activities and projects.
- d. Promote the development of regional solutions and explore synergies with existing RRENs.

In due course it will be crucial to provide dedicated support to the creation of NRENs in LDCs which are yet to establish them. This support should be organisational, financial and technical. It will require active engagement with government and regulatory bodies to ensure that reliable data communications capacity reaches the countries, as well as close coordination with already existing activities funded through the European Union (GÉANT) and the World Bank.

#### **B. *Digital Access to Research***

This activity should build on existing initiatives, including Research4Life public private partnership. Institutional users and focal points in LDCs can obtain reliable access to information content, training and related services, and also to provide feedback on how services and content can be improved. It should focus on:

- a. Enabling, facilitating and increasing online access to costly scientific journals, books, and databases at no direct charge.
- b. Putting in place the necessary hard and soft infrastructure to create and/or scale up access to scientific and technical knowledge.
- c. Providing training for librarians, university teachers, graduate students, researchers, IT specialists and other relevant constituencies.

#### ***4. Information Access to Support Research, Development and Demonstration***

Initial activities could include:

- a. Help LDC stakeholder identify, access and use free patent information. The latter is a critical source for identifying existing technologies and requires best-in-class search skills be provided to LDCs. This capacity involves both search and, where necessary, translation.
- b. Assess the ability of LDC stakeholders to commercialize research and innovation that has market potential and promote cross-fertilization across public and private actors to generate marketable R&D that supports national development priorities.
- c. Support a demand-driven approach to innovation and technology transfer. Assist LDC stakeholders in defining specific problems, needs and requirements in core areas of focus as well as with the identification of appropriate technology solutions to address these needs. Assist with access, assessment, translation and implementation.
- d. Assist LDCs in technology scouting, identification and review of available technical information, and support in identifying patent owners and companies with commercially available technical solutions.
- e. Establish linkages with national, regional and global intellectual property-related organizations to enhance communication and provision of services to LDCs.
- f. Serve as a conduit between R&D sources and local entrepreneurs to generate new inventions and new companies. Partners could include accelerators, incubators, science and technology parks, specialized research institutions and other centres of knowledge and excellence, and programmatic interests of major donor foundations.
- g. Make use of existing partnering mechanisms, especially online portals that provide access to public private partnership resources.

#### ***5. IP Training and Technical Assistance***

Provide information and develop and coordinate access to technical and financial cooperation between the LDCs and the providers of IP-related capacity building assistance in order to:

- a. Provide training and technical advice on preparing and upgrading existing laws and drafting of new laws, strengthening human and institutional capacities and enhancing implementation.
- b. Support modernization of IP administration in terms of digital search, examination, publication, and recording of ownership.
- c. Enhance the institutional infrastructure (involving government, university and industry) to support the role of STI and IP as a tool for economic growth and sustainable development.

**6. *Supporting IP Rights Acquisition and Technology Transfer***

- a. Conduct education and training of government, business, university and other stakeholders on various forms of IP and fundamentals of technology transfer.
- b. Conduct training and capacity building to support LDC authors on when and how to file for a patent before publishing their research findings, as well as on technology transfer management.
- c. Develop a program for attorneys and other relevant experts to provide pro-bono or reduced-fee support for LDCs for complex contract negotiation in order to obtain patents and negotiate licenses.
- d. Provide advice to both technology owner and LDCs to facilitate IPRs acquisition and technology transfer.

**Table 1 – Correspondence of projects to Action Lines**

<p style="text-align: center;"><b>Action Lines</b> </p> <p><b>Projects for the first three years</b> </p>	<p style="text-align: center;"><b>Attracting outside technology and facilitating technology transfer</b></p>	<p style="text-align: center;"><b>Supporting home-grown innovation and research</b></p>	<p style="text-align: center;"><b>Bringing imported and indigenous technologies to market</b></p>
<b>1. STI Policy and Capacity Building</b>			
a. Scaling up STI reviews to cover all LDCs over time	x	x	x
b. Collaborative networking with institutional actors in development partners	x	x	x
c. Supporting Academy Academies of Science		x	
d. STI capacity building of tertiary-level institutions		x	
e. Training LDC’ researchers in preparing grant proposals		x	
f. Supporting research collaboration		x	
g. Supporting dissemination of best practices and processes that enable translation of research into innovation to achieve sustainable development benefits		x	x
h. Promoting mechanisms and links between research and innovation activities and marketing opportunities in cooperation with the private sector			x
i. Diaspora outreach and creation of an LDC diaspora STI network		x	x
<b>2. Technology Needs Assessment for Transformative Change</b>			
a. Identifying core area of focus for each LDCs and preparing specific initiatives to maximize the impact of technology to promote sustainable development	x	x	x
b. Provide expertise to interface with donors, UN agencies and international organizations to articulate LDC priority needs, prepare proposals and communicate with providers of the IP-related support	x		
c. Conduct an assessment of STI policies, the innovation ecosystem and technology commercialization capacity of the LDCs to identify gaps and appropriate interventions	x	x	x
d. Identify opportunities to strengthen R&D infrastructure, providing a platform to coordinate with existing CB programmes to improve access of LDCs	x	x	
e. Promote collaboration at the regional level and among groups of LDCs sharing common characteristics/challenges and explore synergies and complementarities	x	x	
f. Collaborate with UN system entities and other int’l organizations in identifying data gaps and fostering statistical capacities needed for STI policy-making	x		
<b>3. Digital Research Access and Networking</b>			
<i>National and Regional Research and Education Network Facilitation</i>			
a. Promote connectivity between institutions, campuses and scientists from LDCs and development partners and facilitate onward connectivity		x	
b. Carry out gap analyses of existing national infrastructure, and support the NREN build-out through interaction and advocacy with national governments and regulators		x	
c. Support the roll out of Trust and Identity and Authentication Services in NRENs to ensure that scientists will have access to existing STI-initiatives.		x	
d. Promote the development of regional solutions and explore synergies with existing RRENs		x	
<i>Digital Access to Research</i>			
a. Enable, facilitate and increase online access to scientific journals, books, and databases		x	

<p style="text-align: center;"><b>Action Lines</b> </p> <p><b>Projects for the first three years</b> </p>	<p style="text-align: center;"><b>Attracting outside technology and facilitating technology transfer</b></p>	<p style="text-align: center;"><b>Supporting home-grown innovation and research</b></p>	<p style="text-align: center;"><b>Bringing imported and indigenous technologies to market</b></p>
b. Put in place the necessary hard and soft infrastructure to create and/or scale up access to scientific and technical knowledge		x	
c. Provide training for librarians, university teachers, graduate students, researchers, IT specialists and other relevant constituencies		x	
<b>4. Information Access to Support Research, Development and Demonstration</b>			
a. Help LDC stakeholder identify, access and use free patent information	x		x
b. Assess the ability of LDC stakeholders to commercialize research and innovation that has market potential		x	x
c. Support a demand-driven approach to innovation and technology transfer. Assist in defining specific problems, needs and requirements and the identification of appropriate technology solutions to address these needs	x		x
d. Assist LDCs in technology scouting, identification and review of available technical information, and support in identifying patent owners and companies with commercially available technical solutions	x		
e. Establish linkages with national, regional and global IP organizations to enhance communication and provision of services to LDCs	x		
f. Serve as a conduit between R&D sources and local entrepreneurs to generate new inventions and new companies		x	x
g. Make use of existing partnering mechanisms, especially online portals that provide access to public private partnership resources	x		x
<b>5. IP Training and Technical Assistance</b>			
a. Provide training and technical advice on preparing and upgrading/drafting laws, strengthening human and institutional capacities and enhancing implementation	x		
b. Support modernization of IP administration in terms of digital search, examination, publication, and recording of ownership	x		
c. Enhance the institutional infrastructure to support the role of STI and IP as a tool for economic growth and sustainable development	x		x
<b>6. Supporting IP Rights Acquisition and Technology Transfer</b>			
a. Conduct education and training of government, business, university and other stakeholders on various forms of IP and fundamentals of technology transfer	x		x
b. Conduct training and capacity building to support LDC authors on when and how to file for a patent before publishing their research findings, as well as on technology transfer management	x		x
c. Develop a program for attorneys/experts to provide pro-bono or reduced-fee support for contract negotiation in order to obtain patents and negotiate licenses	x		x
d. Provide advice to both technology owner and LDCs to facilitate IPRs acquisition and technology transfer	x		x

## **Annex 2. Prioritized projects and activities for the initial 18 months**

### ***1. Technology Needs Assessment for Transformative Change***

- a. Conduct rapid assessments of STI policies (including by partnering with UNCTAD and UNESCO), innovation ecosystem and technology commercialization capacities of LDCs mainly focused on identifying technological needs and gaps and appropriate interventions.
- b. Identify the core area of focus for each LDC (such as public health, agriculture, industry, ESTs, sustainable energy, and information and communication technology) and prepare specific initiatives to maximize the impact of technology as an instrument to foster structural transformation, reduce poverty and promote sustainable development.
- c. Provide expertise to interface with donors, UN agencies and international organizations to articulate LDC priority needs, prepare proposals, and communicate with providers of IP-related support.
- d. Identify opportunities to strengthen R&D infrastructure, providing a platform to coordinate with existing capacity building programmes to improve access of LDCs.
- e. Promote collaboration at the regional level as well as among clusters of countries that share common characteristics, challenges and explore synergies and complementarities.
- f. Collaborate with relevant UN system entities and other international organizations to identify data gaps, and to foster statistical capacities needed for STI policy-making, taking into consideration the SDGs and IPoA objectives.
- g. Scale up STI reviews to cover all LDCs over time (STI review should facilitate the articulation of evidence-based implementation plans).

### ***2. Mapping of activities in support of LDCs in the area of STI***

- a. Carry out an analysis of existing STI initiatives, mechanisms and programmes specifically targeting LDCs within the UN system, relevant international and regional organizations as well as the private sector. Such activity could be carried out in cooperation with the recently established Technology Facilitation Mechanism (TFM). And other existing knowledge-sharing platforms.

### ***3. IP Training and Technical Assistance***

- a. Provide training and technical advice on preparing and upgrading existing laws and drafting new laws, strengthening human and institutional capacities and enhancing implementation and enforcement.
- b. Support modernization of IP administration in terms of digital search, examination, publication, and recording of ownership.
- c. Enhance the institutional infrastructure (involving government, university and industry) to support the role of STI and IP as a tool for economic growth.

#### ***4. Digital Research Access and Networking***

##### ***A. National and Regional Research and Educations Network Facilitation***

- a. Disseminate information to LDCs on Technology Bank activities and allow onward communication to connected institutions, campuses and scientists.
- b. Carry out gap analyses of existing infrastructure of national STI institutions, and support the NREN build-out through interaction and advocacy with national governments and regulators (preferably in collaboration with the World Bank, in such countries where the World Bank is already active or has plans).
- c. Support the roll out of Trust and Identity and Authentication Services in NRENs located in LDCs, to ensure that scientists will have easy access to Technology Bank activities and projects.
- d. Promote the development of regional solutions and explore synergies with existing RRENs.

##### ***B. Digital Access to Research***

- a. Build on existing initiatives, including the Research4Life public private partnership to enable, facilitate and increase online access to costly scientific journals, books, and databases at no direct charge.
- b. Put in place the necessary hard and soft infrastructure to create and/or scale up access to scientific and technical knowledge.
- c. Provide training for librarians, university teachers, graduate students, researchers, IT specialists and other relevant constituencies.

## Annex 3. Operational Principles

The projects and activities of the TB will be governed by the following guiding operational principles. Such principles may be further developed, as appropriate, in light of needs resulting from the operations of the Technology Bank.

1. Virtually all United Nations programs are subject to results-based management (RBM). RBM is a management strategy by which all actors, contributing directly or indirectly to achieving a set of results, ensure that their processes, products and services contribute to the achievement of desired results (outputs, outcomes and higher level goals or impact). The actors in turn use information and evidence on actual results to inform decision making on the design, resourcing and delivery of programmes and activities as well as for accountability and reporting. (United Nations Development Group, Results-Based Management Handbook, 2011, page 2). Inclusiveness is a fundamental principle of RBM, thus engaging all stakeholders, including through the establishment of a process to monitor and evaluate progress and use the information to improve performance. A RBM approach is designed to improve program and management effectiveness, efficiency and accountability, and focuses on measurable changes (results) to be achieved, as well as strategies and activities that will lead to these changes (results). It requires balancing realistic expected results with the resources available and reporting on the results achieved and their contribution to reaching organizational goals. The Technology Bank will take a RBM approach when planning, monitoring and evaluating its work. The Technology Bank will ensure that its reporting systems are aligned to RBM principles, with a view to continuous improvement of effectiveness and accountability and to ensure that programmes and activities are achieving intended results for the benefit of LDCs.

2. The activities and projects of the Technology Bank will be guided by the needs and priorities of its beneficiaries. All positive and negative results and impacts - direct or indirect, intended or unintended – resulting from the activities and projects of the Technology Bank will be assessed during the planning, execution and evaluation stages. This includes assessing the effectiveness of the Technology Bank in achieving its objectives and ensuring sustainability over time, as well as the efficiency of the Technology Bank in the use of available resources. To the fullest extent measureable, the economic, social and environmental impacts resulting from projects and activities of the Technology Bank in the beneficiary countries will be assessed, including such impacts on all actors involved in, or affected by, Technology Bank activities and projects.

3. All Technology Bank activities and projects are expected to support key national and regional stakeholders and promote their ownership and leadership, as well as to strengthen domestic institutional capacity and accountability. All Technology Bank activities and projects should be demand-driven and results-oriented, and should focus on the specific outcomes that beneficiary countries seek to achieve. Technology Bank projects and activities must align with

national development priorities and be consistent with national programming principles. Initiatives undertaken by the Technology Bank in partnerships with relevant UN Agencies, Funds and Programmes should be integrated with the respective United Nations Development Assistant Frameworks in each country, and be developed in consultation with the United Nations Country Team and other relevant stakeholders.

4. All Technology Bank activities and projects will be designed to complement, rather than compete with or duplicate activities and projects already undertaken by other UN agencies or donors. Synergies across existing initiatives and/or joint actions and approaches should be a guiding principle for planning. The Technology Bank should leverage the existing initiatives within the UN system at the regional and national level to implement its programme of work. The Technology Bank should also, in collaboration with UN system entities, LDC governments and their development partners and other relevant stakeholders, learn from successful experiences that can be replicated and/or adapted to a LDC context.

5. Technology Bank projects and activities will be developed over time as the institution gains experience and expertise through an initial set of initiatives. The start-up phase should facilitate the consolidation of the financial base of the Technology Bank and help in building partnerships with stakeholders in LDCs and other developing and developed countries, including from the private sector. The design of projects and activities of the Technology Bank should also incorporate financial sustainability considerations.

6. No activities and projects of the Technology Bank will contain features that can generate barriers or discrimination, including gender-based discrimination. Conversely the Technology Bank should recognize that the absence of any discrimination and gender equality help improve the scientific quality and societal relevance of the produced knowledge, technology and innovation. Technology Bank activities and projects should take into account women as well as men's needs and behaviors and promote equal opportunities and a balanced participation of women and men at all levels.

7. No activities and projects of the Technology Bank will lead to any infringement of existing intellectual property rights. Transfer of technology to LDCs should be promoted and facilitated on a voluntary basis with agreed terms and conditions.

8. Technology Bank activities and projects should aim to increase public engagement through the establishment of iterative and inclusive participatory multi-actor dialogues between researchers, policy makers, private sector entities, civil society organizations and citizens, with a view to fostering mutual understanding of STI outcomes and policy agendas.

9. In designing all Technology Bank activities and projects, consideration should be given as to whether a multi-country and/or regional approach may be preferable for achieving the desired results. The Technology Bank should leverage North-South, South-South and triangular cooperation arrangements in the design and delivery of its projects and activities.

10. A clear link and collaboration will be established between the Technology Bank and the recently launched Technology Facilitation Mechanism and its Interagency task Team on STI for SDGs, as well as with the Commission on Science and Technology for Development (CSTD) as appropriate.

11. As a complement to its operational activities in the LDCs, the Technology Bank should also serve as a knowledge hub connecting LDC's STI needs, available STI resources and key STI actors who can respond to these needs. As a hub it will be in position to facilitate LDC access to already existing information and projects and can foster joint initiatives and synergies with relevant institutions and organizations. The Technology Bank will establish specific objectives and challenges to be solved and call for proposals from UN agencies, other international organizations, NGOs and companies to attain them, prioritizing those promoting high quality solutions with more efficient and effective implementation strategies, as well as involving multi-agency and multi-stakeholder collaboration.

12. To achieve the Technology Bank objectives and improve its operations, an appropriate system for *monitoring and evaluation* will be put in place. The system will be comprehensive, transparent and evidence-based, providing a strong focus on the assessment of outputs and impacts. Key principles of the system will be as follows:

The comprehensive monitoring and evaluation strategy will ensure appropriate and systematic evaluation coverage of all Technology Bank activities and projects, and define a detailed timetable for specific evaluation work. The following elements are envisaged:

- A comprehensive internal review of the Technology Bank and its activities and projects will be carried after the first planning cycle as set out in this initial three-year strategic plan, and will take place no later than 3 years after the start of operations, with a specific focus on the implementation to date, the quality of the activities under way, progress towards the objectives set, and mid-course corrections needed. This internal review will inform subsequent planning.
- A full-scale, external evaluation will be commissioned after the second planning cycle of the Technology Bank, as it will be defined in its next strategic plan, and preferably no later than 6 years after the start of operations. This evaluation will analyze in depth the rationale for the effort, the results of its implementation to date and the impact of activities and projects. The findings of this evaluation will be taken into account in a

revised Technology Bank strategy, and will consider specific objectives, operational structure and planned activities and projects.

- Continuous monitoring and review of all Technology Bank activities and projects will provide managers and key stakeholders with regular feedback on the consistency of performance with set outputs and outcomes, as well as an indication of external and internal factors that may affect the delivery of projects and activities.

Both the internal review and full-scale externally commissioned evaluation will be carried out with the involvement of all relevant stakeholders and beneficiaries and the external evaluation will be carried out by independent external experts, using a broad evidence base. The findings of the external evaluation will be made publicly accessible, and will include a management response that specifies actions to be taken in light of the evaluation recommendations.

At the center of the Technology Bank monitoring and evaluation policy will be a focus on data gathering in order to provide a strong evidence-based assessment of the progress towards objectives, quality, output and impact of projects and activities, but in a manner that does not over-burden beneficiary countries and stakeholders. Evaluation activities will be supported by independent evaluation experts and involve users with a view to providing expert advice and strategic guidance on the further development of the Technology Bank.

In addition, the information gathered through monitoring and evaluation, for instance regarding publications and patenting by LDC researchers and access to newly available technology, should be validated and complemented by information on other forms of outputs and outcomes to capture the potential impact of the Technology Bank activities in a broader sense. In this regard cross-cutting studies could be conducted with a view to analyzing issues of transversal interest, such as the quality of research and innovation performance in LDCs, job creation, economic performance in relevant sectors and other impacts. Common templates, methodologies and indicators should be adopted, as far as possible, so as to promote comparability and coherence, and to facilitate an aggregated overview of impact of projects and activities across beneficiary countries.

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## END NOTE

\* The 2011 Istanbul Programme of Action called for the establishment of a technology bank and a science, technology and innovation supporting mechanism dedicated to least developed countries, a long-standing priority of the LDCs confirmed in the 2015 Addis Ababa Action Agenda and in Sustainable Development Goal 17. Preparatory work towards the Technology Bank culminated with the report of the feasibility study prepared by a High-Level Panel of Experts in 2015 (see at <http://unohrlls.org/technologybank/>). The Panel's recommendations highlighted that the Technology Bank, modelled on the United Nations University, has the potential to strengthen national capabilities and provide expertise to the world's least developed countries, ensuring that they are no longer left behind in achieving internationally agreed development goals. The panel underscored that the establishment of the Technology Bank is not only required but also feasible. It recommended that the Technology Bank supports a focused and sustained STI collaboration and capacity building in LDCs, helps promote technology transfer and diffusion and fosters coherence in global support and cooperation. On that basis the General Assembly requested the Secretary-General to take the steps necessary to launch and operationalize the Technology Bank by 2017. In this context the Secretary General appointed the members of the Governing Council of the Technology Bank in May 2016. In the period leading up to the formal establishment of the Technology Bank by the General Assembly the members of the Governing Council are to provide support to the Secretary General in undertaking the necessary steps towards the operationalization of the Technology Bank, including by preparing its Charter for consideration and adoption by the General Assembly.